**From:** William B. Karesh <karesh@ecohealthalliance.org>
**To:** Dominic Travis <datravis@umn.edu>
**CC:** Jonna Mazet <jkmazet@ucdavis.edu>;Tracey Goldstein <tgoldstein@ucdavis.edu>;Shaun Kennedy <skennedy@foodsystemsinstitute.com>;Amy Kircher <akircher@umn.edu>;Kristine Smith <ksmith@ecohealthalliance.org>
**Sent:** 7/20/2017 6:01:38 AM
**Subject:** Re: DHS proposal update: wildlife trade risk assessmet

Hi Dom,

I get the first one where UCD is going to take up the work we used to do with CDC funds, but I'm a little less clear on the other part. Let me discuss with Kris when I get back to NY and get more insight from her.

Also, did you discuss USDA's previous refusal to allow any testing for FAD's in our port sampling efforts? This might affect the project design for UCD.

BK

Sent from my iPhone

**William B. Karesh, D.V.M**
*Executive Vice President for Health and Policy*

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On Jul 19, 2017, at 7:01 AM, Dominic Travis <datravis@umn.edu> wrote:

All,

This email is to connect several conversations. You all know that UMN Food Protection and Defense Institute (Amy Kircher lead) is leading the submission of a proposal for the "DHS Center of Excellence -- Cross Border Threats and Supply Chain Defense" call. This will be a suite of 6 or so projects, each at ~200K/year for 2 years. Amy believes that we have the opportunity to build upon our domestic WL trade risk analysis platform previously funded through a similar mechanism and design phase II as a part of this grant, thus continuing toward a full import risk assessment model.

After several versions of how we may fit into the bigger plan, Amy asks that we develop two complementary proposals that fill the most important gaps in our previous assessment - diagnostic data collection and exposure assessment post port of entry. Tracey, Kristine and I met today to think about this and propose the following collaboration between UCD, EHA, FSI and UMN.

Project 1 - Tracey and UCD have offered to lead a focused pilot on diagnostic surveillance that builds upon the previous findings of Smith et al., and is informed by our recent work. We propose to focus on LIVE animals (followed by more fresh, drippy bushmeat) and screen for RNA viruses in ~ two ports TBD (as well as other details pending stakeholder feedback). Objective 1 would be a stakeholder engagement exercise to further define this scope more specifically. We believe this is different from (or builds upon) previous work for two reasons: first, the focus on LIVE animals and RNA viruses, and second, it would be guided by - and contribute to - the overall risk-based framework which we started a few years ago and so is a step in developing an overall import risk assessment model.

Project 2 - two ideas so far. 1) develop a tracking system for those sampled animals in project one and follow them longitudinally to better characterize exposure. 2) continue work on our previous projects to estimate exposure via other data sets and approaches (there are several ideas buried in this objective that will need to be fleshed out depending upon the pathway we choose - we did exotic ruminants, fish and camels). This would be kind of a direct (1) and indirect (2) approach to estimating exposure risk.

The thought is that the whole team would be named on both, but the first would basically be diagnostic cost focused to maximize the money available, including Tracey and technical staff. The rest of us would be no cost personnel but named on the proposal. The second would basically include the pathway analysis starting with the ports of interest, sample collection and following through exposure mapping. Again, all players would be included, but the people costs for the rest of us would be in this proposal.

Amy believes that this project has a good chance of being scaled up quickly by DHS if successful, so Im listing the full team below realizing that we will need to address budget and people realities in the beginning. First thoughts:

<u>UMN (aside from Kircher who is overall lead and involved in these projects)</u>
Travis - coordinator
Singer - lead, risk assessment modeling team
Tiffany Wolf - analyst
PD/VPH residents - worker bees

<u>UCD</u>
Goldstein - Lead - diagnostic grant
Lab personnel
Mazet advisory and modeling team

<u>EHA</u>
Kristine Smith - Lead port surveillance protocols
Allison White - LEMIS database manager for Entry assessment
Karesh - Advisory and EHA lead

<u>FSI</u>
Kennedy - lead, exposure pathway analysis

Basically, this is our previous team with added collaboration with UCD, which obviously makes us stronger in several ways. If we agree on the above concept, we have one week to get two concept notes to Amy so they can create the overall portfolio story at the Center with their team. We develop full proposals if/when asked to do so after first round review. Right now, Kristine, Tracey, Shaun and I are committed to developing draft concepts this week based upon above.

Tracey, Kristine and Amy, please correct any mis perceptions I have from today's discussions.

Please let us know any thoughts/reservations/reactions. Otherwise, we will move forward with this concept at the core.

Thanks
Dom

PS - One more thought. Many of us would like to push our aquatic pathway forward but that is unlikely to be a priority for this group. However, our aquatic lead, Alex Primus and I are meeting with USDA Thursday to discuss their interest in our Tilapia results from the previous work, so we could potentially build a parallel aquatics project with USDA money if we are lucky.

--
Dominic Travis DVM, MS
Associate Professor, College of Veterinary Medicine
University of Minnesota

Phone: 612 626 5911
Skype: dominic.travis
www.facebook.com/biodiversitydoctors.

**From:** Andrew Clements <aclements@usaid.gov>
**To:** Brian Bird <bhbird@ucdavis.edu>
**CC:** PREDICTMGT <predictmgt@usaid.gov>;PREDICT-outbreak <predict-outbreak@ucdavis.edu>;Terra Kelly <trkelly@ucdavis.edu>
**Sent:** 4/28/2018 7:08:28 AM
**Subject:** [predict] [predict-outbreak] Re: Ghana human Lassa fever case - apparent misdiagnosis

Thanks. Not great after Ghana also messed up the H9N2 HPAI diagnosis earlier this year.

At least the animal sampling teams got a live practice opportunity....

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

On Apr 28, 2018, at 3:33 AM, Brian Bird <bhbird@ucdavis.edu> wrote:

Hi everyone,

You may already have heard via your Ghana Mission contacts, but we received word from our team in Ghana this evening that the Lassa fever positive human case in Ghana reported previously was a false-positive test result.

Our global country lead was meeting with CDC and the Ghana Mission when it was reported by the Noguchi Memorial Institute for Medical Research that contamination with the positive control material was the likely culprit of the misdiagnosis. If true, this is unfortunate, but happens to the best of laboratories, and is the thing of laboratory lead's nightmares everywhere. Further testing in Ghana and at CDC-Atlanta will hopefully confirm or refute the initial Lassa result.

If I get more relevant details I'll forward them along.

I hope everyone has a good weekend,

-Brian

**From:** Brian Bird <bhbird@ucdavis.edu>
**Date:** Friday, March 23, 2018 at 3:18 PM
**To:** PREDICTMGT <predictmgt@usaid.gov>
**Cc:** PREDICT-outbreak <predict-outbreak@ucdavis.edu>, Terra Kelly <trkelly@ucdavis.edu>
**Subject:** Update Ghana Lassa fever field investigation 23March2018

Hi all,

The field team has completed their field investigation, and has submitted all specimens to the Noguchi laboratory for Lassa testing.

We will send out further updates as the situation warrants and as lab results come in and are released by the GoG.

Further details in report.

Have a great weekend!

-Brian

Brian H. Bird DVM, MSPH, PhD
Global Lead Sierra Leone and
Multi-Country Ebola operations
PREDICT-USAID

One Health Institute
1089 Veterinary Medicine Dr.
School of Veterinary Medicine
University of California, Davis
Email: bhbird@ucdavis.edu
Skype: brianhbird1
http://www.vetmed.ucdavis.edu/ohi/predict/index.cfm

--

You received this message because you are subscribed to the Google Groups "PREDICTMGT" group.
To unsubscribe from this group and stop receiving emails from it, send an email to predictmgt+unsubscribe@usaid.gov.
To post to this group, send email to predictmgt@usaid.gov.
To view this discussion on the web visit https://groups.google.com/a/usaid.gov/d/msgid/predictmgt/5FE2CCF9-B520-4AE8-9A2D-35E2E3137F19%40ucdavis.edu.

**From:** Jonna Mazet <jkmazet@ucdavis.edu>
**To:** Christine Kreuder Johnson <ckjohnson@ucdavis.edu>
**Sent:** 11/8/2018 5:59:19 PM
**Subject:** Fwd: WHO declines opportunity to do DRC Ebola serosurveys; PREDICT interested?

FYI -- here's his document and my response.
Not sure where it came from -- could have even been Andrew pitching to WHO.
We'll see how he responds.

I'll develop the message we discussed & send that to you with Tracey and Karen copied.
Thanks for the call,
J

Date: Thu, Nov 8, 2018 at 10:57 AM
Subject: Re: WHO declines opportunity to do DRC Ebola serosurveys; PREDICT interested?
To: AOTR/Grant Manager Andrew Clements <aclements@usaid.gov>

Got it & we will explore.
Some of the activities listed in this description may be achievable during the course of activities we already have planned. Others would be extra and may or may not be possible or appropriate to conduct, based on us not being WHO.
From where did the proposal originate? Is it a WHO plan or from somebody else who doesn't mind it being conducted by others. I just want to be careful that we're not viewed as swooping in to implement something that another group developed & pitched (IP concern).
I'll reply with our current plan in a separate email with more individuals copied.
Thanks for resending and rescuing from cyberpurgatory,
Jonna

---------- Forwarded message ---------
From: **Andrew Clements** <aclements@usaid.gov>
Date: Thu, Nov 8, 2018 at 9:10 AM
Subject: Fwd: WHO declines opportunity to do DRC Ebola serosurveys; PREDICT interested?
To: Jonna Mazet <jkmazet@ucdavis.edu>

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

Begin forwarded message:

**From:** Andrew Clements <aclements@usaid.gov>
**Date:** November 7, 2018 at 3:50:56 PM GMT+1
**To:** Jonna Mazet <jkmazet@ucdavis.edu>
**Subject: WHO declines opportunity to do DRC Ebola serosurveys; PREDICT interested?**

Hi Jonna,

WHO said it doesn't have the bandwidth at the moment to do the work proposed in the attachment.

If there is (a) additional core funding for PREDICT to do this work in year 5 (or the extension) and (b) it doesn't displace other important PREDICT activities in DRC during year 5, would you be interested? Not sure if the budget is realistic not. You would know better.

I am aware that putting money towards this reduces the remaining ceiling available for the extension period, but I think it deserves high priority. Without this information, I'm not sure how DRC will break out of the cycle of waiting for an outbreak and trying to respond. And in DRC, this might be the best thing we could hand over to the country if it allows them to target their early warning human surveillance and prepare HCWs for possible future cases.

Andrew

P.S. just left Jordan. The mission really likes the Predict activities there.

**Improving effectiveness of early-warning human surveillance for Ebola outbreaks in DR Congo**[1]

Problem: further shortening the time of initial detecting and reporting for Ebola outbreaks is limited by the lack of vigilance and understanding of spillover risk.

Proposed solution: improve effectiveness of early-warning human surveillance for Ebola outbreaks by focusing it on geographic areas and animal-human interfaces that have evidence of previous spillover of Ebola viruses to people.

Proposed work: (1) gather existing serosurvey data from human populations in DR Congo and (2) produce additional evidence on past and present exposure of people to Ebola viruses using existing samples.

Proposed activities:

1. *Consensus meeting*. Meet with in-country and international partners to brief them on the project and begin identifying previous serosurveys conducted and collections of human sera that could be tested for evidence of previous exposure to Ebola virus.
2. *Review and prioritize*. Conduct a desk review of all Ebola serosurveys conducted to date in DR Congo and compile a list of all banked samples (with metadata) from DR Congo that could be tested for presence of Ebola antibodies (separated by individual Ebola species). Prioritize existing serum samples (e.g. based on where there are gaps in data in terms of geography) for testing and make recommendations for where new samples should be collected to fill gaps in geographic locations and/or specific animal-human interfaces.
3. *Test*. Conduct additional serosurveys on prioritized banked samples.
4. *Report out*. Compile existing and new serosurvey results and conduct a final briefing for in-country and international partners on spillover risk at specific geographic locations and interfaces. Present recommendations for any adjustments to early-warning human surveillance for Ebola.

Estimated timeline: 18 months




Estimated cost:

| | |
|---|---|
| Consensus meeting: | $ 20,000 |
| Desk review/prioritization: | $ 20,000 |
| Testing: | $240,000 |
| Report out: | $ 20,000 |
| **Total** | **$300,000** |

[1] Study proposed for DR Congo since it has reported 10 Ebola outbreaks between 1976 and 2018. Gathering similar evidence from other countries such as Gabon (4 outbreaks), Republic of Congo (4 outbreaks), South Sudan (3 outbreaks), and Uganda (5 outbreaks) would provide these countries with information valuable for improving their early warning surveillance for Ebola outbreaks.

**From:** Jon Epstein <epstein@ecohealthalliance.org>
**To:** Jonna Mazet <jkmazet@ucdavis.edu>
**CC:** Peter Daszak <daszak@ecohealthalliance.org>;Brian Bird <bhbird@ucdavis.edu>;Tracey Goldstein <tgoldstein@ucdavis.edu>;Anthony, Simon J. <sja2127@cumc.columbia.edu>
**Sent:** 11/30/2018 11:21:08 PM
**Subject:** draft email for comment

Hi Jonna,
Here is a draft email to Tolbert. Please suggest edits and I'll send it to him, and copy Mosoka and Jim.

Dear Tolbert,
I hope you are well. I wanted to follow up from our meeting on October 24th where we discussed results from our bat samples. As a reminder, we have a confirmed finding of Ebola virus genetic material in an oral swab from a bat, but we were only able to sequence part of the genome and discussed that additional testing of a duplicate oral swab sample could allow us to try to obtain the complete genome of the virus so that we can accurately identify the strain. As per our conversation, we are preparing to do the additional testing of the bat sample at our PREDICT partner lab at Columbia University. Since the initial testing exhausted all of the sample material, the additional testing required shipment of the duplicate oral swab sample from that bat. We received an export permit from FDA and the samples were shipped to Columbia this week, due to arrive Saturday. What would you like us to do with the other remaining samples (e.g. blood) from this bat?

Would you like us to sign an MTA with FDA, to cover the transfer of the samples and their use? We will be happy to comply with whatever additional documentation you think is appropriate.

Cheers,

Jon Epstein

**Jonathan H. Epstein DVM, MPH, PhD**

*Vice President for Science and Outreach*

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**From:** Jonna Mazet <jkmazet@ucdavis.edu>
**To:** William B. Karesh <karesh@ecohealthalliance.org>
**CC:** David Wolking <djwolking@ucdavis.edu>
**Sent:** 1/30/2019 2:56:07 AM
**Subject:** Re: [predict] Re: Inviting P2 external advisory panel to upcoming consortium meetings

That's a great point -- Vancouver it is, but I think you can also offer that they could attend Bali if they desire to see the fruits (and hopefully make another rec to USAID for further programming).
See you soon,
Jonna

On Tue, Jan 29, 2019 at 12:15 PM William B. Karesh <karesh@ecohealthalliance.org> wrote:
Ron Waldman was just asking Peter about this yesterday.

Honestly, as advisors, it seems appropriate to have them at the Semi-annual for advice. For the final meeting in Bali, it seems more like a courtesy since at that point there is not much left to advise us on.

Want to check to get Jonna's opinion on both and then I can send them a save the date or dates as appropriate.

BK

**William B. Karesh, D.V.M**
*Executive Vice President for Health and Policy*

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On Jan 29, 2019, at 2:54 PM, David J Wolking <djwolking@ucdavis.edu> wrote:

Hey Billy,

Hope Paris and the OIE meeting was productive or at least fun. Just wanted to get on your radar save the dates for PREDICT's upcoming semi-annual consortium meeting in Vancouver, Canada (April 30 - May 1, 2019) and of course the final All-country meeting in Bali, Indonesia some time in late summer (actual dates still TBD). We would love to have the panel attend both but understand travel to the west coast might be

challenging in April if heading out again to the larger capstone meeting a few months later on.

If we can share save the dates with all panel members that would be great! Let me know if I can help in any way...

Best,

David

**From:** Ava Sullivan <sullivan@ecohealthalliance.org>
**Sent:** Tue, 3 Jan 2017 14:12:39 -0500
**Subject:** Re: John MacK. flight
**To:** Elizabeth Leasure <ealeasure@ucdavis.edu>
**Cc:** "William B. Karesh" <karesh@ecohealthalliance.org>, Jonna Mazet <jkmazet@ucdavis.edu>, Katherine Leasure <kaleasure@ucdavis.edu>

Hi Liz,
Thanks for thinking of options with us. Here is a section of the CFR I have been looking at regarding this inquiry.

2 CFR 200.474 - Travel costs.
(...)
(e) Commercial air travel.
(1) Airfare costs in excess of the basic least expensive unrestricted accommodations class offered by commercial airlines are unallowable except when such accommodations would:
(i) Require circuitous routing;
(ii) Require travel during unreasonable hours;
(iii) Excessively prolong travel;
(iv) Result in additional costs that would offset the transportation savings; or
(v) Offer accommodations not reasonably adequate for the traveler's medical needs. The non-Federal entity must justify and document these conditions on a case-by-case basis in order for the use of first-class or business-class airfare to be allowable in such cases.

Please let me know if this contributes to our ability to make accommodations for Mr. MacKenzie.
Thanks for your time on this!
Ava

On Tue, Jan 3, 2017 at 12:46 PM, Elizabeth Leasure <ealeasure@ucdavis.edu> wrote:

> Hi there. UCD policy requires a doctor's note, so we don't have flexibility there if we are paying for his travel costs through UCD. Can you or Ava point me to the USAID guideline regarding medical conditions? I'm not familiar with it and would need to look at it before I can say either way for #2. #3 is an option, though obviously not ideal.
>
> Elizabeth Leasure
>
> One Health Institute
>
> University of California, Davis
>
> 530-754-9034 (office)
>
> REDACTED cell)
>
> **From:** William B. Karesh [mailto:karesh@ecohealthalliance.org]
> **Sent:** Tuesday, January 03, 2017 9:25 AM
> **To:** Elizabeth Leasure
> **Cc:** Jonna Mazet; Katherine Leasure; Ava Sullivan
> **Subject:** Re: John MacK. flight
>
> Option 1) I'm checkin on Dr.'s note.

Option 2) the USAID guidelines says that we can decide if medical conditions warrant it and we can document it (rather than a doctor's note) and I have an email from John saying that because [redacted] which could serve as our documentation.

Option 3) we can charge coach to PREDICT and cover the extra from unrestricted funds from EHA.

Let me know what you think and I can get back to Dr. MacKenzie.

Thanks,

BK

**William B. Karesh, D.V.M**

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On Jan 3, 2017, at 12:06 PM, Elizabeth Leasure <eleasure@ucdavis.edu> wrote:

Hi Billy. UCD has pretty strict rules regarding business class fare, but we can do it if the person has a note from their doctor indicating business class fare is needed to accommodate a medical condition, or if they are required to travel overnight without the opportunity for normal rest before beginning work. Do either of these apply?

Thanks,

Liz

Elizabeth Leasure

One Health Institute

University of California, Davis

530-754-9034 (office)

REDACTED (cell)

**From:** William B. Karesh [mailto:karesh@ecohealthalliance.org]
**Sent:** Tuesday, January 03, 2017 7:56 AM
**To:** Elizabeth Leasure; Jonna Mazet
**Subject:** John MacK. flight

Any way that we can get John MacKenzie on a business class flight. REDACTED REDACTED

He wrote to say that if he has to fly coach class REDACTED

BK

**William B. Karesh, D.V.M**

*Executive Vice President for Health and Policy*

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--

**Ava Sullivan**
*Program Assistant*

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**Sent:** Tue, 10 Jan 2017 17:17:02 -0800
**Subject:** Fwd: Request for collaborative research proposal to PAK-US Science and Technology Program 2017
**From:** Jonna Mazet <jkmazet@ucdavis.edu>
**To:** Elizabeth S Chase <eschase@ucdavis.edu>

---------- Forwarded message ----------
From: **Saqib Muhammad** <REDACTED>
Date: Fri, Jan 6, 2017 at 12:16 PM
Subject: Request for collaborative research proposal to PAK-US Science and Technology Program 2017
To: "jkmazet@ucdavis.edu" <jkmazet@ucdavis.edu>

Dear Dr. Jonna Ann Mazet, I'm M. Saqib from University of Agriculture, Faisalabad, Pakistan, working as assistant in the Department of Clinical Medicine & Surgery and with a research focus on zoonotic and infectious disease of domestic and wild animals. Currently I have short term collaboration with Prof Zheng Li Shi, (Wuhan institute of virology, China) on Epidemiology and virus discovery in camel in Pakistan and with Dr. Christian Drostein (Institute of Virology, Bonn University, Germany) on MERS CoV sero-epidemiology in camels in Pakistan. I'm very much interested to work with you through PAK-US Science and Technol. Program on '**surveillance of emerging zoonotic viral pathogens in bats, livestock and arthropode vectors in Pakistan**. I'm looking forward to read from you.

Thank you very much

**Dr. M. Saqib**
*Asst. Prof.*
**Dept. Clinical Medicine Surgery**
**University of Agriculture,**
REDACTED

**From:** Jon Epstein <epstein@ecohealthalliance.org>
**Sent:** Thu, 19 Jan 2017 14:22:02 -0500
**Subject:** Re: My notes from the CDC trip
**To:** Brian Bird <bhbird@ucdavis.edu>
**Cc:** Tracey Goldstein <tgoldstein@ucdavis.edu>, Jonna Mazet <jkmazet@ucdavis.edu>, Christine Kreuder Johnson <ckjohnson@ucdavis.edu>

Looks OK to me, too. Thanks Brian.
-Jon

On Thu, Jan 19, 2017 at 2:08 PM, Brian Bird <bhbird@ucdavis.edu> wrote:

Great catch! Oops!

-b

**From:** [redacted] on behalf of Tracey Goldstein [redacted]
**Date:** Thursday, January 19, 2017 at 10:55 AM
**To:** Brian Bird <bhbird@ucdavis.edu>
**Cc:** Jonna Mazet <jkmazet@ucdavis.edu>, Christine Kreuder Johnson <ckjohnson@ucdavis.edu>, Jon Epstein <epstein@ecohealthalliance.org>
**Subject:** Re: My notes from the CDC trip

Looks good to me Brian. One minor correction - it is Tierra Evans not Terra Kelly.

T

On Tue, Jan 17, 2017 at 4:12 PM, Brian Bird <bhbird@ucdavis.edu> wrote:

Hey folks,

Here were the main points and action items I have from my notes from the trip to Atlanta. They aren't in any particular order except as how they appeared chronologically. Can you each take a bit of time and look through these and see if my memory of them fits with what you remember? Quite possible I missed some of the things or got the exact details wrong for what we discussed and offered to the folks there, so I want to have this vetted a bit between us before we share back with them. Then we can reconcile our collective memories of the visit and make more definite plans of action. Klena is doing the same process on their side as well.

-b

Notes from the CDC VSPB – UCDavis – EcoHealth Visit:

1. Bangladesh: Possible collaboration to further investigate IgM+ Nipah case specimens and those cross reactive for both hendra/nipah for virus isolation attempts at CDC?
2. Outbreak response general activities: Look into feasibility of utilizing PREDICT field teams for animal surveillance activities in interesting clusters of cases pop-up and warrant further investigation in areas where difficult for VSPB to work.
3. ASIA: Possible avenue for collaboration using Nepal-India-Bangladesh livestock transit corridor as a model of CCHFV translocation/surveillance?
4. CDC LAB: Sharing of pan-Rabies virus qRT-PCR assay (LRN assay? Mentioned by Dr. Damon) with PREDICT team.
5. Workforce Uganda: New UWA lab being built. UCD to share list of One-Health workforce students trained as lab/field staff to potentially work in the new lab.
6. Uganda: VSPB offered to run specimens from Tierra Kelley's study on their filovirus serology assays to help sort out the western-blot serology in that paper if it continues to have challenges in getting accepted. Will use bank of Tanzania human sera as a negative control panel (see #10 below).
7. Tanzania: VSPB offer to run human RVFV IgM and IgG serology from the R&B project and other VHFs on specimens from the VISHA project;
8. Tanzania: VSPB to share Sosuga reagents to test interesting possible paramyxovirus positive cases. VSPB interested in virus isolation from positive RVFV or other VHF specimens.
9. Tanzania: UCD to work out shipping needs/requirements from TZ.
10. Tanzania: UCD to provide these sera above as a bank of human sera (presumably filovirus negative) to serve as bank of "sticky" African sera as a reagent for further VHF diagnostics development.

11. PREDICT Ebola host project: VSPB offer to consider providing additional reagent (lysates) for serologic testing to support that activity (discussion led by Pierre).
12. PREDICT One-Health Lab: UCD to share Tracey and Simon's protocols and controls for the multi-family RT-cPCR assays, and their improved filovirus assay with VSPB diagnostics.
13. Sierra Leone: VSPB offer to share LN2 plant for cold-chain in support of ebola surveillance activities in-country. PREDICT to pay maintenance or service contract/operating expenses. Plan to keep plant at Njalla University under care of Dr. Lebby with PREDICT using multiple dewars to stockpile LN2 when/where needed.
14. Sierra Leone: UCD to share our financial management/tracking tools to see if those are helpful in managing CDC CoAg in Salone.
15. Generally, both sides open to investigating how UCD and VSPB can partner in future activities/grants/proposals and interesting ideas come about and are feasible.

-b


--
Tracey Goldstein, PhD
One Health Institute
School of Veterinary Medicine
University of California
Davis, CA 95616
Phone: (530) 752-0402
Fax: (530) 752-3318
E-mail: tgoldstein@ucdavis.edu

--

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web: ecohealthalliance.org

Twitter: @epidemjon



*EcoHealth Alliance leads cutting-edge research into the critical connections between human and wildlife health and delicate ecosystems. With this science we develop solutions that promote conservation and prevent pandemics.*

**From:** Andrew Clements <aclements@usaid.gov>
**Sent:** Wed, 25 Jan 2017 16:33:14 +0100
**Subject:** Fwd: AI outbreak in Bangladesh
**To:** Jonna Mazet <jkmazet@ucdavis.edu>
**Cc:** Alisa Pereira <apereira@usaid.gov>

FYI. Here's the whole chain including the recent response from Jon.

*Andrew P. Clements, Ph.D.*
*Senior Scientific Adviser*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

Begin forwarded message:

**From:** Jon Epstein <epstein@ecohealthalliance.org>
**Date:** January 25, 2017 at 3:32:58 PM GMT+1
**To:** Ricardo Echalar <rechalar@usaid.gov>
**Cc:** Abul Kalam <[redacted]>, Eric Brum <[redacted]>, Ariful Islam <arif@ecohealthalliance.org>, Angela Wang <awang@usaid.gov>, Andrew Clements <aclements@usaid.gov>, Alisa Pereira <apereira@usaid.gov>, Professor Nitish Debnath <[redacted]>, Sudarat Damrongwatanapokin <sdamrongwatanapokin@usaid.gov>, Charles Lerman <clerman@usaid.gov>, Lindsay Parish <lparish@usaid.gov>, Evelyn Luciano <luciano@ecohealthalliance.org>, Mindy Rostal <rostal@ecohealthalliance.org>, Emily Hagan <hagan@ecohealthalliance.org>, predict@ucdavis.edu
**Subject: Re: AI outbreak in Bangladesh**

Eric,
I agree that coordinated investigations would make sense.

Arif, could you comment on your perspective of the level of communication/coordination between IEDCR and DLS? From Kalam's email below, it sounds like DLS and IEDCR were at least aware of each other's field activities, even if not conducted jointly. My understanding is that the samples collected by PREDICT got screened for H5 at IEDCR which suggests that there was some coordination between the agencies, at least at the laboratory level.

I also agree that this type of engagement is certainly is a good opportunity for us (EPT partners) to facilitate cooperation between agencies both directly and via the OH secretariat.

Cheers,
Jon

On Wed, Jan 25, 2017 at 8:43 AM, Ricardo Echalar <rechalar@usaid.gov> wrote:

> Thank you for the information, Eric and Kalam.
> This was my assumption on the poultry farm-level outbreak given the endemic nature of the disease in Bangladesh. I am glad this was captured/reported by the surveillance system and we will be waiting on more information from the genetic analysis.

I agree regarding the need for better coordination. I thought that the One Health Secretariat would serve this purpose. Kalam, how can P&R support the OH Secretariat and OH actors to advocate for this coordination? It also sounds like the coordination can also be better between our EPT partners (it begins with us), eg. crow die-off investigation.

Please keep us informed of any additional developments.

Ricardo

--

Ricardo Echalar, MPH
Senior Public Health Advisor
Office of Infectious Diseases, Emerging Threats Division
Bureau for Global Health
U.S. Agency for International Development (USAID)
1300 Pennsylvania Ave, NW, 3.6-53, 3rd Floor, RRB
Washington, DC 20523
(W) +1.202.712.4800 | (M) REDACTED E-mail: rechalar@usaid.gov

On Wed, Jan 25, 2017 at 4:20 AM, Charles Lerman <clerman@usaid.gov> wrote:

> Thanks, Eric. You shared important information that I will of course keep under wraps. However, please be aware that there is high demand for accurate information and we therefore look forward to public release. Would you please send me daily updates? Knowing how busy you are, please keep them short -- bullets would be fine.

On Wed, Jan 25, 2017 at 2:11 PM, Eric Brum < REDACTED > wrote:

> Dear Chuck and Ricardo,

Please find attached the preliminary outbreak report we prepared while assisting DLS with their outbreak investigations. It is for internal use only and not for wider distribution. The publicly available info is that which is contained within the official reports to OIE. The DLS Epidemiology Unit along with an epidemiologist from our FAO investigated the crow die off in Rasjhahi, which is also due to H5N1 and an indicator of the higher viral loads we are know experiencing during peak flu season. This is unlikely to be due to an introduction of a new virus, but we won't be able to confirm that until we have completed genetic analysis of virus isolates from these outbreaks. DLS was not caught off-guard by these outbreaks as they were aware of the endemic situation and the continuing circulation of the virus detected via their LBM sink surveillance programme, but since farm-level outbreaks have not been reported for so long, the appearance to the general public is that this is a new outbreak or new introduction. We assisted DLS to develop a more effective long-term control strategy and they are now in the process of implementing it. The attention drawn to these outbreaks will hopefully further hasten them to implement their new strategy. Will provide more information as it becomes available.

Regarding coordination, we also understand that the PREDICT team investigated the same crow die-off separately as part of an IEDCR investigation, so perhaps the One Health Secretariat could look at how to get everyone working together to conduct joint investigations rather than the continuation of the practice of human health/IEDCR investigating separately from animal health/DLS.

Thanks and best regards,
Eric

Eric Brum, DVM, MSc (Vet. Epi & Public Health)
Country Team Leader
Emergency Centre for Transboundary Animal Diseases (ECTAD)
Food and Agriculture Organization of the United Nations (FAO), Bangladesh
E-mail: REDACTED

On Wed, Jan 25, 2017 at 10:15 AM, Charles Lerman <clerman@usaid.gov> wrote:
> Thanks, Kalam. This outbreak is generating a lot of interest in our Mission
> now. Please continue to share all relevant information with us -- and, Eric
> and Arif, I would appreciate the same from you.
>
> On Wed, Jan 25, 2017 at 9:44 AM, REDACTED wrote:
>>
>> Hi Ricardo,
>> The outbreak in the commercial poultry was detected by the passive
>> surveillance system of DLS ( farmers reporting ) and the crow deaths were
>> notified by Predict-2 to IEDCR and immediately informed by IEDCR to DLS.
>> Well, the secretariat is yet to be functional as the first staff of the
>> Secretariat is seconded very recently ( I informed you in a separate
>> message). However, EPT-2 partners ( FAO , Predict -2 and P&R ) are engaged
>> in the process. FAO is supporting DLS to conduct post outbreak surveillance
>> and Predict-2 is also actively involved. EPT-2 were invited in the National
>> Technical Committee Meeting except Predict-2. I requested DG livestock to
>> invite Predict-2 also.
>> DLS has convened another meeting with partners to deal with crow die ups
>> where Arif is also invited.
>> This clearly show the importance of a functional one health secretariat.
>> Warm regards,
>> Kalam
>>
>>
>>
>> From: Ricardo Echalar <rechalar@usaid.gov>
>> To: Abul Kalam REDACTED
>> Cc: Charles Lerman <clerman@usaid.gov>, "Sudarat Damrongwatanapokin
>> (sdamrongwatanapokin@usaid.gov)" <sdamrongwatanapokin@usaid.gov>, Eric Brum
>> REDACTED, Professor Nitish Debnath REDACTED
>> Date: 01/25/2017 04:40 AM
>> Subject: Re: AI outbreak in Bangladesh
>> ---
>>
>>
>>
>> Hi, Kalam,
>>
>> Thank you for this information. I saw the OIE reports yesterday. Could you
>> tell us how the One Health Secretariat has been engaged? Were these detected
>> as part of routine surveillance by DLS? I've copied Eric and Nitish as they
>> may have additional information.
>>
>> Ricardo
>>
>>
>> --

>>
>> Ricardo Echalar, MPH
>> Senior Public Health Advisor
>> Office of Infectious Diseases, Emerging Threats Division
>> Bureau for Global Health
>> U.S. Agency for International Development (USAID)
>> 1300 Pennsylvania Ave, NW, 3.6-53, 3rd Floor, RRB
>> Washington, DC 20523
>> (W) +1.202.712.4003 | (M) REDACTED E-mail: rechalar@usaid.gov
>>
>>
>>
>> On Tue, Jan 24, 2017 at 1:05 AM, REDACTED wrote:
>> Dear Chuck,
>> If not already informed , let me inform you that Bangladesh has reported
>> Avian Influenza outbreak ( both in commercial poultry farm and house crow)
>> to OIE. Though AI was reported in house crow in 2016, Bangladesh did not
>> declare any AI events in poultry since 2014. Links of OIE and media is
>> below:
>>
>> http://uk.reuters.com/article/uk-health-birdflu-bangladesh-idUKKBN1571QY?l=0
>>
>>
http://www.oie.int/wahis_2/public/wahid.php/Reviewreport/Review?page_refer=MapFullEventReport&reportid=22467
>>
>>
http://www.oie.int/wahis_2/public/wahid.php/Reviewreport/Review?page_refer=MapFullEventReport&reportid=22408
>> Warm regards,
>> Kalam
>>
>
>
>
> --
> Charles Lerman, Ph.D.
> Senior Infectious Diseases Advisor
> U.S. Agency for International Development - Dhaka, Bangladesh

REDACTED

--
Charles Lerman, Ph.D.
Senior Infectious Diseases Advisor
U.S. Agency for International Development - Dhaka, Bangladesh

REDACTED

--

**Jonathan H. Epstein DVM, MPH**

*Vice President for Science and Outreach*

EcoHealth Alliance
460 West 34th Street – 17th floor
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REDACTED mobile)

web: ecohealthalliance.org

Twitter: @epidemijon

*EcoHealth Alliance leads cutting-edge research into the critical connections between human and wildlife health and delicate ecosystems. With this science we develop solutions that promote conservation and prevent pandemics.*

**From:** Jon Epstein <epstein@ecohealthalliance.org>
**Sent:** Wed, 25 Jan 2017 13:39:04 -0500
**Subject:** Re: AI outbreak in Bangladesh
**To:** Jonna Mazet <jkmazet@ucdavis.edu>
**Cc:** "William B. Karesh, D.V.M" <karesh@ecohealthalliance.org>, Peter Daszak <daszak@ecohealthalliance.org>

I just meant in future, that he could inform the mission once we're approved by you.
-Jon

On Jan 25, 2017 1:29 PM, "Jonna Mazet" <jkmazet@ucdavis.edu> wrote:

> Thanks for that on communication, Jon.
> Sorry, but I don't understand your mention of waiting for approval to start, as I green-lighted that to you on Jan 17:
>
> Date: Tue, Jan 17, 2017 at 6:43 PM
> Subject: Re: Urgent:Govt. of Bangladesh request for PREDICT to investigate unusual crow die-off in Rajshahi,Northwestern Bangladesh
> To: Jon Epstein <epstein@ecohealthalliance.org>
> Cc: "predict-outbreak@ucdavis.edu" <predict-outbreak@ucdavis.edu>, Megan M Doyle <mmdoyle@ucdavis.edu>, David John Wolking <djwolking@ucdavis.edu>, Ariful Islam <arif@ecohealthalliance.org>, Mindy Rostal <rostal@ecohealthalliance.org>, Emily Hagan <hagan@ecohealthalliance.org>, Christine Kreuder Johnson <ckjohnson@ucdavis.edu>
>
> Hi Jon,
> If the team's work on this investigation can be accomplished and is consistent with your current work plan and budget, please proceed. The assistance requested is consistent with our outbreak response guidelines. If budget needs will exceed what you already have allocated for Bangladesh, please advise.
> Thanks,
> Jonna
>
> On Wed, Jan 25, 2017 at 10:02 AM, Jon Epstein <epstein@ecohealthalliance.org> wrote:
>
> > Thanks Jonna.
> > I just sent Arif an email suggesting he communicate to the mission directly as soon as he's approved by us to start outbreak investigation, and to update them regularly during it. I also reminded him about copying you/PREDICT senior management on mission communications 9I copied you in my reply to his update as well). As soon as I get his outbreak response form I'll send that along.
> >
> > Cheers,
> > Jon
> >
> > On Wed, Jan 25, 2017 at 12:49 PM, Jonna Mazet <jkmazet@ucdavis.edu> wrote:
> >
> > > Just received from Andrew & Alisa on my end.
> > > Good update from Arif.
> > > Again, these would be the exact kind of updates that we and DC would appreciate receiving in real-time (the Jan 17 & 18 ones especially). Of course the Mission would like to hear from Arif directly, too, but if he is busy in response mode, we can all help with that by forwarding his messages/updates to you. Please remind Arif to copy either predict@ucdavis.edu
> > > or predict-outbreak@ucdavis.edu on outbreak, Mission, and partner communications, so that we can help forward information, especially if you are traveling or in the field, etc.
> > > Take care,
> > > Jonna
> > >
> > > ---------- Forwarded message ----------

From: **Andrew Clements** <aclements@usaid.gov>
Date: Wed, Jan 25, 2017 at 8:15 AM
Subject: Fwd: AI outbreak in Bangladesh
To: Joana Mazet <jkmazet@ucdavis.edu>
Cc: Alisa Pereira <apereira@usaid.gov>

More....

*Andrew P. Clements, Ph.D.*
*Senior Scientific Adviser*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

Begin forwarded message:

**From:** Ariful Islam <arif@ecohealthalliance.org>
**Date:** January 25, 2017 at 5:05:07 PM GMT+1
**To:** Ricardo Echalar <rechalar@usaid.gov>
**Cc:** Abul Kalam <REDACTED>, Eric Brum <REDACTED>, Angela Wang <awang@usaid.gov>, Andrew Clements <aclements@usaid.gov>, Alisa Pereira <apereira@usaid.gov>, Jon Epstein <epstein@ecohealthalliance.org>, Professor Nitish Debnath <REDACTED>, Sudarat Damrongwatanapokin <sdamrongwatanapokin@usaid.gov>, Charles Lerman <clerman@usaid.gov>, Lindsay Parish <lparish@usaid.gov>
**Subject: Re: AI outbreak in Bangladesh**

Dear Richardo and chuck:
Thanks for your email. I would like to give you update information regarding crow-die off investigation in Rajshahi and Dhaka city.

PREDICT team formally invited by the IEDCR, One Health secretariat to participate in an investigation of a crow die-off in Rajshahi on 12th January. As a part of the immediate response, Prof. Flora made One Health team ( comprising veterinarians, Physician, Anthropologist and wildlife) and send the team on the same day by signing the official order. The official letter was sent to the respective departments .

PREDICT is conducting crow die-off investigation in both Rajshahi and Dhaka city. The collected samples were tested both in BLRI and icddr,b lab. Initial result immediately shared with GOB (DLS, IEDCR and forest depart) through IEDCR on 16th January that the crows were positive for influenza A/H5.

After getting the lab result, Prof. Flora organized an immediate meeting with GOB partners16th January at 10.00 AM to discuss the events of unusual crow death at multiple sites Rajshahi city and the next steps for prevention and control of crow mortality and to reduce the probable public health threats through One Health approach. DLS, Forest department, and Health department participated and meeting minutes were shared with Director general (DG) of 03 departments. I think, it is the example of One health exercise among GOB partners.

on18th January, DLS called national Technical Committee meeting and relevant experts and partners participated including IEDCR and EPT-2 partners. on 25th january, DLS again called high-level meeting to discuss current outbreak influenza status in which all relevent GOB and development partners were present (DLS, Forest department, Directorate of Health services ,IEDCR, FAO, City corporation, P&R and PREDICT, Field officers from outbreak site). I think, these activites are real examples of One health story.

I think, we have regular communication and coordination with EPT-partners (FAO, P&R, PREDICT).

I'll share update status of crow die-off investigation in Rajshahi and Dhaka city in next email.

with best regards,

Arif

On Wed, Jan 25, 2017 at 7:43 PM, Ricardo Echalar <rechalar@usaid.gov> wrote:

> Thank you for the information, Eric and Kalam.
> This was my assumption on the poultry farm-level outbreak given the endemic nature of the disease in Bangladesh. I am glad this was captured/reported by the surveillance system and we will be waiting on more information from the genetic analysis.

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Please keep us informed of any additional developments.

Ricardo

--

Ricardo Echalar, MPH
Senior Public Health Advisor
Office of Infectious Diseases, Emerging Threats Division
Bureau for Global Health
U.S. Agency for International Development (USAID)
1300 Pennsylvania Ave, NW, 3.6-53, 3rd Floor, RRB
Washington, DC 20523
(W) +1.202.712.4902 | (M) REDACTED E-mail: rechalar@usaid.gov

On Wed, Jan 25, 2017 at 4:20 AM, Charles Lerman <clerman@usaid.gov> wrote:

> Thanks, Eric. You shared important information that I will of course keep under wraps. However, please be aware that there is high demand for accurate information and we therefore look forward to public release. Would you please send me daily updates? Knowing how busy you are, please keep them short -- bullets would be fine.

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Thanks and best regards,
Eric

Eric Brum, DVM, MSc (Vet. Epi & Public Health)
Country Team Leader
Emergency Centre for Transboundary Animal Diseases (ECTAD)
Food and Agriculture Organization of the United Nations (FAO), Bangladesh
E-mail: REDACTED

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>> From: Ricardo Echalar <rechalar@usaid.gov>

>> To: Abul Kalam <REDACTED>
>> Cc: Charles Lerman <clerman@usaid.gov>, "Sudarat Damrongwatanapokin
>> (sdamrongwatanapokin@usaid.gov)" <sdamrongwatanapokin@usaid.gov>, Eric Brum
>> <REDACTED>, Professor Nitish Debnath <REDACTED>
>> Date: 01/25/2017 04:40 AM
>> Subject: Re: AI outbreak in Bangladesh
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>> Ricardo
>>
>>
>> ---
>>
>> Ricardo Echalar, MPH
>> Senior Public Health Advisor
>> Office of Infectious Diseases, Emerging Threats Division
>> Bureau for Global Health
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>> below:
>>
>> http://uk.reuters.com/article/uk-health-birdflu-bangladesh-idUKKBN1571QY?il=0
>>
>>
>> http://www.oie.int/wahis_2/public/wahid.php/Reviewreport/Review?page_refer=MapFullEventReport&reportid=22467
>>
>>
>> http://www.oie.int/wahis_2/public/wahid.php/Reviewreport/Review?page_refer=MapFullEventReport&reportid=22498
>> Warm regards,
>> Kalam
>>
>>
>>
>>

> --
> Charles Lerman, Ph.D.
> Senior Infectious Diseases Advisor
> U.S. Agency for International Development - Dhaka, Bangladesh

REDACTED

--
Charles Lerman, Ph.D.
Senior Infectious Diseases Advisor
U.S. Agency for International Development - Dhaka, Bangladesh

REDACTED

--

**Jonathan H. Epstein DVM, MPH**

*Vice President for Science and Outreach*

EcoHealth Alliance
460 West 34th Street – 17th floor
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1 212 380 4467 (direct)
REDACTED mobile)

web: ecohealthalliance.org

Twitter: @epidemjon

*EcoHealth Alliance leads cutting-edge research into the critical connections between human and wildlife health and delicate ecosystems. With this science we develop solutions that promote conservation and prevent pandemics.*

**From:** Kirsten Gilardi <kvgilardi@ucdavis.edu>
**To:** William B. Karesh <Karesh@ecohealthalliance.org>
**CC:** Jonna Mazet <jkmazet@ucdavis.edu>;Alisa Pereira <apereira@usaid.gov>;PREDICTMGT <predictmgt@usaid.gov>;Elizabeth Leasure <ealeasure@ucdavis.edu>;predict-outbreak@ucdavis.edu <predict-outbreak@ucdavis.edu>
**Sent:** 1/26/2017 3:01:05 AM
**Subject:** Re: [predict-outbreak] Wrapping up Rwanda outbreak assistance

Billy, you're very right about the government's desire to be absolutely sure before announcing. There's some resentment among members of the National One Health Platform that the MoH announced the outbreak initially, without involving the MoA. I'm still not clear on who was calling it H5N1 early on, but of course that definitely got gov't coordination and public outreach/information management off on the wrong foot in-country, and had repercussions for the region, for sure.

Of course, they are holding off on releasing their response plan until they know what they are dealing with…

-Kirsten

On Jan 26, 2017, at 12:33 AM, William B. Karesh <Karesh@ecohealthalliance.org> wrote:

No official reports to OIE or FAO systems yet. They will end up being the 3rd country in Africa to report h5n8 so in all fariness, I'm sure everyone there wants to be really sure and inform the right people before releasing officially.

BK

**William B. Karesh, D.V.M**
*Executive Vice President for Health and Policy*

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+1.212.380.4465 (fax)
www.ecohealthalliance.org

President, OIE Working Group on Wildlife

Co-chair, IUCN Species Survival Commission - Wildlife Health Specialist Group

EPT Partners Liaison, USAID Emerging Pandemic Threats - PREDICT-2 Program

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On Jan 25, 2017, at 5:24 PM, Jonna Mazet <jkmazet@ucdavis.edu> wrote:

Kirsten says not on the ground in Uganda, but we have heard it from other (unconfirmed) sources. Our team was told that they would receive the official subtyping today, but nothing by their bedtime.
Probably worth noting that the problem and/or another disease event may have been going on for some time, possibly complicating the diagnosis. We will continue to gather information and be ready to provide assistance if requested.
J

On Wed, Jan 25, 2017 at 1:59 PM, Alisa Pereira <apereira@usaid.gov> wrote:
Today in the mtg I heard someone in the audience say the Uganda samples were h5n8. Do we have confirmation on that finding?

Thanks

Sent from my iPhone

On Jan 25, 2017, at 4:58 PM, Jonna Mazet <jkmazet@ucdavis.edu> wrote:

Please find the attached the report of the rapid assistance provided in Rwanda in response to the government request for assistance in potential avian influenza response.
Have a nice day.
Jonna

predictmgt+unsubscribe@usaid.gov
predictmgt@usaid.gov
https://groups.google.com/a/usaid.gov/d/msgid/predictmgt/CAO5tDrFBB4-_wNfMnYbXjz@7KAuFgDG9b0B3Ho85WqLdvTPdA%40mail.gmail.com

**From:** Jonna Mazet <jkmazet@ucdavis.edu>
**To:** Jon Epstein <epstein@ecohealthalliance.org>
**CC:** Peter Daszak <daszak@ecohealthalliance.org>;William B. Karesh, D.V.M <karesh@ecohealthalliance.org>
**Sent:** 1/29/2017 1:29:29 AM
**Subject:** Re: Outbreak forms being updated

Sounds like an excellent plan,
J

On Sat, Jan 28, 2017 at 5:59 PM, Jon Epstein <epstein@ecohealthalliance.org> wrote:
Jonna,
A quick note: Arif is working with his team now to update the outbreak report forms so that they're current through today (there are 2 reports, 1 for Dhaka, 1 for Rajshahi ). I've asked that I receive the updated versions in an hour. I'll then review and send them to you.

I've also advised Arif, as per Ricardo's last email, not to send an update to the mission.

Cheers,
Jon

**From:** William B. Karesh <karesh@ecohealthalliance.org>
**To:** Alisa Pereira <apereira@usaid.gov>
**CC:** Amanda Fuchs <fuchs@ecohealthalliance.org>;aclements@usaid.gov" <aclements@usaid.gov>;predict@ucdavis.edu <predict@ucdavis.edu>
**Sent:** 2/3/2017 8:33:10 PM
**Subject:** [predict] Re: Semi-Annual Meeting and Data Sharing Meeting

Yes, thinking first two days P-2 staff, day 3 with USAID and Advisors, day 4&5 data meeting with FAO and P&R, USAID.

Sent from my iPhone

**William B. Karesh, D.V.M**
*Executive Vice President for Health and Policy*

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EPT Liaison - USAID Emerging Pandemic Threats - PREDICT 2 program

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On Feb 3, 2017, at 4:08 PM, Alisa Pereira <apereira@usaid.gov> wrote:

Are you guys thinking of having part of the mtg without usaid as discussed on the last mgt call? If so, NY is probably a better choice.

I would also vote for Ny bc it takes us away from the office where we can totally focus and not get drawn into day to day business.

Andrew, thoughts?

Sent from my iPhone

On Feb 3, 2017, at 3:59 PM, Amanda Fuchs <fuchs@ecohealthalliance.org> wrote:

I apologize for the multiple emails but wanted to add, we are thinking the meeting would be in New York City but could be in Washington, DC if preferred.

Best,

**Amanda Fuchs, LMSW**

*Administrative Assistant to the Executive Vice President for Health &Policy*

EcoHealth Alliance
460 West 34th Street – 17th floor
New York, NY 10001

1.212.380.4470 (direct)
1.212.380.4465 (fax)
www.ecohealthalliance.org

*Communications Coordinator, Future Earth oneHEALTH Project*

***EcoHealth Alliance leads cutting-edge research into the critical connections between human and wildlife health and delicate ecosystems. With this science we develop solutions that promote conservation and prevent pandemics.***

On Fri, Feb 3, 2017 at 3:54 PM, Amanda Fuchs <fuchs@ecohealthalliance.org> wrote:
Good afternoon,

Billy and I spoke about scheduling the next Semi-Annual meeting as well as Data Sharing meeting for the last week in August or beginning of September. We are proposing to have both meetings over the course of one week. Please advise if there are preferred dates. Thank you and hope you have a great weekend!

Best,

**Amanda Fuchs, LMSW**

*Administrative Assistant to the Executive Vice President for Health &Policy*

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*Communications Coordinator, Future Earth oneHEALTH Project*

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**From:** Elizabeth Leasure <eaonce@ucdavis.edu>
**To:** Christine Kreuder Johnson <ckjohnson@UCDAVIS.EDU>, Megan M Doyle <mmdoyle@UCDAVIS.EDU>, David John Wolking <djwolking@UCDAVIS.EDU>, "Jonna Mazet" <jkmazet@UCDAVIS.EDU>
**Subject:** RE: P2 activities
**Sent:** Sat, 4 Mar 2017 00:16:00 +0000
Copy of PREDICTactivities tracker March 3 2017_el.xlsx

Hi there. All of my additions (Ghana and Metabiota only) are in red text, but I wasn't quite sure how to add the information below from EHA for China (so I'll leave that to you ☺).

1) Yunnan Institute of Endemic Diseases Control and Prevention, PREDICT Human behavior risks surveillance partner, Dr. Yunzhi Zhang
2) Key Laboratory of Pathogenic Microbiology and Immunology, Institute of Microbiology, Chinese Academy of Sciences, PREDICT laboratory partner, Dr. Fu Gao

Elizabeth Leasure
One Health Institute
University of California, Davis
530-754-9034 (office)
REDACTED (cell)

---

**From:** Christine Kreuder Johnson
**Sent:** Friday, March 03, 2017 3:36 PM
**To:** Megan M Doyle; David John Wolking; Jonna Mazet; Elizabeth Leasure
**Subject:** P2 activities

Hi all –
Tracker looking good to me. Only # of outbreaks is pending - I think we should just delete that for now (until we get this sorted in EIDITH (or we could just add in data from the M&E)
Does anyone want to take a look to make sure our terminology isn't too confusing?
Liz, Thanks in advance for any updates you have.
Megan and I are doing one more doublecheck.
/ckj

PRODUCED IN NATIVE FORMAT

**From:** Peter Daszak <daszak@ecohealthalliance.org>
**To:** Jonna Mazet <jkmazet@ucdavis.edu>;Leilani Francisco <francisco@ecohealthalliance.org>
**CC:** predict@ucdavis.edu <pred-ct@ucdavis.edu>;'William B. Karesh' <karesh@ecohealthalliance.org>;Christine Kreuder Johnson <ckjohnson@ucdavis.edu>
**Sent:** 3/28/2017 5:37:29 PM
**Subject:** RE: [predict] Re: PREDICT-2 behavioral risk surveillance meeting in DC

Agree – this sounds positive and I'm looking forward to going to them with a more solid plan for the work.

BTW – Leilani will be coming to the country-by-country review meeting at UCD, and is setting up alternate month, alternate coast meetings with CKJ.

Cheers,

Peter

**Peter Daszak**
*President*

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**From:** jonna.mazet@gmail.com [mailto:jonna.mazet@gmail.com] **On Behalf Of** Jonna Mazet
**Sent:** Tuesday, March 28, 2017 10:18 AM
**To:** Leilani Francisco; Peter Daszak
**Cc:** predict@ucdavis.edu; William B. Karesh; Christine Kreuder Johnson
**Subject:** Re: [predict] Re: PREDICT-2 behavioral risk surveillance meeting in DC

Sorry for the inconvenience of rescheduling, but this does signal that they are expecting a substantive work plan discussion at the first meeting.
So, well in advance of mid-May, I need a solid behavior scope and work plan outlining specific activities in each of the countries where work will be conducted over the rest of this year and next. It will be subject to collaborative negotiations with USAID and will likely have to be based on funding levels available for countries. We will see more about that next week.
Leilani, please work with Chris on where we have the viral, interface, and site data to best justify selections for work, as well as with Billy on where behavior change policy might be most needed and useful. Sierra Leone will be key.
Thanks to all for the quick and good work on the PowerPoint.
Jonna

On Tue, Mar 28, 2017 at 7:08 AM, Jonna Mazet <jkmazet@ucdavis.edu> wrote:
Sounds good. Leilani will be in touch to get a new date set.
Hopefully all will be sorted by then.
Have a nice day.

Jonna

On Tue, Mar 28, 2017 at 6:19 AM, Shana Gillette <sgillette@usaid.gov> wrote:
Hi Jonna,

I spoke with Alisa and we think it will be a better use of everyone's time for us to wait until we can have a substantive discussion. Let's plan to reschedule for mid-May for the behavioral overview.

Best Regards,
Shana

On Mon, Mar 27, 2017 at 6:54 PM, Jonna Mazet <jkmazet@ucdavis.edu> wrote:
Dear Predict Management Team,
I understand that you are meeting with Leilani and Peter on Wednesday. Of course, we want very much to keep the behavioral scope moving and on great footing.
Unfortunately, as some of you know, we just today received from Amalhin the decoder that has alerted us to some major project planning disconnects. These may or may not have major project implications going forward, depending on the flexibility for making adjustments that you have on your end. Therefore, I can only support a meet-and-greet for Leilani and you all this week, not a substantive discussion of the plan moving forward.
If you all would prefer to hold on this first meeting for a time when you can discuss things with more certainty and forward motion, we understand. If you'd like to have the meeting and get to know each other despite the landscape, that's still good with me.
Please just let us all know,
Jonna

On Wed, Mar 22, 2017 at 5:51 AM, Shana Gillette <sgillette@usaid.gov> wrote:
ok, great, see you then.
Best,
Shana

On Tue, Mar 21, 2017 at 5:48 PM, Leilani Francisco <francisco@ecohealthalliance.org> wrote:
Many thanks Shana.
Wednesday the 29th from 11 to 12:30 works well for both me and Peter.
Looking forward to meeting with you then,
Leilani

**From:** Shana Gillette [mailto:sgillette@usaid.gov]
**Sent:** Tuesday, March 21, 2017 3:44 PM
**To:** Leilani Francisco <francisco@ecohealthalliance.org>
**Cc:** Alisa Pereira <apereira@usaid.gov>; Jonna Mazet <jkmazet@ucdavis.edu>; Peter Daszak <daszak@ecohealthalliance.org>; Christine Kreuder Johnson <ckjohnson@ucdavis.edu>
**Subject:** Re: PREDICT-2 behavioral risk surveillance meeting in DC

Dear Leilani,

I have been looking at dates when Dennis and Alisa will be available. Next week, Dennis and Alisa will be available between 9 and 12:30am on Tuesday and Wednesday next week. Would either day work for you? If not, I can look at the following week.

Best,
Shana

On Fri, Mar 17, 2017 at 2:31 PM, Leilani Francisco <francisco@ecohealthalliance.org> wrote:

Dear Shana and Alisa,

Hope this finds you well. I am pleased to report that I had very intensive and productive meetings with our UC Davis and Metabiota partners in California this week and I'm excited about the way forward. I'm looking forward to meeting with you in DC and wanted to get in touch about possible meeting dates. Please let me know what works well on your end and we can go from there.

Best regards,
Leilani

--
**Leilani Francisco, PhD, MA, PMP**
*Senior Scientist | PREDICT-2 Senior Behavioral Risk Coordinator*

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--
Shana Gillette, PhD
Senior Risk Mitigation Adviser
Emerging Threats Division
Office of Infectious Disease
Bureau for Global Health
U.S. Agency for International Development (USAID)
Office Phone: 202-712-1456
Work Mobile: 571-243-3424
Email: sgillette@usaid.gov

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Email: sgillette@usaid.gov

UCDJSR0002209

**Sent:** Tue, 28 Mar 2017 14:17:09 -0700
**Subject:** Re: [predict] Re: PREDICT-2 behavioral risk surveillance meeting in DC
**From:** Jonna Mazet <jkmazet@ucdavis.edu>
**To:** Peter Daszak <daszak@ecohealthalliance.org>
**Cc:** Leilani Francisco <francisco@ecohealthalliance.org>, "predict@ucdavis.edu" <predict@ucdavis.edu>, "William B. Karesh" <karesh@ecohealthalliance.org>, Christine Kreuder Johnson <ckjohnson@ucdavis.edu>

Great!

On Tue, Mar 28, 2017 at 10:37 AM, Peter Daszak <daszak@ecohealthalliance.org> wrote:

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BTW – Leilani will be coming to the country-by-country review meeting at UCD, and is setting up alternate month, alternate coast meetings with CKJ.

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Peter

**Peter Daszak**

*President*

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**From:** REDACTED [mailto: REDACTED **On Behalf Of** Jonna Mazet
**Sent:** Tuesday, March 28, 2017 10:18 AM
**To:** Leilani Francisco; Peter Daszak
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> Best regards,
>
> Leilani
>
> --
>
> **Leilani Francisco, PhD, MA, PMP**
> *Senior Scientist | PREDICT-2 Senior Behavioral Risk Coordinator*
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--

Shana Gillette, PhD

Senior Risk Mitigation Adviser

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Shana Gillette, PhD

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Email: sgillette@usaid.gov

**Sent:** Thu, 30 Mar 2017 10:06:59 -0700
**Subject:** Re: 3/30 GVP Call Agenda + Action Items
**From:** Jonna Mazet <jkmazet@ucdavis.edu>
**To:** Cara Chrisman <cchrisman@usaid.gov>
**Cc:** Peter Daszak <daszak@ecohealthalliance.org>, Nathan Wolfe <nwolfe@metabiota.com>, Eddy Rubin <erubin@metabiota.com>, Dennis Carroll <dcarroll@usaid.gov>, Brooke Watson <watson@ecohealthalliance.org>, Elizabeth S Chase <eschase@ucdavis.edu>

Eddy's order with updated/more slides to consider for discussion now,
Jonna

CUGH GVP Session.pptx

On Wed, Mar 29, 2017 at 1:10 PM, Cara Chrisman <cchrisman@usaid.gov> wrote:

> Hi All,
> Looking forward to our call tomorrow at the regularly scheduled time (Eddy will not be joining). Please find the agenda below, as well as our list of action items and some supplemental information.
>
> Best,
> Cara
>
> 3/30 Agenda
>
> - Establishing a not-for-profit
> - Costa Rica (see below)
> - CUGH
> - Wellcome Trust f/u (Eddy & Peter)
> - Paper Status
> - PMAC
> - Tokyo & JICA
> - AOB
>
> 3/23 Actions
>
> - Dennis - Set up f/u meeting with Chris Elisa (DC in March)
> - Dennis – Keep Larry in the loop as we move forward and run the "ask" by him when completed
> - Nathan – Update post-call with Richard Wilcox
> - Eddy/Nathan – Follow up regarding Verily and decide about inclusion as a partner on the website
> - Eddy – align with Peter and reach out to Sir Michael Stratton about GVP (in progress)
> - Cara – Start list of who to target (including WT) in May with refined "ask"
> - Cara – Connect Katherine L with ELSI group
> - Peter – align with Eddy and reach out to Brian Grenfell about GVP
> - Peter – Resubmit updated GVP paper
> - Peter – Look into cost for FoMI's to host a 2d GVP mtg with report
>
> Remaining 3/9 & 3/2 Actions
>
> - Peter/Brooke - Work with rest of EHA team to set up a post-May 1st webinar on modelling and possibly other S&T topics (in progress)
> - Peter - Send modeling timeline to core group
> - Dennis - Reach out to Richard Hatchett (CEPI)
> - All - Identify other key individuals to engage with the core group (Keiji, Steve, Kathleen, etc.) on particular topics
>
> Costa Rica - Email Exchange (in chronological order)
>
> Dear Dennis, Cara, Pedro and Dan,
> I am sending all four of you this message to make an electronic introduction in order to get the ball rolling regarding the involvement of Costa Rica in the Global Virome Project, a very interesting and ambitious project to identify viruses of high potential for zoonosis.
> Dennis and Cara, please meet Dr. Pedro Leon (President of the Costa Rican National Academy of Sciences) and Dr. Dan Janzen (Conservation Biology Professor at UPenn who has been instrumental in managing and growing the Area de Conservation Guanacaste (ACG) in Costa Rica).
> Pedro and Dan, please meet Dr. Dennis Carroll (Director of Pandemic Influenza and other Emerging Threats Unit at USAID) and Dr. Cara Chrisman (Senior Infectious Diseases Technical Advisor at USAID). Today we met with Dennis and Cara to discuss the current state of the Global Virome Project and Costa Rica's positive attributes to play a role in this project, including the very active species "barcoding" that is going on in at the ACG).

I hope you interact directly with each other. We are here to help in any way we can. One near term possibility is for Dennis and Cara to visit Costa Rica to see first hand what Costa Rica has to offer. You are all very accomplished scientists, so you can dive into the technical issues whenever necessary.
Best regards,
Roman

--
Roman Macaya, Ph.D.
Ambassador
Embassy of Costa Rica
2114 S Street NW
Washington, D.C. 20008
Tel. (202) 499-2984
Fax (202) 265-4795

Dear Cara and Dennis,
Good to know about you and the Global Virome Project. I think a collaboration with groups in CR would result in win-win proposición.
The Maize Rayado Fino Virus was sequenced years ago. Some human viruses have been partially sequenced at UCR. In ACG Marylene Roossinak?? has also sequenced plant viruses? Daniel knows details.
Please let us know when you can come to CR so we can plan accordingly.
Saludos
Pedro León
President
Academia Nacional de Ciencias

Enviado desde mi iPhone

Pedro and Don, thanks for your quick and positive replies to Ambassador Macaya's introductions. As he noted, I and a number of colleagues from around the world are trying to pull together a global effort to "re-imagine" how we might better prepare for and respond to future threats from emerging viral diseases. (NOTE: this is not a US government venture, but rather an evolving global partnership that is committed to global ownership and shared benifits). The past decade has been a clear indication that our response to everything from Avian Influenza to Zika have left the world vulnerable to their worst consequences. As part of our "re-imagining" we have sought to re position our response to future threats from one that is reactive to one that is more proactive. By exploiting the dramatic advances in diagnostic and analytic technologies, as well as our growing understanding of the ecology of viral diseases emergence (and the centrality of events at the animal-human-environment interface) we have sought to mobilize a global effort to comprehensively map the planet's highest priority pathogens while they are still circulating in wild life populations permitting prophylactic countermeasures well in advance of future epidemic events. The Global Virome Project was launched last fall at the Rockefeller Bellagio Conference Center - and is rapidly refining the strategic and operational details that will enable country level activities by the end of the year. In our discussions with Ambassador Macaya we have identified Costa Rica a country of particular interest. Given the excellent documentation of the wildlife in the region and the strong surveillance platforms that exist Costa Rica represents an excellent site for an early launch of GVP. We are still very much in the preliminary discussion stage but would welcome a chance to discuss GVP and the possible interest of the scientific community in Costa Rica in participating in this venture. Below is a link to our website that provides additional information about GVP: its scope, strategies and partners. We would welcome a chance to discuss further if there is interest

www.globalviromeproject.org/

we look forward to hearing from you

all the best

dennis

Cara J. Chrisman, PhD
Senior Infectious Diseases Technical Advisor
Emerging Threats Division
Office of Infectious Disease
Bureau for Global Health
U.S. Agency for International Development (USAID)

Desk: (202) 712-1161
Cell: REDACTED
E-mail: cchrisman@usaid.gov

**From:** Andrew Clements <aclements@usaid.gov>
**To:** Jonna Mazet <jkmazet@ucdavis.edu>
**CC:** PREDICTMGT <predictmgt@usaid.gov> predict@ucdavis.edu <predict@ucdavis.edu>
**Sent:** 3/31/2017 9:47:56 AM
**Subject:** Re: Please review mBio press release on your bats and MERS-CoV paper

thanks. a few small suggestions (see attached).

On Thu, Mar 30, 2017 at 10:36 PM, Jonna Mazet <jkmazet@ucdavis.edu> wrote:
Please find attached a draft press release for our paper being published on Tuesday on the MERS-like virus we identified in Uganda. Intention is for the release to go live simultaneously.
Hope it looks good to you,
Jonna

predictmgt+unsubscribe@usaid.gov
predictmgt@usaid.gov
https://groups.google.com/a/usaid.gov/d/msgid/predictmgt/CAO5tDrGtsVWwpEZz0dCH%3DkB0k18mC02Eg9rD9%3DT6PHSq5%2BmEJw%40mail.gmail.com

--

Andrew Clements, Ph.D.
Senior Scientific Advisor
Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health
U.S. Agency for International Development
Mobile phone: 1-571-345-4253
E-mail: aclements@usaid.gov

*For more information on USAID's Emerging Pandemic Threats program, see: http://www.usaid.gov/ept2*

Draft copy
mBio.Predict PDF2180

**MERS-like Coronavirus Identified in Ugandan Bat**

*New virus not likely to spread to humans*

WASHINGTON, DC – April 4, 2017 – A team of researchers in the United States and Uganda has identified a novel coronavirus in a bat from Uganda that is similar to the one causing Middle East Respiratory Syndrome (MERS) in people, giving further credence to the theory that such viruses originate in bats.

The work, part of the United States Agency for International Development's (USAID's) Emerging Pandemic Threats PREDICT project, was described this week in mBio®, an online open-access journal of the American Society for Microbiology.

**Not likely a threat to humans**

Laboratory experiments with the virus, named PREDICT/PDF-2180, indicate that while its genetics appear similar to MERS-coronavirus (MERS-CoV), there are significant differences in part of its spike gene – the segment of the virus responsible for invading cells.

"In its current form, evolution notwithstanding, this virus is probably not going to be a threat to human health," said lead study author Simon J. Anthony, Ph.D., an assistant professor of epidemiology at Columbia University's Mailman School of Public Health and its Center for Infection and Immunity.

By contrast, MERS-CoV itself has been shown to spread from animals such as camels to humans and between humans.

**About MERS**

MERS, first reported in Saudi Arabia in 2012, is an illness sometimes marked by severe acute respiratory disease with symptoms of fever, cough and shortness of breath. About 4 of every 10 patients with the condition have died, according to the Centers for Disease Control and Prevention.

The PREDICT project, led by the University of California, Davis, is a multicenter global initiative for surveillance and discovery of viruses that could pose a pandemic threat through animal-human transmission of pathogens. In Uganda, PREDICT worked closely with researchers from Gorilla Doctors, a non-governmental organization.

"The discovery of this new virus by a team of field veterinarians and laboratory scientists in Uganda is the result of a tremendous effort to strengthen capacity in the region to better understand potential threats to the health not just of Ugandans, but of people around the world," said co-author Kirsten Gilardi, DVM, Co-Director of the Karen C. Drayer Wildlife Health Center at UC Davis and a regional lead for PREDICT in east-central Africa.

**Using a clone to test a virus**

For the study, Anthony and colleagues at the UC Davis One Health Institute and with the non-profit organization Gorilla Doctors sequenced the genome of the PDF-2180 virus found in a rectal swab taken from a bat trapped in February 2013 in southwestern Uganda. Overall, the virus was 87 percent identical to MERS-CoV and 91 percent identical to NeoCoV, another coronavirus found in a bat from South Africa. However, part of the spike gene was only 46 percent identical to the one belonging to MERS-CoV.

Next, to test the ability of the virus to spread to humans, researchers at the University of North Carolina constructed an infectious MERS-CoV clone expressing the PDF-2180 spike protein. Viruses derived from the clone could reproduce themselves but could not enter cells expressing DPP4, the receptor normally used by MERS-CoV to infect human cells, or establish new infections either in Vero cells derived from monkeys or in human airway cells from healthy lung donors.

The team plans to repeat the experiments with other viral samples to get a better grasp of what animal-borne viruses pose a risk to human health.

**Coronaviruses in bats**

The discovery of the virus adds to the growing number of coronaviruses identified in bats, Anthony said, including coronaviruses in South Africa, Mexico, Thailand, the Netherlands, Italy, and China.

"Collectively, these examples demonstrate that the MERS-related coronaviruses are highly associated with bats and are geographically widespread," Anthony said.

The study was supported by the USAID Emerging Pandemic Threats PREDICT project and by the National Institute of Allergy and Infectious Disease. The article can be found online at [URL to come].

Bats provide important ecosystem services through pollination of native plants and agricultural crops and consumption of insects like mosquitoes that can spread disease and feed on people and livestock. While bats are ancestral or current reservoirs for some high-profile emerging infectious diseases affecting people, measures to reduce contact with bats, rather than eradication or significant disturbance of bats in their natural habitat, is effective as a means of reducing the risk of transmission of bat viruses to people.

# # #

**Contact:**

Tim Paul, Columbia University Mailman School of Public Health
tp2111@cumc.columbia.edu
Phone: 212-305-2676

Kat Kerlin, UC Davis
kekerlin@ucdavis.edu
Phone: 530-752-7704

**About the American Society for Microbiology**

The American Society for Microbiology is the largest single life science society, composed of over 48,000 scientists and health professionals. ASM's mission is to promote and advance the microbial

sciences. ASM advances the microbial sciences through conferences, publications, certifications and educational opportunities. It enhances laboratory capacity around the globe through training and resources. It provides a network for scientists in academia, industry and clinical settings. Additionally, ASM promotes a deeper understanding of the microbial sciences to diverse audiences.

**About USAID**
USAID is the lead U.S. Government Agency providing foreign development and humanitarian assistance. The agency's Emerging Pandemic Threats program, which works in support of the Global Health Security Agenda, links U.S. foreign assistance with the resources, expertise and creativity of the private sector as well as nongovernmental organizations. Since its launch in 2001, the Global Development Alliance has changed the way many U.S. international development projects are financed and implemented. USAID has cultivated more than 900 public-private alliances with over 1,700 individual partners to benefit development programming. www.usaid.gov

**About Columbia University's Mailman School of Public Health**
Founded in 1922, Columbia University's Mailman School of Public Health pursues an agenda of research, education, and service to address the critical and complex public health issues affecting New Yorkers, the nation and the world. The Mailman School is the third largest recipient of NIH grants among schools of public health. Its over 450 multi-disciplinary faculty members work in more than 100 countries around the world, addressing such issues as preventing infectious and chronic diseases, environmental health, maternal and child health, health policy, climate change & health, and public health preparedness. It is a leader in public health education with over 1,300 graduate students from more than 40 nations pursuing a variety of master's and doctoral degree programs. The Mailman School is also home to numerous world-renowned research centers including ICAP (formerly the International Center for AIDS Care and Treatment Programs) and the Center for Infection and Immunity. For more information, please visit www.mailman.columbia.edu.

**About the UC Davis One Health Institute**
The One Health Institute is active all over the world, working at the interface of animals, people, and the environment to solve complex problems that impact health and conservation. The institute grew out of the UC Davis School of Veterinary Medicine's deep commitment to the One Health approach and is home to the well-established Wildlife Health Center. Our scientists and educators provide innovation and leadership to UC Davis, the UC system, state and federal agencies, and to partners around the globe. www.onehealthinstitute.net

**About Gorilla Doctors**
Gorilla Doctors is dedicated to saving the mountain and eastern lowland (Grauer's) gorilla species one gorilla patient at a time. Our international veterinary team provides hands-on medical care to ill and injured mountain and Grauer's gorillas living in the national parks of Rwanda, Uganda, and the Democratic Republic of Congo (DRC) and works with the PREDICT Project to conduct surveillance for pathogens that can spillover from animal hosts to people. www.gorilladoctors.org

**About University of North Carolina**
Founded in 1789, the University of North Carolina is a premiere research institution in the southeastern United States. The mission of the Gillings School of Global Public Health is to improve public health, promote individual well-being and eliminate health inequities across North Carolina and around the

world. We are ranked the top public school of public health in the nation by U.S. News & World Report (2016 edition) and placed second among all public health schools. In 2016, the 245 faculty at the School performed research in more than 82 countries and has received about $180 million in research funds from outside sources, focused on improving global public health. Over 1,500 graduate students attend the Gillings School of Global Public Health each year and the North Carolina Institute of Public Health is the School's service and outreach arm. For more information, visit: http://sph.unc.edu/

**Sent:** Fri, 7 Apr 2017 07:15:29 -0700
**Subject:** Re: PREDICT-2 behavioral risk surveillance meeting in DC
**From:** Jonna Mazet <jkmazet@ucdavis.edu>
**To:** Christine Kreuder Johnson <ckjohnson@ucdavis.edu>
**Cc:** "predict@ucdavis.edu" <predict@ucdavis.edu>, Elizabeth S Chase <eschase@ucdavis.edu>

I'm likely not available for the USAID meeting or the phone meeting. That's okay, go ahead. I may. E able to call in for USAID, but I'm supposed to be off. I know you can handle planning call & I will swoop in if they give you any trouble. I have made it clear in writing and by phone that I want to see a written, comprehensive plan with vision well in advance of the USAID meeting. If you could reinforce that on the call, I would appreciate it. I am NOT looking for a country-by-country plan of our human surveillance with survey -- that is already underway, approved & tracked, and it is our overall surveillance plan that crosses objective groups.
I AM looking for a bat-focused risk mitigation, behavior change & public communication plan/campaign to be designed and implemented imminently in Sierra Leone. GoSL & our team are currently asking for support on how to engage with communities & give them something protective & productive to do NOW!

This is an emergency & needs to be the focus of your call. Please feel free to copy & paste the appropriate parts of this message into an email to Leilani & Peter in advance of your call or tell me if you want me to do that.

I will also see Peter tomorrow, so I will reinforce in person.

Please advise on preferred path,
J

On Thursday, April 6, 2017, Christine Kreuder Johnson <ckjohnson@ucdavis.edu> wrote:

> Hi Leilani –
>
> I could do 7:30 – 9am (less ideal for us west coasters with elementary school kids but I think I can make that work)
>
> Liz - can you confirm Jonna's schedule for this meeting as she's traveling at the moment?
>
> /ckj

---

**From:** Shana Gillette <sgillette@usaid.gov>
**Date:** Thursday, April 6, 2017 at 2:28 PM
**To:** Leilani Francisco <francisco@ecohealthalliance.org>
**Cc:** Peter Daszak <daszak@ecohealthalliance.org>, Jonna Mazet <jkmazet@ucdavis.edu>, Alisa Pereira <apereira@usaid.gov>, Christine Kreuder Johnson <ckjohnson@UCDAVIS.EDU>, "predict@ucdavis.edu" <predict@ucdavis.edu>
**Subject:** Re: PREDICT-2 behavioral risk surveillance meeting in DC

Hi Leilani,

The morning of the twelfth will work best for everyone.

Best

Shana

On Tuesday, April 4, 2017, Leilani Francisco <francisco@ecohealthalliance.org> wrote:

Hi Shana,

May 12th works well for us. Would 2:00 to 3:30 PM work on your end?

Best,

Leilani

On Fri, Mar 31, 2017 at 12:13 PM, Leilani Francisco <francisco@ecohealthalliance.org> wrote:

> Many thanks, Shana.
>
> I'll check on availability and get back to you asap.
>
> Thanks again,
>
> Leilani

**From:** Shana Gillette [mailto:sgillette@usaid.gov]
**Sent:** Friday, March 31, 2017 11:25 AM
**To:** Leilani Francisco <francisco@ecohealthalliance.org>
**Cc:** Peter Daszak <daszak@ecohealthalliance.org>; Jonna Mazet <jkmazet@ucdavis.edu>; Alisa Pereira <apereira@usaid.gov>; Christine Kreuder Johnson <ckjohnson@ucdavis.edu>; predict@ucdavis.edu

**Subject:** Re: PREDICT-2 behavioral risk surveillance meeting in DC

Hi Leilani,

The morning of May4th is open for Dennis, the morning of the 9th, the afternoon of the 10th, and all day on May 12th.

Best,

Shana

On Wed, Mar 29, 2017 at 11:44 AM, Leilani Francisco <francisco@ecohealthalliance.org> wrote:

> Thanks everyone.
>
> Shana,
>
> Please let me know what dates might work well on your end, and I'd be happy to coordinate.
>
> Best,
>
> Leilani

**From:** Peter Daszak [mailto:daszak@ecohealthalliance.org]
**Sent:** Tuesday, March 28, 2017 2:39 PM
**To:** Shana Gillette <sgillette@usaid.gov>
**Cc:** Jonna Mazet <jkmazet@ucdavis.edu>; Leilani Francisco <francisco@ecohealthalliance.org>; Alisa Pereira <apereira@usaid.gov>; Christine Kreuder Johnson <ckjohnson@ucdavis.edu>; predict@ucdavis.edu
**Subject:** RE: PREDICT-2 behavioral risk surveillance meeting in DC

No problem at all. By mid-May we'll be able to give a full review of work already done and plans moving forward.

Re. dates – we have a meeting at Davis on 16th & 17th of May, and I know that Dennis is trying to set up GVP meetings for the week after, so it would be good to lock in a date fairly soon.

Cheers,

Peter

**Peter Daszak**

*President*

EcoHealth Alliance

460 West 34th Street – 17th Floor

New York, NY 10001

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+1 212 380 4465 (fax)

www.ecohealthalliance.org

*EcoHealth Alliance leads cutting-edge research into the critical connections between human and wildlife health and delicate ecosystems. With this science we develop solutions that promote conservation and prevent pandemics.*

**From:** Shana Gillette [mailto:sgillette@usaid.gov]
**Sent:** Tuesday, March 28, 2017 11:59 AM
**To:** Peter Daszak
**Cc:** Jonna Mazet; Leilani Francisco; Alisa Pereira; Christine Kreuder Johnson; predict@ucdavis.edu
**Subject:** Re: PREDICT-2 behavioral risk surveillance meeting in DC

Hi Peter,

We now have meeting conflicts at that time, Dennis is shuttling between the Pentagon and AAAS that day, so it is probably better if we reschedule.

Best Regards,
Shana

On Tue, Mar 28, 2017 at 10:56 AM, Peter Daszak <daszak@ecohealthalliance.org> wrote:

OK, but just to let you know that Leilani and I are both in town, so happy to do a 'meet and greet' as Jonna suggests. Could do this at 11am either at USAID or could do lunch.

Understand if you can't and no problem either way....

Cheers,

Peter

**Peter Daszak**

*President*

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**From:** Shana Gillette [mailto:sgillette@usaid.gov]
**Sent:** Tuesday, March 28, 2017 9:19 AM
**To:** Jonna Mazet
**Cc:** Leilani Francisco; Alisa Pereira; Peter Daszak; Christine Kreuder Johnson; predict@ucdavis.edu
**Subject:** Re: PREDICT-2 behavioral risk surveillance meeting in DC

Hi Jonna,

I spoke with Alisa and we think it will be a better use of everyone's time for us to wait until we can have a substantive discussion. Let's plan to reschedule for mid-May for the behavioral overview.

Best Regards,
Shana

On Mon, Mar 27, 2017 at 6:54 PM, Jonna Mazet <jkmazet@ucdavis.edu> wrote:

Dear Predict Management Team,

I understand that you are meeting with Leilani and Peter on Wednesday. Of course, we want very much to keep the behavioral scope moving and on great footing.

Unfortunately, as some of you know, we just today received from Amalhin the decoder that has alerted us to some major project planning disconnects. These may or may not have major project implications going forward, depending on the flexibility for making adjustments that you have on your end. Therefore, I can only support a meet-and-greet for Leilani and you all this week, not a substantive discussion of the plan moving forward.

If you all would prefer to hold on this first meeting for a time when you can discuss things with more certainty and forward motion, we understand. If you'd like to have the meeting and get to know each other despite the landscape, that's still good with me.

Please just let us all know,

Jonna

On Wed, Mar 22, 2017 at 5:51 AM, Shana Gillette <sgillette@usaid.gov> wrote:

ok, great, see you then.

Best,

Shana

On Tue, Mar 21, 2017 at 5:48 PM, Leilani Francisco <francisco@ecohealthalliance.org> wrote:

Many thanks Shana.

Wednesday the 29th from 11 to 12:30 works well for both me and Peter.

Looking forward to meeting with you then,

Leilani

**From:** Shana Gillette [mailto:sgillette@usaid.gov]
**Sent:** Tuesday, March 21, 2017 3:44 PM
**To:** Leilani Francisco <francisco@ecohealthalliance.org>
**Cc:** Alisa Pereira <apereira@usaid.gov>; Jonna Mazet <jkmazet@ucdavis.edu>; Peter Daszak <daszak@ecohealthalliance.org>; Christine Kreuder Johnson <ckjohnson@ucdavis.edu>
**Subject:** Re: PREDICT-2 behavioral risk surveillance meeting in DC

Dear Leilani,

I have been looking at dates when Dennis and Alisa will be available. Next week, Dennis and Alisa will be available between 9 and 12:30am on Tuesday and Wednesday next week. Would either day work for you? If not, I can look at the following week.

Best,
Shana

On Fri, Mar 17, 2017 at 2:31 PM, Leilani Francisco <francisco@ecohealthalliance.org> wrote:

> Dear Shana and Alisa,
>
> Hope this finds you well. I am pleased to report that I had very intensive and productive meetings with our UC Davis and Metabiota partners in California this week and I'm excited about the way forward.
>
> I'm looking forward to meeting with you in DC and wanted to get in touch about possible meeting dates.

Please let me know what works well on your end and we can go from there.

Best regards,

Leilani

--

**Leilani Francisco, PhD, MA, PMP**
*Senior Scientist | PREDICT-2 Senior Behavioral Risk Coordinator*

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460 West 34th Street – 17th floor
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--

Shana Gillette, PhD

Senior Risk Mitigation Adviser

Emerging Threats Division
Office of Infectious Disease

Bureau for Global Health

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Work Mobile: 571-243-3424

Email: sgillette@usaid.gov

--

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--

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Email: sgillette@usaid.gov

**From:** Katherine Leasure <kaleasure@ucdavis.edu>
**To:** 'PREDICTMGT' <predictmgt@usaid.gov>
**CC:** 'Jonna Mazet' <jkmazet@ucdavis.edu> predict@ucdavis.edu <predict@ucdavis.edu>
**Sent:** 4/7/2017 11:17:18 PM
**Subject:** PREDICT International Travel Requests

*Please find below an international travel request for your review and approval. Please let me know if you have any questions. Thanks!!*

1. Monagin (Senegal): $1,350 airfare/$251 (Dakar)

Travel Requests:

1. UC Davis would like to request travel approval for Corina Monagin to travel from Los Angeles, California, USA to Dakar, Senegal from April 29 to May 7, 2017 for meetings with partners, and to prepare for surveillance activities.

**Trip purpose:** Dr. Corina Monagin will be traveling to Dakar, Senegal to have working meetings with PREDICT-2 program partners at the Interstate School of Veterinary Medicine and Sciences of Dakar (EISMV), the University Cheikh Anta Diop (UCAD), and the Senegalese Institute of Agricultural Research (ISRA). These working meetings will focus on preparations for the roll-out of surveillance activities in the country. Dr. Monagin is new to the PREDICT-2 UC Davis Senegal team and is using this opportunity to introduce herself to the partners.

*Katherine Leasure*
HR/Payroll/Financial Assistant
One Health Institute
University of California, Davis
530-752-7526
530-752-3318 FAX
kaleasure@ucdavis.edu

**From:** Andrew Clements <aclements@usaid.gov>
**Sent:** Tue, 11 Apr 2017 12:39:33 +0200
**Subject:** Re: [Non-DoD Source] Cost sharing zoonotic surveillance work in Thailand
**To:** Jonna Mazet <jkmazet@ucdavis.edu>

Thx

*Andrew P. Clements, Ph.D.*
*Senior Scientific Adviser*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email:* aclements@usaid.gov

On Apr 11, 2017, at 12:28 AM, Jonna Mazet <jkmazet@ucdavis.edu> wrote:

---------- Forwarded message ----------
From: **Jonna Mazet** <jkmazet@ucdavis.edu>
Date: Mon, Apr 10, 2017 at 3:25 PM
Subject: Re: [Non-DoD Source] Cost sharing zoonotic surveillance work in Thailand
To: "Kevin Olival, PhD" <olival@ecohealthalliance.org>
Cc: Supaporn Wacharapluesadee [REDACTED], Martha M CIV Stokes [REDACTED], "predict@ucdavis.edu" <predict@ucdavis.edu>, Jon Epstein <epstein@ecohealthalliance.org>, Alice Latinne <latinne@ecohealthalliance.org>, "William B. Karesh" <karesh@ecohealthalliance.org>, Peter Daszak <daszak@ecohealthalliance.org>, Evelyn Luciano <luciano@ecohealthalliance.org>, Molly Turner <turner@ecohealthalliance.org>, "Lance R CIV DTRA J3-7 (US) Brooks" <[REDACTED]>, "Stotish, Timothy R CIV DTRA J3-7 (US)" [REDACTED], Thiravat Hemachudha [REDACTED]

Dear Supaporn, Marty, Kevin, and all,

I am extremely supportive of the proposed collaboration. I agree that it is just the sort of cooperation and leveraging for success that we need to make real progress toward our shared global health goals and desires to support good work in Thailand.

I do also agree with Kevin that there is no need to incorporate specific budgets in the project descriptions and breakdown of work across partners. If there is specific need to do that by site or overall country costs, we can handle that with the smaller group of individuals who need that information and make sure that all inclusive dollars are reflected and messaging is appropriate for the required audience.

Marty, thank you so much for support of the collaboration. Happy to be doing this together.

Please let me know if you need anything from Predict HQ to facilitate.

Best,

Jonna

Jonna AK Mazet, DVM, MPVM, PhD
Professor of Epidemiology & Disease Ecology
Executive Director, One Health Institute
Global Director, PREDICT Project of USAID Emerging Pandemic Threats Program

School of Veterinary Medicine
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+1-530-752-3630
onehealthinstitute.net

For scheduling and logistical issues, please contact:
Ms. Liz Chase
eschase@ucdavis.edu
+1-530-752-3630

---

**From:** Stokes, Martha M CIV (US) [REDACTED]

**Sent:** Saturday, April 8, 2017 3:23 AM
**To:** Kevin Olival, PhD; Supaporn Wacharapluesadee; predict@ucdavis.edu; Dr. Jonna Mazet
**Cc:** Jon Epstein; Alice Latinne; William B. Karesh; Peter Daszak; Evelyn Luciano; Molly Turner; Brooks, Lance R CIV DTRA J3-7 (US); Stotish, Timothy R CIV DTRA J3-7 (US)
**Subject:** RE: [Non-DoD Source] Cost sharing zoonotic surveillance work in Thailand

Dear Kevin, Supaporn, Jonna and all,

First of all, I want to thank you for considering a collaborative effort with CBEP to support the important work that EHA, PREDICT and Supaporn have been conducting in Thailand. This is exactly the sort of cooperation that Lance Brooks and I, along with other CBEP science team members, discussed with Dennis Carroll and his team at USAID earlier this year. At that meeting we agreed that the scope of work to be accomplished, coupled with the potential for changes in the funding landscape, compel us to seek out ways to align our efforts with PREDICT and the Global Virome Project.

Let me assure you that CBEP will work closely with your team and other stakeholders to ensure that there is no duplication of efforts and that all regulations and guidelines are followed. Our goal is to enable the collection of data not presently included in the PREDICT work that would then be shared with EHA and PREDICT, with the potential to augment and enhance PREDICT results, while providing our program with valuable information on zoonotic risk. We have in place a contract with Chulalongkorn University which would provide us with a mechanism to directly fund Supaporn for the collection and analysis of samples.

Please let me know if there is any additional information needed from CBEP. We are excited about the prospect of contributing to this extremely important work, and look forward to exploring other opportunities to leverage our collective resources for this shared mission.

Best,
Marty

Martha Stokes, PhD
Southeast Asia Regional Science Manager
Cooperative Biological Engagement Program
REDACTED

-----Original Message-----
From: Kevin Olival, PhD [mailto:olival@ecohealthalliance.org]
Sent: Friday, April 7, 2017 1:25 PM
To: Supaporn Wacharapluesadee <REDACTED>; Stokes, Martha M CIV (US) <REDACTED>; Stokes, Martha M CIV (US) <REDACTED>; predict@ucdavis.edu; Dr. Jonna Mazet <jkmazet@ucdavis.edu>
Cc: Jon Epstein <epstein@ecohealthalliance.org>; Alice Latinne <latinne@ecohealthalliance.org>; William B. Karesh <karesh@ecohealthalliance.org>; Peter Daszak <daszak@ecohealthalliance.org>; Evelyn Luciano <luciano@ecohealthalliance.org>; Molly Turner <turner@ecohealthalliance.org>
Subject: [Non-DoD Source] Cost sharing zoonotic surveillance work in Thailand

All active links contained in this email were disabled. Please verify the identity of the sender, and confirm the authenticity of all links contained within the message prior to copying and pasting the address to a Web browser.

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Dear Supaporn, Marty, Jonna, and EHA PREDICT colleagues,

I'm writing this email pursuant to the recent proposal that DTRA may be able to support additional zoonotic viral surveillance work in Thailand via a direct award to Chulalongkorn Univ (Supaporn's lab). Overall, we are very supportive of

finding a way to cost share PREDICT-related activities with other USG agencies and Thai Gov't funding. However, as everyone is aware, it's also very important that we clearly defining the roles and activities of the different partners/agencies funding the work so there is no overlap and that we are compliant with USG rules for supporting the work.

Supaporn, could you please outline the proposed activities that would be supported by DTRA in a very brief document, so that it's clear how complimentary work will be split up and aligned with our plans for PREDICT? Any additional issues, e.g. agreement from DTRA that all data collected at sites where PREDICT and DTRA are cost-sharing will be entered into EIDITH, would also be useful to include.

Just wanted to start this email chain so that we're all on the same page, and to ensure full compliance as we move forward in supporting the important work in Thailand.

Thank you,
Kevin

Kevin J. Olival, PhD
Associate Vice President for Research

EcoHealth Alliance
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New York, NY 10001

1 212 380 4478 (direct)
[redacted] mobile)
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Caution-www.ecohealthalliance.org < Caution-http://www.ecohealthalliance.org/ >

EcoHealth Alliance leads cutting-edge research into the critical connections between human and wildlife health and delicate ecosystems. With this science we develop solutions that promote conservation and prevent pandemics.

<NSTDA-P2-DTRA_co-fund 2017 proposed sumary.pdf>

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You received this message because you are subscribed to the Google Groups "PREDICTMGT" group.
To unsubscribe from this group and stop receiving emails from it, send an email to predictmgt+unsubscribe@usaid.gov.
To post to this group, send email to predictmgt@usaid.gov.
To view this discussion on the web visit https://groups.google.com/a/usaid.gov/d/msgid/predictmgt/CAO5tDrG_v9Ey8L0nLXL5CrQzWyR3CNXGLNzQPtAQLRqw4113YQ%40mail.gmail.com.

**From:** Woutrina Smith <wasmith@ucdavis.edu>
**To:** Brian Bird <bhbird@ucdavis.edu>
**CC:** David John Wolking <djwolking@ucdavis.edu>; Jonna Mazet <jkmazet@ucdavis.edu>; Elizabeth Leasure <ealeasure@ucdavis.edu>; Elizabeth VanWormer <liz.vanwormer@unl.edu>
**Sent:** 4/19/2017 11:59:01 PM
**Subject:** Re: TZ grants - Request for NCE and Annual Meeting

I suggest we deal with the two issues separately. Falgu just asked us to provide her the time of extension and justification, so let's give her that by email to pass up the food chain, and also give the blessing to delay Mary's visit to fall amidst the busy schedules. Those are the highest priority communications and in the context of us all being so busy right now, it may take some time to schedule any follow up calls and meetings, which is fine. Other aspects of MB need time to play out before we address partnership directly for future DTRA work.
Wout

---

On Apr 19, 2017, at 3:23 PM, Brian Bird <bhbird@ucdavis.edu> wrote:

Makes most sense to me to just be straight forward. Tell MB that we would like to pursue the NCE with them and that we've valued their help in managing the project, but that we'll be striking it out on our own on the next grants moving forward. We might want to have a call with them to help smooth the blow?

And communicate the same to Mary and her team (probably after the NCE is put in and hopefully approved?) so that they are aware.

Perhaps that's not very savvy, but at least it's clean and simple.

-b
aka "bull in china shop"?

**From:** David J Wolking <djwolking@ucdavis.edu>
**Date:** Wednesday, April 19, 2017 at 12:36 PM
**To:** "Prof. Woutrina Smith" <wasmith@ucdavis.edu>, Brian Bird <bhbird@ucdavis.edu>, Jonna Mazet <jkmazet@ucdavis.edu>
**Cc:** Elizabeth Leasure <ealeasure@ucdavis.edu>, Elizabeth VanWormer <liz.vanwormer@unl.edu>
**Subject:** Re: TZ grants - Request for NCE and Annual Meeting

This is timely and getting tricky with the NCE mixed in with the annual meeting and future collabs angle. The last call I had with Falgu about the equipment process was pretty awkward thanks to that future directions conversation and I simply deflected that one. But without any connections with Mary or the DTRA team directly how should we plan the diplomatic approach for: 1) pass through via MB for the NCE proposal and 2) working around MB to explore future projects?

I'm not responding until we're on the same page here with strategy as Falgu often cold calls me by phone or Skype...

David

On Wed, Apr 19, 2017 at 9:32 AM, Falgunee K. Parekh <fparekh@metabiota.com> wrote:

Hi All,
Now that the Year 3 funds have been released and the equipment purchase has been approved, I think it is a good time to discuss the Request for No Cost Extension (NCE). Currently the Period of Performance is set to end around August 5, 2017. How much additional time do you think we need? I know that we have previously discussed 6 months, but would 9 months be more appropriate to account for variations in seasonality and any potential delays in sample collection and analysis? Please let me know what would work best for you and also provide a justification for that amount of time that we can present to DTRA.

Also, I spoke with Mary briefly about the annual meeting. The earliest that she could be available for in-country meetings is end of July/beginning of August. She would prefer to see some preliminary results at the annual meeting, so if we need to delay to the fall then that is fine. Can you please let me know when you may have some preliminary results ready to present, and when would be a good time to have in-country meetings?

Finally, Mary seems very supportive of us pursuing follow-on work. This would be done through the normal BAA process, however prior to submitting an abstract we can have preliminary conversations to discuss potential concepts. Please send any potential research concepts that you may be interested in pursuing that would be reasonable follow-ons to the current projects. I would like to set up a meeting in the next few weeks to discuss potential concepts so that we can begin those conversations with Mary. As you may recall with these current grants, the process can take some time with DTRA, so now is the right time to start planning for the follow-on. Thanks.

Falgunee

**Falgunee K. Parekh**, MPH, PhD
Staff Scientist, Epidemiology

Metabiota, Inc.
Tel: 301.676.1919 | Email: fparekh@metabiota | skype: falgunee
metabiota.com

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**From:** Andrew Clements <aclements@usaid.gov>
**Sent:** Tue, 9 May 2017 22:21:28 +0200
**Subject:** Re: PRO/AH/EDR> Undiagnosed disease - Liberia (07): fatal, meningitis
**To:** Tara Milani <tmilani@usaid.gov>
**Cc:** Dennis Carroll <dcarroll@usaid.gov>, Richard Greene <rgreene@usaid.gov>, Kendra Chittenden <kchittenden@usaid.gov>, Alisa Pereira <apereira@usaid.gov>, Mildred Howard <mphoward@usaid.gov>, Monica Dea <mdea@usaid.gov>, Jon Epstein <epstein@ecohealthalliance.org>, Jim Desmond <desmond@ecohealthalliance.org>, Jonna Mazet <jkmazet@ucdavis.edu>

Thanks, Tara.

*Andrew P. Clements, Ph.D.*
*Senior Scientific Adviser*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

On May 9, 2017, at 10:13 PM, Tara Milani <tmilani@usaid.gov> wrote:

> Thanks Andrew, agree. MOH official position is "probable Meningitis" as of now. According to CDC this morning, more samples both from patients as well as postmortem has been collected and sent to Atlanta, France and South Africa for further testing.
> The possibility of vaccination has been entertained, but WHO has indicated they are out of stock for this type of vaccine Meningitis C (?)

Meanwhile all TDYers coming to Liberia are asked to get their Meningitis vaccine updated. Also those of us here have to make sure it is up to date. I will forward you Embassy Notice from today.

tara

*Tara Milani*
*Health Office Director*
*USAID/Liberia*
*Office Tel:* REDACTED
*Mobile Tel:*
*tmilani@usaid.gov*

> On Tue, May 9, 2017 at 7:50 PM, Andrew Clements <aclements@usaid.gov> wrote:
>
> FYI.

Interesting numbers: CDC ran 29 tests for various diseases and only meningitis was positive (for 4 patients only). Will be interesting to see if all affected people had meningitis of if there was another disease or toxin lurking in there as well.

> The following comment is a little frightening given that the recent Ebola epidemic had never been seen in Liberia before: "Liberia has never experienced meningitis before," Dahn said, noting that meningitis normally affects countries that are hot and have long dry season; such as Mauritania, Burkina Faso, Sudan, Ethiopia and other sub-Sahara countries which usually experience meningitis every 2 years or sometimes annually."

> Two reasons to avoid using this kind of logic:

1. Unless there is active looking for a disease, it's wise to not declare that a disease doesn't exist in a particular country. Lots of things are lurking in the background which is why there is a Predict project.

2. A lot of lore and "common knowledge" about diseases is based on past outbreaks which took place in a world that has changed dramatically. The levels of land use change, interactions with animals, migration, and urbanization have all increased in the past few decades. So the old rules (e.g. Ebola outbreaks are small and only occur in remote villages) may longer apply 100% of the time.

*Andrew P. Clements, Ph.D.*
*Senior Scientific Adviser*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

Begin forwarded message:

**From:** promed-edr@promedmail.org
**Date:** May 9, 2017 at 7:06:07 PM GMT+2
**To:** promed-post@promedmail.org, promed-edr-post@promedmail.org, promed-ahead-post@promedmail.org
**Subject: PRO/AH/EDR> Undiagnosed disease - Liberia (07): fatal, meningitis**
**Reply-To:** promedNOREPLY@promedmail.org

UNDIAGNOSED DISEASE - LIBERIA (07): FATAL, MENINGITIS
**********
A ProMED-mail post
<http://www.promedmail.org>
ProMED-mail is a program of the
International Society for Infectious Diseases
<http://www.isid.org>

Date: Mon 8 May 2017
Source: Global News Network [edited]
<http://gnnliberia.com/2017/05/08/liberian-health-authorities-say-recent-deaths-sinoe-caused-meningitis/>

Addressing a news conference in Monrovia [Mon 8 May 2017], Health Minister Bernice Dahn said based on the Centers for Disease Control (CDC) initial report on the cluster of deaths in Sinoe, which later spread to Montserrado and Grand Bassa counties, the Ministry believes that it is dealing with a probable outbreak of meningitis.

According to Minister Dahn, the CDC tested specimens from 4 patients for 29 different diseases, noting that the tests for 28 of the diseases proved negative, while the meningitis test proved positive.

"As a public health measure, we are taking it as that and we are working on it so that we do not have further spread." Minister Dahn said.

She noted that the MOH will continue to conduct the previous

investigation that is currently on the table so that it can clear all doubts, adding, "Today [8 May 2017] the MSF was instructed to do a meningitis test on the specimens that we have."

Meningitis is an acute inflammation of the protective membrane covering the brain and spinal cord, known collectively as the meninges. The most common symptoms are fever, headache, and neck stiffness. Other symptoms include confusion or altered consciousness, vomiting, and inability to tolerate light or loud noise.

Meanwhile, Minister Dahn has said as of 7 May [2017], a total of 31 cases, including 13 deaths have been reported from 3 counties.

She said a total of 27 cases and 10 deaths have been reported from Sinoe County, while Montserrado County recorded 2 cases and 2 deaths, and Grand Bassa County 2 cases and one death.

"Liberia has never experienced meningitis before," Dahn said, noting that meningitis normally affects countries that are hot and have long dry season; such as Mauritania, Burkina Faso, Sudan, Ethiopia and other sub-Sahara countries which usually experience meningitis every 2 years or sometimes annually.

"Meningitis can be transmitted through saliva and close body contacts," Dahn said, and urged the public not to panic because meningitis can be treated and prevented.

She is urging the public to report to health authorities anyone showing signs and symptoms of meningitis so that the person can be treated immediately.

[Byline: Cholo Brooks]

--
Communicated by:
ProMED-mail Rapporteur Mary Marshall

[There seems to be a definitive diagnosis at last. The increased surveillance and timely treatment that the Minister of Health has implemented will help to end the outbreak. An 8 May 2017 report in the Huffington Post indicated that the USA CDC is sending 2 meningitis laboratory scientists and one meningitis senior epidemiologist to Liberia this week to join the staff from the CDC Country Office in Liberia in the investigation (<http://www.huffingtonpost.com/entry/meningitis-suspected-in-unexplained-cluster-of-deaths-in-liberia_us_59109a8ee4b0e7021e99b055>).

Maps of Liberia can be accessed at <http://www.geoatlas.com/medias/maps/countries/liberia/li2r765a/liberia_pol.jpg> and <http://healthmap.org/promed/p/54>. - Mod.TY]

[See Also:
Undiagnosed disease - Liberia (06): (SI,MO) fatal
http://promedmail.org/post/20170503.5010772
Undiagnosed disease - Liberia (05): (SI,MO) fatal
http://promedmail.org/post/20170502.5007111

Undiagnosed disease - Liberia (04): (SI) fatal MoH/WHO
http://promedmail.org/post/20170501.5005335
Undiagnosed disease - Liberia (03): (SI) fatal
http://promedmail.org/post/20170429.5002799
Undiagnosed disease - Liberia (02): (SI) fatal
http://promedmail.org/post/20170427.5000144
Undiagnosed disease - Liberia: (SI) fatal, RFI
http://promedmail.org/post/20170426.4997304]
.....ty/mj/lm
*##########################################################*
**********

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For assistance from a human being, send mail to:
<postmaster@promedmail.org>.
##########################################################
##########################################################

List-Unsubscribe: http://ww4.isid.org/promedmail/subscribe.php

**Sent:** Wed, 10 May 2017 14:37:00 -0700
**Subject:** Re: Request for OAA guidance on the possibility of transferring sub-awards with Predict agreement
**From:** Jonna Mazet <jkmazet@ucdavis.edu>
**To:** Andrew Clements <aclements@usaid.gov>
**Cc:** David J Wolking <djwolking@ucdavis.edu>, Elizabeth Leasure <eaileasure@ucdavis.edu>, Shana Gillette <sgillette@usaid.gov>, Alisa Pereira <apereira@usaid.gov>

Wonderful (magic!).
Thank you,
Jonna

On Wed, May 10, 2017 at 5:30 AM, Andrew Clements <aclements@usaid.gov> wrote:

> See below for opinion from Ryland. Based on this, UCD has my approval to take over the sub-sub-awards wherever it is replacing Metabiota as the in-country implementing partner.

*Andrew P. Clements, Ph.D.*
*Senior Scientific Adviser*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

Begin forwarded message:

> **From:** Ryland Marbray <rmarbray@usaid.gov>
> **Date:** May 10, 2017 at 1:55:10 PM GMT+2
> **To:** Andrew Clements <aclements@usaid.gov>
> **Cc:** Patricia Bradley <pbradley@usaid.gov>, Alisa Pereira <apereira@usaid.gov>, Shana Gillette <sgillette@usaid.gov>
> **Subject: Re: Request for OAA guidance on the possibility of transferring sub-awards with Predict agreement**
>
> Hi Andrew,
> I have no problems with that. Ultimately the prime (UC Davis) was granted consent to enter into an agreement with Metabiota however that does not relieve them of any responsibilities for preforming all duties within the agreement.

Best,

Ryland

On Tue, May 9, 2017 at 5:06 PM, Andrew Clements <aclements@usaid.gov> wrote:

> Hi Ryland and Patricia,

Previously, we informed you that one of Predict's consortium partners (Metabiota) was providing salary supplements in some of the countries in which it is operating. The prime (UC Davis) is considering the possibility of taking over operations in some of the countries where Metabiota currently operates.

A key consideration is what happens to the sub-sub-awards that OAA has already approved between Metabiota and in-country partners. Since these are sub-sub-awards that are all under the USAID agreement with UCD, would it be possible for UCD to just take over the existing sub-sub-awards?

Thanks?

Andrew

*Andrew P. Clements, Ph.D.*
*Senior Scientific Adviser*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

—

Ryland Marbray
Agreements/Contracting Officer

**USAID** Office of Acquisition & Assistance
M/OAA/E3
1300 Pennsylvania Ave., NW.,
Rm. 567-B, SA-44
Washington, DC 20523

Phone: (202) 567-5328 rmarbray@usaid.gov

**From:** Peter Daszak <daszak@ecohealthalliance.org>
**To:** David J Wolking <djwolking@ucdavis.edu>;Jonna Mazet (jkmazet@ucdavis.edu) <jkmazet@ucdavis.edu>;Johnson Christine Kreuder (ckjohnson@ucdavis.edu) <ckjohnson@ucdavis.edu>;Kevin Olival, PhD" <olival@ecohealthalliance.org>
**CC:** predict@ucdavis.edu <predict@ucdavis.edu>;Anna Willoughby <willoughby@ecohealthalliance.org>
**Sent:** 5/11/2017 1:10:01 AM
**Subject:** Modeling & Analytics semi-annual

Hi David,

De-scientificated our M&A semi-annual following Jonna's suggestions, and added a couple of pictures….hope it's ok..

M&E stuff will come to you on Friday…

Cheers,

Peter

**Peter Daszak**
*President*

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**Section 2: (Oct – March 31, 2017)**

**Modeling and Analytics (PREDICT M&A):**

Major highlights and successes

- Developed a software package to allow in-country and other partners to analyze PREDICT data. Software includes documentation, training modules, and even mock datasets to explore. All issues of data security were ensured by the IM and M&A teams, whereby access to data is limited via an individual's EIDITH login credentials.
- Launched version 2.0 of the EID hotspots maps for emerging zoonoses. This completely new analysis identifies where on the planet the next EID will most likely originate and replaces the Jones *et al.* hotspots map from 2008. A paper will be released by *Nature Communications* later this year. All data from this project and the outputs of these models will be released publicly allowing researchers around the world to access this important information.
- PREDICT was well-represented at the International Meeting on Emerging Diseases and Surveillance (IMED) in Vienna, Austria on November 4-7, including more than X in-country PREDICT participants. Presentations included:
    - "Identifying the next Zika: An analysis of zoonotic potential in Flaviviridae"
    - "Global correlates of emerging zoonoses: Anthropogenic, environmental, and biodiversity risk factors"
    - "The global virome project"
- Organized and ran a workshop to analyze the economics of emerging diseases under a One Health framework at the World Bank, January 30 - February 2. Full published report from World Bank will follow.
- Presented overview and first results of Africa Sustainable Livestock 2050 modeling at a workshop with FAO partners in Ethiopia, February 20-24.
- Finalized for public release a new strategy to identify sites on the planet that likely have the highest number of unknown high-risk viruses that are yet-to-be-discovered ("missing zoonoses"). A PREDICT manuscript has been accepted by the world's highest impact science journal, *Nature*, and will be published in a few weeks **(map below).**

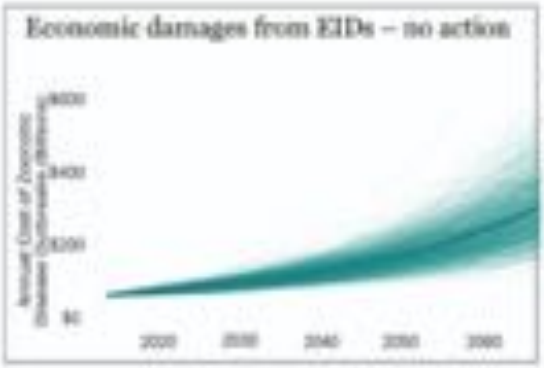



**Left:** Map identifying locations on the planet that likely harbor the most zoonotic viruses from primates, including those yet-to-be-discovered.

Progress and new model development

African Sustainable Livestock 2050:

- Worked with EPT-2 partners FAO to develop a hotspots analysis for the ASL 2050 project. This allows us to identify how proposed changes to livestock production in Africa will affect the risk of zoonotic disease emergence. Analyses show important regional differences in the drivers of EIDs that can be used to help policy goals.
- Developed dynamic model to analyze how intensification of poultry production and different surveillance and control policies (e.g. culling) will impact avian influenza risk in the region.
- Developed modeling approach to identify sites for optimal targeting of global viral discovery from mammal and water bird populations. This flexible solution can be used nationally, regionally or globally, and identifies the most cost-effective allocation of resources to discover new viruses from wildlife. Individual models and maps were developed for 30 countries, 10 regions, and globally.
- Estimated the number of currently undiscovered 'missing zoonoses' globally, extending previous analysis from ~750 mammal host species to all terrestrial mammals (n=5304 spp.).
- To assess longterm trends in pandemic risk, calculated expected global economic damages from EIDs over the next 50 years **(Figure below)** using data from the Emerging Infectious Disease Repository (EIDR) – a PREDICT-derived publically-available database.




**Left:** Analysis of the likely economic cost of emerging infectious diseases over the next 50 years if no coordinated global action is taken. Total cost is $3.6 trillion. Investing in a control program that reduces the number of events or size of events by only 5% gives a 96:1 return-on-investment.

Analyzing PREDICT-1 Data to Support Surveillance

- Using PREDICT-1 data, developed an interactive *viral accumulation curve* tool and searchable table to allow in-country staff to explore viral discovery data, and compare the efficacy of different sampling protocols.

- To identify the risk interfaces that produce the most novel viruses in our sampling, designed a power analysis using viral detection rates and animal sampling distributions from PREDICT-1.
- As a way to understand which PREDICT coronaviruses are more likely to jump from one host species to another (i.e. their potential to infect people) analyzed host and viral relatedness (pylogenies) for all viral discovery data in China.
- Designed a way to help rank novel viruses by their zoonotic potential. Calculated the "Phylogenetic Host Breadth" (genetic diversity of all known hosts for a virus) for all P1 viruses based on observed host associations.
- To assess most productive timing for sample collection, began analysis of seasonal patterns in viral detection from P1 data, including integration of life history data and global climate datasets.

Products of note

- To improve and accelerate analyses for PREDICT, the M&A team developed an R package, fasterize, implementing high-speed algorithms for geospatial analyses. This tool will be made open source and will be of value to researchers globally doing spatial analyses.
- To better understand the diversity of viruses in birds, the M&A team developed a preliminary model examining avian life-history traits and viral richness in birds using data from 1907 avian-virus associations from the literature for 929 bird species and 142 viruses,
- Designed new approach to refine a global model to predict the number of zoonotic viruses per mammalian host species. This used a novel geographic cross-validation procedure for evaluating spatial models by excluding species by zoogeographic region.
- Analysis of risk of viruses surviving on surfaces and in the environment. Updated a database of viral decay/survival studies to include 272 publications. These data will be made public once compiled.
- After the **emergence of Zika virus**, the M&A team developed a series of analyses to assess the zoonotic potential of other, less studied Flaviviruses:
    - Network analysis based on host and vector associations for all known flaviviruses from the literature.
    - Mapped global flavivirus diversity based on mammal and bird host distributions and human case distributions.
    - Analyzed the characteristics of all known flaviviruses to identify which are more likely to be able infect humans.
- Developed an R package, fasterize, implementing high-speed algorithms for geospatial analyses – to rapidly speed up time-consuming risk analyses. This tool will be made publically available.

Global Virome Project

- To estimate the costs and optimize potential sampling sites for the Global Virome Project, the M&A team used spatial analyses which combined maps of mammal and waterbird biodiversity, hotspot risk, 'missing zoonoses' and access costs for an additional 13 PREDICT countries.
- Individual GVP site allocation models and maps developed for 30 countries, 10 regions, and globally.
- Developed and ran economic model to calculate Return on Investment for a 10-year investment in the Global Virome Project.

**From:** Jonna Mazet <jkmazet@ucdavis.edu>
**To:** Kirsten Gilardi <kvgilardi@ucdavis.edu>,Mike Cranfield <[redacted]>
**Sent:** 5/12/2017 1:51:28 PM
**Subject:** Fwd: NYTimes: A Refuge for Orangutans, and a Quandary for Environmentalists

Just FYI in case you didn't see

---------- Forwarded message ----------
From: **Andrew Clements** <aclements@usaid.gov>
Date: Tue, Apr 25, 2017 at 12:56 PM
Subject: NYTimes: A Refuge for Orangutans, and a Quandary for Environmentalists
To: Dennis Carroll <dcarroll@usaid.gov>, tom.hughes@ecohealthalliance.org, "Timothy Meinke (HANOI/OH)" <tmeinke@usaid.gov>, "Daniel Schar (RDMA/OPH)" <dSchar@usaid.gov>, Bambang Heryanto <bheryanto@usaid.gov>, William Karesh <Karesh@ecohealthalliance.org>, dasrak@ecohealthalliance.org, Jonna Mazet <jkmazet@ucdavis.edu>, Alisa Pereira <apereira@usaid.gov>, djwolking@ucdavis.edu, sgillette@usaid.gov

FYI
>
> https://www.nytimes.com/2017/04/25/world/asia/indonesia-borneo-orangutans-palm-oil.html?smid=nytcore-ipad-share&smprod=nytcore-ipad
>
> Some worry that a palm oil company's gift to endangered Borneo orangutans distracts from a big threat to the species: deforestation by such companies.
>

**From:** Dennis Carroll <dcarroll@usaid.gov>
**Sent:** Mon, 22 May 2017 10:37:00 -0400
**Subject:** PMAC update
**To:** Jonna Mazet <jkmazet@ucdavis.edu>

Sister, at your convenience can we chat about the meeting in Montreux. a few updates for you.

d

--
Dr. Dennis Carroll
Director, Emerging Threats Program
Bureau for Global Health
U.S. Agency for International Development

Office: 202-712-5009
Mobile: REDACTED

**Sent:** Mon, 05 Jun 2017 15:56:00 -0700
**Subject:** Re: Sierra Leone staff contracts and details
**From:** Brian Bird <bhbird@ucdavis.edu>
**To:** Karen Saylors <ksaylors@metabiota.com>
**Cc:** Frantz Jean Louis <fjeanlouis@metabiota.com>, Eddy Rubin <erubin@metabiota.com>, Jonna Mazet <jkmazet@ucdavis.edu>, Aiah Gbakima [redacted]
Copy of Annex B3 - Bombali_2015-33-USAID_FINAL.xlsx

Thanks Karen. I hope you had a great and relaxing vacation!

We didn't manage to discuss KPMG on the call today, we ran out of time. I'm hoping we can chat about KPMG the next time we talk.

Prof did mention that you could provide me with the contracts, leases, etc that we will consider to carry-on with? In particular, the staff and the UNIMAK sub award are needed to see how best to proceed.

He also mentioned on the call that the vehicles were purchased on other projects and not on PREDICT. In the SLA budget, there is a line item each year for $17,000 for a "Used Vehicle- Freetown Car". Can you clarify what that is referring too? Was this money spent?

Also, it is mentioned in the SLA budget ("PREDICT Equipment tab"), that there was ~$146k of lab supplies and equipment? We didn't have budget or plans for much of this type of equipment listed under the scope of EHP, so I'm trying to understand how/why they were listed. I remember a specific conversation about some of the equipment and they were removed from a different budget document at one point. Were these supplies purchased, and are they now in country?

Generally, it would be very helpful to reconcile the SLA budget list of items (the only budget and purchasing list I've seen) with what was actually purchased and delivered in-country. There's some pretty large differences between the various Annexes and portions of the SLA that I have (Annex A3 vs. B3 etc...). Is there someone in Metabiota who can help with that task?

Many thanks!

-b

---

**From:** Karen Saylors <ksaylors@metabiota.com>
**Date:** Monday, June 5, 2017 at 12:58 PM
**To:** Brian Bird <bhbird@ucdavis.edu>, Aiah Gbakima [redacted]
**Cc:** Frantz Jean Louis <fjeanlouis@metabiota.com>, Eddy Rubin <erubin@metabiota.com>
**Subject:** Re: Sierra Leone staff contracts and details

Hi Brian.
Just getting back from vacation, so now responding to you. Yes indeed, we have used KPMG, a payroll company in Sierra Leone, because taxes and social security are complicated in SL, but I defer to Prof to clarify how that decision was made, as it was before my time. I believe you are having a call today so Prof can definitely give you feedback on how that decision was made.

I hope all's well.
Karen

---

**From:** Brian Bird <bhbird@ucdavis.edu>
**Date:** Thursday, June 1, 2017 at 7:48 AM
**To:** Karen Saylors <ksaylors@metabiota.com>, Eddy Rubin <erubin@metabiota.com>
**Cc:** Aiah Gbakima [redacted], Frantz Jean Louis <fjeanlouis@metabiota.com>
**Subject:** Sierra Leone staff contracts and details

Hi Karen and Eddy,

Just checking in on where we are with sharing the details of the SL staff contracts/salaries/timelines and payment mechanisms.

I see in the SLA budget annex that you share that it looks like you were using a payroll company (KPMG?) to pay salaries? Is that correct? Is there an absolute requirement to use a payroll company in Sierra Leone like I've heard there is in China?

Thanks!

-Brian

Brian H. Bird DVM, MSPH, PhD
One Health Institute
1089 Veterinary Medicine Dr.
School of Veterinary Medicine
University of California, Davis
bhbird@ucdavis.edu

PRODUCED IN NATIVE FORMAT

**From:** Brian Bird <bhbird@ucdavis.edu>
**To:** PREDICTMGT <predictmgt@usaid.gov>
**CC:** PREDICT-outbreak <predict-outbreak@ucdavis.edu>
**Sent:** 6/5/2017 11:47:50 PM
**Subject:** [predict] [predict-outbreak] Re: Update from DRC Bas-Uele Ebola outbreak

Rapid fire update from the field team on today's activities. (Sorry for the two emails.... I figured this would come tomorrow).

Details on confirmation of 5th case by IgG serology (tertiary contact of index case).

Reported as of today: 5 confirmed and 3 probable EVD cases.

-Brian

**From:** Brian Bird
**Date:** Monday, June 5, 2017 at 2:43 PM
**To:** PREDICTMGT
**Cc:** PREDICT-outbreak
**Subject:** Re: Update from DRC Bas-Uele Ebola outbreak

Update from the field team. Most current information is from end day 03 June.

As of that date, there were no persons remaining on the contact trace list as they had either cleared the 21-day monitoring window, or were removed as suspected cases were ruled-out by laboratory diagnostics. Fingers crossed it stays that way.

Regarding the request for PREDICT assistance in field ecology studies in the outbreak area, the team was able to clarify that all potential partners were requested to submit proposals of activities for consideration. The PREDICT team has limited their preliminary discussions to only bat and rodent sampling, while awaiting permission to proceed from USAID. There is a coordination meeting by the MoH this week to sort out details, and hopefully gain more information on what exactly is requested from PREDICT during this activity. I will share details as I get them.

All the best to you!

-brian

**From:** Brian Bird
**Date:** Friday, June 2, 2017 at 8:52 PM
**To:** PREDICTMGT
**Cc:** PREDICT-outbreak
**Subject:** Update from DRC Bas-Uele Ebola outbreak

Hi all,

I am handing correspondence for this one while Jonna is in transit to Tanzania.

We received a request to support ecological investigations in the outbreak area this evening. The letter requests ecological investigations similar to what was completed during the 2012 Isiro *Bundibugyo ebolavirus* outbreak. Update to the Outbreak form and the Letter of request is attached. Fortunately, as the form and other sources indicate the numbers of suspected cases continues to drop and many persons were removed from the contact trace in the past few days as they passed the 21-day monitoring window. Hopefully this trend continues.

One concern is that in the past few days it was indicated that at least 9 organizations may be invited to conduct ecological investigations. I have asked the team to clarify if there is a level of coordination at the

GoDRC level for the potential multiple requests to many different partner organizations or was only PREDICT invited (see entries for May 30 and 31st). I will pass on that information when I receive it.

Have a great evening or morning!

-Brian

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# PREDICT Outbreak or Health Event Rapid Report

**Today's Date:** *June 5th, 2017*
**Working Title of Investigation**: *Outbreak of Ebola Virus Disease in the Bas-Uele province, DR Congo*
**Cumulative day of the outbreak investigation: 27**

**Please describe the disease signs and symptoms and species affected (humans, domesticated animals, wildlife:**

*On 8 May 2017, an alert of 9 suspected cases of Human Viral Hemorrhagic Fever and 2 deaths in the Likati Health Zone, Bas-Uele Province was received from the Provincial Health Officer. Symptoms were fever, bloody vomiting, diarrhea, and bleeding from the nose.*

| **Location** | |
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| Country: | *Democratic Republic of Congo* |
| District: | *Province of Bas-Uele, Health zone of Likati, north-west of Buta* |
| Village/Town: | *Village in the Nambwa health area, Territory of Aketi* |
| GPS Coordinates (if known): | |
| Date that first case(s) of illness occurred (if known or estimate): | *April 22nd, 2017* |
| Date that PREDICT was first notified of outbreak: | *On May 10th, 2017 the PREDICT CC was informed by the INRB staff working in the virology lab that they were notified of suspected cases of VHF in the Likati Health Zone and that samples were expected to arrive for confirmatory testing anytime.*<br><br>*On May 11th, 2017 the PREDICT CC was informed that the samples arrived at INRB in early afternoon and are being tested for Ebola. The same day the PREDICT CC was informed by the EPT2 focal point at the mission who talked on the phone with the Bas-Uele provincial health officer about more details on this alert: 9 cases and 2 deaths.* |

| **Key Information** | **Description of Findings/Actions/Outcomes** | | | |
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| How many affected individuals? | | **Suspected:** | **Confirmed:** | **Deaths:** |
| | **Humans** | 0 | 5 | 4 |
| | **Domestic Animals** | | | |
| | **Wild Animals** | | | |
| How was outbreak first noticed? | *During 16th week, a 45 year old man (case 1), fisher and farmer, became sick with fever, then bloody vomiting, bloody* | | | |



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| | *stools and nosebleed in the fisher camp along the river Likati, in the Nambwa health area. He was brought to a traditional healer and then transported by moto with 2 relatives, case 2 (moto driver) and case 3 (his brother) to the Likati general hospital about 45 km away.* But he died on the road. Then case 3 decided to return to their village with the corpse. He was buried in the Kapayi village, Nambwa health area. On 25th April, case 2 and 3 developed the disease with same symptoms. Case 2 died the same day, and case 3 recovered. From these 3 persons, 6 other close contacts were infected. Among them, a young boy who attended the burial of case 1 died on 11th May.<br><br>The provincial health office has sent a team to the site to investigate and information is expected when they return as the area has no cell phone coverage. |
| Where was the first reported case? What is/was the extent of geographic spread? Include comments on the apparent speed of spread. | *For now the disease is located within four health centers: Nambwa (12 cases, 2 deaths), Mumu (3 cases, 1 death), Ngayi (4 cases, 0 death) and Azande (1 case, 0 death), in the Likati Health Zone, Territory of Aketi in the Bas-Uele province, where the first reported case was treated at the health center. No case is reported outside this area.* |
| Has the country requested support from PREDICT (include date of request)? | *Yes, the INRB General Director asked PREDICT to retest the 5 samples that were received from the field using PREDICT protocols;* |
| If so, which government agency requested PREDICT support? | The Ministry of Health through the INRB which is the national Public Health Laboratory |
| When was PREDICT response initiated (date)? | Saturday, 13th May, 2017 |
| Are other EPT partners involved in the response (which ones and how)? | *None for now* |
| What type of assistance did PREDICT initially provide? Which PREDICT personnel were involved? | Testing of 5 samples from the field using PREDICT protocols and primers for Filoviruses, by the PREDICT lab manager and lab technician |
| When was the first official acknowledgement of the outbreak (by which government agency or other reputable body and date)?<br><br>When was a response initiated and by whom? Which agencies were involved? Who was in charge of the national response? | On May 9th, 2017, the Bas-Uele provincial office informed the MoH direction of disease surveillance of the alert.<br><br>A team from Buta, the provincial health office was sent to the site to investigate. A team from the MoH direction of disease control, INRB, Hygiene and the Ministry of information travelled on Saturday morning to the field. They reached Likati (health zone office) on Sunday night at 10.00 PM. On Monday morning they had a meeting with the health zone staff and sent a first report to the national coordination committee via the Ministry of Health |



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| Was the cause of the outbreak confirmed by a laboratory? If so, give details of the initial confirmation (cause, species, specimen types tested and dates of testing if known).<br><br>*Note: Daily updates for ongoing laboratory testing should be entered in the Daily Activities/Timeline table below.* | Yes, the INRB virology laboratory tested 5 serum samples collected from patients admitted at the Nambwa health center and who were in contact with the diseased cases. They performed real-time PCR and found 2 positive results for Zaire Ebola virus. The tests were performed on 11th May and re-tested on 12th May, 2017 by the same staff.<br><br>On Saturday, 13th May, the samples were re-tested by the PREDICT staff using the PREDICT protocol. They found one positive result on the 5 samples, the same that was clearly positive by real-time PCR. |
| Where was the laboratory testing performed (name of laboratory)? | Samples were tested at the INRB virology laboratory |
| Number of days between initiation of government response and lab confirmation of laboratory results. | N/A |

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| **Summary of the Outbreak or Event:** | **To be filled after active outbreak or event activity has ceased** | | | |
| **Working name of the outbreak:** | | | | |
| **Total number of cases:** | | **Suspected:** | **Confirmed:** | **Deaths:** |
| | **Humans** | | | |
| | **Domestic Animals** | | | |
| | **Wild Animals** | | | |
| **Summary of PREDICT Team response activities during the outbreak.** | | | | |



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**PREDICT Outbreak or Health Event Response Daily Activities/Timeline**

**Working Title of Investigation:** *Suspicion of VHF in the Bas-Uele province, DR Congo*

*Instructions: This is the timeline of all PREDICT team activities related to this event. Please fill out in detail any PREDICT team activity as they occur on a **daily** basis (e.g., sample collection, other field activities, laboratory testing, outbreak related meetings attended, communications with the Mission or Government, etc.) in addition to the key specific items listed below.*

*Add additional rows into the specific activities listed below **in chronological order** as needed. If a specific listed event has not yet occurred, please put "pending" or "not expected" in the date column.*

**Key Events:**

| Date | Day # | Notification or Action Taken |
|---|---|---|
| 5/10/2017 | 1 | First notification of 9 suspected cases of Viral Hemorrhagic Fever in the Nambwa Health Area, Likati Health Zone, Bas-Uele Province; |
| 5/11/2017 | 2 | PREDICT Country coordinator (CC) notified of reception of samples from the suspected cases at the INRB;<br>PREDICT CC notified PREDICT global team |
| 5/12/2017 | 3 | Two samples out of five tested positive for Ebola Zaire virus, and 3 were negative by real-time PCR at the INRB virology laboratory.<br><br>PREDICT CC attended the National coordination committee meeting where the Minister and his team presented the situation: 9 cases and 2 deaths, and preparations are made of an investigation team composed of epidemiologists, medical biologists and lab technicians (from the MoH and INRB) to travel tomorrow from Kinshasa to support the local team, begin contact tracing and prepare the logistic for the outbreak response. The area of Nambwa is located 45 km from Likati but it takes about 5 days to reach by car and 2 days by motorcycle. The Minister and WHO have contacted the UN Mission to provide an helicopter to bring equipment to the site.<br><br>The INRB will deploy the K-Plan mobile laboratory that was purchased through the USAID funds for Yellow Fever Outbreak in Nambwa. |
| 5/13/2017 | 4 | PREDICT CC attended the meeting of the National coordination committee, where the Ministry of Health updated partners of the situation on the ground: a total of 11 cases were reported since the beginning of the outbreak with 3 deaths in the 3 health areas of Nambwa (7 cases and 3 deaths), Mouma (3 cases and 0 death) and Ngayi (1 case and 0 death). The provincial investigation team was back to Likati and could send this update by phone via the provincial health office. |



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| | | A team of 9 persons left Kinshasa today for Nambwa, composed of 2 epidemiologist, 1 lab technician, 1 clinician, 1 data manager, 1 information specialist, 1 hygienist, 1 logistician and 1 psychologist. They are expected to reach Nambwa on Monday or Tuesday and will prepare the logistic for the local coordination committee and begin contact tracing and sensitization.<br><br>Staffs from the WHO country office and the Ministry of health are working to prepare the list of needs for the outbreak response and a budget.<br><br>A request was made to the MONUSCO to provide an air lift between Kinshasa and Likati for shipping all materials and equipment, including the K-Plan mobile laboratory from the INRB. |
| 5/15/2017 | 6 | On Saturday, 13th May, the General Director of INRB asked PREDICT to retest the 5 samples received from the field for Filovirus using the PREDICT protocol. The reason was to have a second diagnostic method. The INRB staff tested these samples on Friday and Saturday by real time PCR, using 3 different protocols: the first targeting the L gene returned 1 positive result; the second targeting the NP gene returned 2 positive results, and the 3rd targeting the Glycoprotein gene returned 1 positive result.<br><br>Using the PREDICT protocols, the PREDICT staff tested the five samples which returned only one putative positive result on the gel, from the sample which tested positive from the 3 protocols used by the INRB staff. Amplicon from this sample will be send to GATC for sequencing per our protocol. This result was as expected as the PREDICT Filovirus protocols should be and are correct for detection of this virus but are also necessarily less sensitive as a result of conserved technique, resulting in weak or negative reactions in samples with low viral load.<br><br>PREDICT CC and virologist attended the National Coordination meeting. Two points were discussed: 1) the plan and budget for the outbreak response: a group from the MoH direction of disease control, the INRB, WHO, UNOCHA and UKAID finalized the plan and budget on Monday morning. Main points are: strengthening of coordination, surveillance, hygiene and biosecurity, medical and psycho-social care, laboratory diagnostic, communication and rehabilitation of health centers and the Likati General Hospital in the Bas-Uele province. No decision of quarantine will be made. The INRB will deploy two mobile laboratories, one at Nambwa (epicenter) and a second in Buta with possibility to be deployed anywhere based on the epidemiologic situation of the outbreak.<br><br>The total budget for the response is $8,072,636.00 and includes: |





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| | | coordination at national, provincial and local levels ($945,377), surveillance and laboratory ($1,685,265.00), communication ($505,000.00), materials and supplies ($1,605,000.00), medical and psychosocial care ($2,313,280.00), prevention ($ 477,839.00), Water, hygiene and sanitation ($540,675). Main Challenges are: transport of goods to the affected area (THE UN may help with a Helicopter), and transport of probable cases to the Ebola Treatment Center due to bad roads.<br><br>2) the situation on the field: now the total of cases has increased to 20, reported from 4 health areas: Nambwa with 12 cases and 2 deaths, Muma with 3 cases and 1 death, Ngayi with 4 cases and 0 death, Azande with 1 case and 0 death. Samples collected will all be shipped to the INRB because the committee decided not to wait for the mobile lab to be deployed.<br><br>Right now all cases are being treated at home because there is no facility for handling Ebola cases. The Ebola Treatment Center is still under rehabilitation. The team has begun to disinfect the laboratory and health centers and the local radio broadcast is used for sensitization. |
| 5/16/2017 | 7 | PREDICT virologist attended the National Coordination Committee. A new case was reported from Nambwa, young girl 16 years old living in a house with a suspect case. Now the total number of reported cases are 21: Nambwa 13 cases, 2 deaths; Muma 3 cases, 1 death; Ngayi 4 cases, 0 death, Azande 1 case, 0 death.<br><br>3 teams are now deployed in the field in three different locations with the following objectives : active research of suspected cases, sample collection, contacts tracing and assessment of logistic needs. A fourth team led by the Ministry of Health will leave Kinshasa tomorrow with one mobile laboratory from the INRB, prepared to perform 100 tests. WHO has mobilized PPEs from the city of Kisangani to support the response.<br><br>Seven committees were set up and will be meeting everyday; PREDICT was invited to be included in the committee in charge for laboratory and research. The first meeting will be on next Thursday to analyze all needs and make request to different partners. These committees will report to the National Coordination Committee daily.<br><br>PATH, a CDC Implementing Partner in charge to support the country Emergency Operation Center – GHSA is partnering with DigitalGlobe and UCLA to get precise maps of the Likati health zone. They have provided cellphones with GPS to the team who will travel to the site tomorrow. |
| 5/17/2017 | 8 | The PREDICT Lab manager attended the National Coordination |

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| | | Committee meeting at the MoH: no new cases reported from Likati, still a total of 21 cases with 3 deaths, and 4 health areas affected; samples were collected from a total of 13 cases; 5 were shipped to Kinshasa and tested at the INRB, and 8 are kept in Aketi waiting to be tested on site. The investigation team has identified a total of 416 contacts to be followed.<br><br>A team from the INRB travelled this morning with the 1st mobile laboratory which will be deployed in Nambwa. The 2nd mobile laboratory (K-Plan) will be transported to the field tomorrow and will be deployed in Likati.<br><br>A fourth investigation team, led by the Minister of Health will travel to the site tomorrow.<br><br>WHO has confirmed that PPEs (unknown number of kits) were deployed to Aketi from their stockpile in Kisangani<br><br>PREDICT was requested by the Commission of Laboratory and Research to provide for the mobile laboratory: one glovebox, 1 Qiagen extraction kit and Ethanol. |
| 5/18/2017 | 9 | PREDICT CC and virologist attended the 1st meeting of the commission for laboratory and research, with staffs from the INRB, CDC, UCLA and FAO-ECTAD:<br>- The mobile lab arrived and was deployed to Aketi with 4 INRB staffs;<br>- The K-Plan laboratory travelled today and will be deployed to Buta, the provincial capital city;<br>- INRB transmitted a list of reagents and supplies needed to perform lab tests in the field; the list was transmitted to the MoH and FAO. The team from FAO informed that they will provide the needed supplies according to what is available now at the Central Vet Lab<br>PREDICT virologist attended the National Coordination Committee meeting:<br><br>The Minister of Health reported on his trip to Aketi: the deployed team is performing active research of suspected cases and contacts; visited health facilities and traditional healers, ongoing data collected regarding burials in villages; sensitization of local communities; different opinion leaders are intensively collaborating with investigation teams; as well as challenges due to bad roads.<br><br>Epidemiological update:<br>Total of 29 suspected cases reported, and 3 deaths: Nambwa Health Area=11 cases and 2 deaths; Muma Health Area=3 cases and 1 death; |



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| | | Ngayi Health Area=14 cases and 0 death; Azande Health Area=1 case and 0 deaths.<br>Registered contacts under follow up = 416.<br>A total of 35 samples collected: 5 were shipped to Kinshasa and the remaining stored at Likati waiting to be tested on site.<br>Four new alerts received, 2 from Azande and 2 from Ngabatal, under investigation<br><br>Mobile lab expected to be operational tomorrow<br><br>Discussion on vaccination: Director of the Expanded Program for Immunization presented a plan and proposal for the use of experimental vaccine that was used in West Africa which is made of recombinant ZEBOV-VZV. The vaccine is efficient in protecting chimpanzees from infection. It should be conserved at -60°C, conditioned in 10 doses/vial and after reconstitution could be conserved between +2 and +8°C for a maximum of 6 hours. The vaccine is administered via intramuscular injection.<br>The Protocol of vaccination is ready and will be submitted this evening to the Ethical Committee at KSPH for approval and will be considered a clinical trial. The vaccine is not approved to be used in humans yet.<br>If the DRC Government accept the use of this vaccine, nearly 12,000 doses could be provided to be administered to teams working in the field. |
| 5/19/2017 | 10 | PREDICT virologist attended 2nd meeting of the commission for laboratory and research with staff from the INRB, CDC, UCLA;<br><br>The commission has transmitted the complete list of members and partners to Ministry of Health.<br><br>The General Director of INRB presented the strategy for response to the outbreak:<br>- The Mobile Laboratory should be operational for PCR, ELISA tests and rapid tests<br>- As there are only 3 deaths reported till today there is a possibility that this current Ebola outbreak may be mask by another unknown pathogen – INRB will also deploy a team from the Parasitology and Bacteriology Laboratories to perform investigations and diagnosis on samples collected in the field (for example recently in Banalia - Shigella and Salmonella infections were responsible for several deaths)<br><br>**Reagents for diagnosis:**<br>- Two boxes of Ebola rapid tests are available at INRB Virology Laboratory<br>- Another tests will be provided by Japanese Cooperation |



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- The Ebola tests for Mobile Laboratory (Kaplan- Prof. Parisi) were sent to DRC via DHL
- The Gene Expert machine with reagents will be received this Sunday and offered by UCLA project to INRB

PREDICT virologist also attended the National Coordination Committee meeting:

Epidemiological update:

At the date of May 18, 2017 a total of 32 suspected cases were reported with 4 deaths:
Nambwa-11 cases, 2 deaths, Mouma – 3 cases, 1 death, Ngayi – 14 cases, 1 death*, Azande-2 cases and Ngabatala – 2 cases.

Concerning the 4th death* – young girl, 22 years old died with hemorrhagic symptoms, vomiting and fever on May 8, 2017 in a small village near Ngayi. She was the family member of the 3rd died case. The burial ceremony was done for her and this was only reported when the surveillance team visited the site. Four direct contacts were identified, they are sick and under the surveillance in the village.

Registered contacts: 416 persons
Samples collected: 35

The Mobile Laboratory was installed and the testing of samples will start this evening.

In the reference Hospital in Likati, separate room for suspected cases and sick persons was prepared for safe medical follow –up of these persons.

The General Director of INRB highlighted the importance of intensive research of new cases, the daily follow-up of all contacts (two times per day with measurement of corporal temperature). He also highlighted the importance to determine the "definition of case" by the medical team deployed in the field. The follow-up of contacts is very challenging/difficult to be implemented, there is a need for trained voluntaries (ex. members of Red Cross) to help.

**Vaccination Program against Ebola:**
The Government has approved the use of the Ebola vaccine in DRC during this Ebola outbreak.
The Protocol of vaccination was submitted to Ethical Committee at KSPH for approval as a clinical trial.
Several scenarios were proposed and will be discussed before starting the

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| | | vaccination. |
| 5/20/2017 | 11 | PREDICT CC attended the meeting of the commission of Laboratory and Research:<br><br>Results from the CIRMF laboratory in Gabon: The 2 positive samples for Zaire Ebola Virus out of the 5 that were tested at the INRB were retested and confirmed in CIRMF. The staff at CIRMF is performing whole sequencing of the virus and will send results on Monday or Tuesday with Phylogenetic analysis.<br><br>The K-Plan mobile laboratory arrived in Kisangani pending transportation to Buta, the provincial capital city.<br><br>The INRB staff sent to Likati have tested 22 samples collected from suspected cases, all tests (real-time PCR) returned negative results.<br><br>The director of INRB would like PREDICT to test all negative results with PREDICT protocol for the 5 PREDICT viral families. The DRC PREDICT team is unsure about this as the current sample collection is not in conformity with PREDICT protocol. PREDICT samples should be stored at -80° C soon after collection in either Trizol or VTM which is not the case on the field.<br><br>PREDICT CC attended the meeting of the National Coordination Committee:<br><br>The following issues were raised:<br>The data from the field need to be cleaned, waiting for more accurate data tomorrow; the generator of the mobile laboratory is not working, and the lab is using the generator from the Health Zone office; contact tracing is challenging due to bad roads; 2 health facilities were selected to be rehabilitated and transformed to Ebola Treatment Centers (ETC).<br><br>The K-Plan reagents not arrived yet at the INRB as of this evening at 4.00 PM<br><br>The CDC will provide rapid tests for this outbreak<br><br>It was proposed that the team in Likati prepares and sends a list of all cases and contacts, noting timeline of symptoms occurrence, date of sample collection, and clinical outcome in order to better follow the epidemiological curve and be more specific on contacts who can be considered to be removed from the list |

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| | | All commissions should prepare an operational action plan; all technical discussion should be prepared in the commissions, and each partner interested to support specific actions and activities should present this to the commission. |
| 21/05/2017 | 12 | - |
| 22/05/2017 | 13 | PREDICT CC and Virologist attended the National Coordination Committee Meeting at the MoH **(all items are informational and do not reflect PREDICT activities)**:<br>Situation in the field:<br>- A total of 43 suspected cases with 4 deaths: Nambwa, 24 cases and 2 deaths; Muma, 4 cases and 1 death; Ngayi 10 cases and 1 death; Azande, 3 cases and Ngabatala, 2 cases.<br>- A total of 419 contacts registered: 158 in Nambwa, 162 in Muma, 98 in Ngayi, 1 in Azande and 0 in Ngabatala.<br>- Number of contacts followed=54;<br>- A total of 38 samples collected to date, of which 5 were tested at INRB and 33 being tested in the field with the Mobile laboratory in Nambwa. -- All 33 samples were negative by PCR for the Zaire Ebola virus nucleoprotein.<br>- The K-Plan mobile laboratory that was picked up from the INRB and thought to have left for Kisangani is still in Kinshasa waiting to be transported to Buta.<br>- The INRB team who will work on this mobile lab is already in Buta.<br>- Dr. Pierre Rollin from CDC arrived in Kinshasa with 250 OraSure (OraQuick) rapid tests and 100 Chembio Ebola-Paludism rapid tests. These tests will be used in the field by investigation teams working at places distant from the mobile laboratory.<br>- UCLA in partnership with Dr. Gary Kobinger (a researcher at the University of Laval, Canada, formerly with the Public Health Agency of Canada) will provide the GeneExpert to be used at the Ebola Treatment Center. |
| 23/05/2017 | 14 | PREDICT CC and Virologist attended 2 meetings; the meeting of the commission of Laboratory and research at INRB and the National Coordination Committee meeting at the MoH **(all items are informational and do not reflect PREDICT activities)**:<br><br>1) Meeting of the Commission of laboratory and research:<br>- Sample collection from patients at the Ebola Treatment Center in Likati is ongoing.<br>- It has been decided that 4 aliquots of each sample will be prepared: one to be tested at the mobile lab, the second to be tested using GeneExpert in the field, the third will be shipped to the CIRMF in Gabon for confirmation and the fourth will be stored at the INRB in Kinshasa.<br>- The K-Plan mobile lab will be transported in Buta by a UN flight and will be installed at the Buta General Hospital. |



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| | | - The INRB has also received the following reagents for the GeneExpert; Filovirus and Zaire Ebola virus (2x96 tests); reagents for PCR for Ebola virus; Ebola IgM and IgG ELISA as well as reagents for Shigella, Salmonella and Malaria.<br><br>2) Current situation in the field:<br>- A total of 48 suspected cases and 4 deaths reported: Nambwa, 28 cases and 2 deaths, Muma 5 cases and 1 death, Ngayi 10 cases and 1 death, Azande 3 cases and Ngabatala 2 cases.<br>- A total of 419 contacts have been registered and from them 49 will be removed from the list of follow up. The remaining 370 contacts are in Nambwa: 109, Ngayi: 98, Muma: 162, Azande: 1 and Ngabatala: 0.<br>- Radio broadcast from a local radio station is currently being used for sensitization but it needs to be improved in order for its signal to be transmitted across multiple villages.<br>- Some staff from the Bacteriology and Parasitology labs at the INRB will travel in the days ahead to Likati to begin testing of samples for other pathogens.<br>- At the moment, two Ebola Treatment Centers are operational; one in Likati and the other in Nambwa. They are managed by Doctors Without Borders (MSF). There is plan to set up 2 others in Muma and Ngayi. |
| 24/05/2017 | 15 | PREDICT Virologist attended 2 meetings; the meeting of the commission of Laboratory and research at INRB and the National Coordination Committee meeting at the MoH **(all items are informational and do not reflect PREDICT activities)**:<br><br>1) Meeting of the Commission of laboratory and research:<br>- The commission received confirmation that the K-Plan mobile laboratory has left for Buta;<br>- Staff from UCLA presented their results of Ebola serological survey in 4 different sites. All Ebola negative samples will be transferred to INRB for further investigation.<br>- The field team reported new symptoms including fever and jaundice as result, it was recommended that samples be tested for Yellow Fever, Hepatitis A, B and C.<br><br>2) National coordination meeting at the MoH:<br>- The field team revised the definition of cases, following the new case definition, there are currently 35 suspected cases and 4 deaths: Nambwa, 22 cases and 3 deaths; Muma, 3 cases and 0 death; Ngayi, 3 cases and 1 death; Azande, 3 cases and finally 2 new cases each in Mabangu and Mobenge (new sites)<br>- A total of 294 contacts have been registered: 98 in Nambwa, 78 in Ngayi, 87 in Muma, 11 in Azande, 10 in Ngabatala, 4 in Mabangu and 6 in Mobenge. |



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| 25/05/2017 | 16 | PREDICT CC and virologist attended the meeting of the commission of Laboratory and research at INRB and the virologist attended the National Coordination Committee meeting at the MoH **(all items are informational and do not reflect PREDICT activities)**:<br><br>1) Meeting of the Commission of laboratory and research:<br>- All negative field samples for Ebola will be retested in Likati for other pathogens using the GeneExpert platform and in Buta using the K-Plan mobile lab (PREDICT not involved in the testing).<br>- This testing will be for Yellow fever, Hepatitis B and Hepatitis C. An aliquot will be shipped to the INRB by a UN flight.<br>- Two staff from the NIH in the US arrived yesterday evening and will travel to Buta and Likati tomorrow for lab support.<br>- To case epidemiological data interpretation, all samples shipped to the INRB are accompanied with other relevant information such as the date of disease onset, date of sample collection, signs and symptoms etc.<br><br>2) National Coordination Committee meeting:<br>- A total of 37 suspected cases have been reported from 6 health areas, distributed as follow:<br>- Nambwa: 20 suspected, 2 probable, 1 confirmed, 3 deaths;<br>- Muma: 8 suspected, 1 probable and 1 confirmed;<br>- Ngayi: 2 suspected, 1 death;<br>- Azande: 3 suspected;<br>- Mobenge: 2 suspected;<br>- Mabangu: 2 suspected;<br>- Currently, only 177 contacts are being followed: 139 out of 142 in Nambwa, 4 out of 4 in Mabangu, and 34 out of 78 in Muma.<br><br>- The K-Plan mobile lab has arrived in Kisangani and will be deployed to Buta tomorrow.<br>- Patients care and treatment for Ebola suspected cases/contacts will be free of charge in the whole of Likati health zone. |
| 26/5/2017 | 17 | PREDICT virologist attended the meeting of the commission of Laboratory and research at INRB. There was no National Coordination Committee meeting today **(all items are informational and do not reflect PREDICT activities)**:<br>- The K-Plan mobile laboratory arrived in Buta, and will be deployed to the general reference hospital. Laboratory reagents for the K-Plan lab bought by INRB will be sent to Buta, including ELISA tests for HCV, HBsAg, Hepatitis E and Yellow Fever. |
| 27/5/2017 | 18 | **All items are informational and do not reflect PREDICT activities**:<br>Situation in the field:<br>- A total of 52 cases and 4 deaths are reported, including 47 suspected, 3 probable and 2 confirmed. |

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| | | - A total of 200 out of 241 registered contacts are currently being followed by the field teams: 139/142 in Nambwa, 4/4 in Mabongo, 40/78 in Muma, 11/11 in Azande and 6/6/ in Mobenge.<br>- All 47 suspected cases tested negative for Ebola by real-time PCR in Likati. Their samples will be tested by Serology (IgM and IgG) to look for Ebola antibodies.<br>- All field negative samples for Ebola (from suspected cases) will be transferred to INRB for further analysis.<br>- Medical diagnostic kits will be shipped to Likati in order to support free medical care at the general hospital. |
| 29/05/2017 | 20 | PREDICT Virologist attended 2 meetings; the meeting of the commission of Laboratory and research at INRB and the National Coordination Committee meeting at the MoH **(all items are informational and do not reflect PREDICT activities)**:<br><br>1) Meeting of the commission of Laboratory and research:<br><br>- The INRB field team will begin to test samples for bacterial pathogens (e.g Shigella and Salmonella) in Buta using the K-Plan mobile lab<br>- The field epidemiology and laboratory team began cleaning field dataset, deleting duplicates, removing all Ebola negative cases and reclassifying all remaining cases as suspected, probable, and contacts to be followed;<br>- Testing of samples by ELISA has also began in the mobile lab in Likati<br>- The commission thinks that it is now time to conduct ecological studies<br>- It should be noted that a team of researchers from the University of Kisangani Center for Surveillance and Biodiversity conducted an ecological study in Likati some time before the outbreak<br>- Investigators were told that the index case was in contact with a wild pig. Also some persons in the community reported die-offs of domestic pigs<br>- Researchers from the NIH proposed to conduct a longitudinal study of all contacts of confirmed and probable cases to determine markers of the infection.<br><br>2) Meeting of the National Coordination Committee:<br><br>- After cleaning the dataset, the field team has now reported only 19 cases and 4 deaths in total: 14 suspected cases (6 in Nambwa, 4 in Muma, 3 in Ngayi and 1 in Ngabutala); 3 probable cases (2 in Nambwa and 1 in Ngayi) and 2 confirmed cases in Nambwa;<br>- The number of contacts registered is now 101 (20 in Nambwa; 5 in Mobenge; 61 in Muma and 15 in Ngayi<br>- Die-offs of domestic pigs were reported from Azande, Ngabatala and Mobenge, and the field veterinarian team collected samples from 30 pigs and 2 goats; |



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| | | - The committee agreed to conduct ecological studies within the area of Aketi. |
| 30/05/2017 | 21 | PREDICT CC and Virologist attended the meeting of the commission of Laboratory and research at INRB. The PREDICT virologist attended the National Coordination Committee meeting at the MoH **(all items are informational and do not reflect PREDICT activities)**:<br><br>1) Meeting of the commission of Laboratory and research<br><br>- The K-Plan mobile laboratory was successfully installed in Buta and ready to be used. The equipment will also be used for testing of bacteria pathogens in blood and stool samples. An aliquot of all negative samples will be shipped from Likati to Buta.<br>- Two staff from the NIH arrived in Likati to support testing on the mobile laboratory platform.<br>- Dr. Kobinger from Canada has begun testing samples in Likati by ELISA. Currently, there are 2 Ebola IgG positive samples which were negative by real-time PCR.<br>- Aliquots of all samples negative for Ebola by real-time PCR in Likati were received at the INRB. Through support from METABIOTA, these samples will be inactivated and extracted RNA shipped to the USA for deep sequencing. The DRC PREDICT lab was also requested to test these samples using the PREDICT protocol for all priority viral families.<br>- The local Veterinarian in Likati has collected samples from domestic pigs and goats. These samples will be shipped to the Central Veterinary Laboratory in Kinshasa for testing. FAO will also provide ELISA reagents to test for the African Swine Fever.<br>- Ecological studies are being proposed by different institutions: PREDICT, FAO, Institut de Medecine Tropicale (Antwerp, Belgium), Robert Koch Institute (Germany), the University of Kisangani, NICD (South Africa), NIH and the University of OKAIDO (Japan). Request letters from the MoH will be released soon; all institutions are requested to send their protocols to Prof. Muyembe, director of the INRB by tomorrow.<br><br>2) National Coordination Committee meeting<br><br>- Situation in the field: There are a total of 17 cases: 12 are suspected cases (6 in Nambwa, 1 in Muma, 3 in Ngayi and 2 in Azande), 3 probable cases (2 in Nambwa and 1 in Ngayi), and 2 confirmed cases (from Nambwa).<br>- A total of 4 deaths: 3 from probable EVD cases (2 in Nambwa and 1 in Ngayi) and 1 from a confirmed case in Nambwa.<br>- On the 101 contacts registered, 20 are in Nambwa, 5 in Mobenge, 61 in Muma and 15 in Ngayi. Only contacts from Nambwa and Mobenge were |

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| | | followed by the investigation teams.<br>- Active surveillance activities will continue in the Likati health zone even after the declaration of the end of the outbreak. |
| 31/05/2017 | 22 | PREDICT CC and Virologist attended the meeting of the commission of Laboratory and research at INRB. The PREDICT virologist attended the National Coordination Committee meeting at the MoH **(all items are informational and do not reflect PREDICT activities)**:<br><br>1) Meeting of the commission of Laboratory and research<br><br>- A team from the African CDC attended this meeting following the request from the government of the DRC to help set up a transboundary surveillance system with neighbor countries and to contact key actors in Ebola response management to become part of the regional collaboration center. A follow-up meeting will be held in Gabon on the 25-26 July, 2017 and the INRB is invited. The African CDC suggested that the CIRMF in Gabon be added to the list of institutions which will conduct ecological studies in the field.<br>- In Likati a total of 4 samples tested positive for Ebola IgG by ELISA (the Elisa IgM tests are not sensitive enough). In order to interpret these results, a second sample will be collected from these 4 cases (at least 10 days after the first test) to detect any increase in antibody titer. This will enable the discrimination between recent and past infection. The field team is advised to send all clinical and epidemiological data from these 4 cases in order to support lab interpretation.<br>- The K-Plan mobile laboratory is already in Buta. Blood and stool samples will be tested for bacteria pathogens (hemoculture and coproculture).<br>- The first batch of Ebola negative samples from suspected cases arrived at the INRB and will be tested using the PREDICT protocol.<br>- Metabiota DRC director will prepare an MTA for the samples that will be shipped to the USA for deep sequencing.<br><br>2) National Coordination Committee meeting<br><br>- Situation in the field is unchanged, still 17 cases: 12 suspected, 3 probable and 2 confirmed, with 4 deaths and 101 contacts.<br>- The local Vet team will travel tomorrow to Nambwa, Ngayi and Muma to investigate die-offs among domestic animals and collect samples. |
| 1/06/2017 | 23 | PREDICT Virologist attended the National Coordination Committee meeting at the MoH **(all items are informational and do not reflect PREDICT activities)**:<br><br>- There was no meeting of the commission of laboratory and research due |

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| | | to difficulties to establish contact with the field team<br>- Current epidemiologic data from the field suggest there are a total of 13 cases (8 suspected, 3 probable and 2 confirmed) and still 4 deaths<br>- A second blood sample was collected today from the 4 cases with Ebola positive IgG on ELISA. IgG titration which will be performed in Likati to determine if there is an increase in titer<br>- Today marks 21 days since the outbreak was officially declared and the curve suggests that the outbreak is coming to an end. A scientific commission will be put in place to discuss next steps and preparedness strategies for any other Ebola outbreak as well as opportunity for a vaccination campaign<br>- All samples collected from domestic animals (pigs and goats) tested negative for Ebola. These samples will be shipped to the Central Vet Lab in Kinshasa for further analysis<br>- A total of 357 contacts were removed from the list and 72 are currently being followed. That is 38/38 in Nambwa, 9/9 in Mabango, 11/11 in Azande and 14/14 in Ngayi |
| 01/06/2017 | 23 | Official Request from the Ministry of Public Health (National Institute of Biomedical Research) to assist with an ecological investigation in the Bas-Uélé Province. The request specifically mentions "as was provided during the Isiro epidemic". *Nota bene* - The Isiro outbreak referred to was in 2012 and was of Bundibugyo ebolavirus. |
| 03/06/2017 | 25 | PREDICT Virologist attended the meeting of the commission of Laboratory and research at INRB and the National Coordination Committee meeting at the MoH **(all items are informational and do not reflect PREDICT activities)**:<br><br>1) Meeting of the Commission of Laboratory and Research<br><br>- In the field, Dr. Gary Kobinger from Canada retested Ebola specimen by ELISA for anti-Ebola IgG: 2 specimens showed increased titers of IgG relative to a previously collected specimen's IgG titers. Using rise in titer of these paired serum results as a sign of recent infection, there are now 4 confirmed positive cases; 2 by real-time PCR and 2 by IgG serology. Repeat testing of the 2 other specimens that were initially positive for IgG, one was negative and the other showed an indeterminate result and will be retested.<br>- The commission has prepared a plan of activities for the next 21 days and for a period of 2 months after the end of the outbreak that will be proposed to the national coordination committee<br>The plan has 4 objectives:<br>1) Conduct ecological studies in Likati<br>2) Evaluation of some rapid tests (OraQuick, Chembio and Quicknavyebola ) in human and animal population<br>3) Train local health workers on the use of the rapid tests as well as on |

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| | | Biosafety & Biosecurity<br>4) Strengthen the capacity of the laboratory at the Buta General Hospital in the analysis of samples from the Bas-Uélé province<br><br>2) The National Coordination Committee meeting<br><br>- Situation in the field: ***Currently, there are no suspected cases***, 3 probable cases (2 in Nambwa and 1 in Ngayi) and 4 confirmed cases (all from Nambwa, 2 confirmed by real-time PCR and 2 by ELISA serology)<br>- A total of 4 deaths have been registered: 3 from Nambwa (1 confirmed and 2 probable), and 1 probable from Ngayi<br>- 72 contacts were removed from the contact trace list because laboratory results from suspected cases they were connected to turned out to be negative.<br>- Free Medical care is currently being implemented in some of the health facilities in the Likati health zone as basic medical kits were distributed by WHO and UNICEF. It is reported that WHO will send 20 more basic medical kits to the area |
| 5/06/2017 | 27 | PREDICT Virologist attended the meeting of the commission of laboratory and research at INRB and the National Coordination Committee meeting at the MoH **(all items are informational and do not reflect PREDICT activities)**:<br><br>1) Meeting of the Commission of Laboratory and Research<br><br>- An additional sample from a suspected case that initially tested negative for Ebola virus genomic material by real-time PCR, on further testing was found to be positive by ELISA for IgG with a rising titer indicative of recent infection (1st sample tested negative, second sample tested IgG ++ and the third was IgG ++++). This case is now considered as the 5th confirmed case<br>- The commission is developing a budget for post-epidemic surveillance<br>- A meeting is planned to develop a coordination plan for the ecological study that will be conducted in the near future.<br>- FAO has ordered lab reagents to be used in testing samples collected from pigs and goats at the Central Veterinary Lab.<br><br>2) National Coordination Committee Meeting<br>- Currently, there are 5 confirmed cases and 3 probable. The 5th confirmed case initially tested negative by real-time PCR and is now test positive by ELISA with increasing anti-Ebola IgG antibody titers.<br>- Of note is that the 5th case was the care-giver of the driver of the motorcycle who died after transporting the index case<br>- The Commission for Laboratory and Research will organize a coordination meeting with all partners for the ecologic study in a few |

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| | | days.<br>- It was mentioned that all partners ending their activities and leaving the outbreak zone should present a report of their support and an inventory of items they would like to leave in Likati |
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## In-Country Government Outbreak or Health Event Points of Contact

| **Public Health ministry or department:** | |
|---|---|
| Name: | Benoit Kebela Ilunga |
| Email: | REDACTED |
| Mobile Phone: | |

| **Livestock ministry or department:** | |
|---|---|
| Name: | Leopold Mulumba |
| Email: | REDACTED |
| Mobile Phone: | |

| **Wildlife/Environment ministry or department:** | |
|---|---|
| Name: | Jeff Mapilanga |
| Email: | REDACTED |
| Mobile Phone: | |

| **OIE focal point:** | |
|---|---|
| Name: | Honore N'Lemba Mabela |
| Email: | REDACTED |
| Mobile Phone: | |

| **IHR focal point:** | |
|---|---|
| Name: | Theophile Bokenge |
| Email: | REDACTED |
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| **FAO:** | |
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| Name: | Philippe Kone |
| Email: | REDACTED |
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| **WHO:** | |
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| Name: | Ernest Dabire |
| Email: | dabireer@who.int |
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| **EPT ONE HEALTH WORKFORCE Project:** | |
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| Name: | Diafuka Saila Ngita |
| Email: | Diafuka.saila_ngita@tufts.edu |

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|---|---|
| Mobile Phone: | REDACTED |

| EPT PREPAREDNESS and RESPONSE Project: | |
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| Name: | |
| Email: | |
| Mobile Phone: | |

**Other Important Contacts:**

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| Organization: | |
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| **From:** | Andrew Clements <aclements@usaid.gov> |
| **To:** | Brian Bird <bhbird@ucdavis.edu> |
| **CC:** | PREDICTMGT <predictmgt@usaid.gov>;PREDICT-outbreak <predict-outbreak@ucdavis.edu> |
| **Sent:** | 6/6/2017 3:40:45 PM |
| **Subject:** | [predict-outbreak] Re: Update from DRC Bas-Uele Ebola outbreak |

Thanks. In the future, such a chart would be helpful.

*Andrew P. Clements, Ph.D.*
*Senior Scientific Adviser*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

On Jun 6, 2017, at 5:35 PM, Brian Bird <bhbird@ucdavis.edu> wrote:

It seems that there isn't one publically available yet, at least not through the WHO sit reps that I have seen.

-b

**From:** Andrew Clements <aclements@usaid.gov>
**Date:** Monday, June 5, 2017 at 11:49 PM
**To:** Brian Bird <bhbird@ucdavis.edu>
**Cc:** PREDICTMGT <predictmgt@usaid.gov>, PREDICT-outbreak <predict-outbreak@ucdavis.edu>
**Subject:** Re: Update from DRC Bas-Uele Ebola outbreak

Thanks, Brian.

Is there a chart in existence that shows how the confirmed and probable cases are connected to each other?

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Rapid fire update from the field team on today's activities. (Sorry for the two emails… I figured this would come tomorrow).

Details on confirmation of 5th case by IgG serology (tertiary contact of index case).

Reported as of today: 5 confirmed and 3 probable EVD cases.

-Brian

**From:** Brian Bird <bhbird@ucdavis.edu>
**Date:** Monday, June 5, 2017 at 2:43 PM

**To:** PREDICTMGT <predictmgt@usaid.gov>
**Cc:** PREDICT-outbreak <predict-outbreak@ucdavis.edu>
**Subject:** Re: Update from DRC Bas-Uele Ebola outbreak

Update from the field team. Most current information is from end day 03 June.

As of that date, there were no persons remaining on the contact trace list as they had either cleared the 21-day monitoring window, or were removed as suspected cases were ruled-out by laboratory diagnostics. Fingers crossed it stays that way.

Regarding the request for PREDICT assistance in field ecology studies in the outbreak area, the team was able to clarify that all potential partners were requested to submit proposals of activities for consideration. The PREDICT team has limited their preliminary discussions to only bat and rodent sampling, while awaiting permission to proceed from USAID. There is a coordination meeting by the MoH this week to sort out details, and hopefully gain more information on what exactly is requested from PREDICT during this activity. I will share details as I get them.

All the best to you!

-brian

**From:** Brian Bird <bhbird@ucdavis.edu>
**Date:** Friday, June 2, 2017 at 8:52 PM
**To:** PREDICTMGT <predictmgt@usaid.gov>
**Cc:** PREDICT-outbreak <predict-outbreak@ucdavis.edu>
**Subject:** Update from DRC Bas-Uele Ebola outbreak

Hi all,

I am handing correspondence for this one while Jonna is in transit to Tanzania.

We received a request to support ecological investigations in the outbreak area this evening. The letter requests ecological investigations similar to what was completed during the 2012 Isiro *Bundibugyo ebolavirus* outbreak. Update to the Outbreak form and the Letter of request is attached. Fortunately, as the form and other sources indicate the numbers of suspected cases continues to drop and many persons were removed from the contact trace in the past few days as they passed the 21-day monitoring window. Hopefully this trend continues.

One concern is that in the past few days it was indicated that at least 9 organizations may be invited to conduct ecological investigations. I have asked the team to clarify if there is a level of coordination at the GoDRC level for the potential multiple requests to many different partner organizations or was only PREDICT invited (see entries for May 30 and 31st). I will pass on that information when I receive it.

Have a great evening or morning!

-Brian

Brian H. Bird DVM, MSPH, PhD
One Health Institute
1089 Veterinary Medicine Dr.
School of Veterinary Medicine
University of California, Davis
bhbird@ucdavis.edu

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**To:** Brian Bird <bhbird@ucdavis.edu>
**CC:** PREDICTMGT <predictmgt@usaid.gov>,PREDICT-outbreak <predict-outbreak@ucdavis.edu>
**Sent:** 6/6/2017 3:43:18 PM
**Subject:** [predict] [predict-outbreak] Re: Update from DRC Bas-Uele Ebola outbreak

Thanks.

You have my permission to continue the discussions/coordination. Once there is a set scope and budget, we can discuss whether it is possible within the country budget.

Andrew

*Andrew P. Clements, Ph.D.*
*Senior Scientific Adviser*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

On Jun 6, 2017, at 5:23 PM, Brian Bird <bhbird@ucdavis.edu> wrote:

Hi Andrew,

For now, there is a request from MoH to participate in ecology studies… but that also went to about 9 other groups at the same time all requesting basically the same thing. So, it seems there is some negotiating and coordination at the MoH level to do to sort out exactly who will do what and where.

For now, the team is proposing a single 10-day expedition to the outbreak area focused on bat and rodent sampling. The team is awaiting the outcome of the discussions this week with the MoH, and the other partners to avoid overlap and duplication.

Does the team have preliminary permission to carry-on in the discussions with MoH, and focus on developing a 10-day bat and rodent sampling strategy around the outbreak area?

Once we have more details on the coordination, exact scope, and a not to exceed budget we'll share forward for final approval.

Thanks!

-b

**From:** Andrew Clements <aclements@usaid.gov>
**Date:** Monday, June 5, 2017 at 11:40 PM
**To:** Brian Bird <bhbird@ucdavis.edu>
**Cc:** PREDICTMGT <predictmgt@usaid.gov>, PREDICT-outbreak <predict-outbreak@ucdavis.edu>
**Subject:** Re: Update from DRC Bas-Uele Ebola outbreak

Thanks, Brian.

Can you clarify what is meant by Predict "awaiting permission to proceed from USAID"?

Is that permission from me or the Mission or both?

Andrew

*Andrew P. Clements, Ph.D.*
*Senior Scientific Adviser*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

On Jun 6, 2017, at 12:00 AM, Brian Bird <bhbird@ucdavis.edu> wrote:

Update from the field team. Most current information is from end day 03 June.

As of that date, there were no persons remaining on the contact trace list as they had either cleared the 21-day monitoring window, or were removed as suspected cases were ruled-out by laboratory diagnostics. Fingers crossed it stays that way.

Regarding the request for PREDICT assistance in field ecology studies in the outbreak area, the team was able to clarify that all potential partners were requested to submit proposals of activities for consideration. The PREDICT team has limited their preliminary discussions to only bat and rodent sampling, while awaiting permission to proceed from USAID. There is a coordination meeting by the MoH this week to sort out details, and hopefully gain more information on what exactly is requested from PREDICT during this activity. I will share details as I get them.

All the best to you!

-brian

**From:** Brian Bird <bhbird@ucdavis.edu>
**Date:** Friday, June 2, 2017 at 8:52 PM
**To:** PREDICTMGT <predictmgt@usaid.gov>
**Cc:** PREDICT-outbreak <predict-outbreak@ucdavis.edu>
**Subject:** Update from DRC Bas-Uele Ebola outbreak

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**To:** Brian Bird <bhbird@ucdavis.edu>
**CC:** PREDICTMGT <predictmgt@usaid.gov>,PREDICT-outbreak <predict-outbreak@ucdavis.edu>
**Sent:** 6/9/2017 9:35:54 AM
**Subject:** [predict] [predict-outbreak] Re: Update from DRC Bas-Uele Ebola outbreak

Thanks

*Andrew P. Clements, Ph.D.*
*Senior Scientific Adviser*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

On Jun 9, 2017, at 3:45 AM, Brian Bird <bhbird@ucdavis.edu> wrote:

Small updates from the DRC team. System being put in place to monitor the confirmed and probable survivors over time.

-Brian

**From:** Brian Bird <bhbird@ucdavis.edu>
**Date:** Tuesday, June 6, 2017 at 8:34 AM
**To:** Andrew Clements <aclements@usaid.gov>
**Cc:** PREDICTMGT <predictmgt@usaid.gov>, PREDICT-outbreak <predict-outbreak@ucdavis.edu>
**Subject:** Re: Update from DRC Bas-Uele Ebola outbreak

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To view this discussion on the web visit https://groups.google.com/a/usaid.gov/d/msgid/predictmgt/243E07B9-8AC8-4BE9-AB4B-AC39FC15FB09%40ucdavis.edu.

--
You received this message because you are subscribed to the Google Groups "PREDICTMGT" group.
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To view this discussion on the web visit https://groups.google.com/a/usaid.gov/d/msgid/predictmgt/6A4B6CFB-7FA5-490D-8947-B6B185F8377D%40ucdavis.edu.

**From:** "William B. Karesh" <karesh@ecohealthalliance.org>
**To:** Karen Saylors <ksaylors@metabiota.com>, Romain Bagamboula <[redacted]>
**Cc:** Mario Freddy Mondele <mmondele@usaid.gov>, Ubald Tamoufe <utamoufe@metabiota.com>, Prime Mulembakani <pmulembakani@metabiota.com>, Evelyn Luciano <luciano@ecohealthalliance.org>, Peter Daszak <daszak@ecohealthalliance.org>, "predict@ucdavis.edu" <predict@ucdavis.edu>, Amanda Andre <amanda.andre@ecohealthalliance.org>, Leticia Gutierrez-Jimenez <gutierrez@ecohealthalliance.org>, Leilani Francisco <francisco@ecohealthalliance.org>, Alice Latinne <latinne@ecohealthalliance.org>
**Sent:** Wed, 14 Jun 2017 19:41:32 +0000
**Subject:** [predict] Re: des nouvelles

Merci beaucoup Karen and Dear Colleagues in Brazzaville
First, let me say that we are honored to be working with you on the PREDICT-2 project in the Republic of Congo.

Dr. Peter Daszak and I are looking forward to meeting with you all soon in Brazzaville in July. We are planning to arrive on Saturday evening, 8 July.

Accompanying us will be Dr. Leilani Francisco, the behavioral coordinator for PREDICT-2 who has been working closely with Karen; and Dr. Leticia Gutierrez, our Field Veterinarian for EcoHealth Alliance on the PREDICT-2 project.

We are also hoping that Karen and Dr. Prime will also be joining us in Brazzaville.
If it is possible, could you please save some time to meet with us on 10 July. We are also available to meet on Sunday, 9 July if you would prefer.

Also, we would like to arrange a dinner on Sunday night, 9 July, and would be honored and pleased if you could join us.

Cordialement,

Billy

**William B. Karesh, D.V.M**
*Executive Vice President for Health and Policy*

EcoHealth Alliance
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President, OIE Working Group on Wildlife

Co-chair, IUCN Species Survival Commission - Wildlife Health Specialist Group

EPT Partners Liaison, USAID Emerging Pandemic Threats - PREDICT-2 Program

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On Jun 14, 2017, at 1:09 PM, Karen Saylors <ksaylors@metabiota.com> wrote:

Bonjour a tous.

J'espère que tout va bien a Brazzaville.

Je regrette de vous informer que nous subissons quelques changements dans le projet PREDICT et que la gestion globale sera transmise de Metabiota à l'Alliance EcoHealth. Nous prévoyons une transition à l'amiable, alors, dans cet esprit, nous espérons pouvoir venir à Brazzaville ensemble pour vous rencontrer en équipe en juillet. En outre, je voudrais vous présenter les trois acteurs principaux de EHA, copiés ici: Peter Daszak, le president de EHA, Billy Karesh, le Vice President (*Executive Vice Presideent for Health and Policy*), et Evelyn Luciano, le coordinateur de EHA.

Je me souviens également, Mario, que lorsque nous avons parlé pour la dernière fois, vous avez mentionné que vous serez en voyage pour un mois pendant ce période. Nous espérons pouvoir venir à Brazzaville pour vous rencontrer en équipe **entre le 8-11 juillet**, alors je ne sais pas si vous serez sur place pendant ce temps, mais je suis sûr que nous pouvons rencontrer quelqu'un d'autre à la Mission à votre place.

A EHA, ils seront en mesure de définir l'ordre du jour de la visite et clarifieront les changements spécifiques qu'ils espèrent effectuer dans le plan de mise en œuvre de PREDICT au Congo.

C'était un plaisir de travailler avec vous et j'espère poursuivre notre collaboration positive dans le futur.

Meilleurs salutations,
Karen

Karen Saylors, Ph.D.
Vice President, Field Research | Metabiota
Deputy Director, PREDICT Behavioral Surveillance
425 California Street, San Francisco, CA 94104
Email: ksaylors@metabiota.com
Mobile: (+1) 310 994 5770

| | |
|---|---|
| **From:** | Mario Mondelo <mmondelo@usaid.gov> |
| **To:** | William B. Karesh <karesh@ecohealthalliance.org> |
| **CC:** | Jonna Mazet <jkmazet@ucdavis.edu>;David Wolking <djwolking@ucdavis.edu>;Alisa Pereira <apereira@usaid.gov>;Shana Gillette <sgillette@usaid.gov>;Andrew Clements <AClements@usaid.gov>;Ava Sullivan <sullivan@ecohealthalliance.org>;Alice Latinne <latinne@ecohealthalliance.org>;Peter Daszak <daszak@ecohealthalliance.org>;Alison Andre <andre@ecohealthalliance.org>;Amanda Andre <amanda.andre@ecohealthalliance.org>;Sarah Atwood Barma <satwood@usaid.gov>;Leticia Gutierrez-Jimenez <gutierrez@ecohealthalliance.org>;Leilani Francisco <francisco@ecohealthalliance.org>;GeeEA@state.gov <GeeEA@state.gov> |
| **Sent:** | 6/16/2017 8:40:41 AM |
| **Subject:** | Re: PREDICT transition in ROC |

Hi Billy,

Sorry for my delayed reply, we have internet issues in the city these past few days.

Thank you for sharing the report.

Mario

Sent from my iPhone

On Jun 14, 2017, at 15:40, William B. Karesh <karesh@ecohealthalliance.org> wrote:

Greetings,

Look forward to speaking with you shortly. I'm not sure if all of you have received the recent PREDICT-2 semi-annual report, but attached are the pages for the Republic of Congo.

a bientôt,

Billy

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UCDU5R0002290

**From:** Dennis Carroll <dcarroll@usaid.gov>
**Sent:** Wed, 21 Jun 2017 14:52:43 -0400
**Subject:** Re: GVP Docs For Review & Feedback
**To:** Brooke Watson <watson@ecohealthalliance.org>
**Cc:** [redacted], Cara Chrisman <cchrisman@usaid.gov>, Jonna Mazet <jkmazet@ucdavis.edu>, Peter Daszak <daszak@ecohealthalliance.org>, Eddy Rubin <erubin@metabiota.com>, Nathan Wolfe <nwolfe@metabiota.com>

Thanks for moving this along Brooke. Great job. Looking forward to your input [redacted]

did

Dr Dennis Carroll
Director, Emerging Threats Programs
U.S. Agency for International Development
Office: (202) 712-5009
Mobile: [redacted]

On Jun 21, 2017, at 1:43 PM, Brooke Watson <watson@ecohealthalliance.org> wrote:

> [redacted]
> Great, thanks for the heads up.
>
> Attached is a revised draft of the WHO bulletin, with changes tracked - please make any changes and improvements you see fit. There are a couple references I couldn't find, which I've mentioned in the comments - if you're able to add those, it would be really helpful. Thanks again for volunteering to make the paper better.
>
> Best,
>
> Brooke

On Tue, Jun 20, 2017 at 7:13 PM, [redacted] wrote:

> Hi GVP team,
>
> Jonna and I have been speaking to our PREDICT team about calibrating the country-level budget for Phase 1 countries.
> Since two out of three officers who can help are currently traveling this week, we will work on this next week.
>
> Regards,
> [redacted]
>
> [redacted]
> One health leadership fellow
>
> University of California, Davis

One Health Institute

School of Veterinary Medicine

**From:** Cara Chrisman [mailto:cchrisman@usaid.gov]
**Sent:** Friday, June 16, 2017 8:35 AM
**To:** Jonna Mazet <jkmazet@ucdavis.edu>; Peter Daszak <daszak@ecohealthalliance.org>; Eddy Rubin <erubin@metabiota.com>; Nathan Wolfe <nwolfe@metabiota.com>; Brooke Watson <watson@ecohealthalliance.org>; [redacted]
**Cc:** Dennis Carroll <dcarroll@usaid.gov>
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1. Outreach Plan - Please add anyone/any place that is missing, as well as good POC's.
2. Pitch Deck - Any feedback/edits would be much appreciated.
3. GVP Presentation - This is the expanded/general GVP presentation we discussed and for which we would also like feedback. **Peter - the slide for your editing is #13.**

Thanks,

Cara & Dennis

GVP General Presentation.6.16.2017.pptx

Cara J. Chrisman, PhD
Senior Infectious Diseases Technical Advisor
Emerging Threats Division
Office of Infectious Disease
Bureau for Global Health
U.S. Agency for International Development (USAID)

Desk: (202) 712-1161

Cell: REDACTED
E-mail: cchrisman@usaid.gov

--

**Brooke Watson, MSc**
*Research Scientist*

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REDACTED

REDACTED

One health leadership fellow

University of California, Davis

One Health Institute

School of Veterinary Medicine

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GVP.General Presentation.6.16.2017.pptx

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**Cc:** Dennis Carroll <dcarroll@usaid.gov>
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<GVP.PMAC.WHO.Bulletin.6.21.17_bw.docx>

**From:** Brian Bird <bhbird@ucdavis.edu>
**To:** Jonna Mazet <jkmazet@ucdavis.edu>;David J Wolking <djwolking@ucdavis.edu>;Corina Grigorescu Monagin <cgmonagin@ucdavis.edu>;Elizabeth Leasure <ealeasure@ucdavis.edu>;Tracey Goldstein <tgoldstein@ucdavis.edu>
**Sent:** 6/23/2017 5:34:19 PM
**Subject:** Overall Sierra Leone update thus far

Here's an overview of what's happened so far.... attached is trip report with my notes/impressions for more details on each of these areas below.

**Summary:**

1. Staff communications: getting better.... I look less like the devil day by day
2. UNIMAK: tentative "yes" to being full partner… loads of concerns though…
3. USAID: spent 6-7 hours total with them so far.... outcome seems good for now.
4. Ministries: Ag and Health happy with lab plan; unhappy with release of finding… political window has closed… major worry about election violence and disruption; trying to meet with Office of National Security.
5. SLA: won't be easy or quick to change this…
6. Other meetings:
    a. CDC: happy UCD is in charge
    b. P&R: director hopes we'll keep their office space in F/T, total rent is $24,000/yr.... right now P&R pays nothing…they had their national roll out of the one health platform. Nice moment for the country.

Liz and David, I'll be emailing you for some needed documents etc that various folks want to see, so we can get things going here….

-b

**Trip Report: UCDavis – Metabiota Transition Sierra Leone**
**Brian Bird – June 2017**

**Major issues and discussions:**

1) **Staff Communications:**
    a. **Monday 19 June:** Initial dinner with Prof Gbakima and James Bangura set things on the right track. After 2 hours, they understood some of why there was going to be a transition and that we were trying to do the best job we can for the project and the people. By the end of the 3rd hour we were on okay footing. Their main issue was that they did not fully understand until the phone call with Jonna that a transition was coming and that it was going to be absolute.
    b. **Wednesday 21 June:** Met with field staff in Makeni. Much anger and frustration. They had clearly been told something along the lines of get ready to be fired, the project is shutting down, or that UCD can't be trusted etc… I was surprised by the level of frustration from the young folks. Fortunately, Prof and James vouched for me, and another guy Victor who works for Metabiota and who I was with in Kenema during the roughest part of the outbreak vouched for me as stand up guy. That helped, but I did not win them over completely. They wanted absolute answers to questions like (are we all going to be hired, who will employ us, etc…) I did not have definitive answers at that point, so they didn't like that. My reply was that I ain;t promising things that I don't know if I could deliver. Eventually that line of reasoning helped… moderate success on this one…
    c. **Thursday 22 June:** Met with F/T staff. They were more accepting of the change. Messages had clearly been shared from Makeni to F/T.
    d. **Friday 23 June:** discussions with Prof and James on their contracts.

2) **UNIMAK partnership: Tentative "Yes" to being full implementing partner**
    a. Wednesday (21 June) met with representatives from UNIMAK (Head of Administration - Mercy Mwaura; Head of HR – Veronica; Registrar – Father Francis). FYI- UNIMAK is a Catholic University.
    b. Senior leadership (Chancellor and Vice-chancellor are in China, but have already been briefed on the transition and given tentative yes).
    c. **Main issues discussed:**
        i. **Staff:** they can absorb the staff, they are exploring how to best adapt their hiring process to smooth the process and reduce the screening process time and requirements. They have no issues with some staff living in FT and working for UNIMAK. Hiring timeline after candidate selection about 3-4 weeks.
        ii. **Procurement and logistics:** They don't really have any capacity for this… willing to learn, but they are afraid their systems for purchasing (only ever purchased in-country supplies) can meet our needs. They suggested getting another organization to handle this part of the work.
        iii. **Administrative oversight:** Want to know exactly what is expected of them and what the SOW would be.
        iv. **Technical oversight:** concerned that they wouldn't be able to give the technical oversight needed… I told them this would still reside within the PREDICT team. UNIMAK's chief role would be administrative, not technical – except for the lab staff.

v. **Any other international projects:** Yes, they have had this type of arrangement with other international organizations before, but they have been much smaller than what our ask would be.

d. **What UNIMAK needs to begin:**
   i. Description of UC Davis and how we implement and partner with other Universities within PREDICT.
   ii. SOW and expectations and how will we ensure compliance
   iii. A conference call with someone from UCD who can discuss how these types of contracts/subawards work with UCD.
   iv. I offered up to let them chat with Prof Kazawala or someone else from the UCD-PREDICT network so that they could get an unbiased opinion on how we work and what we can bring to the table.
   v. List of personnel and qualifications – they need to figure out what job categories they need to have in place and if they can skip the vetting process for new hires so they don't have to start at the absolute beginning of the hiring process.

**3) Mission Communications:**

a. USAID-Washington Delegation and SL mission: I've met with them now 3 times, plus informal communications at various functions. Each of the 3 meetings was for about 2 hours.
   i. **Tuesday 20 June: Meeting at Radison Blu**
      1. Richard Greene, Kendra Chittenden, Robbin Boyer (Budget team lead), Dorothy Peprah from SL mission, Prof., James
      2. Extensive questioning on transition, plans for resumption of work and especially on laboratory testing.
      3. All seemed to be answered to satisfaction from what I could tell. Kendra came to our defense somewhat.
      4. I brought up budget uncertainties… (unfortunately Robbin had left the room)… Richard was adamant that all the money is coming… when I mentioned the details on the 4 million supplement etc it got fuzzy, so I'm not really sure what's going on there… so I dropped it and moved on, never got to the CAPs issues etc.
      5. Brought up SLA issues… Richard offered to provide us a letter from USAID to help with the SLA transition to "vouch for us" etc… (we will need this… see below)
      6. Communications around finding: Richard said not to expect any action on the ground from the communications partners until 3-6 months down the road… sounds like they may be switching implementing partners in country, but they didn't say.
      7. By end of meeting, I think that I had expressed the importance of PREDICT-SL within the GHSA context enough through the prism of what I saw here during the outbreak that Richard started to soften a bit. Lots of content to provide that laid on real-world context and that made an impact I think… or I'm a horrible judge of people… could go either way.
   ii. **Wednesday 21 June: Visit of delegation to Makeni – UNIMAK**
      1. About 15 people: Richard, Irene Koek (Global Health Bureau), Robbin Boyer (global budget team), Jeff Muschell (global ebola team), Kendra, Saad, Dorothy, Tesfy (FAO), and many others…

2. Prepped team for Laboratory visit, and met with Univ Cambridge staff Umaru Jah.
3. Lab visit/tour went well – stressed UNIMAK-Cambridge aspects. Umaru handled parts related to NGS platforms and Moynia (PREDICT staff) did most of the talking. She did well, but threw us under the bus on the lab training even though she had been briefed on the new plan… weird and something to watch out for with her… I know her from Kenema… not my favorite even then.
    a. Had a good moment with Richard and visiting team talking about testing modalities and how qRTPCR is a laser beam search diagnostic and that the PREDICT method is more of a spotlight… they got the point I think. And how we build more than push-button scientific capacity using our platform.
4. Gave 30 min presentation to the visiting team. James did an excellent job after some coaching and slides touchup the day prior.
    a. *[Big issues revealed in biosafety practices in some videos he wanted to show… got those removed and we showed some photos only.] After talking though those issues James was upset that his training from MB was so poor… he didn't know what he didn't know… **the need for robust BS&S training is critical.***
5. 30+ mins of excellent and supportive questions from Richard, Kendra, Dorothy during visit. Many centered from Richard on the behavioral work and targeted professions (hunters etc) and how to turn the data in that into action items for later communications efforts… and about other virus family testing…. He's keen to do arenas (Lassa fever v) … 5 families be damned… probably appropriate on the rodents

**iii. Thursday 22 June US Embassy: meeting of all USAID partners**

1. All USAID-Washing staff present, plus local mission
2. All partners gave short 2-3 min presentations
3. Final sit-down meeting with Dorothy, Kendra, Richard
    a. Richard: pleased and happy with what he has seen
    b. Dorothy: seems that things are on the right track
    c. Kendra: agreed.
    d. Richard:
        i. *TESTING*: When can in country testing begin? Answer: during/after the upcoming training… "when will the first results be generated in country?" Answer: during/after the upcoming training… with preliminary results to begin in August… confirmation will take a while longer… Kendra chimed in "and then those will be have to be cleared by GoSL before USAID has them".
        ii. *BEHAVIOR*: When will the behavior results be analyzed? Answer: being transcribed now, then analyzed… full analysis pending probably end of year? RG: hope we have that info to help guide the discussions on findings communications especially as fits with certain occupations and risk interfaces.

iii. *REPORTING*: wants us to help create easy to digest reporting slides for him to report to NSC "the good work of PREDICT in GHSA"....
    1. Add picture vignettes with testimonials
    2. Diagrams of Animals to Specimens to results
    3. How we are leveraging training of PREDICT staff to enhance numbers of other GoSL etc trained staff.

iv. **Thursday 22 June: Meeting with CDC Deputy Country director Laura Perone**
    1. She's an old friend
    2. Happy that we are transitioning, not much love for MB either
    3. Offered to assist us in whatever way we need.
    4. Gave a list of contacts for logistics companies and other customs clearance activities
    5. Will be a good point of contact for us in probably many unanticipated ways.
    6. Sarah Hersey – CDC Country director was out of the country so will catchup with her on next trip.

**4) Ministries:**

a. **21 June: Min. Ag Forests Food Security (MAFFS)**
    i. Drs. Kamara (chief vet officer), Dr. Leno epi-lead, Dr. Jalloh (asst. director of animal production)
    ii. Discussed transition and the new UCD leadership.
    iii. Very light and easy tone in the meeting.
    iv. Rolled out lab capacity plan and they agreed verbally that it looked good (confirmed by email later).
    v. Long discussion about finding: Not much change in opinion from "scientifically interesting – politically dead in the water". Really interesting analogy given of how the teach children not to sit on the fire stones...
    vi. I stressed the importance of informing the public and how we are getting to a point when we will be blamed if something occurs. Also brought up the fact that others are looking and they won't wait for the government to be prepared. We will, but we need action... this line of reasoning seemed to get some traction with them... thus far they are our closest allies in the release of the information... BUT they were also the farthest from the impacts of EVD on their professional work earlier....
    vii. They will send us the names of 2 persons for the lab training from TEKO.

b. **Tuesday 20 June: MoHS Deputy Chief Medical Officer Dr. Jambai #2 career person in MoHS**
    i. Had lunch with him after the US Mission marathon mentioned above...
    ii. He is very supportive of the project, the team, and the transition. No concerns with the lab plan or the other issues.
    iii. Did not have the chance to discuss the finding as we were in public.

c. **Friday 23 June: MoHS Chief Medical Officer: Dr. Brima Kargbo – senior most career person in MoHS**
    i. Morning meeting – introduced and explained transisition

ii. He had no issues in principle with it once he understood that the project would remain intact as he had been understanding it.
iii. Extensive discussions around the finding: in no uncertain terms this is not to be publically released until after the election.
    1. He was told that the President said "to take care of it, and he didn't want to hear about it".
    2. Stressed the need to start communications around animal contact and risk avoidance ASAP in the affected areas, but no details shared about the finding.
    3. Wants to keep this discussion about the finding among the scientists... not the public.
    4. Would not budge... he said that if the US Ambassador can't get a meeting to discuss this then there is nothing we can do.

d. **POTENTIAL MAJOR ISSUE:** Prof and James informed me later that they think he is UNAWARE of a publication submission apparently.... as are the MAFFS folks.... Only Drs. Jambai (DCMO) and the Bombali district DMO are aware and on as authors.... Need to fix this... discussion with them later today (Friday 23 June)

**5) Service Level Agreement Officials (SLA)**

a. Friday 23 June: Met with Yaya Conteh (Principal Health Partners Coordinator and Head of SLA team) after launch of One Health Platform in F/T.
    i. Not going to be easy to change SLA
        1. UC Davis must register as NGO in-country
        2. UNIMAK also must register as in-country service provider
            a. This takes a couple of months
            b. Extensive paperwork
    ii. After registration, we will need a new SLA
        1. Changing existing one won't work
        2. Probably easier anyway to just make a new one rather than being tied with the old one.
        3. Before new one can be done... will need to make district level visits to ensure that work performed so far has been in accordance with the SLA
    iii. To start process:
        1. Send information describing UC Davis and leadership of PREDICT
        2. Describe why changing implementing partners
        3. Describe what changes if any to proposed scope of work
        4. Describe how UNIMAK is primary in-country partner and how that strengthens country.
        5. Send letter from UNIMAK agreeing to participate
        6. Send letter from USAID describing how project is ongoing and that UC DAVIS has always been the lead organization globally.

b. Looking at 3-6 month delay easily...
    i. Only way to continue operations is under MB until new SLA is approved...

**6) Other meetings:**

a. P&R: Roll out and launch of the National One Health Platform this week
    i. Met with Susan Scribner (Director P&R) and Serge Nzietcheung (West Africa Regional lead)

1. They share office space here in MB palace in F/T
2. Met to touch base and discuss the one health platform and thank Prof and James for their help in the discussions and buildup of the program.

**From:** "Katherine Leasure" <kaleasure@ucdavis.edu>
**To:** "Cassandra Louis Duthil" <clouisduthil@usaid.gov>
**Cc:** "Andrew Clements" <aclements@usaid.gov>, "PREDICTMGT" <predictmgt@usaid.gov>, "Predict inbox" <predict@ucdavis.edu>, "Jonna Mazet" <jkmazet@ucdavis.edu>
**Subject:** RE: PREDICT International Travel Requests
**Sent:** Fri, 23 Jun 2017 11:20:45 -0700

Hi Cassandra,

Many thanks for clarifying. I will notify EHA that travel has been approved.

Best,
Katie

**From:** Cassandra Louis Duthil [mailto:clouisduthil@usaid.gov]
**Sent:** Friday, June 23, 2017 10:21 AM
**To:** Katherine Leasure
**Cc:** Andrew Clements; PREDICTMGT; Predict inbox; Jonna Mazet
**Subject:** Re: PREDICT International Travel Requests

Hello Katie,

Only AOR approval is required for France travel. I think this was just a slight oversight. Billy Karesh's travel to France is approved per Andrew's earlier approval message.

Best,

Cassandra Louis Duthil
Program Assistant
Emerging Threats Division
U.S. Agency for International Development (USAID)
**Telephone: 202-712-5583 Cell:** REDACTED clouisduthil@usaid.gov

On Fri, Jun 23, 2017 at 1:05 PM, Katherine Leasure <kaleasure@ucdavis.edu> wrote:
Hi Andrew. I just wanted to follow-up on #4 below for Billy Karesh travel to France. Does that location now require mission concurrence as well, or AOR approval only? If the former, I will follow-up with Cassandra as I haven't yet seen a request for concurrence. Thanks!

---

**From:** Andrew Clements [mailto:aclements@usaid.gov]
**Sent:** Tuesday, June 13, 2017 11:03 PM
**To:** Katherine Leasure
**Cc:** PREDICTMGT; predict@ucdavis.edu; Jonna Mazet
**Subject:** Re: PREDICT International Travel Requests

Travel to New York, South Korea, and Germany approved.

All other travel approved subject to mission concurrence.

*Andrew P. Clements, Ph.D.*
*Senior Scientific Adviser*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*
On Jun 13, 2017, at 11:57 PM, Katherine Leasure <kaleasure@ucdavis.edu> wrote:

> *Please find below international travel requests for your review and approval. Please let me know if you have any questions. Thanks!!*

1. Suu-Ire (USA): $1,500 airfare/$341 (New York City) max daily per diem

2. Daszak (RoC, CIV, South Korea): $19,120 airfare *_business class required_ REDACTED /$305 (Brazzaville), $330 (Abidjan), $373 (Seoul) max daily per diems

3. Karesh, Gutierrez Jimenez, Francisco (RoC, CIV): $10,000 airfare *_business class required for Dr. Karesh_ REDACTED $3,000 airfare each for economy class/$305 (Brazzaville), $330 (Abidjan) max daily per diems

4. Karesh (France): $10,000 airfare *_business class required_ REDACTED /$464 (Paris) max daily per diem

5. Latinne (Indonesia): $900 airfare/$146 (Sulawesi) max daily per diem

6. Goldstein (Germany): $1,600 airfare/$278 (Marburg) max daily per diem

Travel Requests:

1. EcoHealth Alliance would like to request travel approval for Dr. Richard Suu-Ire to travel from Accra, Ghana to New York, NY USA from July 5 to August 5, 2017 for a PREDICT Modeling & Analytics Fellowship.

**Trip purpose**: This fellowship is part of PREDICT's efforts to provide capacity development for country partners in modeling and analytical skills. Dr. Suu-Ire, the field team lead for PREDICT Ghana Coordinator, will gain valuable modeling skills and experience in habitat suitability, ecological niche modeling, and creating zoonotic disease risk maps.

2. EcoHealth Alliance would like to request travel approval for Dr. Peter Daszak to travel from Newark, NJ, USA to Brazzaville, Republic of Congo from July 7-10, 2017 and then on to Abidjan, Cote d'Ivoire from July 11-14, 2017 to meet with partners and assist with the transition of work PREDICT work to EcoHealth Alliance. From Abidjan, Cote d'Ivoire, Dr. Karesh will travel to Seoul, South Korea from July 15-20, 2017 to present GVP work at the US-South Korea Workshop on International Wildlife Diseases, and to meet with South Korean organizations.

**Trip purpose**: RoC – Dr. Daszak will be meeting with the RoC Mission and local partners to ensure a smooth transition from Metabiota to EcoHealth Alliance. Cote d'Ivoire – Dr. Daszak will meet with the USAID Mission and visit field sites in Abidjan. South Korea – Dr. Daszak will be presenting "The Global Virome Project (GVP): Making the 21st century safe from the threat of emerging viral threats," and participating in a Q&A session at the Workshop on International Wildlife Disease in South. Dr. Daszak will also be meeting with directors from the Ministry of Health and Ministry of Agriculture to discuss funding the project as well as other science organizations.

3. EcoHealth Alliance would like to request travel approval for Drs. William Karesh, Leticia Gutiérrez Jiménez, and Leilani Francisco to travel from New York, NY, USA to Brazzaville, Republic of Congo from July 7-10, 2017 and then on to Abidjan, Cote d'Ivoire from July 11-15, 2017 to set up and strengthen local partnerships to begin and/or transition PREDICT work with EcoHealth Alliance.

**Trip purpose**: RoC – Drs. Karesh, Gutiérrez Jiménez, and Francisco will be travelling with fellow EcoHealth Alliance colleagues to Brazzaville on a scoping visit to meet with potential partners to begin setting up PREDICT operations within the country. The exact itinerary is still being developed. Cote d'Ivoire – Drs. Karesh, Gutiérrez Jiménez, and Francisco will then travel to Abidjan to continue the scoping trip, visiting with

existing PREDICT partners to transition to working with EcoHealth Alliance including visits with the Mission, Institut Pasteur, LANADA, a possible site visit, and a community engagement event on July 13.

4. EcoHealth Alliance would like to request travel approval for Dr. William Karesh to travel from New York, NY, USA to Paris, France from July 16-20, 2017 to participate in the World Organisation for Animal Health's (OIE) ad hoc group on the transport of biological materials.

**Trip purpose:** Dr. Karesh will participate in the World Organisation for Animal Health's (OIE) ad hoc group on the transport of biological materials. Dr. Karesh will present on relevant challenges in wildlife disease surveillance, including the transport of emergency diagnostic specimens from endangered species and the current work with the CITES Secretariat and member states to find an acceptable solution to facilitate rapid diagnosis of wildlife morbidity and mortality events of potential public health importance.

5. EcoHealth Alliance would like to request travel approval for Dr. Alice Latinne to travel from Bangkok, Thailand to Southeast and West Sulawesi, Indonesia from July 20 to August 4, 2017 for field work with in-country partners.

**Trip purpose**: In Southeast and West Sulawesi, Dr. Latinne will assist the PREDICT Indonesia team in field sampling (rodents and bats).

6. UC Davis would like to request travel approval for Dr. Tracey Goldstein to travel from Sacramento, CA, USA to Marburg, Germany from September 12-17, 2017 to present at the 9th International Filovirus Symposium.

**Trip purpose**: Dr. Goldstein will attend and present PREDICT data at the 9th International Filovirus Symposium. The presentation title is not available at this time, as the data to be presented is currently pending approval for release. Although we anticipate approval will be in place prior to the conference, should Dr. Goldstein be unable to present PREDICT data, her travel costs would be supported on non-PREDICT funds.

*Katherine Leasure*
HR/Payroll/Financial Assistant
One Health Institute
University of California, Davis
530-752-7526
530-752-3318 FAX
kaleasure@ucdavis.edu

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You received this message because you are subscribed to the Google Groups "PREDICTMGT" group.
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To view this discussion on the web visit

https://groups.google.com/a/usaid.gov/d/msgid/predictmgt/013601d2ec42%24e7e99f90%24b7bcdeb0%24%40ucdavis.edu.

**From:** Andrew Clements <aclements@usaid.gov>
**To:** <undisclosed-recipients:>
**Sent:** 7/3/2017 11:45:30 AM
**Subject:** July 2, 2017 Emerging Pandemic Threats update

**Summary:**

106 poultry outbreaks, 16 wild bird outbreaks, and 315 human infections with 6 pathogens (various avian influenza viruses, MERS-CoV, Lassa) were reported by 16 countries between June 5 and July 2, 2017. These outbreaks/infections occurred between January and June 2017.

**Specific pathogens and countries affected:**

**H5N1/Asia** Highly-Pathogenic Avian Influenza (HPAI) – 23 poultry outbreaks (Egypt, Nigeria)
*A total of 23,500 bird outbreaks (more than 250 million birds affected) and 879 human infections (52% average case fatality rate) have been reported by 67 countries between 1997 and 2017.*

**H5N2** HPAI – 16 poultry outbreaks (China)
*A total of 1,022 bird outbreaks (more than 71.8 million birds affected) have been reported by 4 countries between 2012 and 2017; no human infections reported to date.*

**H5N8** HPAI – 62 poultry outbreaks and 16 wild bird outbreaks (Belgium, Bulgaria, China, DR Congo, Egypt, Finland, Italy, Luxembourg, Russia, South Africa, South Korea, UK)
*A total of 2,945 bird outbreaks (more than 24.7 million birds affected) have been reported by 50 countries between 2013 and 2017; no human infections reported to date.*

**H7N9/Asia** LPAI and HPAI – 5 poultry outbreaks and 47 human infections (China)
*A total of 23 bird outbreaks (1.6 million birds affected) and 1,533 human infections (36% average case fatality rate) have been reported by 3 countries between 2013 and 2017.*

**MERS-CoV** – 50 human infections (Qatar, Saudi Arabia, UAE)
*A total of 29 camel outbreaks and 2,039 human infections (35% average case fatality rate) have been reported by 27 countries between 2012 and 2017.*

**Lassa** – 218 human infections (Nigeria)
*A total of 1,609 human infections (24% average case fatality rate) have been reported by 35 countries between 2000 and 2017.*

**Data sources:**

http://www.who.int/csr/don/en/
http://www.who.int/influenza/human_animal_interface/en/
http://www.afro.who.int/en/clusters-a-programmes/whe/outbreaks-and-other-emergencies-updates.html
http://www.oie.int/wahis_2/public/wahid.php/Diseaseinformation/WI
http://empres-i.fao.org/eipws3g/
https://www.cdc.gov/flu/weekly/index.htm
http://www.moh.gov.sa/en/CCC/pressreleases/pages/default.aspx

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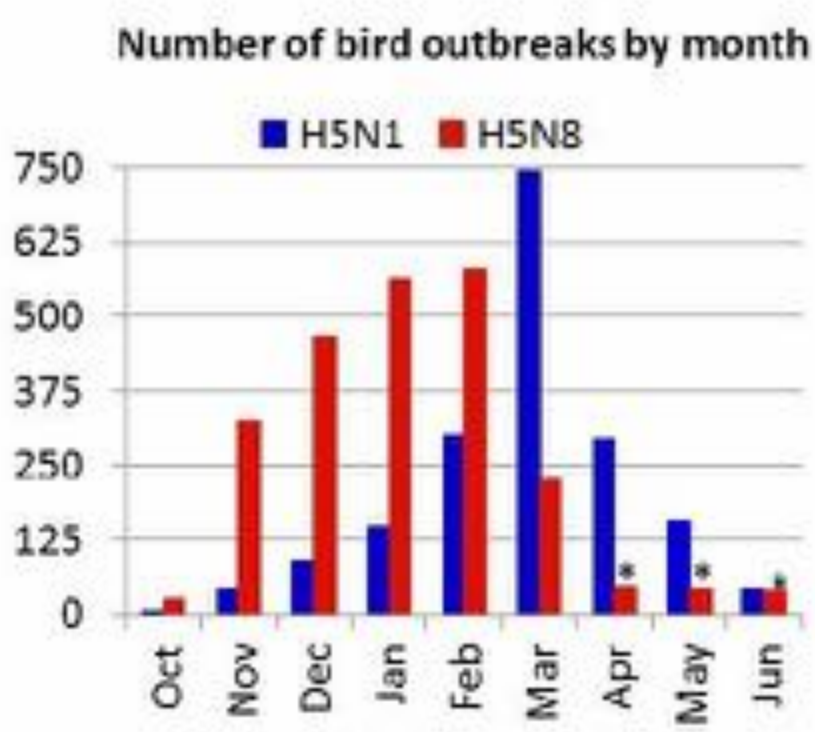
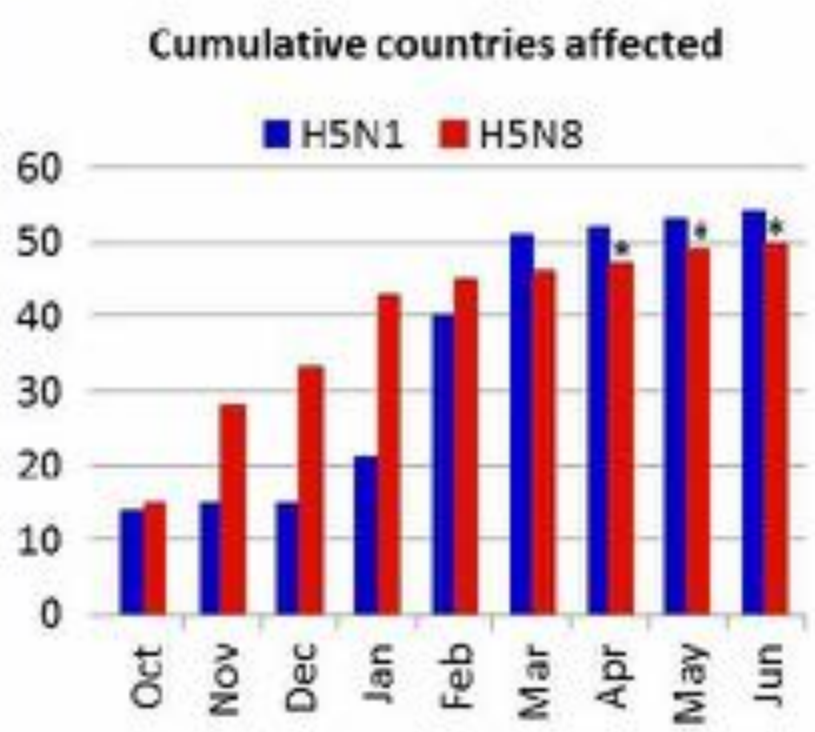
Andrew Clements, Ph.D.
Senior Scientific Advisor
Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health
U.S. Agency for International Development
Mobile phone: [illegible]
E-mail: [illegible]

*For more information on USAID's Emerging Pandemic Threats program, see* http://www.usaid.gov/ept2

# Spread of H5N8 HPAI (Nov 2016-Jun 2017) Similar to that of H5N1 HPAI (Nov 2005-Jun 2006)




- → Based on number of monthly bird outbreaks and cumulative countries affected, H5N8 has spread faster and caused more outbreaks than H5N1 during a comparable time period in 2005-2006
- → Number of H5N8 outbreaks declined starting in March 2017; same pattern seen for H5N1 after first quarter of 2006

Source: OIE reports through 7/2/17. * Data for April through June 2017 are not final as reporting is still occurring.

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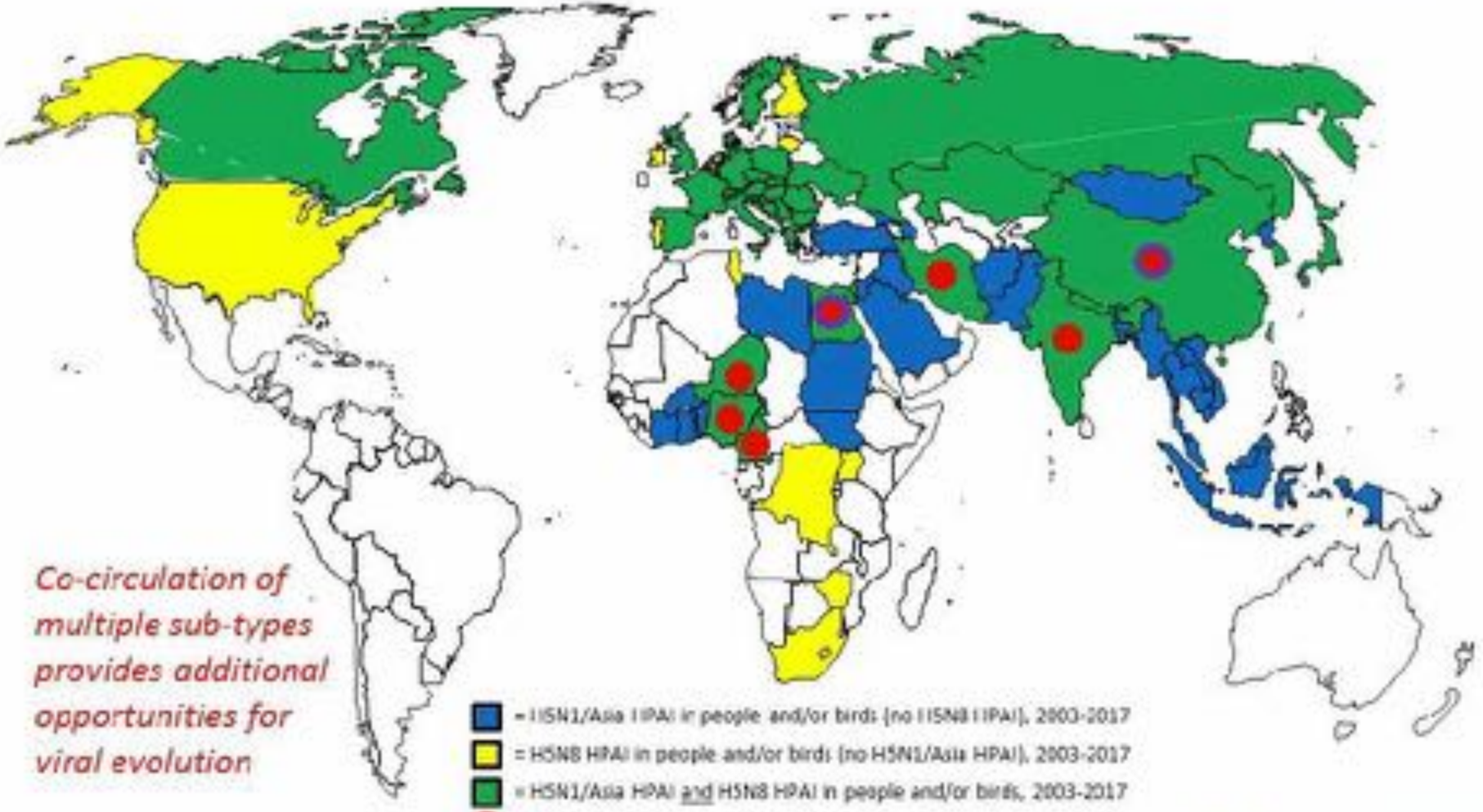
FROM THE AMERICAN PEOPLE
Global Health Emerging Threats Division

UCDUSR0002310

# Similar Vulnerabilities for Spread

## 36/50 of Countries Affected by H5N8 HPAI Previously Reported H5N1/Asia HPAI Between 2003-2017




Sources: OIE and WHO reports through 7/2/17.

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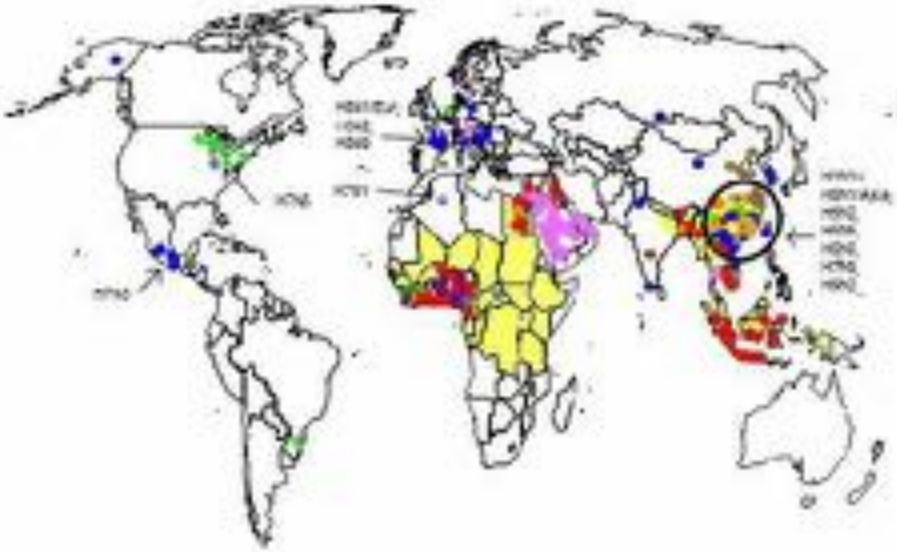
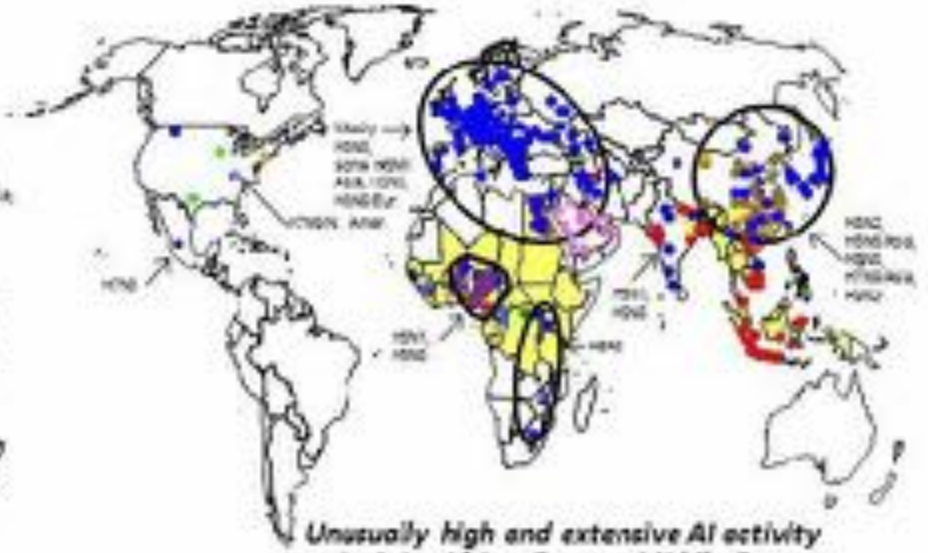
UCDUSR0002311

# Detection of Specific Zoonotic Viruses that have Potential to Directly Spread within Human Populations^

**Nov 2015-Oct 2016**



**Nov 2016-Oct 2017**




- = H5N1/Asian lineage HPAI* (poultry, wild birds, humans)
- = H7N9 LPAI ** (poultry, wild birds, or humans)
- = other HPAI or LPAI (humans)
- = other HPAI including H6N1/Eur lineage, H5N1/NA lineage (poultry, wild birds)
- = H1N1v, H1N2v, and H3N2v swine influenza (humans)
- = Ebola (humans)
- = Marburg (humans)
- = Lassa (humans)
- = Nipah (humans)
- = Middle East Respiratory Syndrome-Coronavirus (humans or animals)
- = monkeypox (primates, humans)

Sources = OIE, WHO, CDC, Ministry of Agriculture/FAO (Egypt, Indonesia), and IEDCR (Bangladesh) reports between 11/1/15 and 7/2017. ^ While these reports reflect known infections with these viruses, there may be additional virus circulation in these and other countries that is not detected due to limitations in surveillance and/or detection. All of these viruses are from viral families with at least one member that is capable of infecting people and spreading directly from person to person without using food, water or insects as vectors. *Highly-pathogenic avian influenza. ** Low-pathogenicity avian influenza. ☐ = countries (including eastern/southeastern China, northeastern India, and most of Indonesia) using USAID avian influenza, Ebola, or other emerging pandemic threats funding between FY2015 and FY2017 for prevention, detection, and response. ★ = location where a new virus first detected.

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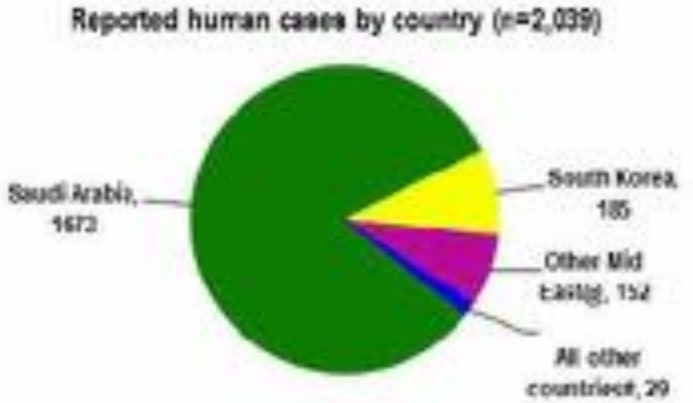
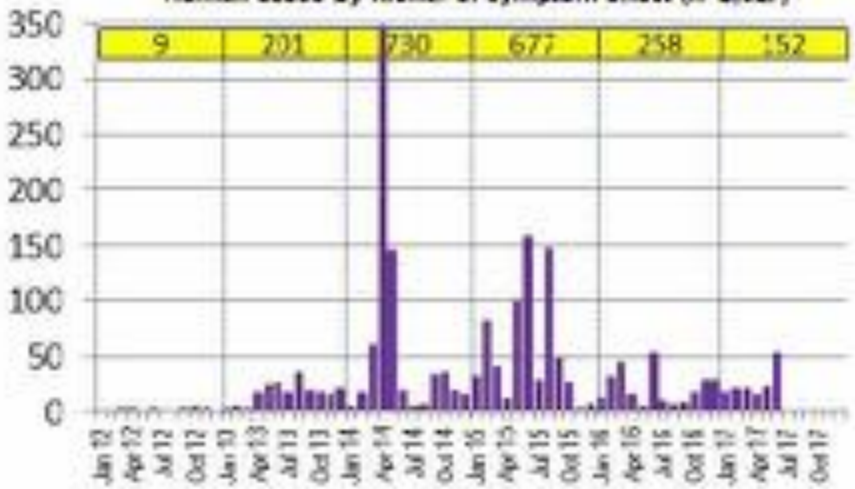
UCDUSR0002312

# MERS – Coronavirus, 2012-2017




# Algeria (2), Austria (2), China (1), France (2), Germany (2), Greece (1), Italy (1), Malaysia (1), Netherlands (2), Philippines (2), Thailand (3), Tunisia (3), Turkey (1), UK (3), US (2); @ Bahrain (1), Egypt (1), Iran (6), Jordan (27), Kuwait (4), Lebanon(1), Oman (5), Qatar (20), UAE (82), Yemen (1); 1 Qatar case detected in UK




## Summary of human cases:

At least 2,039 cases (and 710 deaths):

- 27 countries affected in 4 regions
- Age range 1-109 years (median 53)
- 67% of cases male
- **Apparent case fatality rate = 35%**
- At least 42% with pre-existing medical conditions
- At least 10% had contact with camels^
- At least 38% of cases in clusters of 2 or more
- At least 14% cases in health care workers

Sources = WHO, FAO, OIE, ProMed, Flutrackers, and scientific publications through 7/2017. ^ Includes direct and indirect contact with camels; at least 15% of cases had camel contact since September 2014 when Saudi Arabia started routinely reporting contact with animals
* Camels illegally imported from Pakistan tested positive at a quarantine station in Iran.

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Global Health/Emerging Threats Division

UCDUSR0002313

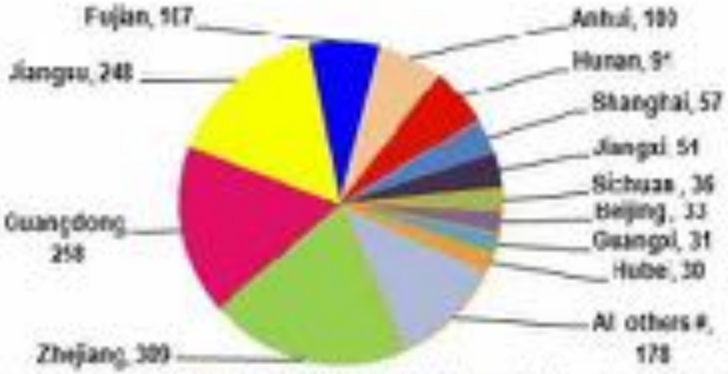
# H7N9/Asia Avian Influenza, 2013-2017

### 3 affected countries in 2 regions



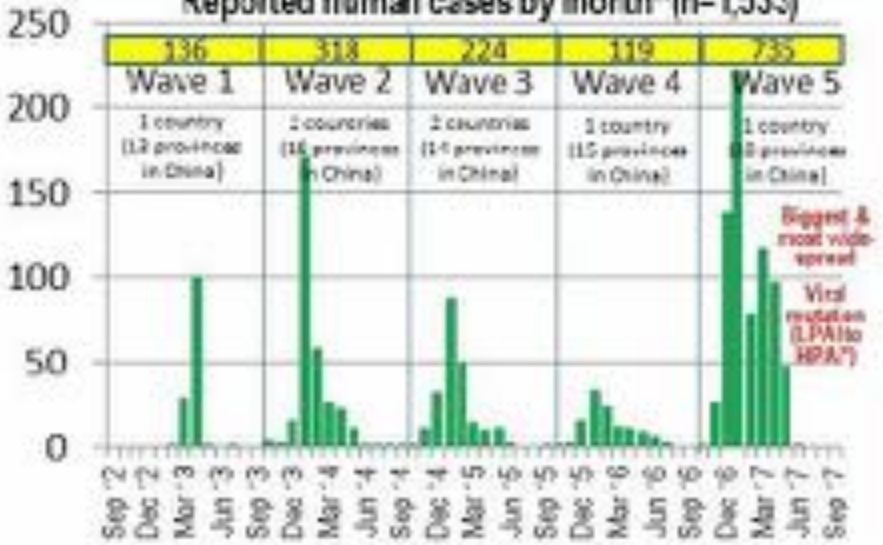
- = 1 country with local animal-to-human (and possible limited human-to-human) spread
- = 2 countries** with importation of human cases from China via travel
- = location (provincial level) of human cases

### Reported human cases in China by province (n=1,530)




# Chongqing (9), Gansu (5), Guizhou (17), Hebei (29), Henan (28), Hong Kong (21), Jilin (3), Liaoning (4), Macao (2), Shaanxi (7), Shandong (27), Shanxi (3), Taiwan (5), Tianjin (4), Tibet (3), Xinjiang (19), Yunnan (2).

### Reported human cases by month^(n=1,533)




## Summary of human cases:

At least 1,533 cases (and 593 deaths):

- Both LPAI and HPAI viruses can infect humans
- Age range 0-91 years (median 58)
- 70% of cases male
- **Apparent case fatality rate = 39%**
- 1% with pre-existing medical conditions
- 4% of cases in clusters of 2 or more
- 0.1% cases in health care workers
- At least 66% had contact with poultry

Source – WHO reports through 6/28/17. * LPAI – Low Pathogenicity (in chickens) Avian Influenza; HPAI – Highly Pathogenic (in chickens) Avian Influenza. ^ Waves are October to September.

USAID
FROM THE AMERICAN PEOPLE
Global Health/Emerging Threats Division

UCDUSR0002314

**From:** Andrew Clements <aclements@usaid.gov>
**Sent:** Mon, 3 Jul 2017 16:31:31 +0200
**Subject:** WHO declares an end to the Ebola outbreak in the Democratic Republic of the Congo - WHO | Regional Office for Africa
**To:** LimML@state.gov, Jonna Mazet <jkmazet@ucdavis.edu>, [redacted] "Subhash Morzaria (FAORAP)" <[redacted] [redacted]> pmulembakani@metabiota.com, ksaylors@metabiota.com, William Karesh <Karesh@ecohealthalliance.org>

FYI: WHO/AFRO announcement:

http://www.afro.who.int/en/media-centre/pressreleases/item/9744-who-declares-an-end-to-the-ebola-outbreak-in-the-democratic-republic-of-the-congo.html

*Andrew P. Clements, Ph.D.*
*Senior Scientific Adviser*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

**From:** Eddy Rubin <erubin@metabiota.com>
**To:** Jonna Mazet <jkmazet@ucdavis.edu>
**CC:** Karen Saylors <ksaylors@metabiota.com>
**Sent:** 7/19/2017 1:15:21 AM
**Subject:** bar coding

Hi Jonna,
Interesting talking to Dan Janzen. He is quite the enthusiastic field biologists. (Screening frogs because the same mosquito that bites them will bite humans while true maybe a bit much for GVP.) The Barcode of Life (BOL) program which he is part of uses the Cytochrome C oxidase 1 gene (CO1) as the mitochondrial gene they amplify while PREDICT is using the host Cytochrome B gene to amplify as our marker.
You mentioned on the call that PREDICT is bar coding every sample. Metabiota's bar coding protocol so far as we are rolling it out in in DRC and Cameroon is to bar code and sequence the Cytochrome B PCR product for every virus positive sample and when the field team is uncertain about species identification. In addition, as to ensure the presence nucleic acid a QAQC step is to carry out Cyto B for 10% of all samples undergoing virus testing.
Probably not relevant but FYI there maybe a bit of press next week that Metabiota has received an investment from In-Q-Tel.. In-Q-Tel is sort of a USG VC firm that connects new technology companies to various USG agencies.. We are providing access to our platform and analytics.
Cheers
Eddy

**From:** Jonna Mazet <jkmazet@ucdavis.edu>
**To:** Eddy Rubin <erubin@metabiota.com>;Karen Saylors <ksaylors@metabiota.com>
**CC:** Tracey Goldstein <tgoldstein@ucdavis.edu>;Anthony, Simon J. <sja2127@cumc.columbia.edu>
**Sent:** 7/19/2017 2:08:28 PM
**Subject:** Re: bar coding

Hi Eddy,
Thanks for the clarification re genes. Please get with Simon & Tracey on the current protocols. We had decided globally, to use bar coding for house keeping (ensuring presence of nucleic acid) on every sample going forward (rather than b-actin or ferritin, which should have been being done on every sample) to both reduce duplicative steps and get us the host information that is making the interpretation of data to date difficult. I believe there has been discussion of not going to the sequencing step for the negatives, but the lab team has those details. I am copying the leads.
Congrats on the investment,
Jonna

On Tue, Jul 18, 2017 at 6:15 PM, Eddy Rubin <erubin@metabiota.com> wrote:
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**From:** Tracey Goldstein <tgoldstein@ucdavis.edu>
**To:** Jonna Mazet <jkmazet@ucdavis.edu>
**CC:** Eddy Rubin <erubin@metabiota.com>;Karen Saylors <ksaylors@metabiota.com>;Anthony, Simon J. <sja2127@cumc.columbia.edu>
**Sent:** 7/19/2017 5:32:18 PM
**Subject:** Re: bar coding

Hi Eddy,

Just to follow up on Jonna's email and consistent with previous emails with Christian in March, presented on labs calls with the Asia and Africa teams, etc. our guidance on those calls is as follows:

Our guidance is to replace the Beta-actin PCR as an extraction control with Cyt b PCR (if Cyt B doesn't work then follow up with CO1 PCR).

For bats and rodents, all samples that are positive for a viral family should be sequenced to confirm the host.

If budgets allow, for negative samples – verify up to five individuals per species by barcoding.

Blood samples should be prioritized for sequencing if these have been tested as these may give the best sequences, but oral and rectal swab RNA works too.

Thus, please run CytB (and/or if you prefer CO1) on all samples. Save the PCR products until you have completed the viral family screening. For samples that are confirmed positive for a virus send the barcoding PCR product for sequencing to confirm the species, and also send barcoding PCR products for subset of negatives to verify species as budgets allow.

I have also attached the barcoding protocols again for your reference, we provide assays for both CytB and CO1.

Hope this helps to clarify any questions.

Best, Tracey

On Wed, Jul 19, 2017 at 7:08 AM, Jonna Mazet <jkmazet@ucdavis.edu> wrote:
Hi Eddy,
Thanks for the clarification re genes. Please get with Simon & Tracey on the current protocols. We had decided globally, to use bar coding for house keeping (ensuring presence of nucleic acid) on every sample going forward (rather than b-actin or ferritin, which should have been being done on every sample) to both reduce duplicative steps and get us the host information that is making the interpretation of data to date difficult. I believe there has been discussion of not going to the sequencing step for the negatives, but the lab team has those details. I am copying the leads.
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Interesting talking to Dan Janzen. He is quite the enthusiastic field biologists. (Screening frogs because the same mosquito that bites them will bite humans while true maybe a bit much for GVP.) The Barcode of Life (BOL) program which he is part of uses the Cytochrome C oxidase 1 gene (CO1) as the mitochondrial gene they amplify while PREDICT is using the host Cytochrome B gene to amplify as our marker.
You mentioned on the call that PREDICT is bar coding every sample. Metabiolta's bar coding protocol so far

as we are rolling it out in in DRC and Cameroon is to bar code and sequence the Cytochrome B PCR product for every virus positive sample and when the field team is uncertain about species identification. In addition, as to ensure the presence nucleic acid a QA/QC step is to carry out Cyto B for 10% of all samples undergoing virus testing.
Probably not relevant but FYI there maybe a bit of press next week that Metabiota has received an investment from In-Q-Tel.. In-Q-Tel is sort of a USG VC firm that connects new technology companies to various USG agencies.. We are providing access to our platform and analytics.
Cheers

Eddy

--

(510) 752-0432
(510) 752-3318
tgoldstein@ucdavis.edu

# Barcoding-Cytochrome b RT-PCR Protocol

Our guidance is to replace the Beta-actin PCR as an extraction control with Cyt b PCR (if Cyt B doesn't work then follow up with COx PCR).

For bats and rodents, all samples that are positive for a viral family should be sequenced to confirm the host.

If budgets allow, for negative samples – verify up to five individuals per species by barcoding.

Blood samples should be prioritized for sequencing as these may give the best sequences, but oral and rectal swab RNA works too.

**Methods:** Reverse Transcription performed separately using Invitrogen Superscript III First Strand Synthesis kit (Cat# 18080-400), followed by PCR.

**Reference:** Townzen, JS et al. (2008). Med. Vet. Entomol. 22:386-393

**Primer sequences:**

| | |
|---|---|
| CytB_F: | 5'- GAGGMCAAATATCATTCTGAGG -3' |
| CytB_R: | 5'- TAGGGCVAGGACTCCTCCTAGT -3' |

**Invitrogen Platinum Taq kit ( Cat #: 10966-026)**

For **25µL** reaction:

2.5µL 10X PCR Buffer
0.75µL $MgCl_2$ (50mM)
0.5µL dNTP (10mM)
0.1µL Platinum Taq DNA polymerase
18.15µL Molecular grade water
1µL Forward primer @ 10µm
1µL Reverse primer @ 10µm
1µL template

**PCR reaction conditions:**

94°C for 2min
50 cycles- 94°C for 30 sec denature
52°C for 50 sec annealing
72°C for 60 sec elongation
72°C for 7 min final elongation
10°C for cooling

**Target:** Mitochondrial Cytochrome b
Size ~ 457 bp

**Visualizing results:** Run 10µL of PCR product on a 1.5% agarose gel

## Barcoding-Cytochrome Oxidase I (COI) RT-PCR Protocol

**Methods:** Reverse Transcription performed separately using Invitrogen Superscript III First Strand Synthesis kit (Cat# 18080-400), followed by nested PCR.

**Reference:** Townzen, JS et al. (2008). Med. Vet. Entomol. 22:386-393

**Primer sequences:**

| | | |
|---|---|---|
| Round 1: | COI_long_F: | 5`- AACCACAAAGACATTGGCAC -3` |
| | COI_long_R: | 5`- AAGAATCAGAATARGTGTTG -3` |
| Round 2: | COI_short_F: | 5`- GCAGGAACAGGWTGAACCG -3` |
| | COI_short_R: | 5`- AATCAGAAYAGGTGTTGGTATAG -3` |

**Invitrogen Platinum Taq kit ( Cat #: 10966-026)**

For **25µL** reaction:

2.5µL 10X PCR Buffer
0.75µL $MgCl_2$ (50mM)
0.5µL dNTP (10mM)
0.1µL Platinum Taq DNA polymerase
18.15µL Molecular grade water
1µL Forward primer @ 10µm
1µL Reverse primer @ 10µm
1µL template

**PCR reaction conditions:**

94°C for 2min
45 cycles- 94°C for 30 sec denature
48°C for 50 sec annealing
72°C for 60 sec elongation
72°C for 7 min final elongation
10°C for cooling
Same protocol for Rounds 1 and 2

**Target:** Mitochondrial Cytochrome Oxidase Subunit 1
Round 1 ~ 663 bp
Round 2 ~324 bp

**Visualizing results:** Run 10µL Round 1 PCR product on a 1.5% agarose gel
Run 10µL Round 2 PCR product on a 1.5% agarose gel

UCDUSR0002321

**From:** Cara Chrisman <cchrisman@usaid.gov>
**Sent:** Thu, 10 Aug 2017 15:27:34 -0400
**Subject:** GISAID Meeting Background Documents
**To:** Jonna Mazet <jkmazet@ucdavis.edu>, [redacted], Nathan Wolfe <nwolfe@metabiota.com>, Peter Daszak <daszak@ecohealthalliance.org>, Brooke Watson <watson@ecohealthalliance.org>, Eddy Rubin <erubin@metabiota.com>
**Cc:** Dennis Carroll <dcarroll@usaid.gov>
Attachment
Elbe_et_al-2017-Global_Challenges.pdf
Eurosurveillance-22750_GISAID_From-Vision-to-Reality.pdf
Attachment

Hi All,
As per our conversation earlier today, please see the attachments in preparation for the call with Peter Bogner of GISAID next Monday.

Best,
Cara

Cara J. Chrisman, PhD
Senior Infectious Diseases Technical Advisor
Emerging Threats Division
Office of Infectious Disease
Bureau for Global Health
U.S. Agency for International Development (USAID)

Desk: (202) 712-1161
Cell: [redacted]
E-mail: cchrisman@usaid.gov

Begin forwarded message:

**From:** Peter Bogner <peter@gisaid.org>
**To:** William Steiger <wsteiger@usaid.gov>, Dennis Carroll <dcarroll@usaid.gov>
**Subject: Re: Human Virome Project**

Dear Bill,

Indeed, we are certainly aware of Dr. Carroll's work since our initiative got off the ground. It goes without saying, we'd be honored to contribute in some way to his efforts. As I am currently on the West coast, I'd be delighted to connect for a call over these next couple of weeks. To help Dr. Carroll get a better understanding of our efforts, allow me to attach a couple of recent publications that make reference to our initiative.

Thank you kindly for this introduction.

Peter

The GISAID Initiative
*promoting the sharing of all influenza data*
*in a Public-Private-Partnership with the Federal Republic of Germany*
*visit us at* http://gisaid.org

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On 8/7/17, 13:35, "William Steiger" <wsteiger@usaid.gov> wrote:

Dear Peter,

I know you remember Dr. Dennis Carroll here at USAID, who has been one of the key experts involved in our pandemic-preparedness planning over many years. Recently, Dennis has been spearheading the thinking behind the Human Virome Project, the vision of which is to sequence all of the viruses that have or could have zoonotic potential. I am certain your experience with setting up GISAID will be incredibly valuable to Dennis and his team as they consider how to design the governance, corporate structure, partnerships, headquarters and legal arrangements for the Project.

I'll leave it to you two to connect.

Thanks in advance for your consideration.

Regards,

Bill

Global Challenges
Open Access

RESEARCH ARTICLE

Global Health

# Data, disease and diplomacy: GISAID's innovative contribution to global health

Stefan Elbe[1] and Gemma Buckland-Merrett[2]

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**Impact Statement:** The rapid spread of lethal infectious diseases is a global challenge potentially affecting any person around the world. To protect populations against such deadly outbreaks, it is critical that scientists and governments rapidly share information about the pathogens causing them. Without access to such information, it will be very difficult to properly assess the risk posed to global health, to develop new medical countermeasures, and to mount a commensurate international response. However, recent outbreaks suggest several impediments to the rapid sharing of virus data. Scientist may wish to withhold data until their scholarly studies are published; governments are fearful about the repercussions of being associated with a major new outbreak; and it remains challenging to fund global public goods like an international database to host such data. Through the first study of the Global Initiative on Sharing All Influenza Data (GISAID), this article shows how it is possible to encourage the greater international sharing of such data through the careful design of new sharingmechanisms. GISAID has now developed a successful track-record in the field of influenza that may also serve as a useful blueprint for managing other diseases and global challenges requiring the international sharing of sensitive data.

**Keywords**
data-sharing, GISAID, global health, influenza, pandemic preparedness, public-private partnerships, virus.

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## Abstract

The international sharing of virus data is critical for protecting populations against lethal infectious disease outbreaks. Scientists must rapidly share information to assess the nature of the threat and develop new medical countermeasures. Governments need the data to trace the extent of the outbreak, initiate public health responses, and coordinate access to medicines and vaccines. Recent outbreaks suggest, however, that the sharing of such data cannot be taken for granted – making the timely international exchange of virus data a vital global challenge. This article undertakes the first analysis of the Global Initiative on Sharing All Influenza Data as an innovative policy effort to promote the international sharing of genetic and associated influenza virus data. Based on more than 20 semi-structured interviews conducted with key informants in the international community, coupled with analysis of a wide range of primary and secondary sources, the article finds that the Global Initiative on Sharing All Influenza Data contributes to global health in at least five ways: (1) collating the most complete repository of high-quality influenza data in the world; (2) facilitating the rapid sharing of potentially pandemic virus information during recent outbreaks; (3) supporting the World Health Organization's biannual seasonal flu vaccine strain selection process; (4) developing informal mechanisms for conflict resolution around the sharing of virus data; and (5) building greater trust with several countries key to global pandemic preparedness.

## Introduction

The rapid spread of lethal infectious diseases is a global challenge potentially affecting any person living around the world. Already on multiple occasions in the 21st century, a deadly new infectious disease emerged suddenly and then quickly spread through the dense network of international circulations that make up our globalized world – from HIV/AIDS and SARS, through pandemic flu and MERS, to recent experiences with Ebola and now the Zika virus.[1] Sharing

[1]"Benefits of sharing". *Nature*. 11 February 2016, p. 129.

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**Impact Box:**

*What challenges does the study address?*

The timely international sharing of virus data is critical for protecting populations against lethal infectious disease outbreak. Without access to such information, it is very difficult to properly assess the risk posed to global health, to develop new diagnostics, medicines and vaccines, and to mount a commensurate international response. However, experiences with recent outbreaks suggest that there are three challenges when it comes to sharing virus data. First, scientists may hesitate to share data on lethal viruses because they are concerned about other researchers then using this data to publish scholarly articles more quickly than they can do themselves – meaning their scientific contribution is not properly acknowledged and recognised. Second, governments might interfere with the international exchange of information because of concerns about the negative economic ramifications of being identified as the source country of an international outbreak. They may also wish to retain ownership over any potential intellectual property associated with the data and – particularly for low- and middle-income countries – will be keen to ensure that they can secure access to new vaccines or medicines subsequently developed on the basis of that cooperation. Finally, there is also a more practical public goods challenge in terms of who will actually provide the funding and material infrastructure for hosting such virus data.

*What is new about the research?*

This research presents the first study of a new mechanism for encouraging the international sharing of virus data that has been created in the field of influenza. Initially spurred by the global threat posed by human infections with highly pathogenic avian influenza (H5N1), the Global Initiative on Sharing All Influenza Data (GISAID) was launched in 2008 as a new mechanism for incentivising and promoting the international sharing of virus data.

*What are the implications of the research?*

The research shows how it is possible to overcome some of the challenges associated with the international sharing of virus data through the skilful design of new sharing mechanisms that are sensitive to the needs of stakeholders. Already, this important sharing mechanism has developed a successful track record in the field of influenza and may also serve as a useful blueprint for other diseases and global challenges that depend on the international sharing of sensitive data. The research further shows how philanthropic actors can play an important role in bringing about novel global health initiatives and how important it is to build trust in new global health initiatives. Finally, the research also illustrates how innovative solutions to global challenges can be found when lessons are creatively applied from one issue area to another and that such cross-sectoral learning should be encouraged.

information on the viruses that cause such outbreaks is critical to protecting global health. Scientists need to rapidly share their information with other scientists around the world to understand the nature of the threat and to develop new medical countermeasures. Governments need the data to trace the extent of the outbreak, to coordinate public health interventions, and to ensure that populations have access to medicines and vaccines. All of this is particularly important in the case of flu, because of the comparatively rapid rate at which influenza viruses change, and the lurking spectre of a potentially devastating human pandemic. However, recent infectious disease outbreaks suggest that such international cooperation cannot be taken for granted and point to three impediments potentially hampering the timely sharing of such critical virus data.

First, scientists may hesitate to share data on lethal viruses because they are concerned about other researchers using this data to publish scholarly articles more quickly than they themselves are able to – meaning that their scientific contributions would not be properly acknowledged and recognized. Second, governments might also interfere with the international exchange of information because of concerns about the negative economic ramifications of being identified as the source country for an international outbreak. They may also wish to retain ownership over any intellectual property potentially residing in such data and – particularly for low- and middle-income countries – will wish to ensure that they can secure access to new vaccines or medicines developed on the basis of that cooperation. Finally, even where these two challenges can be overcome, there is still a much more practical obstacle in terms of who will actually provide the international leadership, legitimacy, coordination, and funding needed for sustaining the material infrastructures essential for collecting, curating, and distributing such virus data. The international sharing of virus data may be critical to global health, but it is also enveloped in a Gordian knot of complex policy challenges.

The Global Initiative on Sharing All Influenza Data is an initiative aimed at untying that knot. Initially spurred by the global threat posed by human infections with highly pathogenic avian influenza (H5N1), GISAID introduced a new mechanism for incentivising and promoting the international sharing of influenza virus data. GISAID's pivotal innovation consists of governing access to the data through a unique data access agreement extending a number of key "protections" and assurances to data contributors. In order to access the new database, users would first have to positively identify themselves through an initial registration and log-in process so that access to the data could be monitored. As part of that initial procedure, users would also agree to acknowledge those who submitted the data in their publications and to make best efforts to work collaboratively with data contributors on scientific publications. Users would further have to agree not to share the data with third parties outside the GISAID community and would also not seek to place any restrictions on the use of the data. Through extending such additional "protections," it was hoped that the GISAID mechanism could actively incentivize scientists and governments around the world to share influenza virus data in a timelier manner.



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As GISAID marks its tenth anniversary, this article undertakes the first in-depth analysis of its wider contribution to global health. The primary source material for the analysis comes from more than 20 semi-structured, background interviews conducted with key informants in the international community. Those stakeholders were drawn from the international scientific community, government institutions, pharmaceutical companies, research institutes, international organizations, and many of those involved in creating GISAID itself. Additional primary and secondary source material was identified in the form of policy papers, background papers, working papers, official documents, articles and books on virus sharing produced by science journalists, governments, think tanks, scientists, and international organizations. The article argues that GISAID is making at least five key contributions to global health: (1) collating the most complete repository of high-quality influenza data in the world; (2) facilitating the rapid sharing of potentially pandemic virus information during recent outbreaks; (3) supporting the World Health Organization's biannual seasonal flu vaccine strain selection process; (4) developing informal mechanisms for conflict resolution; and (5) building greater trust with several low-income and middle-income countries key to pandemic preparedness.

## Obstacles to the international sharing of virus data

The international exchange of influenza virus data, including for viruses with human pandemic potential, is particularly important because influenza viruses *evolve* more rapidly than many other viruses.[2] Influenza, in other words, is a fast moving target. A World Influenza Centre was thus established at the Medical Research Council's National Institute for Medical Research in London in 1948. The World Health Organization (WHO) subsequently assumed the coordinating role for influenza virological surveillance with the establishment of the Global Influenza Surveillance Network (GISN) in 1952 – renamed the Global Influenza Surveillance and Response System (GISRS) in 2011.[3] The network gradually expanded over subsequent decades, with a small number of laboratories becoming designated core WHO Collaborating Centres and receiving specimens/viruses for analysis from currently approximately 140 WHO-designated National Influenza Centres located in more than 100 countries around the world.

Much of this early influenza work was carried out on the basis of biological characteristics of the viruses. As genetic sequencing technology became more widely available over the past two decades, however, so too genetic sequence data became more central to the process.[4] At the same time, and with laboratories now sequencing more and more influenza viruses, it was also becoming evident that in practice much of these data were *not* being shared and *not* being made public.[5] That is because there are at least three obstacles to the timely international sharing of influenza virus data.

### Science, publications and recognition

The intensely competitive nature of science is one reason why virus data may not be shared in a timely manner. In a context where the standing of scientists, and the research income they can generate, is heavily linked to their publications, citations, and scientific reputations, there is pressure to be the "first" to publish findings – especially about a lethal new virus. Several interviewees expressed the view that scientists are concerned that sharing such information in an open and timely manner might enable others to publish findings with their data more quickly than they themselves could – meaning that their scientific contribution in discovering and analysing a new virus would not be properly credited and acknowledged (Longo and Drazen, 2016; Pearson, 2006: 965). Indeed, a number of interviewees expressed concerns about other researchers who just "crunch" the data generated and made available by others, without contributing to the generation of such data themselves,[6] as well as the importance of end users giving appropriate credit to originators.[7] Scientists from low-income and middle-income countries have also complained that analyses from samples they shared in the past (because they lacked the powerful molecular research capacity of laboratories in high-income countries) have subsequently been presented at international meetings and conferences without proper advance notification, or without including those who had shared the samples in the authorship arrangements (Sedyaningsih et al., 2008). Historically, some scientists have therefore decided to share such virus information in public databases only *after* their scientific papers had

[2] Interview with Philip Dormitzer, Vice President and CSO Viral Vaccines, Pfizer Vaccine Research and Development, 24 March 2015.

[3] Interview with Alan Hay, former Director of the WHO Collaborating Centre (World Influenza Centre) in London (1989 to 2008); Co-Chair of Scientific Advisory Council and Scientific Liaison Officer of GISAID, 15 September 2014.

[4] Interview with Alan Hay.

[5] Interview with John McCauley, WHO Collaborating Centre for Reference and Research on Influenza, Crick Worldwide Influenza Centre, 9 February 2015.

[6] Interview with Gwenaelle Dauphin, Animal Health Service, Animal Production and Health Division, Food and Agriculture Organization of the United Nations, 9 October 2015; Interview with Yuelong Shu, Director of WHO Collaborating Centre for Reference and Research on Influenza, Beijing, 4 June 2014; Interview with John McCauley.

[7] Interview with Ian Brown, Director of EU/OIE/FAO International Reference Laboratory for Avian Influenza and Newcastle Disease, 16 September 2014; Interview with Alan Hay.



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been published – leading to delays in the international sharing of data to the potential detriment of global health.[9]

This obstacle to the timely sharing of influenza virus data became all the more disconcerting when, in 2003, lethal human infections with highly pathogenic avian influenza H5N1 viruses re-emerged in Hong Kong. Those human deaths raised the specter of a potentially much more devastating pandemic, with the human mortality rate of the virus reported by WHO at around 60% (WHO, 2016). With so much concern, fear, and attention now centring on the lethal H5N1 virus, the possible reputational benefits to scientists from being the first to publish analyses of the viruses were all the greater. It is precisely during such high-profile times that everyone wants to get there "first".[9] At the same time, the scientists at the forefront of such new outbreaks also suddenly become extremely busy, as their laboratories have to go into overdrive and often do not have enough resources to meet this surge in demand, whilst the priority in these circumstances is to generate science and evidence in support of control programmes.[10] With an increased workload, scientists would have even less time than usual to write up their findings, meaning, there was a real risk that information critical to global health would not be shared quickly. Even though the need for sharing data is arguably much greater in the context of the threat of a human pandemic, so too are the obstacles to achieving such international sharing of virus data in practice.

## Governments, trade and access to medicines

Governments may have additional reasons for not wanting data about lethal viruses to be shared internationally. They could be concerned with the negative economic ramifications of being identified as the county at the source of a lethal new outbreak,[11] and do not wish to be seen as the country that "caused" a devastating human pandemic.[12] There can also be intellectual property considerations surrounding such samples and information, which could be critical to the commercial development of new diagnostics, vaccines, and medicines.[13] Indeed, low-income and middle-income countries in particular will be concerned to ensure access to any new medicines and vaccines produced with the help of such samples and data – as new medical countermeasures may later turn out to be too costly or only available in insufficient quantities.[14]

Many of these issues came to a fore in 2006 when, amidst intense concern about a possible flu pandemic, media reports surfaced about critical H5N1 sequence data not being made freely accessible to all countries – raising issues around fairness in accessing such data (Brown, 2006). It also emerged that new pandemic vaccines were being developed on the basis of biological samples initially obtained from affected countries in southeast Asia, but that originating countries were not consulted over the subsequent movement and sharing of such viruses with third parties (especially with industry) – raising additional concerns about the transparency of the GISN sharing mechanism (Sedyaningsih et al., 2008). Later, it transpired that once new H5N1 vaccines had been developed, they were not economically viable for many of those affected countries that had initially shared samples.[15] Confronted with the prospect of having to ride out a flu pandemic without access to the same medical countermeasures available to many high-income countries, governments of affected countries began to openly question whom the sharing of virus samples through the GISN actually benefitted.

All these issues culminated in a lengthy and acrimonious diplomatic dispute over international virus sharing. The dispute was triggered when Indonesia (at the time experiencing the highest number of human cases of H5N1 infection) unexpectedly decided to stop sharing "its" virus samples from 20 December 2006 – marking the start of protracted, high-level diplomatic negotiations surrounding the equity, fairness, and transparency of influenza virus sharing (Supari, 2008: 24). In terms of global health security, Indonesia's decision was regarded as a potential disaster in the sense that WHO now did not have a complete picture of how H5N1 was spreading and evolving[16]; but it also exposed the deeper political sensitivities around the international sharing of virus samples that would need to be addressed. As genetic sequence data of influenza viruses was becoming increasingly central to pandemic preparedness efforts, similar sensitivities emerged around such data as well.

[8] Interview with John McCauley. Interview with Nancy Cox, former Director of the Influenza Division, Centers for Disease Control and Prevention, Atlanta, 17 September 2014.

[9] Interview with Alan Hay.

[10] Interview with Ian Brown, Director of EU/OIE/FAO International Reference Laboratory for Avian Influenza and Newcastle Disease, 16 September 2014.

[11] Interview with Ilaria Capua, former Head of the Virology Department at Istituto Zooprofilattico Sperimentale delle Venezie, Padova, 22 June 2015.

[12] Interview with Nancy Cox.

[13] Interview with Philip Dormitzer. Interview with Ron Fouchier, Professor in Molecular Virology, Department of Viroscience, Erasmus MC Rotterdam, 15 September 2014. See also Mary Quick. 'New WHO global initiative on sharing avian influenza data'. *The Lancet Infectious Diseases* 6(10): 621. October 2006.

[14] Petersen, 'Plan to pool bird flu data takes off', p. 963.

[15] 'Statement by the Minister of Health of the Republic of Indonesia H. E. DR. Dr. Siti Fadilah Supari'. November 2007. Available at: http://www.ip-watch.org/files/Indonesia_statement_WHO.pdf. (Accessed 11 January 2016).

[16] Interview with Robert Webster, Emeritus faculty, Department of Infectious Diseases St. Jude Children's Research Hospital, Memphis, 10 July 2015; see also Richard Holbrooke and Laurie Garrett, "Sovereignty" That Risks Global Health'. *Washington Post*. 10 August 2006.



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## Practical challenges: funding databases sustainably

There is also a much more practical obstacle to the sharing of virus data. Somebody needs to provide the international leadership, legitimacy, coordination, and funding necessary for maintaining the material infrastructures central to collecting, curating, and distributing such data. A database will require both a physical infrastructure, as well as scientific oversight to design the database, curate the information, liaise with laboratories around the world, and so forth. Yet several interviewees described just how difficult it is to secure funding for databases. They are not seen as glamorous or important as research projects,[17] or indeed as an essential part of scientific intercourse that are central to advancement of scientific research.[18] Unlike funding for research projects, moreover, databases also require continuous and even indefinite funding commitments, which many funders can be loath to agree to.[19]

Nevertheless, such an influenza database was initially created in the USA, by the Los Alamos National Laboratories in New Mexico, with funding from the US Centers for Disease Prevention and Control (CDC).[20] The database was created around the time of the first outbreak of lethal human infections with H5N1 in Hong Kong in 1997 and worked well for some years.[21] However, when H5N1 began to spread internationally in 2004, it became clear that a number of affected countries were very sensitive about sharing H5N1 virus information and did not want WHO to release the data to others without their permission (Roos, 2006). As a way of acknowledging and addressing such concerns, those overseeing the Los Alamos database decided to create a separate, password-protected compartment from the seasonal flu database that would only be open to those working on sequencing H5 viruses.[22]

Creating this private H5 compartment may have been a practical solution to the diplomatic sensitivities and tensions that were rapidly surfacing, but it also created new problems. Some scientists expressed frustration that without access to this compartment, they could not properly analyse how the viruses they were isolating related to the other viruses circulating internationally.[23] There was also a perception that the private compartment at Los Alamos was somewhat of a "club", where only a limited group of scientists enjoyed access.[24] One scientist to vocally draw public attention to this problem was the Italian veterinary scientist Ilaria Capua. In February 2006, her laboratory received a sample of an avian influenza virus infecting birds in Nigeria (Zarocka, 2006a). There was great scientific interest in the new sample because it was the first to come from Africa. Capua was thus offered access to the private compartment in return for sharing her findings with the Los Alamos database.[25] Capua, however, declined the offer and instead deposited the genetic sequence information in the public domain archive Genbank. Her decision to take a stand against that system, to challenge the status quo, and to invite other leading scientists to join her in pushing for a change of approach, attracted much scientific attention and media coverage at the time.[26] With unfavourable media attention surrounding the Los Alamos database, combined with the lack of a sustainable funding mechanism, as well as decreasing support from the US CDC, there was now a need to find a new home where such influenza virus data could be shared.[27]

## A new Global Initiative on Sharing All Influenza Data (GISAID)

The idea for an improved way of promoting the international sharing of influenza virus sequences was initially discussed in 2006, with the call for a new global initiative on sharing avian flu data (Zarocka, 2006b). Eventually, becoming the Global Initiative on Sharing All Influenza Data, GISAID's genesis was closely associated with Peter Bogner – a studio executive with a background in creating and licensing media content,[28] and in philanthropic behind-the-scenes work for organizations such as the United Nations and UNICEF.[29] Bogner provided the lion's share of funding for setting up GISAID (a low-mid seven figure sum) and was key to the development of the licensing mechanism that defines the GISAID data sharing policy.[30] As chief executive of its management board, he remains closely involved in the initiative to this day.[31]

[17] Interview with an expert in computational biology, 23 February 2015; Interview with a European expert on research and biotechnologies issues, formerly working in the European Commission, 19 February 2015.

[18] Interview with Alan Hay.

[19] Interview with Catherine Machete, Bioinformatics Institute of the University of Auckland, New Zealand, 17 December 2015.

[20] Interview with Nancy Cox.

[21] Interview with Ilaria Capua.

[22] Interview with Nancy Cox.

[23] Interview with Ron Fouchier.

[24] Interview with Ilaria Capua. See also Steven Salzberg, 'The Commons of the Internet', *Nature* 456, 10 July 2008, p. 161.

[25] Interview with Ilaria Capua.

[26] Interview with Nancy Cox.

[27] Interview with Masato Tashiro, former Director, WHO Collaborating Centre for Reference and Research on Influenza, Japan, 3 June 2016; Interview with Catherine Machete.

[28] 'Rock's Rollouts', *Multichannel New International*, November/December 1995; Hans-Juergen Jakobs, 'Der V. Fährer', *Sueddeutsche Zeitung*, 10 January 2005.

[29] Peter Bogner was Co-Chair of the UNICEF Entertainment Support Committee. Letter from Horst Corsi, 2. September 1988.

[30] Email correspondence with GISAID Initiative (Freunde von GISAID e.V.), 16. January 2016; Robin McDowell, 'Indonesia agrees to hand bird flu information to new online database', The Associated Press, 16 May 2008.

[31] Correspondence for the Meeting between German Government with GISAID. Bundesministerium fuer Ernaehrung und Landwirtschaft, 16. March 2015.

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Remarkably, Bogner had no background in influenza – or even global health more broadly – prior to his involvement in GISAID, although he did have extensive experience with media and global affairs more generally. In 2006, a number of events would begin to draw him more closely into the world of influenza.

Bogner's interest in pandemic preparedness was originally piqued during a breakfast with Michael Chertoff (then United States Secretary of Homeland Security) and a small group of executives at the World Economic Forum in Davos in January 2006. Not long thereafter, Bogner was also asked by the New York Office of the United Nations Secretary General to use his extensive media contacts to look into unfavourable media claims alleging that WHO was operating a "secret" database in Los Alamos for genetic sequences of highly pathogenic avian influenza (HPAI) viruses and first liaised with Dr. Margaret Chan, who would subsequently become Director General of the WHO.[32] In April 2006, Bogner then attended a scientific influenza meeting in Cambridge where he met Nancy Cox, who that year became head of the influential influenza division at US CDC. Sharing a ride with Bogner back to London, Cox had an opportunity to elaborate upon the challenges surrounding pandemic preparedness and the importance of international influenza sample and data sharing (Zarnitska, 2006b).

As Bogner became more understanding of the complexities involved, he also learned from Cox of Indonesia's dilemma surrounding a particularly disconcerting H5N1 virus outbreak in Karo, Sumatra – where limited human to human transmission could not be immediately ruled out. Given his political connections in Indonesia, Bogner was able to secure a meeting to speak directly with the Indonesian Minister of Health Siti Supari, who was leading Indonesia's approach to these issues. Eventually Bogner was even able to persuade Supari to share the sequences of the Karo cluster, resulting in their deposit in Genbank.[33] It was an unexpected diplomatic breakthrough, and a decision quickly met with reciprocity by the US CDC, when Cox not long thereafter announced that they too would be making influenza data publically accessible (Quick, 2006: 621). By this time, Bogner had become deeply immersed in the issues around the international sharing of influenza virus data.[34]

The creation of GISAID moved a step closer when the influential scientific journal *Nature* published a prominent letter signed by more than 70 leading scientists (including seven Nobel laureates) in August 2006. The letter – coauthored by Peter Bogner, Ilaria Capua, Nancy Cox, and David Lipman – proposed the creation of a new global consortium that would foster international sharing of avian influenza isolates and data (Bogner et al., 2006). The letter, whose signatories included many researchers and officials from countries directly affected by H5N1, stated the intention for scientists participating in the consortium to share their sequence data, to analyse findings jointly, and to publish results collaboratively (ibid.). Although initially only members of the consortium would be able to access the data, as soon as possible following analysis and validation (and no longer than six months later), the data would then be deposited in publicly available databases that are part of the International Sequence Database Collaboration (e.g. EMBL, DDBJ, and Genbank) (ibid.).

Bogner was prominently listed as first author of the *Nature* letter and coined the acronym GISAID.[35] However, along with a number of other influenza scientists, he was also aware that notwithstanding its good intentions, the brief letter still lacked much practical detail, and that the core issues of transparency and equity of data sharing would likely remain unresolved if data archives with anonymous access to data (like Genbank) were used. Ultimately, they felt, the sharing of such data would only work if any rights to the data that may exist would remain untouched through the process of sharing.[36] Moving things forward in practice would thus necessitate much more extensive consultation with a range of different stakeholders and mediating the development of a new system satisfying their various needs and concerns. At this point, Bogner set out to use his considerable knowledge of media and licensing issues, along with a pool of legal experts in intellectual property, government lawyers, as well as the help of key influenza experts, to develop a new mechanism that would permit the sharing of data without delay in a publicly accessible and free database, yet to be developed.[37] Over the next 18 months, those efforts would focus on three key areas: (1) developing and negotiating with Members States the legal terms for a new database access agreement; (2) the technical design of a new influenza database; and (3) agreeing the initiative's governance structure.

## An innovative approach to data sharing: the GISAID data access agreement

How could a new system better incentivize the international sharing of virus data? One possible way forward would be to

[32] Email Correspondence between Margaret Chan and Peter Bogner. 17 March 2006.

[33] CIDRAP, 'Indonesia, FAO, OIE pledge to publish H5N1 data'. 3 August 2006. Available at: http://www.cidrap.umn.edu/news-perspective/2006/08/indonesia-fao-oie-pledge-publish-h5n1-data. [Accessed 11 January 2016]; Email correspondence between Peter Bogner and Nancy Cox. 3 August 2006; Email correspondence between John Sulston and Peter Bogner. 5 August 2006.

[34] McDowell, "Indonesia agrees to hand bird flu information".

[35] Interview with Peter Bogner, Chairman of GISAID (Fernside von GISAID e.V.). 28 November 2015.

[36] Ibid.

[37] Ibid.



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try and provide data contributors with additional protections and assurances about how their data would be used. This could be performed through the careful legal design of a new data agreement governing the submitters' deposits of, and users' access to, such influenza virus data. From late 2006 onwards, Bogner thus engaged a number of former colleagues and lawyers who had worked with him on intellectual property issues during his broadcasting days to help realize a new data licensing agreement.[38] Additional scientific input to this agreement, particularly in terms of providing the scientific language for the sharing agreement and helping to define the data, came from the Scientific Advisory Council (SAC). Constituted early on by GISAID, the SAC was initially chaired by Nancy Cox from the US CDC and is composed of fellow WHO Collaborating Centre directors and FAO/OIE Reference Laboratory counterparts, as well as established researchers in the fields of epidemiology, human virology, veterinary virology, and bioinformatics. The SAC is now co-chaired by Nancy Cox and John McCauley of the Crick Institute.

Developing this new data access agreement (DAA) would require Bogner to travel extensively around the world in an effort to forge an international consensus on a novel sharing mechanism enabling public and animal health authorities to continue their surveillance work, that ensured manufacturers of medical countermeasures could continue their work on developing vaccines, antivirals, or diagnostic kits, and that also provided a transparent mechanism for researchers who had the publication of their manuscripts as their main focus.[39] GISAID's resulting DAA, which came into force in May 2008, retained the principle of a publicly accessible database – meaning that any natural person (whether scientist or not) could obtain credentials to access data in GISAID, predicated upon a one-time positive verification of the individual's identity, and agreement to the terms of the DAA, which license the use of data in GISAID.[40] This process of positively identifying the contributors and users of data differs from the anonymous access afforded to public domain archives (like GenBank), but provides GISAID with the mechanism for enforcement, and makes users adhere to the rules set forth in the DAA. Further benefits of this system are that it makes it easier for scientists to discover and properly acknowledge those who contributed the data and to also assist with any biosecurity considerations that could potentially arise around the use of some such data.[41]

The core provisions of the DAA thus include that users: (1) will share their own data and allow other users to access it; (2) that they will *not* share or distribute data submitted directly to the GISAID sharing mechanism to other non-GISAID servers or to individuals/institutions who are not registered GISAID users; (3) that they will credit the use of others' data in publications; (4) that they will make best efforts to collaborate with the originating laboratory and involve them in analyses and further research involving the data; (5) that they will analyse findings jointly; and (6) that they will maintain common access to technology derived from the data so that it can be used not only for research but also for the development of medical interventions such as diagnostics, vaccines, or antivirals. According to the agreement, GISAID users thus have the right to develop a commercial product on the basis of data obtained through GISAID, but they may not impose any terms on the data itself (which remains the sole property of the contributor), and they must also seek to collaborate with the data contributors.[42]

Most crucially of all, and notwithstanding its status as a publically accessible database, GISAID would therefore *not* fall under the legal definition of "Public Domain", because the GISAID license respects the ownership of data submissions by explicitly not permitting the removal – or waiving – of any potential pre-existing "rights" to the data; to the extent that such rights might exist around the data, they would not be affected by virtue of them having been submitted to GISAID.[43] The unique sharing mechanisms thus ensure that inherent rights (such as intellectual property rights) are not forfeit when sharing data.[44] In many ways, the successful development of this DAA offering additional legal protections and clarity would mark the key to GISAID's new virus sharing mechanism.

## EpiFlu™: creating a new influenza database

In parallel to the legal access agreement, it would also be necessary to develop the actual database itself – especially with the closing of the existing database at Los Alamos. Decisions would have to be made about where to physically locate the new database, how to design its structure and features, as well as making practical arrangements for its day-to-day running. In February 2007, it was announced that the GISAID initiative would collaborate with a Swiss consortium consisting of the Swiss Institute of Bioinformatics (SIB), and the Swiss bioinformatics company SmartGene. SmartGene would provide

[38]Ibid.

[39]McDowell, 'Indonesia agrees to hand bird flu information'.

[40]GISAID EpiFlu™ Database Access Agreement © 2008–2010. Available via: GISAID e.V. Available at: http://gisaid.org/DAA. [Accessed 25 March 2010].

[41]Email correspondence with GISAID Initiative (Fernside von GISAID e.V.), 26 September 2010. See also Lawrence O. Gostin, Alexandra Phelan, Michael A. Stoto, John D. Kraemer and Srinath Reddy, 'Virus sharing, genetic sequencing, and global health security', *Science*, 345(6202), 1295–1296.

[42]Email correspondence with GISAID Initiative (Fernside von GISAID e.V.), 26 September 2010.

[43]Interview with Peter Bogner.

[44]Statement of the Federal Republic of Germany, 'On Substantive Issues and Concerns Regarding the PIP Framework and ITS Implementation', Special Session of the PIP Advisory Group, 13 October 2011.

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secure storage and analysis of the influenza data, whilst SIB would complement genetic sequence information with high-quality protein annotation provided by the team of lead scientist Amos Bairoch, who was well known for having developed the Swiss-Prot protein knowledge database.[45] These initial arrangements for a new database would later become embroiled in complex legal disputes around contractual obligations and the flow of public funds from the USA, via the World Health Organization.[46] This resulted in GISAID establishing a new EpiFlu™ database in Germany in 2009, following the German government's proposal to ensure GISAID's continuation by acting as its new official host.[47]

To design the new database, GISAID used the same technical staff (today's Database Technical Group) composed of experts who held daily responsibilities for the sequencing activities at leading institutions such as the US' CDC, the National Institute for Medical Research in London, as well as the WHO Collaborating Centres in Beijing, Melbourne, and Tokyo, or who had worked on the design of the now defunct Los Alamos Influenza Database (Schnirring, 2009). The new EpiFlu™ database in Germany was then developed by the Max Planck Institut for Informatics (in Saarbruecken) in consultation with the wider scientific community.[48] Because the data that had been uploaded into the original EpiFlu™ database still belonged to those who supplied it (rather than to SIB), the data could then be migrated to the new database in Germany following the consent of the original contributors (Greenemeier, 2009).

With the move to Germany, responsibility for hosting the EpiFlu™ database and GISAID platform would henceforth rest with the German government.[49] Four German institutions in particular would play central roles: (1) the Federal Ministry of Food and Agriculture representing Germany; (2) the Friedrich Loeffler Institute (Germany's Federal Research Institute for Animal Health) responsible for data quality; (3) the Federal Office for Agriculture and Food for the technical hosting of the database; and (4) the Max Planck-Institute for Informatics, which would develop a new software application. In 2011, the Federal Republic of Germany and GISAID also announced that the German government would be the long-term host of the EpiFlu™ database and GISAID platform, which it continues to do to this day.[50] Ensuring the proper design, implementation, and sustainability of the new EpiFlu™ database thus marked a second key dimension in GISAID's data sharing mechanism.

## Developing a governance structure

Establishing an appropriate governance structure formed the final element. Given the scientific and political sensitivities surrounding influenza virus data, a proper governance structure would be vital to ensuring the legitimacy, scientific credibility, independence, and sustainability of the new initiative. Indeed, without such a structure, it would be difficult to build the requisite level of trust amongst scientists and governments necessary for them to agree to share the data with the new initiative. GISAID's governance structure would thus come to comprise of three independently operating bodies: (1) a board of trustees charged with securing the independence of GISAID from political or commercial interests; (2) the Scientific Advisory Council, providing scientific inputs and oversight of the initiative; and (3) the Database Technical Group, offering expertise in developing the database.[51]

In the end, then, it took a good year and a half to move from the initial aspiration for a new global consortium expressed in the 2006 *Nature* letter, to finalizing all of the careful legal, practical, and governance arrangements needed for launching a new virus data sharing platform. Getting the GISAID sharing mechanism off the ground ended up being much more than just a technical challenge of developing a new influenza database. Although the data and database remain central to the enterprise, GISAID represents a much wider international initiative comprising the EpiFlu™ database alongside its innovative sharing mechanism (enshrined it its database access agreement), as well as its wider governance structure. All three elements are critical to achieving its aim of actively promoting the timely international sharing of all influenza virus data. Once these elements were in place, GISAID could officially be launched in Geneva on the occasion of the 61st World Health Assembly in May 2008.[52]

The initiative's activities in different countries (especially China, Indonesia, and the USA) were later streamlined by

[45] 'Swiss Consortium to Manage GISAID Database.' GISAID/Swiss Institute of Bioinformatics/SmartGene Press Release. 19 February 2009; Email correspondence between Amos Bairoch and Peter Bogner. 27 September 2008.

[46] Robin McDowell, 'Influenza Scientists, WHO face off in virus row'. The Associated Press. 3 October 2008.

[47] 'Algner unterstützt Ansiedlung einer internationalen Influenza-Datenbank in Bonn'. German Federal Ministry of Food and Agriculture. 16 October 2009. Available at: http://www.bmel.de/SharedDocs/Presseinformationen/2009/249-Ai-Influenza-Datenbank%20Bonn.html [Accessed 23 March 2016].

[48] 'GISAID Launches Second Influenza Database'. GISAID Foundation Press Release. 14 September 2009. Available at: http://www.pelag.org/1d340963-gisaid-launches-second-influenza-database.html. [Accessed 15 January 2016].

[49] CIDRAP, 'German government to host flu database', 20 October 2009 (http://www.cidrap.umn.edu/news-perspective/2009/10/german-government-host-flu-database) [Accessed 07 January 2016].

[50] German Federal Ministry of Food and Agriculture. (http://www.bmel.de/EN/Ministry/Research-Innovation/_Texts/Influenza-Database-EpiFlu.html) [Accessed 07 January 2016].

[51] GISAID, "Publically accessible EpiFlu database featuring the world's most complete collection of Influenza data" (http://www.bfr.de/SharedDocs/Downloads/06_Dienststellungen/07_Dienstleistungszentrum/T/180420_GISAID-Flyer.pdf__blob=publicationFile) [Accessed 30 November 2015].

[52] GISAID, "Publicly accessible EpiFlu™ 2.0 Database featuring the world's most current and complete collection of Influenza Data". Available at: http://www.influenza.ugh.eu/files/GISAID_Flyer.pdf [Accessed 08 January 2016].


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formalizing them into a registered nonprofit association in Germany operated exclusively for charitable, scientific, and educational purposes – called "Freunde von GISAID e.V. [Friends of GISAID]".[33] In 2013, the German government also reaffirmed its long-term commitment to host the GISAID platform and the EpiFlu™ database, ensuring its sustainability.[34] Wider operations, including user management, bilateral consultations with member states and dialogue with international organizations, or scientific matters remain GISAID's responsibility.[35] GISAID similarly handles registrations and technical support questions.[36] GISAID today also has other public-private partnerships – with the US Centers for Disease Control & Prevention and Singapore's Agency for Science, Technology & Research – which contribute to the development of technology and the educational programmes of the initiative.[37]

## GISAID's contribution to global health

Has GISAID been successful in meeting its aims and objectives? As the initiative marks its 10th anniversary, there is substantial evidence of a sustained track-record of successfully facilitating the international sharing of influenza virus data. Indeed, five contributions of GISAID to global health stand out: (1) collating the most comprehensive repository of influenza genetic sequences, as well as associated clinical and epidemiological metadata; (2) facilitating the rapid sharing of potentially pandemic virus data during recent outbreaks; (3) supporting the WHO's bi-annual influenza vaccine virus recommendations; (4) developing informal mechanisms for conflict resolution around the sharing of virus data; and (5) building greater trust with many low- and middle-income countries key to global pandemic preparedness.

### Comprehensive international influenza virus data

Since its formal launch GISAID has rapidly built up an international user base comprising more than 6500 users.[38] Those users today span individuals at universities, research institutes and public health organizations, clinicians, animal health experts, bioinformaticians, epidemiologists, and members of industry from around the world.[39] The fact that GISAID is now widely used by the WHO – comprising the WHO Collaborating Centres for Influenza, the world's National Influenza Centres, and others[40] – has helped GISAID collate the most complete repository of high-quality influenza data in the world.[41] Influenza data curated by a combination of automatic and manual steps from more than 850 institutions are now held and governed by the GISAID database access agreement.[42]

The EpiFlu™ database today contains the genetic sequences of more than 1,000 influenza viruses with Human Pandemic Potential (HVHPP).[43] The most recent human influenza sequences – human isolates of the subtypes H5N1, H6N1, H7N3, H7N7, H7N9, H9N2, H10N8, and H5N2 – are all contained in the database.[44] The database also holds sequences from others hosts – with (as of 2014) humans making up approximately 69% of data, avian species 19%, and other mammals like swine 10%.[45] Geographically, data is received from around the world, with approximately 36% of submissions coming from Asia, 29% from North America, and 22% from Europe, 5% from Oceania, 4% from Africa and

[33]GISAID, "Publically accessible EpiFlu database featuring the world's most complete collection of Influenza data" (http://www.bln.de/SharedDocs/Downloads/08_Ueberblicksangebot/07_Datenbestandsangebot/Stand/E/160420_GISAID-Flyer.pdf?__blob=publicationFile) [Accessed 30 November 2015]; Correspondence with GISAID Initiative (Freunde von GISAID e.V.), 3 October 2016; Federal Ministry of Food and Agriculture, 'BMEL unterstützt den Kampf gegen Influenzaviren'. Press Release, 5 November 2014. Available at: http://www.bmel.de/SharedDocs/Pressemitteilungen/2014/277-BE-GISAID.html. [Accessed 6 October 2016].

[34]Correspondence with GISAID Initiative (Freunde von GISAID e.V.), 3 October 2016.

[35]'Cooperation Agreement between Freunde von GISAID e.V. [Friends of GISAID] and the Bundesministerium für Ernährung und Landwirtschaft [German Federal Ministry of Food and Agriculture]', 5 November 2014, p. 3.

[36]Ibid.

[37]Correspondence with GISAID Initiative (Freunde von GISAID e.V.), 3 October 2016.

[38]Email correspondence with GISAID Initiative (Freunde von GISAID e.V.), 26. September 2016.

[39]'PIP Framework Advisory Group, 'Draft optimal characteristics of an influenza genetic sequence data sharing system under the pip framework', 2015. Available at: http://www.who.int/influenza/pip/advisory_group/draft_req_doc.pdf. [Accessed 3 December 2015].

[40]'WHO Global Influenza Surveillance and Response System (GISRS)'. Available at: http://www.influenzacentres.org/centres_GISRS.htm. [Accessed 5 March 2016].

[41]'PIP Framework Advisory Group, 'Draft optimal characteristics of an influenza genetic sequence data sharing system under the pip framework', 2015. Available at: http://www.who.int/influenza/pip/advisory_group/draft_req_doc.pdf. [Accessed 3 December 2015].

[42]Email correspondence with GISAID Initiative (Freunde von GISAID e.V.), 26. September 2016.

[43]The GISAID Initiative website (http://gisaid.org) [Accessed 11 January 2016]; PIP Framework Advisory Group, 'Draft optimal characteristics of an influenza genetic sequence data sharing system under the pip framework', 2015. Available at: http://www.who.int/influenza/pip/advisory_group/draft_req_doc.pdf. [Accessed 3 December 2015].

[44]GISAID, "EpiFlu™ database features and web presentation" WHO-GISAID training workshop, St Petersburg 28–29 August, 2014, WHO-GISAID training workshop. Available at: http://www.influenza.spb.ru/events/conferences/gisaid-2014-en [Accessed 30 November 2015].

[45]Ibid.

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4% from South America (as of 2014).[66] At the end of 2015, the EpiFlu™ database broke through the symbolic threshold of holding 500,000 genetic sequences.[67] By October 2016, this number had risen to more than 650,000 genetic sequences.[68]

Data directly submitted to the EpiFlu™ database are also regularly complemented with sequence data deposited into public domain archives that are part of the International Nucleotide Sequence Database Collaboration (covering DDBI, EMBL-EBI, and NCBI). Of the 172,322 virus isolates held in the EpiFlu™ database (as of 4 October 2016), around 40% (65,915) were submitted to GISAID directly, and approximately 60% (106,407) were initially uploaded through the International Nucleotide Sequence Database Collaboration (INSDC).[69] The EpiFlu™ database thus holds both the sequence information submitted directly through the GISAID platform, as well as those submitted to INSDC databases. In light of GISAID's emphasis on hosting high-quality data, the latter data go through a process of further curation before being incorporated into the EpiFlu™ database. Given how rapidly influenza viruses change, moreover, the ability of the GISAID sharing mechanism to attract recent data is particularly significant. Of the data contained in the EpiFlu™ database from viruses collected solely over the past year, 81% were submitted directly to GISAID – and 93% for viruses collected over the last 6 months.[70]

Beyond genetic sequence data, the EpiFlu™ database also stores and provides around 50 different fields of associated metadata (of which most are searchable).[71] Such metadata includes date of specimen collection, specimen source, date of virus harvest, antiviral susceptibility, and – for human samples – patient information such as age, gender, and health status.[72] Along with a number of data analysis tools integrated into the GISAID platform, these additional data are seen by many researchers to be valuable features of the EpiFlu™ database, including for the purposes of surveillance and pandemic preparedness.[73] At the time of writing, plans were also underway to launch the next-generation of the database – EpiFlu™ 2.0 – with funding provided from 2013 to 2016 through the European Union's Research and Innovation funding programme.[74] According to the directors of the core WHO Collaborating Centres for Influenza, GISAID has rapidly emerged as an essential resource and an "irreplaceable cornerstone for public and animal health in the global fight against influenza" upon which the influenza community now depends.[75]

## Global health security: encouraging rapid data sharing during outbreaks

GISAID has also demonstrated its ability to promote the rapid sharing of virus data during several key outbreaks of wider concern to global health security. Indonesia's 2008 decision to resume sharing H5N1 data through GISAID was hailed as a diplomatic triumph.[76] GISAID would again play a key role in the 2009 outbreak of pandemic H1N1. In April 2009, the first news of the novel H1N1 virus initially threatened to overwhelm the database, yet registrations were maintained around the clock to ensure everyone had access to the data and could share early detection findings with health authorities.[77] By April 25, the US CDC had uploaded the first full genome sequence of the new virus from initial US cases into GISAID, instantly giving the research community its first detailed look at novel H1N1.[78] That information was also used for developing new diagnostics for the virus,[79] as well as for subsequent attempts to develop new vaccines for pandemic H1N1.[80]

More recently, GISAID was again used for the rapid sharing of data about the potentially pandemic H7N9 virus that caused human deaths in China and therefore also raised significant international concern. China reported the H7N9 outbreak to the WHO on 31 March 2013, just 6 weeks after the first known person fell ill.[81] On the same day, it published the genomic sequences of viruses from the three human cases then identified on the database of GISAID, along with sharing the data and live virus with the WHO GISRS and other

[66] Ibid.
[67] The GISAID Initiative website (http://gisaid.org) [Accessed 7 January 2016].
[68] Search of EpiFlu Database performed on 4 October 2016.
[69] Search of EpiFlu Database performed on 4 October 2016.
[70] Search of EpiFlu Database performed on 4 October 2016.
[71] Email correspondence with GISAID Initiative (Fernando von GISAID e.V.), 26 September 2016.
[72] PIP Framework Advisory Group, 'Draft optimal characteristics of an influenza genetic sequence data sharing system under the pip framework', 2013. Available at: http://www.who.int/influenza/pip/advisory_group/draft_freq_doc.pdf. [Accessed 3 December 2015].
[73] Interview with animal health specialist, 16 September 2014.
[74] European Commission PREDEMICS Consortium. Available at: http://cordis.europa.eu/projects/rcn/101790_de.html [Accessed 23 March 2016].
[75] Letter of the Directors of the World Health Organization Collaborating Centres for Influenza to the German Government, 18 September 2015.
[76] Interview with Masato Tashiro.
[77] CIDRAP News, 'Pandemic reveals strengths of new flu database' (2009). Available at: http://www.cidrap.umn.edu/news-perspective/2009/06/pandemic-reveals-strengths-new-flu-database. [Accessed 26 November 2015].
[78] Ibid.
[79] Viral gene sequence to assist update diagnostics for swine influenza A (H1N1). Geneva: World Health Organization, 25 April 2009.
[80] CDC Testing New H1N1 Vaccine Target'. Recombinomics Commentary 3 August 2011. Available at: http://www.recombinomics.com/News/08031101/H1N1_Q226R_Vaccine.html. [Accessed 3 March 2016], and 'WHO Testing New Pandemic H1N1 Vaccine Target'. Recombinomics Commentary 18 August 2011. Available at: http://www.recombinomics.com/News/08181101/H1N1_Vaccine_WHO.html. [Accessed 3 March 2016].
[81] ECDC, 'Human infection with a novel avian influenza A(H7N9) virus, China', 27 January 2014. Available at: http://ecdc.europa.eu/en/publications/Publications/influenza-A(H7N9-China-rapid-risk-assessment-27-January-2014.pdf. [Accessed 11 January 2016].


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laboratories.[87] Using the data, the new virus genes could be synthesized in the USA in a matter of days, thus enabling the vaccine company Novartis to also rapidly develop a new vaccine.[83] Since that time, other companies have also used data in GISAID to develop new H7N9 vaccines.[84] GISAID thus plays a crucial role in the timely exchange of information integral to the selection of pre-pandemic vaccine viruses.[85]

## Strain selection for the seasonal flu vaccines

Beyond the specter of pandemic flu, EpiFlu™ also contains the most up-to-date collection of data on seasonal influenza viruses (Neher and Bedford, 2015). The EpiFlu™ database generally receives submissions of data from current/novel strains significantly quicker than data generated from retrospective studies (ibid.). The EpiFlu™ database is thus routinely used during the bi-annual process of selecting viruses that will form the basis for the seasonal flu vaccine in the Northern and Southern Hemispheres. Data on seasonal human influenza viruses for the biannual vaccine strain consultation meetings (VCM) are deposited by WHO Collaborating Centres within a time frame of days to a few weeks of sequencing, depending on urgency and other circumstances.[86] Several of the WHO Collaborating Centres first used the database in September 2008 (following its earlier launch in May of that year) to make their recommendations for the Southern Hemisphere 2009 seasonal flu vaccine, and all of the centres subsequently used it in February 2009, to make recommendations for the Northern Hemisphere 2009–2010 vaccine.[87] Since that time, GISAID has been consistently relied upon by WHO Collaborating Centres for this selection process – giving the database simultaneous global health utility for pandemic and seasonal flu.[88]

## Resolving potential conflicts amongst stakeholders

Over the years, GISAID has also evolved a track record of successfully managing potential tensions and conflicts between stakeholders within the consortium. This became especially clear over the 2013 sharing of Chinese H7N9 virus data, which led to two sets of tensions. First, it emerged on 5 April 2013 that the vaccine company Novartis and the J. Craig Venter Institute were planning to use the sequences uploaded into GISAID to develop a new H7N9 vaccine with the support of the US CDC and with funding from the US government (Butler and Cyranoski, 2013). Because of time constraints and immense concern about the lethality of the virus, however, they initially proceeded without involving the Chinese researchers. They, in turn, felt that this move was not in the spirit of GISAID's data access agreement, which required data users to make best efforts to collaborate with the originating laboratory responsible for obtaining the specimens. At this point, GISAID's president stepped in and was able to mitigate the situation because of his close ties with the parties involved. Following discussions between the parties, the Chinese communicated to GISAID that they were satisfied that Novartis and its partners were engaging with China in a collaborative effort, and the vaccine development plans were able to proceed.[89] Bogner was later commended for his efforts in this matter by both the former Head of Research at Novartis, Philip Dormitzer, as well as the head of the Chinese National Influenza Centre, Yuelong Shu.[90]

A second source of tension emerged around the same time when the Chinese scientists submitted their first major scientific paper on H7N9, including analyses of the sequences, to the prestigious *New England Journal of Medicine*. The Chinese researchers learned that they might be scooped, as a major analysis of the H7N9 virus was already due to come out in the journal *Eurosurveillance* on 10 April, with Masato Tashiro (then director of the WHO's Collaborating Centre in Tokyo) as a co-author. Tashiro claims a draft of the paper was sent to the Chinese researchers along with an offer of co-authorship, which was declined.[91] Bogner again played a key role behind the scenes in brokering a solution by effectively raising concerns of scientific etiquette that could be amicably resolved. Tashiro was asked to delay publication until after the Chinese research publication on 11 April, and their publication was published later – albeit still on the same day (Butler and Cyranoski, 2013). Although the episode confirmed the continuing tensions that exist around the international sharing of virus data, it also showed that such tensions could be constructively managed within the framework and spirit of GISAID.

[83] 'The fight against bird flu' *Nature* (2013). Available at: http://www.nature.com/news/the-fight-against-bird-flu-1.12850. [Accessed 25 November 2015].

[84] 'Vaccine News Daily. 'Positive Phase I clinical trial results for Novartis H7N9 vaccine', 09 November 2013. Available at: http://vaccinenewsdaily.com/stories/310533576-positive-phase-i-clinical-trial-results-for-novartis-h7n9-vaccine [Accessed 11 January 2016].

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[89] Interview with Nancy Cox, 'Vereinbarung GISAID – Global Initiative on Sharing All Influenza Data'. Max Planck Foundation. Available at: http://www.maxplanckforschungsstiftung.org/projects/1101/. [Accessed 23 March 2016].

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[91] Ibid.

[92] Interview with Yuelong Shu; D. Butler and D. Cyranoski, 'Flu papers spark row over credit for data', *Nature*, 497 (2013), pp. 14–15.



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## Building trust internationally

Despite being a relative newcomer to the global health landscape, GISAID has already garnered a reputation for building trust and respect internationally.[92] The fact that a substantial proportion of the influenza sequences deposited in GISAID's database originate from Asia and Africa is no coincidence.[93] GISAID gave many LMICs the feeling that their concerns matter and that users of GISAID are treated equally.[94] The list of countries that have submitted data thus includes laboratories located in Vietnam, Brazil, Argentina, Cambodia, Thailand, India, Chile, Kenya, and Morocco.[95] It also includes countries that are deemed, because of their geographical location and role in responding to past outbreaks, to be central to global pandemic preparedness – including Indonesia, Mexico, Egypt, and China (including Hong Kong).[96] Overall, 201 countries and territories around the world participate in GISAID.[97]

This trust from many low-income and middle-income countries is further nurtured through international workshops instructing researchers from around the world how to work and analyse data generated from viruses isolated in their region. To this end, GISAID has partnered with a number of other organizations such as the WHO's GISRS, the Antiviral Group of the International Society for Influenza and Other Respiratory Viruses Diseases (ISIRV), the PREDEMICS Consortium, and the Tan Tock Seng Hospital to host workshops in Africa, Asia, Russia, Europe, and the USA.[98] Those workshops help to build further trust (as well as capacity) around the international sharing of influenza virus information amongst researchers from low-income and middle-income countries.

GISAID has also enjoyed other forms of international recognition. A meeting of the Association of South East Asian Nations (ASEAN) recognized GISAID in 2009 for encouraging the sharing of influenza genetic data.[99] Its role in moving towards greater transparency and access concerning influenza virus genetic sequence data was also recognized by the 64th World Health Assembly in 2011.[100] Kriji Fukuda, in his capacity as Assistant Director-General for Health Security at the WHO at the time, described GISAID as a "critically important and technically advanced new platform" that "provides an important option for sharing genetic sequence and epidemiological data" (Fukuda, 2011). The hosting of the database and platform by the German government is also seen to provide an important component of the trust GISAID now enjoys in many countries (ibid.). A final, but critical, component to maintaining this trust is GISAID's declaration that – since its formation – neither the initiative, its management, nor its board members have received research support, investment interests, or performed any contract work for industry or other commercial entities.[101]

## Conclusion

GISAID may have had an unlikely birth as a new global health initiative – with an unusually strong role played by an energetic, influential, and dedicated philanthropist without a prior background in global health. As the initiative marks its 10th anniversary, however, it is evident that GISAID is now making significant contributions to global health. Five such contributions stand out: (1) collating the most complete repository of high-quality influenza virus data; (2) facilitating the rapid sharing of potentially pandemic virus information during recent outbreaks; (3) informing the WHO's biannual seasonal flu vaccine strain selection process; (4) developing informal mechanisms for conflict resolution; and (5) building greater trust with low-income and middle-income countries key to pandemic preparedness. Indeed, an array of interviewees pointed out that there is now widely perceived merit in GISAID's formula for balancing the need for control *and* openness, as well as the way it seeks to reconcile the competing imperatives of science, public health, and business.[102] A number of interviewees within and outside of GISAID variously felt that it is functioning well as a mechanism and proving its value,[103] that

[92] Interview with Yuelong Shu.

[93] PIP Framework Advisory Group, 'Draft optimal characteristics of an influenza genetic sequence data sharing system under the pip framework', (2013) Available at: http://www.who.int/influenza/pip/advisory_group/draft_tsg_doc.pdf [Accessed 3 December 2015]; Interview with Ron Fouchier.

[94] Interview with a European expert in research and biotechnologies issues, formerly working in the European Commission, 19 February 2015; Interview with Hanns-Christoph Eiden, President of the Federal Office for Agriculture and Food, Bonn, 20 February 2015.

[95] Search of EpiFlu database performed on 7 January 2016.

[96] Search of EpiFlu database performed on 7 January 2016.

[97] Email correspondence with GISAID Initiative (Freunde von GISAID e.V.), 8 January 2016.

[98] GISAID Training Workshops, https://isirv.org/site/images/notice/org_documents/Cape_Town/AVG-GISAID%20Workshop%20Report_Options/VIII.pdf; https://isirv.org/site/images/conferences/NGS/NG29%20Workshop%20Programme.pdf; https://www.isirv.org/site/images/Report%20on%20GISAID%20Workshop%20HK.pdf; https://www.tnh.com.sg/page.aspx?id=7016; http://www.influenza.ophrs/en/conferences/gisaid-2014-en [All accessed 23 March 2016].

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[102] Interview with Philip Dormitzer.

[103] Interview with David Heymann, Centre for Global Health Security, Chatham House, 9 June 2015.



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there is a clear need for it,[104] that it is (successfully) contributing to changing habits around virus sharing,[105] and that it has now effectively become the "go-to" source for influenza information, especially when new outbreaks happen.[106]

That said, even today it remains hard to know just how much genetic sequence data are still not being shared. Without knowing how many influenza viruses are being sequenced internationally (and when they are being sequenced), it is simply impossible to tell.[107] Some countries evidently prefer to share influenza data through GISAID rather than through other platforms that do not provide contributors with the same levels of protection yet some interviewees also expressed suspicion that – especially in the area of animal health – there still is much information that is not being shared, and that some countries are still only sharing a small proportion of information.[108]

Although GISAID has developed a distinct ethos for sharing, moreover, there are also natural limits regarding its ability to ensure that the terms of its access agreement are adhered to. Limiting access – and even outright exclusion – of those who violate the terms of the access agreement remains a credible sanction, and one that has been used in the past. According to GISAID, the percentage of all active users whose access credentials to the GISAID platform have been revoked at the time of writing is around 0.16%.[109] At present, however, GISAID is only able to trace who is accessing information, not whether people are passing this information on to others.[110] GISAID maintains that if such data subsequently surfaces, they do have means to prove someone has illegally obtained the data – meaning that data contributors who suspect violations could seek to pursue this through legal channels.[111] Nor, of course, can there be ultimate guarantees that people will adhere to these rules when confronting all the pressures of a pandemic situation in future, although the initiative has now developed a successful track record of navigating such situations.[112]

Looking forward, there are at least three challenges that GISAID will need to navigate over the medium to long term. One such longer-term challenge mentioned by several respondents revolves around the future leadership of the initiative. On the one hand, the material sustainability of the initiative is ensured for the foreseeable future through vital support provided by the federal government of Germany.[113] On the other hand, it is evident that the personal investment of significant amounts of time, energy, expertise, skill, and commitment by its philanthropic champion has been central to the success of GISAID.[114] The longer term question of who will continue to provide wider leadership and the championing of GISAID will have to be addressed. Towards this end, the German government recently called for the institutionalization of GISAID to ensure its longevity.[115]

A second challenging area for GISAID are the ongoing negotiations around the Pandemic Influenza Preparedness (PIP) Framework. The PIP framework creates responsibilities for the sharing of biological samples of influenza viruses with pandemic potential as well as providing a mechanism – partially funded by industry contributions – for the provisions of benefits (like medicines and vaccines) to affected countries. The question of whether genetic sequences data (as opposed to physical specimens) should also be governed by the framework proved too sensitive to be resolved during the initial negotiations for the PIP framework (Gostin et al., 2014). At the time of writing, GISAID is thus having to navigate a complex and sensitive set of diplomatic negotiations around the future role of genetic sequence data in the framework, with potentially considerable ramifications for the future of the initiative.

Probably, the biggest question to arise from GISAID's success, however, is whether its sharing mechanism can be extended to also cover other viral diseases and stand for a wider paradigm shift in improving international data sharing. As we have already seen several times over the past decade, influenza is not the only potentially lethal infectious disease that the world confronts, and it remains to be seen whether GISAID has both the aspiration and capacity to expand into other lethal viral diseases – such as Ebola, MERS, West Nile Virus, and other zoonotic diseases.[116] There are certainly signs that this data sharing problem also manifested itself during the more recent Ebola outbreak in West Africa, (Yozwiak et al., 2015) as well as the spread of Zika virus.[117] Although GISAID was approached to extend its scope to include Ebola viruses, GISAID's leadership felt at the time that this was beyond its capacity. Yet Ebola is clearly another disease that shows more generally that the spread of viruses and their husbandry systems do not align naturally with political boundaries.[118] Here too, as in a number of other lethal infectious diseases,

[104] Interview with Nancy Cox.
[105] Interview with Alan Hay.
[106] Interview with Philip Dormitzer.
[107] Interview with Ron Fouchier.
[108] Interview with Gwenaëlle Dauphin.
[109] Email correspondence with GISAID Initiative (Fernside von GISAID e.V.), 18 January 2016.
[110] Interview with Masato Tashiro.
[111] Email correspondence with GISAID Initiative (Fernside von GISAID e.V.), 18 January 2016.
[112] Interview with John McCauley.
[113] Interview with an expert in computational biology, 23 February 2015.
[114] Interview with Ron Fouchier; Interview with an expert in computational biology, 23 February 2015; Interview with John McCauley.
[115] Minutes from the Annual General Meeting between Germany and GISAID, 28 April 2015.
[116] Interview with an expert in computational biology, 23 February 2015; Interview with Ron Fouchier.
[117] Brazil Considers Reforming Biosecurity Law Amid Criticism', Associated Press, 9 February 2016. Available at: http://www.cnbc.com/world-news/brazil-considers-reforming-biosecurity-law-amid-criticism-1274312. [Accessed: 10 February 2016].
[118] Interview with Ian Brown.

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protecting populations will require creative and sustained efforts to carefully reconcile data, disease, and diplomacy.

## Conflict of Interest

The authors have declared no conflict of interest.

## Author Statement

S. Elbe and G. Buckland-Merrett jointly conceived and designed the study, developed the study protocol, collected the data, analysed the data, and prepared and approved the manuscript.

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# GISAID: Global initiative on sharing all influenza data – from vision to reality

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Ten years ago, a correspondence [1,2], signed by more than 70 championed *'A global initiative on sharing avian flu data'* (GISAID) [3], leading to the GISAID initiative in 2008. What started out as an expression of intent to foster international sharing of all influenza virus data and to publish results collaboratively has emerged as an indispensable mechanism for sharing influenza genetic sequence and metadata that embraces the interests and concerns of the wider influenza community, public health and animal health scientists, along with governments around the world. Today GISAID is recognised as an effective and trusted mechanism for rapid sharing of both published and 'unpublished' influenza data [4]. Its concept for incentivising data sharing established an alternative to data sharing via conventional public-domain archives.

In 2006, the reluctance of data sharing, in particular of avian H5N1 influenza viruses, created an emergency bringing into focus certain limitations and inequities, such that the World Health Organization (WHO)'s Global Influenza Surveillance Network (now the Global Influenza Surveillance and Response System (GISRS) [5]) was criticised on several fronts, including limited global access to H5N1 sequence data that were stored in a database hosted by the Los Alamos National Laboratories in the United States (US) [6,7]. This data repository, set up with financial support from the US Centers for Disease Control and Prevention (CDC) as a first attempt to share 'sensitive' data from affected countries, but was accessible only to those who were also providing H5N1 sequence data. This limited-access approach restricted wider sharing of data prior to publication, which was vital for broader understanding of the progress of the emergent public and animal health threat. The need for greater transparency in data sharing and for acknowledgement of those contributing samples from H5N1-infected patients and animals and related genetic sequence data was not satisfied by sharing data after formal publication via public-domain databases. Scientists charged with the day to day responsibilities of running WHO Collaborating Centres (CCs) for influenza, National Influenza Centres and the World Organisation for Animal Health (OIE)/ Food and Agriculture Organization of the United Nations (FAO) [8] reference laboratories, were therefore eager to play a key role and provide scientific oversight in the creation and development of GISAID's data sharing platform that soon became essential for our work.

A unique collaboration ensued, involving, in addition to members of WHO's GISRS and OIE/FAO reference laboratories, the wider influenza research community along with officials in governmental institutions and non-governmental organisations. Facilitated by a well-connected broadcast executive with background in licensing of intellectual property, an agreement was drawn up on the sharing of genetic data to meet emergency situations, without infringing intellectual property rights - the GISAID Database Access Agreement (DAA). The DAA governs each individual's access to and their use of data in GISAID's EpiFlu database [9]. It was this alliance between scientists and non-scientists, with a diversity of knowledge and experience, involved in drawing up an acceptable simple, yet enforceable, agreement which gained the trust and respect of the scientific community and public health and animal health authorities.

The essential features of the DAA encourage sharing of data by securing the provider's ownership of the data, requiring acknowledgement of those providing the samples and producing the data, while placing no restriction on the use of the data by registered users adhering to the DAA. It essentially defines a code of conduct between providers and users of data, cementing mutual respect for their respective complementary contributions, and upholding the collaborative ethos of WHO's GISRS, initially established 65 years ago this year [5].



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Launched in 2008, the EpiFlu database was of key importance in the response to the 2009 influenza A(H1N1) pandemic, allowing countries to readily follow the evolution of the new virus as it spread globally [10]. Acceptance of the GISAID sharing mechanism by providers and users of data, and the confidence of the influenza community, were further illustrated in 2013 by the unprecedented immediate release of the genetic sequences of influenza A(H7N9) viruses from the first human cases, by Chinese scientists at the WHO Collaborating Centre for Influenza in Beijing [11,12]. Such events reaffirmed GISAID's applicability to timely sharing of crucial influenza data. The subsequent use of the sequence data to generate, develop and test candidate vaccine viruses by synthetic biology within a few weeks also demonstrated how GISAID successfully bridged this important 'technological' gap [13,14]. The paper by Bao et al. from Jiangsu province of China published in this issue once again confirms the importance of the timely sharing of data on the evolution of the A(H7N9) viruses for global risk assessment. The authors analysed the recently isolated H7N9 viruses form the fifth wave in Jiangsu province, and the results showed no significant viral mutations in key functional loci even though the H7N9 viruses are under continuous dynamic reassortment and there is genetic heterogeneity. These findings should help to reduce concerns raised, even though the number of human infection with H7N9 virus increased sharply during the fifth wave in China.

GISAID provides the data-sharing platform particularly used by GISRS, through which sequence data considered by the WHO CCs in selecting viruses recommended for inclusion in seasonal and pre-pandemic vaccines are shared openly and on which research scientists, public and animal health officials and the pharmaceutical industry depend. Such openness of the most up-to-date data assists in an understanding of and enhances the credibility of the WHO recommendations for the composition of these seasonal and potential-pandemic vaccines.

Furthermore, in promoting the prompt sharing of data from potential pandemic zoonotic virus infections, as well as from seasonal influenza viruses, GISAID ensures a key tenet of the WHO Pandemic Influenza Preparedness (PIP) framework [15], highlighting the critical role it plays in mounting an effective mitigating response. GISAID's ability to facilitate efficient global collaborations, such as the Global Consortium for H5N8 and Related Influenza Viruses [16,17], is central to monitoring phylogeographic interrelationships among, for example, H5 subtype viruses in wild and domestic birds in relation to their incidence, cross-border spread and veterinary impact, and assessing risk to animal and human health [18].

Traditional public-domain archives such as GenBank, where sharing and use of data takes place anonymously, fulfil a need for an archive of largely published data; however, that conventional method of data exchange notably has not been successful in encouraging rapid sharing of important data in epidemic or (potential) pandemic situations, such as those caused by Middle East respiratory syndrome coronavirus (MERS-CoV) and Ebola viruses. While the GISAID EpiFlu database is hosted and its sustainability ensured through the commitment of the Federal Republic of Germany [19], the establishment of GISAID and development of the EpiFlu database was reliant to a large extent on philanthropy of one individual and voluntary contributions and generosity of many others, together with some initial financial provision by the US CDC and the German Max Planck Society.

That GISAID has become accepted as a pragmatic means of meeting the needs of the influenza community in part reflects the particular characteristics of influenza and the continual need for year-round monitoring of the viruses circulating worldwide, essential for the biannual vaccine recommendations and assessment of the risk posed by frequent zoonotic infections by animal influenza viruses [20]. In the meantime, calls for an equivalent mechanism to promote the timely sharing of data in other urgent epidemic settings go largely unfulfilled [21,22]. A recent publication considered whether the 'paradigm shift' in data sharing by GISAID could be applied more generally to assist in preparedness for and response to other emergent infectious threats, such as those posed by Ebola virus [21] and Zika virus [23]. Such a trusted system could complement and take full advantage of the latest advances in rapid sequencing of specimens in the laboratory and in the field, for outbreak investigation [24].

Given the crucial importance of genetic data in improving our understanding of the progress of an emergent, potentially devastating epidemic, the effectiveness of GISAID in influenza pandemic preparedness is self-evident and provides important lessons for future pandemic threats. While the genetic makeup and the necessary associated data of the different viruses are distinct requiring separate databases/compartments for unambiguous analysis, the modi operandi for sharing genetic data are generic and the GISAID mechanism could be applied to other emerging pathogens. Indeed, the wider implementation of such a data sharing mechanism should be key in concerted efforts to contain spread of disease in animals and threats to human health, in realising the concept of One Health.

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## Conflict of interest

None declared.

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UCDUSR0002340

**From:** Leilani Francisco <francisco@ecohealthalliance.org>
**To:** David J Wolking <djwolking@ucdavis.edu>;Prof. Jonna Mazet <jkmazet@ucdavis.edu>;Kevin Olival <olival@ecohealthalliance.org>;Peter Daszak <daszak@ecohealthalliance.org>;Brian Bird <bhbird@ucdavis.edu>;Corina Grigorescu Monagin <cgmonagin@ucdavis.edu>;Tracey Goldstein <tgoldstein@ucdavis.edu>;Simon Anthony <sja2127@columbia.edu>;Christine Kreuder Johnson <ckjohnson@ucdavis.edu>;Megan Doyle <mmdoyle@ucdavis.edu>;Prof. Woutrina Smith <wasmith@ucdavis.edu>;Tammie O'Rourke <torourke@metabiota.com>;William B. Karesh <karesh@ecohealthalliance.org>;Catherine Machalaba <machalaba@ecohealthalliance.org>
**Sent:** 9/13/2017 8:53:03 PM
**Subject:** RE: Slides from semi-annual meeting

Hi David,
Please find mine attached.
Best,
Leilani

**From:** David J Wolking [mailto:djwolking@ucdavis.edu]
**Sent:** Wednesday, September 13, 2017 2:24 PM
**To:** Prof. Jonna Mazet <jkmazet@ucdavis.edu>; Kevin Olival <Olival@ecohealthalliance.org>; Peter Daszak <daszak@ecohealthalliance.org>; Brian Bird <bhbird@ucdavis.edu>; Corina Grigorescu Monagin <cgmonagin@ucdavis.edu>; Tracey Goldstein <tgoldstein@ucdavis.edu>; Simon Anthony <sja2127@columbia.edu>; Christine Kreuder Johnson <ckjohnson@ucdavis.edu>; Megan Doyle <mmdoyle@ucdavis.edu>; Prof. Woutrina Smith <wasmith@ucdavis.edu>; Tammie O'Rourke <torourke@metabiota.com>; Leilani Francisco <francisco@ecohealthalliance.org>; William Karesh <karesh@ecohealthalliance.org>; Catherine Machalaba <Machalaba@ecohealthalliance.org>
**Subject:** Slides from semi-annual meeting

Hi there,

We would like to archive the presentations from the semi-annual meeting and Andrew would also like to have them to create a shortened semi-annual meeting slide deck to share with USAID colleagues.

Could you please email me your presentation when you have a chance?

Thanks!

David

# PREDICT SEMI-ANNUAL CONSORTIUM MEETING

**Behavioral Risk Surveillance**

12 September 2017

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UCDUSR0002342

# Summary

- **Part 1**: Summary of Planned Deliverables
- **Part 2**: Engaging Communities
- **Part 3**: Intervention for Safe Bat-Human Interactions
- **Part 4**: Roadmap for Intervention Development

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# PART 1:
# SUMMARY OF PLANNED DELIVERABLES

Behavioral Risk Surveillance

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# Behavioral Risk 2-page Info Sheet




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# Topics for In-depth Exploration




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FROM THE AMERICAN PEOPLE

# Topics for In-depth Exploration




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FROM THE AMERICAN PEOPLE

# Topics for In-depth Exploration




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# Topics for In-depth Exploration




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## Topics for In-depth Exploration




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# Topics for In-depth Exploration




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# PART 2:
# ENGAGING COMMUNITIES

Behavioral Risk Surveillance

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# PART 3:
# SAFE BAT-HUMAN INTERACTION INTERVENTION

*"Living Safely with Bats"*

Behavioral Risk Surveillance

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UCDUSR00023S4

## Communication Campaign Picture Book




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UCDUSR0002355

# Background

- Preliminary analyses identified an expressed need to provide behavior change **strategies** in West Africa as they relate to living **safely with bats**.
- The Consortium was charged with developing content for this **communication campaign** intervention to **reduce risks** associated with human-bat interactions through **behavior change**.
- We developed a **model to assess**: potential materials, channels of communication, as well as respective audiences and core messaging
- **Pilot** for Sierra Leone
- A **moderated picture book format** was recommended and well received by local stakeholders

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# Moderated Story Telling

- Story telling moderation by trusted community leaders
- Descriptive illustrations to address low literacy
- Moderator talking points provided





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# *"Living Safely with Bats"*

**Core Messaging**

- Bats are an Essential Part of our Ecosystem
- Ways to Live Safely with Bats
- How to Dispose of Dead Bats
- If Contact with Live Bats is Unavoidable
- Managing Bats in the Home
- Managing Bats around the Outside of your Home

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UCDUSR0002358

## *"Living Safely with Bats"*




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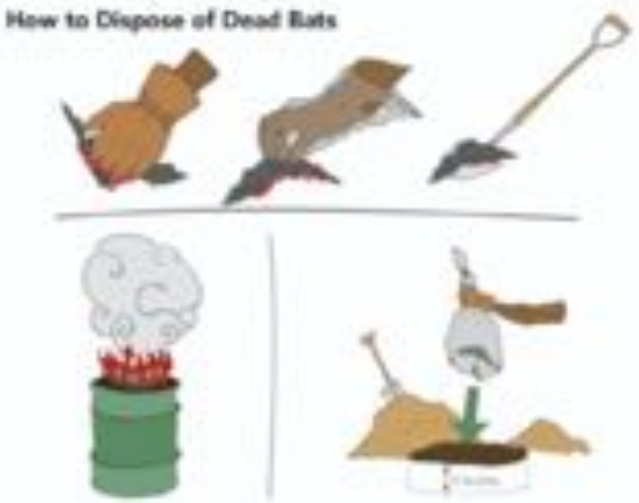
UCDUSR0002359

## *"Living Safely with Bats"*

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## *"Living Safely with Bats"*

**If Contact with Live Bats is Unavoidable**



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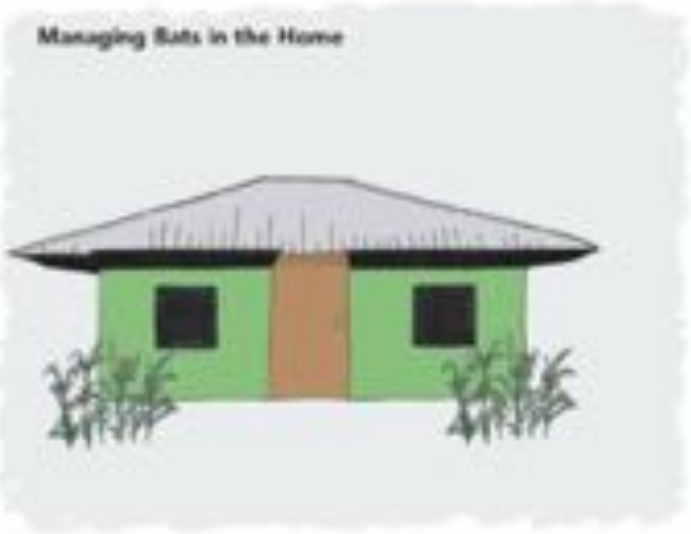
## *"Living Safely with Bats"*

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UCDUSR0002362

## *"Living Safely with Bats"*




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UCDUSR0002363

# PART 4: ROADMAP FOR INTERVENTION DEVELOPMENT

Behavioral Risk Surveillance

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UCDUSR00002364

# HUNTED BATS IN THE VALUE CHAIN

**Republic of Congo**




Part 4: Roadmap For Intervention Development

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# Republic of Congo (RoC) Profile



| | |
|---|---|
| **Concurrent Site 1:** | Marché Total |
| **Concurrent Site 2:** | Marché Ouenzé |
| **Concurrent Site 3:** | Marché Mikalou |
| **Concurrent Site 4:** | Marché Bouemba |
| **Questionnaires (to Date):** | 13 |
| **Ethnographic Interviews (to Date):** | 18 |

**Sub-analysis details**

- Focus on bat-risk interfaces in the Brazzaville bushmeat market value chains
- Analysis includes:
  - Data from Marché Total and Marché Bouemba (sites with bat-related data)
  - 13 interviews with vendors, restaurant owners, butchers, hunters and consumers (6 from Bouemba Market, 7A from Total Market)

**Part 4. Roadmap For Intervention Development**

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## Typical Model for Behavior Change Program Development and Evaluation

**Rationale for using "Logic Models" to frame intervention recommendations**

- Depicts the ideal implementation of interventions as defined by program developers
- In program development answers: how will we know when we have succeeded? What factors will determine success?
- Is also a key tool in program evaluation

**Key features of "Logic Models":**

- Initial outcomes typically include changes in knowledge and attitudes
- Intermediate outcomes often include changes in attitudes and skills
- Distal outcomes typically include changes in behaviors
- Ultimate outcomes typically include reduction in morbidity and mortality
- In process evaluations, the process of implementation is analyzed
- In outcome evaluations, metrics for each of the above are measured




**Part 4: Roadmap For Intervention Development**

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# Rationale Based on Findings (to Date)

| | Qualitative Findings<br>(Interview, Focus Groups, & Participant Observation) | Quantitative Findings<br>(Questionnaire, Section 8, phase sampling, Interview, Ecological and Field Findings, etc.) |
|---|---|---|
| **Knowledge / Beliefs** | | |
| Protective Factors | • Many bat keepers and butchers expressed knowledge of the risks associated with hunting related activities, including the potential for **disease transmission** if bitten by a sick bat.[1] | |
| Risk Factors | • In contrast, some respondents expressed a lack of knowledge regarding what constitutes safe hunting practices.<br>• For example, safe hunting practices could be guided by a **mystical/animal rationale** that dictates which forest you enter and what time you have the forest.[2] | |

Part 4: Roadmap For Intervention Development

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# Rationale Based on Findings (to Date)

| | Qualitative Findings<br>Veterinary Focus Groups & Participant Observation | Quantitative Findings<br>Questionnaire Survey & animal sampling, laboratory, ecological and Pilot Biology, etc. |
|---|---|---|
| **Attitudes** | | |
| Protective Factors | • Most market vendors were familiar with the Ebola epidemic and **accepted it came from animals.** | |
| Risk Factors | • Vendors and hunters who regularly manipulated bats/bushmeat did not believe that there were any risks associated with touching or butchering animals because they had **not experienced consequences.**<br>• For example, almost two thirds of the individuals who were interviewed mentioned that despite having performed these activities and having enhanced others in their community on the same, they had never seen any negative result, leading to low risk perceptions. | |

Part 4. Roadmap For Intervention Development

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# Rationale Based on Findings (to Date)

| | Qualitative Findings | Quantitative Findings |
|---|---|---|
| **Skills** | | |
| Protective Factors | | |
| Risk Factors | • Regarding **knife-related accidents**, individuals with better butchering skills, honed over years working in the markets reported fewer cuts than did individuals with less developed butchering skills. Those without as much butchering experience reported frequent cuts and/or knife slips. | |

Part 4. Roadmap For Intervention Development



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# Rationale Based on Findings (to Date)

| | Qualitative Findings<br>Interviews, Focus Groups, & Participant Observation | Quantitative Findings<br>Questionnaire, human & animal sampling, laboratory, ecological and PREDICT findings, etc. |
|---|---|---|
| **Behaviors** | | |
| Protective Factors | • Respondents said butchering bats unavoidable risks and some try to minimize time spent slaughtering bats and **devoting time to other money-making activities** | |
| Risk Factors | • No bat vendor or butcher reported **using any PPE** while working with bats<br>– Many respondents reported frequent scratches and bites from bats. Bats were described as particularly aggressive animals when captured and therefore individuals often had open wounds<br>• **Risky wound management skills:**<br>– Cleaning wounds using the same water in which the bat meat was washed<br>– Sucking the wound from a bat bat to clean out the wound<br>– Squeezing lemon on wound<br>– Fashioning a makeshift cloth/bandage to cover the wound and continue working<br>– Using traditional remedies<br>– Majority continue to work after treating the wound, exposing self/others to blood contact[1] | |

**Part 4: Roadmap For Intervention Development**



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# Literature Support

A study by Kamins et al.[1] piloted a small educational intervention with bat hunters (n=26) in Southern Ghana on bat-borne disease risk and importance of fruit bats from a conservation stand point:

- When participants were asked if this new information would impact their decisions to hunt and/or slaughter bat meat, 55% of participants said that they would be less likely to hunt, sell or butcher bat meat.

Other reasons for ceasing bat-related activities as reported by participants included:

- If they could get sick from bats
- If they had better economic opportunities
- If they stopped making a profit from selling bats, or the demand for bats decreased
- Stricter laws or increased fines

[1] Kamins, A. [illegible] Kinsiriffe, P. [illegible] et al. Characteristics and Risk Perceptions of Ghanaians Potentially Exposed to Bat-Borne Diseases through Bushmeat Ecotourism. [illegible] 2015.

**Part 4: Roadmap For Intervention Development**

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# Proposed Intervention Logic Model




Part 4. Roadmap For Intervention Development

## Discussion of Preliminary Intervention Recommendations

1. **Outlaw bats in the value chain** → likely to lead to sale on black market
2. **Education on disease harms risk**
3. **Education on safe butchering of domestic animals**
   - Bushmeat vendors often perceived their work as risky, mentioning that they needed to learn other ways to butcher the meat, or go to specific butchers that had a mastery of the work. (train domestic animal butchers to serve as mentors)
   - An educational campaign on safer butchering techniques could be administered to the workers in the markets.
4. **Education on use of Personal Protective Equipment (PPE)**
   - Similarly to the Kinshasa markets, vendors rarely reported using gloves when butchering or handling bushmeat in the ROC Brazzaville markets.
   - A training module on the importance of using PPE in markets could emphasize the importance of wearing gloves, as well as other protection such as masks, aprons, or separate butchering clothes during high-risk bat manipulation activities.

- **Development of intervention recommendations is iterative and ongoing**
  - Recommendations will be iteratively refined via:
    - Ongoing collection and analysis of qualitative data (including interviews, focus groups, and participant observations)
    - Ongoing collection and analysis of quantitative data (including questionnaires, animal and human sampling, laboratory and modeling, and analysis findings)
    - Further site-level risk analysis
    - Feedback from materials to stakeholders within the PREDICT coordination stakeholders (key informants and community members)

**Part 4: Roadmap For Intervention Development**

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# Summary

- **Part 1**: Summary of Planned Deliverables
- **Part 2**: Engaging Communities
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- **Part 4**: Roadmap for Intervention Development

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## Thank you

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**From:** Andrew Clements <aclements@usaid.gov>
**To:** David J Wolking <djwolking@ucdavis.edu>
**CC:** Alisa Pereira Emerging Threats Division <apereira@usaid.gov>;predict@ucdavis.edu <predict@ucdavis.edu>;PREDICTMGT <predictmgt@usaid.gov>;Kirsten Gilardi <kvgilardi@ucdavis.edu>
**Sent:** 10/6/2017 4:37:24 PM
**Subject:** [predict] Re: Uganda EPT meeting notes

Thanks.

Greg at USAID Uganda had no issues with the proposed Predict year 4 work plan.

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

On Oct 6, 2017, at 5:42 PM, David J Wolking <djwolking@ucdavis.edu> wrote:

Hi Andrew and Alisa,

Just sharing some information from Benard in Uganda about the upcoming "high-level" GHSA event in Kampala. If you all have any guidance for us on preparing for the event or meetings we would certainly appreciate your insights.

Cheers,

David

---------- Forwarded message ----------
From: **Benard Ssebide** <bssebide@gorilladoctors.org>
Date: Fri, Oct 6, 2017 at 12:05 AM
Subject: Uganda EPT meeting notes
To: Kirsten Gilardi <kvgilardi@ucdavis.edu>, Mike Cranfield <mrcranfield@gorilladoctors.org>, David J Wolking <djwolking@ucdavis.edu>

Dear Kirsten,

Below are a few highlights from the meeting held today at the USAID mission in Kampala. Detailed notes will be shared shared later.

There will be a One Health Day scheduled for 3rd Nov 2017. We were asked if there is anything we plan to do or we can do to support the activities of the day. It is being organized by the NOHP

Our Yr 4 work-plans were under review at the mission and will be sent back to Washing by the end of this week.

The GHSA high level ministerial event is scheduled for 25th to 27th Oct 2017. Greg will share with the group the website for registration of participants. All participants have to fill in their details at this website for

accreditation. I will send you that as soon as I get it.

We are expected to present at least a poster at this event. Details of the poster sizes will be shared but in the meantime, Greg would like us to share our poster with him for review as soon as possible.

An EPT meeting is planned for the 24th Oct where EPT partners will meet with the USAID health team, USAID Chief Green, and Denis from DC , and staff from USAID Nairobi bureau. This meeting is likely to be at Munyonyo Speke resort, the event venue, but this and time will be confirmed later. During this meeting emphasis will be on accomplishments and success stories, but also on targets and progress towards meeting the targets.

For our planning, I need to confirm with Dr Issa Makumbi the Chair of the organizing committee who will be attending for PREDICT.

The program of the event has not yet been shared but EPT partners are likely to be back benchers / observers at this event.

The meeting minutes will be shared from USAID when ready.

Thanks,

Benard.

**From:** Andrew Clements <aclements@usaid.gov>
**Sent:** Mon, 16 Oct 2017 11:10:20 +0200
**To:** predict@ucdavis.edu, Christine Kreuder Johnson <ckjohnson@ucdavis.edu>, Tracey Goldstein <tgoldstein@ucdavis.edu>, "D. Phil Simon Anthony" <anthony@ecohealthalliance.org>
**Cc:** predictmgt@usaid.gov
**Subject:** [predict] Fwd: A manuscript of EPT-Farmer
mime-attachment.html
Attachment
EPT_Farmer_surveillance.pdf
Attachment

FYI. Thailand FUO study done by Chula. Univ. and CDC several years ago.
Looks like they may have used Predict primers although I didn't see that acknowledged in the manuscript.

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

Begin forwarded message:

**From:** Sudarat Damrongwatanapokin <[REDACTED]
**Date:** October 15, 2017 at 12:03:08 AM GMT+2
**To:** Saowapak Hinjoy <[REDACTED]
**Cc:** Angela Wang <awang@usaid.gov>, Dennis Carroll <dcarroll@usaid.gov>, "Andrew(ANE/TS) Clements" <aclements@usaid.gov>, [REDACTED] Daniel Schar <dschar@usaid.gov>
**Subject: Fwd: A manuscript of EPT-Farmer**

Dear Dr.Soawapak,

Congratulations!! And thank you very much for sharing the published manuscript with USAID team.

Best regards,
Sudarat

Sent from my mobile.

Begin forwarded message:

**From:** Soawapak Hinjoy [REDACTED]
**Date:** October 14, 2017 at 9:48:58 PM GMT+7
**To:** S Wacharapluesadee [REDACTED], Sopon Iamsirithaworn [REDACTED], punnarai smithsuwan [REDACTED], "Padungtod, Pawin (FAORAP)" [REDACTED], "dSchar@usaid.gov" <dSchar@usaid.gov>, Apiladee Soongsam <[REDACTED], "Na Nan, Somruethai (CDC/CGH/DGHP)" [REDACTED]
**Subject: A manuscript of EPT-Farmer**

Dear all,

I am sending you a manuscript that was granted by EPT-farmer from 2014 to 2015. It has been already published in Asian Pacific Journal of Tropical Disease as an attached file.

Thank you very much for your kind contribution on this project.

Best regards,
Jub

Soawapak Hinjoy, DVM, MSc, MPH, DrPH
Veterinary officer, Expert level
Chief of Active Surveillance Section
Bureau of Epidemiology, Department of Disease Control
REDACTED

Asian Pacific Journal of Tropical Disease

journal homepage: http://www.apjtcm.com



Original article https://doi.org/10.12980/apjtd.7.2017D7-104 ©2017 by the Asian Pacific Journal of Tropical Disease. All rights reserved.

# Zoonotic and vector borne agents causing disease in adult patients hospitalized due to fever of unknown origin in Thailand

Soawapak Hinjoy[1*], Supaporn Wacharapluesadee[2], Sopon Iamsirithaworn[1], Pattarasi Sruthsowat[1], Piwin Padungtod[3]

[1]*Bureau of Epidemiology, Department of Disease Control, Ministry of Public Health, Nonthaburi 11000, Thailand*

[2]*WHO Collaborating Center for Research and Training on Viral Zoonoses, Chulalongkorn University, Bangkok 10330, Thailand*

[3]*Thailand Ministry of Public Health-US CDC Collaboration, Department of Disease Control, Ministry of Public Health, Nonthaburi 11000, Thailand*

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Hospitalized patients
Zoonoses
Vector borne

ABSTRACT

**Objective:** To determine the etiologic agents of fever of unknown origin among populations in agricultural communities and to assess the possible risk factors for zoonotic infections.
**Methods:** Hospitalized patients with fever of unknown origin under physician care were asked to participate and provide blood samples for laboratory tests and screening for endemic diseases at the hospitals. Samples were stored at -80 ℃ until they were tested at Chulalongkorn University to identify additional pathogens.
**Results:** We were able to identify the etiologic agents in 24.6% of the 463 enrolled patients. Zoonotic and vector borne agents were confirmed in 59 cases (12.7%). Dengue virus (7.3%) was the most frequently detected disease followed by scrub typhus (3.2%). There were two cases of comorbidities of scrub typhus and dengue fever. The other six cases of zoonoses were leptospirosis, melioidosis, and *Streptococcus suis* infections. Patients with zoonotic/vector borne agents noticed rats in their houses and reported having contact with livestock feces more frequently than those patients without zoonotic/vector borne agents.
**Conclusions:** Dengue virus and scrub typhus were mostly detected in the rainy season. During this specific season, clinicians should raise awareness of those diseases when any patients are admitted to the hospital with fever of an unidentified source.

## 1. Introduction

Emerging infectious diseases (EIDs) comprise those infectious diseases whose incidence in humans has increased in the past two decades and threatens to increase in magnitude in the future[1]. EIDs include new or unrecognized diseases, those that are spreading to new geographic areas and hosts, as well as those that are re-emerging. More than 60 percent of EIDs have zoonotic origins[1].



All study procedures were reviewed and approved by the Thai Ethical Review Committee for Research in Human Subjects, Ministry of Public Health Thailand (IN2555 and 76/2557). Written informed consent was obtained from individual study subjects at enrollment for both the interview and specimen collection.

Foundation Project: Supported by USAID through CDC Cooperative Agreement with Ministry of Public Health, Thailand with grant number: MOPH 5130 GH000172-04.

The journal implements double-blind peer review practiced by specially invited international editorial board members.

Zoonotic EIDs in livestock pose a significant risk to farmers and others in the agricultural production supply chain[1]. Some examples of important zoonoses occurring among Thai livestock farmers and wildlife hunters/butchers that have been notified under the National Communicable Disease Surveillance System in Thailand include anthrax, food poisoning, hepatitis E, leptospirosis, melioidosis, brucellosis, campylobacteriosis, leptospirosis, rabies, salmonellosis, taeniasis, trichinellosis, tuberculosis, toxoplasmosis, *Streptococcus suis*, and *Streptococcus equi* infections[1]. In recent years, zoonoses have been recognized as increasing public health problems in Thailand. This is also evident in the detection of outbreaks of emerging zoonoses at different localities in the world. If surveillance, detection, prevention, and response among these at-risk population groups are lacking or inadequate, an EID can result in far-reaching and severe global consequences. Surveillance, detection, prevention, and response among these at-risk population groups are essential to avert severe global consequences from deadly EIDs. Early detection of infectious

UCDUSR0002381

diseases in high-risk populations is also vital for limiting the spread of EIDs. Disease surveillance by gathering and generating data on disease incidence and prevalence in high-risk populations, as proposed here, can provide the basis of evidence for early detection and prompt response to EIDs in Thailand. The objectives were to determine etiologic agents of fever of unknown origin (FUO) among populations in agricultural communities and to assess the possible risk factors for zoonotic infections.

## 2. Materials and methods

We conducted the study from November 2013 to August 2015 in agricultural communities in Chiang Mai, Nakorn Ratchasima, and Sa Kaeo Provinces with a total of seven participating community hospitals (two hospitals each in Chiang Mai and Nakorn Ratchasima Provinces and three hospitals in Sa Kaeo Province). This population-based surveillance represented seven agriculture districts of the provinces. Hospitalized patients with fever of unknown etiology were asked to participate in the study if they met the inclusion criteria including 1) fever of more than 38 °C for 48 h or more, or 2) fever of more than 38 °C either continuous or intermittent for 14 days or more, or 3) fever of more than 38 °C with no known cause even after extensive diagnostic testing, and 1) aged 18 years or greater, and 2) resident of Chiang Mai, Nakorn Ratchasima or Sa Kaeo Provinces.

Written informed consent was obtained from individual study subjects at enrollment for both the interview and specimen collection. Patients were excluded if they declined to participate in the study, had an HIV infection, or were unable to respond to the questionnaire. All study procedures were reviewed and approved by the Thai Ethical Review Committee for Research in Human Subjects, Ministry of Public Health Thailand (35/2555 and 76/2557).

After a written informed consent was obtained, all participants answered a standardized questionnaire. A direct person-to-person written informed consent was obtained from all participants (adults ≥ 18 years old) at enrollment. Occupational exposure to livestock or wildlife was assessed by project staff at the participating hospitals through patient interviews. The participants were examined and received treatment by attending physicians who made the decision to collect blood samples, cerebrospinal fluid (CSF), or nasopharyngeal (NP) swabs for laboratory tests at each hospital. Initial screening for endemic diseases including influenza, dengue, leptospirosis, scrub typhus, salmonellosis, typhoid, and malaria was done at the surveillance hospitals. Undiagnosed specimens were transported to a central laboratory where testing for several infectious agents was performed.

All interviews and the collection of blood specimens were conducted in the study hospitals. All blood specimens were centrifuged and separated serum was stored at −80 °C until they were tested at the WHO Collaborating Center for Research and Training on viral zoonoses, Chulalongkorn University for further investigation to identify the pathogens, including potential newly emerging pathogens.

### 2.1. Nucleic acid extraction

Nucleic acids were extracted from 200 μL of the NP or CSF samples or 100 μL of whole blood using an easyMAG automation (bioMérieux, France) and eluted in 50 μL of elution buffer, according to the manufacturer's recommendations.

### 2.2. Pathogen detection by molecular technique

#### 2.2.1. 2014

Nucleic acids from NP or whole blood samples were tested by conventional reverse transcription-PCR for detection of 16 viral families including Adeno-, Alpha-, Arena-, Astro-, Bunya-, Corona-, Flavi-, Hanta-, Henipa-, Herpes-, Influenza-, Lyssa-, Paramyxo-, Phlebo-, Rhabdo-, Seadoma- viruses and 16S rRNA for bacteria detection. The positive PCR product was confirmed by sequencing. Nucleic acids from NP were tested for respiratory virus by 2 platforms including Anyplex™ FluA/B Typing Real-time for detection of 2009 pandemic H1N1, influenza A virus and influenza B virus and Anyplex™ II RV16 detection assay for adenovirus, influenza A virus, influenza B virus, parainfluenza virus 1–4, rhinovirus A/B/C, respiratory syncytial virus A-B, bocavirus 1/2/3/4, metapneumovirus, coronavirus 229E, -NL63, -OC43, and enterovirus. Nucleic acids from CSF samples were tested by real-time PCR assays for detection of 8 human herpes virus (ABGENE®, bioMérieux, France). PCR results were interpreted according to the manufacturer's recommendations.

#### 2.2.2. 2015

Nucleic acids from NP samples were tested by FTD Respiratory Pathogens 21 (Fast Track Diagnostics, Luxembourg, Belgium) a multiplex real-time PCR assay for the detection of 21 respiratory pathogens [influenza A, influenza A (H1N1), influenza B, coronaviruses NL63, 229E, OC43 and HKU1, parainfluenza 1, 2, 3 and 4, human metapneumovirus A and B, rhinovirus, respiratory syncytial viruses A and B, adenovirus, enterovirus, *Parechovirus*, bocavirus, *Mycoplasma pneumonia*]. Nucleic acids from whole blood samples were tested by two platforms of multiplex real-time PCR including FTD Tropical fever core (Fast Track Diagnostics, Luxembourg, Belgium) for detection of dengue virus, chikungunya virus, West Nile virus, *Plasmodium* spp., *Rickettsia* spp., *Leptospira* spp., *Salmonella* spp. and FTD Tropical fever Asia (Fast Track Diagnostics, Luxembourg, Belgium) for detection of Japanese encephalitis virus, Hantaan virus/Seoul virus, *Burkholderia mallei/pseudomallei* and *Leishmania* spp.

### 2.3. Statistical analysis

All data were entered into Microsoft Access version 2007. Data

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management and all analyses were performed using SPSS version 20.0 (SPSS, Inc., Chicago, IL, USA). Descriptive statistics were applied to describe distributions of enrolled cases by demographics, syndromes, and etiologies.

## 3. Results

There were 463 patients enrolled into the study. The median age of the enrolled patients was 50.5 years old (interquartile range 33–65 years of age) and 53.0% were female. Among the study subjects reporting occupation, farmers and laborers were the most common, 32.9% and 32.3% respectively, followed by officers (15.6%), students (11.0%) and housewives (8.3%).

The most common syndromes reported from enrolled patients included 187 cases (41.3%) of fever with unidentified source, respiratory symptoms 150 cases (33.3%), gastrointestinal symptoms 51 cases (11.3%), hemorrhagic symptoms 39 cases (8.6%), jaundice 15 cases (3.3%) and neurological symptoms 9 cases (2.0%). The median period between date of onset and date of seeking medical care was 3.5 days (interquartile range 1–5 days). Of enrolled patients, 24.6% (114 cases) were identified for etiological agents. Regarding the laboratory testing from the sites at the hospitals, they were performed for agents believed to be endemic to the region in addition to a variety of emerging pathogens as shown in Table 1. The specimens collected in 2013–2014 were negative either for viral family PCR assays or 16S rRNA (data not shown). The negative results from multiplex real-time PCR assays were not shown in Table 1.

Overall, zoonotic and vector borne agents were confirmed in 59 (12.7%) of 463 study patients. There were 53 cases detecting vector borne diseases including dengue virus (34 cases), scrub typhus (15 cases), comorbidities of scrub typhus and dengue fever (2 cases), Japanese B encephalitis (1 case) and malaria (1 case). The other six cases of zoonotic diseases included leptospirosis (3 cases), melioidosis (2 cases), and *Streptococcus suis* (1 case).

Among the six study patients who had zoonoses, three had fever with an unidentified source, two had fever with jaundice, and one had fever with respiratory symptoms. Fever with an unidentified source and fever with respiratory symptoms were mostly found in vector borne disease. The results were similar to a group of non-zoonotic and vector borne disease (Table 2).

General hygiene practices such as washing hands before eating food and after defecation were in good standards in both groups of patients with zoonotic/vector borne agents and patients without zoonotic/vector borne agents. However, the majority of patients with zoonotic/vector borne agents noticed rats in or near the household area and had contact with animal feces, greater than in those patients without zoonotic/vector borne agents [82.9% *vs.* 71.0%, 95% confidence interval (*CI*) 0.84–4.67 and 20.0% *vs.* 10.5%, 95% *CI* 0.80–3.42] as shown in Table 3. The prevalence ratio of regularly drinking alcoholic beverages among patients with zoonotic/vector borne agents was 13.5 (95% *CI* 2.35–77.21) when compared to the patients without zoonotic/vector borne agents (Table 3).

**Table 1**
Distribution of pathogens identified among enrolled patients.

| Pathogens | Tested cases | Positive (*n*) | Positive (%) |
|---|---|---|---|
| Melioidosis (*n*) | 13 | 2 | 15.4 |
| CSF culture | 3 | 2 | 66.7 |
| *Streptococcus pneumoniae* | | 1 | |
| Japanese B encephalitis virus | | 1 | |
| PCR technique | 463 | 30 | 6.5 |
| Dengue fever[a] | 189 | 20 | 10.6 |
| *Plasmodium* spp | 189 | 1 | 0.5 |
| Influenza A[b] | 45 | 2 | 4.5 |
| Influenza B[b] | 45 | 1 | 2.3 |
| Adenovirus[b] | 45 | 1 | 2.3 |
| Metapneumovirus[b] | 45 | 1 | 2.3 |
| Rhinovirus[b] | 45 | 1 | 2.3 |
| Parainfluenza[b] | 45 | 1 | 2.3 |
| Influenza H1N1[c] | 7 | 1 | 14.3 |
| Herpes virus | 2 | 1 | 50.0 |
| Dengue screening test | 158 | 19 | 12.0 |
| Influenza screening test | 45 | 1 | 2.2 |
| *Salmonella* screening test | 97 | 0 | 0.0 |
| Typhoid screening test | 59 | 0 | 0.0 |
| Scrub typhus screening test | 184 | 17 | 9.2 |
| Leptospirosis screening test | 138 | 3 | 2.2 |
| Malaria screening test | 24 | 1 | 4.2 |
| Bioculture | 70 | 12 | 17.1 |
| *Streptococcus* species | | 1 | |
| *Streptococcus suis* | | 1 | |
| *Streptococcus* group A | | 1 | |
| *Streptococcus viridans* | | 2 | |
| Gram negative bacilli | | 4 | |
| Gram positive cocci | | 1 | |
| *Klebsiella pneumoniae* | | 1 | |
| Tuberculosis | | 1 | |
| Urine culture | 15 | 7 | 46.7 |
| *Pseudomonas aeruginosa* | | 1 | |
| *Acinetobacter baumannii* | | 2 | |
| *Escherichia coli* | | 3 | |
| *Enterococcus* sp. | | 1 | |
| Stool culture | 6 | 2 | 33.3 |
| Fungi | | 1 | |
| Yeast | | 1 | |
| Sputum culture | 8 | 3 | 37.5 |
| *Acinetobacter baumannii* | | 1 | |
| Tuberculosis | | 1 | |
| *Candida albicans* | | 1 | |

[a] FTD Tropical fever core assay; [b] FTD Respiratory Pathogens 21 assay; [c] Anyplex™ FluA/B Typing.

Enrolled study subjects who raised animals accounted for 316 subjects (69.6%). Contact with dogs (74.8%) was the most common reported animal exposure followed by chickens (65.0%), cats (58.9%), cattle (1.9%), pigs (1.0%), and goats (0.5%). All participants exposed to these animals showed a low proportion of regular use of personal protective equipment as following using boots (13.5%), using gloves (8.1%), using masks (5.2%), and using aprons (3.3%).

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**Table 2**
Etiologic agents categorized by syndrome among study participants at the sites.

| Pathogens | Syndrome (n) | | | | | |
|---|---|---|---|---|---|---|
| | Fever with respiratory symptoms | Fever with neurological symptoms | Fever with gastrointestinal symptoms | Fever with jaundice | Fever with hemorrhagic symptoms | Fever with unidentified source |
| Zoonotic disease | 1 | 0 | 0 | 1 | 0 | 1 |
| Vector borne disease | 11 | 0 | 7 | 0 | 6 | 29 |
| Non-zoonotic and vector borne disease | 9 | 1 | 1 | 0 | 1 | 17 |

**Table 3**
Health factors of enrolled patients.

| Health factors | | Patient without zoonotic/vector borne agents [n (%)] | Patient with zoonotic/vector borne agents [n (%)] | Prevalence ratio | 95% CI |
|---|---|---|---|---|---|
| Underlying diseases | | 107 (42.3) | 14 (34.1) | 0.71 | 0.35-1.41 |
| Frequency of alcoholic beverage | Never | 175 (69.2) | 27 (65.4) | 1.00 | |
| | Sometimes | 76 (30.0) | 12 (26.8) | 0.90 | 0.46-2.07 |
| | Always | 2 (0.8) | 5 (9.8) | 13.50 | 2.35-77.21 |
| Frequency of consumption of uncooked food | Never | 141 (56.6) | 21 (55.3) | 1.00 | |
| | Sometimes | 108 (43.4) | 17 (44.7) | 1.06 | 0.53-2.10 |
| Wash hands before eating food | | 201 (79.8) | 35 (85.4) | 1.48 | 0.59-3.71 |
| Wash hands after defecation | | 229 (92.7) | 36 (90.0) | 0.71 | 0.24-2.56 |
| Having contact with any sick person over past one month before getting sick | | 33 (13.1) | 6 (14.6) | 1.13 | 0.44-2.90 |
| Having injection over past one month before getting sick | | 46 (18.3) | 9 (22.0) | 1.26 | 0.56-2.82 |
| Noticed rats in or near the household area | | 170 (71.0) | 34 (82.9) | 1.98 | 0.84-4.67 |
| Having contact with animal feces | | 23 (10.3) | 7 (20.0) | 2.17 | 0.80-5.42 |

## 4. Discussion

The overall incidence of zoonotic and vector borne agents in adult patients diagnosed with FUO was 12.7% (59/463). Our data are similar to data published in a study from the Republic of Armenia[5], but with lower incidence than other studies[6,7]. Prasad *et al*.[8] systemically reviewed etiology of severe febrile illness in low- and middle-income countries and found 3.8% having bacterial zoonosis and 28.5% having malaria while Perez-Arellano *et al*.[7] conducted a study among febrile Bedouin patients in Southern Israel and found 27% of study population diagnosed with one or more zoonoses. A reason of the different results may be from a difference of study populations and surrounding environment including geographical areas and animal populations, which influence high or low risk areas for zoonotic and vector borne diseases. Our study was conducted in one regional hospital and six community hospitals in three provinces. Although the majority of study sites were located in communities of agriculture areas, the majority of the study population was mixed between farmers and laborers, who might not work in the field areas and have rare exposures with animal reservoir or arthropod vectors. The characteristics of our study population could have diluted the effect of risks from zoonotic and vector borne disease.

From Table 1, dengue fever and scrub typhus were the major causes of patient hospitalized FUO. The results were similar to other studies that found dengue was responsible for febrile illnesses in sub-Saharan Africa and other countries[9-10]. A study in Rajasthan, India[11] presented 49.1% of patients with FUO that were confirmed by scrub typhus immunoglobulin M antibodies by ELISA and had a similar result to another prospective study among patients with FUO in Chennai City, South India[12], presenting 23% of patients positive for immunoglobulin M antibodies against *Orientia tsutsugamushi*. FUO is one of the diseases notified by law under the National Communicable Disease Surveillance System in Thailand. In the National Epidemiological Record, FUO rates had been steady at approximately 500-700 cases per 100000 population or 300000-500000 cases per year. A peak of FUO was reported to mostly occur in the rainy season of Thailand[6]. The seasonal occurrence of scrub typhus is more frequent during the rainy season[13] and a study of distribution, seasonal variation, and dengue transmission in Sisaket, Thailand[14] showed more *Aedes aegypti* larvae per household in the rainy season. There are multiple causes of FUO but dengue and scrub typhus were the most common causes in Thailand that were associated with reporting syndromes of fever with an unidentified source as shown in Table 2. Scrub typhus is known to occur all over India. These data might underestimate dengue and scrub typhus in the National Epidemiological Record because of their nonspecific clinical manifestations. The incidences of dengue and scrub typhus were probably reported under an item of FUO. Supporting the screening test for early diagnosis of dengue fever and scrub typhus should be highlighted as the significance of early reporting and ruling out scrub typhus in FUO cases, especially in the community hospitals.

Zoonotic diseases found in our study included leptospirosis, melioidosis, and *Streptococcus suis* infection. Seasonal variation of leptospirosis and melioidosis were observed, with the highest incidence during rainy season from July to October[4,15]. This seasonal variation showed a similar pattern with the report of FUO as discussed above. A higher proportion of observing rats in the household of patients with zoonotic/vector borne agents when compared to those without zoonotic/vector borne agents could be associated with rodent-borne disease, especially for leptospirosis. Temperature in the rainy season is also a major factor influencing potential reproduction of rodents, which tends to increase during this season[16]. Another rodent-borne disease, in particular, hantavirus infections, can be detected in patients who initially present with pulmonary syndromes and hemorrhagic fever with renal syndromes[17]. There were 21 patients hospitalized due to fever with respiratory symptoms and 7 patients hospitalized due to fever with hemorrhagic symptoms in our study. However, a testing of hantavirus did not include laboratory methodology. The high proportion of

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observing rats in the household among the populations in Thailand, according to 71% in patients without zoonotic/vector borne agents and 82.9% in patients with zoonotic/vector borne agents emphasizes the need to strengthen surveillance and find etiological agents of rodent-borne diseases in Thailand.

From the study population in this study, only 10% of participants exposed to those animals reported wearing boots regularly at work, and less than 10% reported wearing masks, aprons, and gloves. The use of good hygiene and work practices, and wearing personal protective clothing and equipment (PPE) can protect farm workers from other infectious diseases including zoonotic diseases[16]. Effective enforcement and measuring the use of PPE, and training courses to provide perceptions of health threats and benefits gained by wearing PPE should be implemented at the farms or in the people who are risk to zoonoses.

There are many pathogens such as trypanosomiasis, schistosomiasis, monkeypox, West Nile virus, Japanese encephalitis, brucellosis, *Bartonella* species, anthrax, etc. causing zoonotic fever and vector borne disease of patients with FUO. Unfortunately, many pathogens were not selected to be in the test panel of laboratory tests in this study. It is suggested that patients with fever of an unidentified source of infection should be considered for further laboratory investigation to identify commonly found pathogens among those patients.

We found 13% of patients hospitalized due to FUO in Thailand showed evidence of zoonotic and vector borne agents. Dengue virus and scrub typhus were most frequently detected in the study populations. The number of cases of FUO, from dengue fever, scrub typhus and other zoonotic diseases including leptospirosis and melioidosis detected in our study were highest in the rainy season from July to October. Clinicians should be aware of those diseases when patients are admitted to the hospital with fever of an unidentified etiology, especially during the rainy season, to give a proper clinical management before the disease progresses.

## Conflict of interest statement

We declare that we have no conflict of interest.

## Acknowledgments

We would like to sincerely thank the medical staff, nurses, laboratorians and public health officers in the seven hospitals for their assistance and participation in this study. Thailand-US Collaboration and USAID are appreciated for their financial support as well as technical supports. Special thanks goes to the National Institute of Health. We also thank Pravit Choomkasien, Sathapath Poonkasem, Arthicha Wongkwanma, Sucharat Khunchairak, Anchana Wigan, Apiladee Soongsan, and officers from the Bureau of Epidemiology, Ministry of Public Health, for their help. The authors also thank Royce Tsukayama from the University of California, Berkeley School of Public Health for his assistance in the manuscript writing.

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| | |
|---|---|
| **From:** | Andrew Clements <aclements@usaid.gov> |
| **To:** | Monica Dea <mdea@usaid.gov> |
| **CC:** | Katherine Leasure <kaleasure@ucdavis.edu>;PREDICTMGT <predictmgt@usaid.gov>;predict@ucdavis.edu <predict@ucdavis.edu>;Prof. Jonna Mazet <jkmazet@ucdavis.edu>;mphoward@usaid.gov <mphoward@usaid.gov>;tmilani@usaid.gov <tmilani@usaid.gov>;skurian@usaid.gov <skurian@usaid.gov> |
| **Sent:** | 11/17/2017 1:56:21 PM |
| **Subject:** | Re: ITA for D. Sayre/I. Navarrete-Macias to Liberia Dec. 1 |

Thanks, Monica!

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

On Nov 17, 2017, at 3:14 PM, Monica Dea <mdea@usaid.gov> wrote:

Mission concurs. Note that the travelers should monitor the Embassy website for news and developments around the elections process in Liberia.

On 17 Nov 2017, at 12:20 PM, Andrew Clements <aclements@usaid.gov> wrote:

+ Monica Dea and Sinu Kurian

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
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*Email: aclements@usaid.gov*

On Nov 17, 2017, at 10:51 AM, Andrew Clements <aclements@usaid.gov> wrote:

Thanks for the reminder.

Approved subject to Mission concurrence.

Including Tara and Millie from the Mission.

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
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On Nov 17, 2017, at 8:02 AM, Katherine Leasure <kaleasure@ucdavis.edu> wrote:

Hi Andrew. I just wanted to follow-up on the below ITA given the short timeline. Please let me know if you

have any questions, or need any further information on this request. Thanks!

On Wed, Nov 15, 2017 at 5:40 PM, Katherine Leasure <kaleasure@ucdavis.edu> wrote:

Hi Andrew. Please find below an international travel request from EcoHealth Alliance for travel to Liberia. Our apologies for the late submission of this request; details of the trip were only recently confirmed. Please let me know if you have any questions. Thank you!

1. Sayre, Navarrete-Macias (Liberia): $1700 airfare each/$295 (Monrovia) max daily per diem

Travel Request –

1. EcoHealth Alliance would like to request travel approval for Dean Sayre and Isamara Navarrete-Macias to travel from New York, NY, USA to Monrovia, Liberia from December 1-15, 2017 for In-country laboratory training.

**Trip purpose:** Dean Sayre and Isamara Navarrete-Macias will train personnel from the National Public Health Lab and the National Veterinary Lab in consensus PCR. Specifically, they will be learning to process samples collected for the Ebola Host Project, in order to develop in-country capacity. In addition, they will give lectures on diagnostic procedures and provide guidance on lab flow and set up for PREDICT sample processing.

**Katherine Leasure**

HR/Payroll/Financial Assistant

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**From:** PRINCE MAHIDOL AWARD CONFERENCE <pmaconference@mahidol.ac.th>
**To:** Sudarat Damrongwatanapokin <sdamrongwatanapokin@usaid.gov>, Jonna Mazet <jkmazet@ucdavis.edu>
**Cc:** PRINCE MAHIDOL AWARD CONFERENCE <pmaconference@mahidol.ac.th>, "Chumnurtai Kamchancitra" [redacted], Dennis Carroll <dcarroll@usaid.gov>, "Clements, Andrew(ANE/TS)" <AClements@usaid.gov>, Daniel Schar <dSchar@usaid.gov>, Anchalee Jatapai <ajatapai@usaid.gov>
**Subject:** Re: Global Virome Project Concept note/ PMAC 2018 side meeting
**Sent:** Wed, 29 Nov 2017 08:47:10 +0000
PMAC2018_Guidelines for Side Meetings.pdf

Dear Dr. Mazet

We are pleased to inform that you are eligible to submit a request to organize a side meeting
" The Global Virome Project: the Beginning of the End of the Pandemic Era" during PMAC 2018 as follows

**29 Jan 2018 : Morning Session 9.00-12.30 hrs**
**Afternoon Session 14.00-17.00 hrs**

We note that you will have 2 different meetings : Closed Meeting invitation only and Open to all participants .
Therefore kindly separate the meeting into 2 side meeting submissions.

You are able to access the side meeting system via the PMAC Registration System at www.pmaconference.mahidol.ac.th
by using your username and password provided in the PMAC invitation letter that we sent to you earlier.

In addition, kindly find attached the Side Meeting Guide for more information.
Should you need further information, please do not hesitate to contact us.

Thank you and best regards,
PMAC Secretariat

On Nov 29, 2017, at 2:16 PM, Sudarat Damrongwatanapokin <sdamrongwatanapokin@usaid.gov> wrote:

Dear PMAC Secretariat,
Thank you for your prompt response, let's me reach out to our colleagues who are copied here and get back to you the soonest.

Best regards,
Sudarat Damrongwatanapokin, D.V.M., Ph.D.
Regional Animal Health Advisor
USAID Regional Development Mission Asia
[redacted]
E-mail: sdamrongwatanapokin@usaid.gov
[redacted]

On Wed, Nov 29, 2017 at 2:05 PM, PRINCE MAHIDOL AWARD CONFERENCE <pmaconference@mahidol.ac.th> wrote:

Dear Dr. Sudarat,

We have checked our email system and did not find any earlier request for this side meeting. Since all the side meeting requests have been allocated the date and room, we have only 3 half day slots left with the room that will support no more than 50 people. For your information, we still have 2 more side meeting requests including from OHP Symposium. If you're ok with half day, we can open the side meeting system to Dr Mazet to fill in the side meeting request form.

Thank you and best regards,
PMAC Secretariat

> On Nov 29, 2017, at 12:22 PM, Sudarat Damrongwatanapokin <sdamrongwatanapokin@usaid.gov> wrote:

Dear PMAC Secretariat,
Not sure that concept note has been submitted to you. The Correspondence person: Jonna has not received the approval notification from you.

Best regards,
Sudarat Damrongwatanapokin, D.V.M., Ph.D.
Regional Animal Health Advisor
USAID Regional Development Mission Asia
REDACTED
E-mail: sdamrongwatanapokin@usaid.gov
REDACTED

—

<GVP Concept Note PMAC_Oct11 (1).docx>

# SIDE MEETINGS GUIDE

The Prince Mahidol Award Conference is pleased to host Side Meetings
**on Monday 29 and Tuesday 30 January 2018 at 9.00-17.30 hrs.**
**The deadline for submission of the side meeting proposal is 15 October 2017.**

Many groups wish to take advantage of the fact that participants attending PMAC 2018 come from diverse organizations around the world, to organize side meetings. Plus, side meetings allow alternative opportunities for workshop or informal dialogue for participants. The PMAC Secretariat is willing to accommodate side meetings prior to the main Conference with the following criteria and guideline.

## Eligibility Criteria and Submission Channel for Side Meeting Organizers

- The Side meeting opportunity is open to the conference partners (co-hosts, supporting institutes or contributors). The conference partners can submit their proposal directly through the PMAC website.
- Interested organizations that are not the conference partners are eligible to apply for a side meeting only if they are invited to attend the Conference and their meetings are co-organized with the conference partners and the meeting subject/content is relevant to the conference theme of that year. The proposal submission has to be completed by the conference partners through the PMAC website.

## Time Schedule for Side Meetings

1. Dates/Times allotted for side meetings

| | | |
|---|---|---|
| **Monday 29 January 2018** | | |
| Morning session | 9.00-12.30 hrs | (1 Time Slot) |
| Afternoon session | 14.00-17.30 hrs | (1 Time Slot) |
| Full day session | 9.00-17.30 hrs | (2 Time Slots) |
| **Tuesday 30 January 2018** | | |
| Morning session | 9.00-12.30 hrs | (1 Time Slot) |
| Afternoon session | 14.00-17.30 hrs | (1 Time Slot) |
| Full day session | 9.00-17.30 hrs | (2 Time Slots) |



UCDUSR0002391

2. Side meetings should not be organized on the field trip day (31 January 2018) and during the main conference (1-3 February 2018).

## Procedure for Submitting Side meeting Request

1. The side meeting organizers who have been invited to the conference and have completed the PMAC registration will be able to access the side meeting system. The Organizer fills in the online side meeting request form via the PMAC registration system by **15 October 2017**.
2. For the accepted side meetings, the PMAC Secretariat sends a confirmation for the Organizer to access the conference participant database by **31 October 2017**.
3. The Organizer directly sends out invitations to the side meeting participants based on the list of invited conference participants in the database.
   *Kindly note that the organizer may invite non-conference participants to their side meeting. However, the organizer is required to provide the list of non-conference participants who have confirmed to attend their side meeting through the side meeting system. Please download the template from the side meeting system.*
4. The Organizer updates details of the side meeting through the side meeting system by **20 December 2017**, if there are any changes from that previously provided.
5. The PMAC Secretariat assigns a room for the side meeting based on the provided expected number of participants attending the side meeting and the required room setup.**
6. The PMAC Secretariat sends the room assigned to the side meeting organizers in **early January 2018**. However, due to space limitation, the PMAC Secretariat reserves the right to change the allotted slot to accommodate all requests as suitable as possible.
7. The Organizer meets with the PMAC Secretariat on **Sunday 28 January 2018** during 15.00 – 17.00 hrs. to check the meeting room.
8. Optional : Accepted side meetings may provide a URL (website, youtube, Facebook, dropbox) that allows access to additional documents related to the side meeting. This URL will be posted on the conference website under your side meeting.

## Logistics Responsible by Organizers

- The Organizer brings their own laptop, meeting documents and registration sheet.
- The Organizer provides a copy of the registration sheet to the PMAC Secretariat after the meeting.



UCDUSR0002392

- The Organizer provides their own meeting equipment (flip charts, marker pens, teleconference, etc).
- The Organizer will be responsible for financial support for their speakers.
- The Organizer will be responsible for transport of their meeting equipment to "Organizer Storage" room and side meeting room at the meeting venue.
- The Organizer will accept responsibility for damage or loss of their equipment during the event.

## Logistics Support by PMAC Secretariat

- Meeting room, LCD, 1 flip chart free of charge, pencil, paper
  (other requirements will be charged by the hotel)
- Central Lunch Buffet and Central Coffee Break will be provided during 29-30 January 2018
  - Central Lunch Buffet at 12.30-14.00 hrs (tentative time)
  - Central Coffee Break (morning) at 10.30-11.00 hrs (afternoon) at 15.00-15.30 hrs (tentative time)
- Updated list of invited participants (access from online database)
- A local staff to help with registration and to facilitate during the meeting
  (our local staff will meet the organizer at the meeting room 30 minutes before the meeting time).
  The registration desk will be set up in front of the meeting room.
- There will be a room for "Organizer Storage" for the Organizer to bring their materials for storage.
  The storage room will be available on Sunday 28 January 2017.
  The PMAC Secretariat will not be responsible for any damage or loss of materials.

Note** Room setup: Classroom, Theater, Roundtable, Boardroom

## List of Conference Co-hosts, Supporting Institutions and Contributors

Prince Mahidol Award Conference, World Health Organization, The World Bank, United Nation Development Programme, Joint United Nations Programme on HIV/AIDS, International Organization of Migration, The Global Fund to Fight AIDS, Tuberculosis and Malaria, United States Agency for International Development, National Institutes of Health, Japan International Cooperation Agency, China Medical Board, The Rockefeller Foundation, Chatham House, Bill & Melinda Gates Foundation, Food and Agriculture Organization of the United Nations, World Organisation for Animal Health, UNICEF, Smithsonian National Museum of Natural History, U.S. Pharmacopeia,
The National Academies of Sciences, Engineering, and Medicine, International Society for Infectious Diseases, Chinese Center for Disease Control and Prevention, Skoll Global Threats Fund,
Public Health Agency of Sweden, Asian Development Bank, British Medical Journal,
People Health Movement



UCDUSR0002393

## Side Meeting Proposal Template

- **Meeting title**
- **Organizer and contact details (Name & Email)**
- **Day :  Monday 29 January 2018 / Tuesday 30 January 2018**
- **Duration:**
  - Morning session 9.00-12.30 hrs  (1 Time Slot)
  - Afternoon session 14.00-17.30 hrs  (1 Time Slot)
  - Full day session 9.00-17.30 hrs  (2 Time Slots)

*Please indicate number of time slots, eg. 1 Full day = 2 Time Slots, 2 Full days  = 4 Time Slots*

- **Background**
- **Objectives**
- **Expected output/outcome**
- **Expected number of participants** (this will affect room allocation)
- **Room set up**
  - Classroom
  - Theater
  - Roundtable
  - Boardroom

    additional requirements (if any, with charges from the hotel)
- **Meeting agenda**
- **Closed meeting for invitees only / Open to all PMAC participants**
- **List of Speakers  (for name tents )**

For any inquiries, please contact the PMAC Secretariat at pmaconference@mahidol.ac.th



UCDUSR0002394

**From:** "William B. Karesh" <karesh@ecohealthalliance.org>
**To:** Jonna Mazet <jkmazet@ucdavis.edu>, David Wolking <djwolking@ucdavis.edu>
**Cc:** [redacted]
**Subject:** Brussels agenda items.
**Sent:** Thu, 30 Nov 2017 16:56:26 +0000

Good morning,
I would suggest:

30 minutes: FAO presentation of EPT-2 activities, 20 minute presentation and 10 minutes of questions. Maybe on first afternoon or second day morning.

30 minutes: One Health policy, assessments and partnership activities (GHSA, JEE, WHO, World Bank, Sendai DRR, CBD) - This might be good on opening morning with visitors present

20-30 Minutes: Break-out into country teams (Global staff join with different countries) and come up with rough draft/outline of a One Health case study

60 minutes: meeting with External Advisors - late on third day.

**William B. Karesh, D.V.M**
*Executive Vice President for Health and Policy*

EcoHealth Alliance
460 West 34th Street - 17th Floor
New York, NY 10001 USA

+1.212.380.4463 (direct)
+1.212.380.4465 (fax)
www.ecohealthalliance.org

President, OIE Working Group on Wildlife

Co-chair, IUCN Species Survival Commission - Wildlife Health Specialist Group

EPT Partners Liaison, USAID Emerging Pandemic Threats - PREDICT-2 Program

*EcoHealth Alliance leads cutting-edge research into the critical connections between human and wildlife health and delicate ecosystems. With this science we develop solutions that promote conservation and prevent pandemics.*

**From:** Sudarat Damrongwatanapokin <sdamrongwatanapokin@usaid.gov>
**Sent:** Thu, 30 Nov 2017 13:43:30 -0800
**Subject:** Fwd: GVP launch at PMAC?
**To:** "Andrew(ANE/TS) Clements" <AClements@usaid.gov>, jkmazet@ucdavis.edu
**Cc:** Dennis Carroll <dcarroll@usaid.gov>, Daniel Schar <dSchar@usaid.gov>, ajatapai@usaid.gov

What 's next step? After submitting through the system on line ( now open for Jonna) then Jonna can revise and update on line , the concept note, meeting agenda, speaker, invited participants until Dec 15). Any questions, please directly send to PMAC Secretariat.

Best regards,
Sudarat

Sent from my mobile.

Begin forwarded message:

**From:** Jonna Mazet <jkmazet@ucdavis.edu>
**Date:** November 30, 2017 at 4:22:19 AM GMT+7
**To:** Andrew Clements <aclements@usaid.gov>
**Cc:** Sudarat Damrongwatanapokin <sdamrongwatanapokin@usaid.gov>, Dennis Carroll <dcarroll@usaid.gov>, "Daniel Schar (RDMA/OPH)" <dSchar@usaid.gov>
**Subject: Re: GVP launch at PMAC?**

> We had provided a draft to Cara and Dennis to finalize and submit, asking for the final agenda to be fleshed out and the provided draft edited to their liking. [redacted] and I were listed as POCs on that draft as requested by Cara and Dennis to have non-USAID contacts and because we had developed the content so far. We thought maybe Cara would be added, since she was submitting, but didn't understand the background on the request to have non-USAID people. On the GVP calls, Cara had indicated that they would manage the submission and would likely send to the Mission for submission, as she understood that tho be the best process. We clearly submitted to her on Oct. 11, asking that the submission occur by Oct. 15. Cara responded on Oct 12 with a couple of minor questions and indicated that she would manage from there and get it submitted. I don't know where it ended after that.
> I'm confused,
> Jonna

On Tue, Nov 28, 2017 at 10:53 PM, Andrew Clements <aclements@usaid.gov> wrote:

> Thanks. Jonna thought the POC was Cara.

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

On Nov 29, 2017, at 12:06 AM, Sudarat Damrongwatanapokin <sdamrongwatanapokin@usaid.gov> wrote:

> Will check with PMAC Secretariat. The correspondence person is Jonna Mazet (from the concept note).
> Best regards,

Sudarat

Sent from my mobile.

On Nov 29, 2017, at 3:12 AM, Dennis Carroll <dcarroll@usaid.gov> wrote:

> I talked with Sudarat last night. She said it was, but is checking
>
> d

On Tue, Nov 28, 2017 at 2:08 PM, Andrew Clements <aclements@usaid.gov> wrote:

> Hi Sudarat,
> Do you know if the GVP side meeting was approved?

Thanks!

Andrew

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

--
Dr. Dennis Carroll
Director, Emerging Threats Program
Bureau for Global Health
U.S. Agency for International Development

Office: 202-712-5009
Mobile REDACTED

**From:** Andrew Clements <aclements@usaid.gov>
**To:** Katherine Leasure <kaleasure@ucdavis.edu>
**CC:** PREDICTMGT <predictmgt@usaid.gov>;Predict inbox <predict@ucdavis.edu>;Jonna Mazet <jkmazet@ucdavis.edu>
**Sent:** 12/14/2017 9:48:30 AM
**Subject:** Re: Change to Approved ITA - L. Gutierrez return date from India

No problem. Thanks.

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

On Dec 14, 2017, at 12:34 AM, Katherine Leasure <kaleasure@ucdavis.edu> wrote:

Hi Andrew. The return date of Dr. Leticia Gutierrez Jimenez's previously approved travel to India (ITA below for reference) has been changed to December 17, following a change to the in-country team's plans. Please let me know if you have any questions. Thanks!

EcoHealth Alliance would like to request travel approval for Dr. Leticia Gutiérrez Jiménez to travel from New York, NY, USA to New Delhi and Lucknow, India from December 1-23, 2017 to conduct field site exploration, training and field sampling, and meet with the PREDICT-2 India team. **Dr. Gutierrez-Jimenez will stay 1 night in New Delhi on both legs of her trip as part of her connecting flights.*

**Trip purpose:** In Delhi, Dr. Gutiérrez-Jiménez will meet with PREDICT-2 India's Country Coordinator, Rajesh Bhatia, and in Lucknow will meet with implementing partners at Sanjay Gandhi Postgraduate Institute of Medical Sciences to coordinate surveillance activities. In Maharajganj, Uttar Pradesh, Dr. Gutiérrez-Jiménez will conduct disease ecology and wildlife surveillance training. She and PREDICT-2 India Field Coordinator, Debapriyo Chakraborty, will also carry out bat and rodent sampling.

**Katherine Leasure**
HR/Payroll/Financial Assistant
One Health Institute
University of California, Davis
530-752-7526
530-752-3318 FAX
kaleasure@ucdavis.edu

--
You received this message because you are subscribed to the Google Groups "PREDICTMGT" group.
To unsubscribe from this group and stop receiving emails from it, send an email to predictmgt+unsubscribe@usaid.gov.
To post to this group, send email to predictmgt@usaid.gov.
To view this discussion on the web visit https://groups.google.com/a/usaid.gov/d/msgid/predictmgt/037d01d374fa%24f3d87140%24db8953c0%24%40ucdavis.edu.

**Subject:** Re: Todays GVP call
**From:** Eddy Rubin <[redacted]>
**Sent:** Thu, 11 Jan 2018 15:24:35 +0100
**Cc:** Jonna Mazet <jkmazet@ucdavis.edu>, Peter Daszak <daszak@ecohealthalliance.org>, Eddy Rubin <erubin@metabiota.com>, Nathan Wolfe <nwolfe@metabiota.com> [redacted], Brooke Watson <watson@ecohealthalliance.org>
**To:** Dennis Carroll <dcarroll@usaid.gov>

I'd support that
Eddy

On Jan 11, 2018, at 3:15 PM, Dennis Carroll <dcarroll@usaid.gov> wrote:

> Given that most of you are in Brussels or are en route back - do we need to reschedule todays call?

d

--
Dr. Dennis Carroll
Director, Emerging Threats Program
Bureau for Global Health
U.S. Agency for International Development

Office: 202-712-5009
Mobile: REDACTED

**From:** Andrew Clements <aclements@usaid.gov>
**To:** Tracey Goldstein <tgoldstein@ucdavis.edu>
**CC:** Jonna Mazet <jkmazet@ucdavis.edu>
**Sent:** 2/1/2018 9:22:00 AM
**Subject:** Re: Ebola serology question

Thanks, Tracey. Hopefully, there will be a time in the future when samples can be tested.

On Wed, Jan 31, 2018 at 11:37 PM, Tracey Goldstein <tgoldstein@ucdavis.edu> wrote:
Hi Andrew,

Our preliminary data suggests that antibodies to this new virus could cross react with the other ebolas and thus possibly on many of the serologic tests used. We have designed a peptide assay that we believe may be able to distinguish it between other ebolas, but we know won't for sure until we have samples for testing.

Testing sera for this purpose is certainly of interest and something we plan to pursue.

Best, Tracey

On Tue, Jan 30, 2018 at 1:52 AM, Andrew Clements <aclements@usaid.gov> wrote:
Hi Jonna and Tracey,

Is your serological assay able to pick up the new filovirus or do you need to adapt the assay to be able to detect it? If it is detectable, is it distinguishable from other commonly circulating filoviruses?

I'm curious whether anyone in affected countries would be interested in screening previously-collected sera for the new filovirus after March 2018.

Andrew

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
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(530) 752-0422
(530) 752-3308
tgoldstein@ucdavis.edu

--

Andrew Clements, Ph.D.
Senior Scientific Advisor
Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health

U.S. Agency for International Development
Mobile phone: 1-571-249-4233
E-mail: [redacted]

*For more information on USAID's Emerging Pandemic Threats program, see* http://www.usaid.gov/ept2

**From:** Elizabeth Leasure <ealeasure@UCDAVIS.EDU>
**To:** David John Wolking <djwolking@ucdavis.edu>, Jonna Mazet <jkmazet@ucdavis.edu>
**Subject:** RE: PREDICT Management Team Call - Tuesday February 6 2018 @ 10AM PST/1PM EST
**Sent:** Wed, 7 Feb 2018 20:58:51 +0000

Hi there. Can one of you give me a little context (if you have any) for this request? I'm assuming it came up on SMT yesterday. I'm not totally sure what he means by "the reassignment among countries," as I thought all of the caps were done away with except DRC and Ghana. I think I'm missing a piece of the puzzle here...

*Elizabeth Leasure*
*Financial Operations Manager*
*One Health Institute*
REDACTED *(cell)*
*530-754-9034 (office)*
*Skype: ealeasure*

---

**From:** Andrew Clements [mailto:aclements@usaid.gov]
**Sent:** Monday, February 05, 2018 1:24 PM
**To:** David John Wolking; Jonna Mazet; Elizabeth Leasure
**Cc:** Alisa Pereira
**Subject:** Re: PREDICT Management Team Call - Tuesday February 6 2018 @ 10AM PST/1PM EST

On a related note, what's the current projection on how long Ebola funds will last with the reassignment among countries?

I want to give as much of a heads up as possible.

Thanks!

Andrew

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*
On Feb 5, 2018, at 6:52 PM, David J Wolking <djwolking@ucdavis.edu> wrote:

> Hi there,
>
> Below and attached for quick reference is the agenda for tomorrow's PREDICT Management Team call.
>
> Best,
>
> David

**PREDICT Management Call Agenda**
**Tuesday, February 6, 2017**
**10:00-11:00AM PDT/1:00-2:00pm EDT**
**#800-444-2801, Access code** REDACTED
**International Dial-in number: 310-765-4820 (toll charges apply)**

**Standing items**
**USAID Updates**

1. **Administrative items**

a. Core (regular) funding update

b. Feedback on P2 additional testing request

2. **PMAC and GVP update (Jonna et al)**

3. **Mission communications roundup**

a. Myanmar and viral testing plans with LBVD

b. Guinea mission visit and updates

c. Liberia and data sharing inquiry

4. **Outbreak updates (Liberia, Cameroon, others)**

6. **EPT partner collaboration/coordination updates (Billy)**

7. **Publication, media, and conference updates**

- CUGH Global Health Conference, New York (March 15-18, 2018)
- "Outbreak: Epidemics in a Connected World" exhibit at NMNH (May 2018)
- One Health Congress Saskatoon (June 22-25, 2018)
- International Conference on Emerging Infectious Diseases (ICEID) in Atlanta (August 26–29, 2018)
- International Meeting on Emerging Diseases and Surveillance (IMED) 2018 in Vienna, Austria (November 9-12, 2018)
- Others?

On Fri, Feb 2, 2018 at 8:10 AM, David J Wolking <djwolking@ucdavis.edu> wrote:
Hi there,

Just a reminder about next week's Management Team call on Tuesday February 6 2018 @ 10AM PST/1PM EST.

We will follow-up with an agenda early next week.

Enjoy the weekend,

David

<PREDICT MT Call (2.6.18).docx>

**From:** Andrew Clements <aclements@usaid.gov>
**To:** Brian Bird <bhbird@ucdavis.edu>
**CC:** PREDICTMGT <predictmgt@usaid.gov>;PREDICT-outbreak <predict-outbreak@ucdavis.edu>
**Sent:** 2/20/2018 6:49:15 AM
**Subject:** [predict] [predict-outbreak] Re: Update PREDICT DRC suspect VHF cluster Vadana-Bas Uele

Thanks

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

On Feb 19, 2018, at 8:58 PM, Brian Bird <bhbird@ucdavis.edu> wrote:

Report from the team today.

INRB testing of 9 yr-old patient's specimen for specific ebolaviruses and marburgviruses was negative. PREDICT laboratory testing for five priority virus families also negative.

Details in report.

Yours,

-Brian

Brian H. Bird DVM, MSPH, PhD
Global Lead Sierra Leone and
Multi-Country Ebola operations
PREDICT-USAID

One Health Institute
1089 Veterinary Medicine Dr.
School of Veterinary Medicine
University of California, Davis
Email: bhbird@ucdavis.edu
Skype: brianhbird1
http://www.vetmed.ucdavis.edu/ohi/predict/index.cfm

--
You received this message because you are subscribed to the Google Groups "PREDICTMGT" group.
To unsubscribe from this group and stop receiving emails from it, send an email to predictmgt+unsubscribe@usaid.gov.
To post to this group, send email to predictmgt@usaid.gov.
To view this discussion on the web visit https://groups.google.com/a/usaid.gov/d/msgid/predictmgt/E6E1E13D-666D-4A75-9F47-4F19591FA0D7%40ucdavis.edu.

**From:** "William B. Karesh" <karesh@ecohealthalliance.org>
**To:** David J Wolking <djwolking@ucdavis.edu>
**Cc:** Jonna Mazet <jkmazet@ucdavis.edu>, Catherine Machalaba <machalaba@ecohealthalliance.org>, "predict@ucdavis.edu" <predict@ucdavis.edu>
**Subject:** Re: GHSA Uganda EPT-2 Implementing Partners' Meeting
**Sent:** Tue, 6 Mar 2018 23:02:17 +0000

This looks really great. If there is time, I'm happy to get on a call with Benard to give him some ideas and/or some short bullet point statements.
There is no reason why we can't significantly contribute to all 6 lines of work - though your local team might not be geared up for AMR or have enough budget to do a lot in each area. That said, what they are already doing is a nice fit with most of the other 5.

It looks like this is something that really won't become reality until late in Year 4 and obviously they are thinking more long term.

BK

**William B. Karesh, D.V.M**
*Executive Vice President for Health and Policy*

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President, OIE Working Group on Wildlife

Co-chair, IUCN Species Survival Commission - Wildlife Health Specialist Group

EPT Partners Liaison, USAID Emerging Pandemic Threats - PREDICT-2 Program

*EcoHealth Alliance leads cutting-edge research into the critical connections between human and wildlife health and delicate ecosystems. With this science we develop solutions that promote conservation and prevent pandemics.*

On Mar 6, 2018, at 2:59 PM, David J Wolking <djwolking@ucdavis.edu> wrote:

Hey Billy and Catherine,
Just sharing this NOHP implementation message and documents from Uganda in case you have ideas or feedback on P2's optimal role and strategy here. Kirsten and Benard would certainly like to hear from other countries/teams, maybe something we could quickly touch on during EB tomorrow?

David

---------- Forwarded message ----------
From: **Kirsten Gilardi** <kvgilardi@ucdavis.edu>
Date: Tue, Mar 6, 2018 at 11:41 AM
Subject: Fwd: GHSA Uganda EPT-2 Implementing Partners' Meeting
To: David John Wolking <djwolking@ucdavis.edu>

David, this is the first I'm seeing/hearing about this: I'll try to find time to look at the draft letter this week or next (and in the meantime find out what kind of deadline Benard's under for providing feedback). I will also forward Benard's earlier email referenced in his message below.
Any guidance on how to proceed from the PREDICT standpoint, please let me know……

And please run up the flagpole as you deem necessary.

Thanks!

-Kirsten

Begin forwarded message:

**From:** Benard Ssebide <[REDACTED]>
**Subject: Fwd: GHSA Uganda EPT-2 Implementing Partners' Meeting**
**Date:** March 5, 2018 at 11:17:29 PM PST
**To:** Kirsten Gilardi <kvgilardi@ucdavis.edu>, Mike Cranfield <mrcranfield@gorilladoctors.org>
**Cc:** David J Wolking <djwolking@ucdavis.edu>

This is what the Implementation letter I shared earlier is about.
Benard.

---------- Forwarded message ----------
From: **Wilberforce Owembabazi** <wowembabazi@usaid.gov>
Date: Wed, Feb 28, 2018 at 5:05 PM
Subject: Re: GHSA Uganda EPT-2 Implementing Partners' Meeting
To: Gregory Adams <gadams@usaid.gov>
Cc: Ricardo Echalar <rechalar@usaid.gov>, [REDACTED], "Aychazibwe, Chrisostom (FAOUG)" <[REDACTED]>, Michelle Lang-Alli <mlang-alli@usaid.gov>, pokot@redcrossug.org, Lindsay Parish <lparish@usaid.gov>, Rose Okot-Chono <rochono@usaid.gov>, ebaregyeya@musph.ac.ug, Andrew Kitua <[REDACTED]>, [REDACTED], amugyisha@redcrossug.org, Marilyn Crane <mcrane@usaid.gov>, "Oteba, Martin" <moteba@uhsc.ug>, bssebide@gorilladoctors.org, Lisa Kramer <lkramer@usaid.gov>, sgillette@usaid.gov, Peninah Nsamba <[REDACTED]>, aschneider@usaid.gov, Rhobbinah Ssempebwa <rsempebwa@usaid.gov>, Norbert Mubiru <nmubiru@usaid.gov>, "Okuthe, Sam (FAOKE)" <[REDACTED]>, Amanda Paust <apaust@usaid.gov>, Kassahun Belay <kbelay@usaid.gov>, Nadira Kabir <nkabir@usaid.gov>, Kathleen Frank <kfrank@usaid.gov>, aclements@usaid.gov, Andrea Long-Wagar <alongwagar@usaid.gov>, cchrisman@usaid.gov, Winyi Kaboyo <[REDACTED]>, "Armand Xueref, Stephanie" <smxueref@msh.org>, Sarah Paige <spaige@usaid.gov>, jokwera@redcrossug.org

Hi All,
Receive the presentation guide for the monthly IP meeting. Attached also is the draft Implementation Letter for your input in tomorrow's meeting.
Looking forward to meeting you tomorrow
Thanks,

**WILBERFORCE OWEMBABAZI, MD, MPH**
**PMS- Global Health Security Agenda, Office of Health and HIV**

U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT
U.S. Mission Compound

REDACTED

On Wed, Feb 21, 2018 at 9:48 AM, <gadams@usaid.gov> wrote:

Here is the call in information for our colleagues in Kenya and US. Greg

Dialing Process into Bridge from a Personal/Business Phone:

Dial: REDACTED

Conference Number: REDACTED

**GHSA Uganda EPT-2 Implementing Partners' Meeting**

The purpose of this meeting will be to discuss the USAID GHSA Implementation Letter (IL) for Uganda. Owe will make a presentation on the IL and facilitate a discussion among you, the GHSA EPT-2 Implementing Partners, to identify the technical components that should be included in the IL.
With this information, we will draft an IL to be presented to the technical counterparts at the four Ministries for their input and edits.
You as Implementing Partners will not be requested to make presentations at this meeting. We just need your technical input and the solid knowledge of your Ministry partners' technical needs related to the GHSA program in Uganda.
Please contact me if you have any questions about this meeting. A conference number will be shared for those calling in from East Africa and the United States.
We will aim to begin and end this meeting on time.
Thank you,
Greg

When: Thu Mar 1, 2018 3pm – 5pm Nairobi

Where: QED Offices, 1st Floor, Embassy Plaza, Ggaba Road, Kampala, Uganda (map)

Who:

- gadams@usaid.gov - organizer
- kfrank@usaid.gov
- mcrane@usaid.gov
- kbailey@usaid.gov
- lparish@usaid.gov
- lkramer@usaid.gov
- REDACTED
- cohrleman@usaid.gov
- smouere@msh.org
- REDACTED
- REDACTED

- REDACTED
- nkabir@usaid.gov
- wowembabazi@usaid.gov
- eburegveya@musph.ac.ug
- REDACTED
- sgillette@usaid.gov
- alongwagar@usaid.gov
- Irene Naigaga
- amugyisha@redcrossug.org
- spaige@usaid.gov
- apaust@usaid.gov
- pokoti@redcrossug.org
- nmubiru@usaid.gov
- jokwera@redcrossug.org
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- rsempebwa@usaid.gov
- rechalar@usaid.gov
- rochono@usaid.gov
- moteba@uhsc.ug

<NOHP IL presentation to partners- March 1, 2018.pptx><NOHP_IL_UG_v1_15Feb2018 (3).docx>

**From:** Elizabeth Leasure <ealeasure@UCDAVIS.EDU>
**To:** Andrew Clements <aclements@usaid.gov>, David John Wolking <djwolking@ucdavis.edu>, Jonna Mazet <jkmazet@ucdavis.edu>
**Cc:** Alisa Pereira <apereira@usaid.gov>
**Subject:** RE: PREDICT Management Team Call - Tuesday February 6 2018 @ 10AM PST/1PM EST
**Sent:** Mon, 12 Mar 2018 22:26:18 +0000

Hi Andrew. Based on current projections and anticipated spending increases, I'm estimating that we will have approximately 25% of the Ebola funds obligated to date remaining as of June 2018. Let me know if you have any questions or need any additional information.

Thanks,
Liz

*Elizabeth Leasure*
*Financial Operations Manager*
*One Health Institute*
*530-304-1803 (cell)*
*530-754-9034 (office)*
*Skype: ealeasure*

---

**From:** Andrew Clements [mailto:aclements@usaid.gov]
**Sent:** Monday, February 05, 2018 1:24 PM
**To:** David John Wolking; Jonna Mazet; Elizabeth Leasure
**Cc:** Alisa Pereira
**Subject:** Re: PREDICT Management Team Call - Tuesday February 6 2018 @ 10AM PST/1PM EST

On a related note, what's the current projection on how long Ebola funds will last with the reassignment among countries?

I want to give as much of a heads up as possible.

Thanks!

Andrew

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*
On Feb 5, 2018, at 6:52 PM, David J Wolking <djwolking@ucdavis.edu> wrote:

> Hi there,
>
> Below and attached for quick reference is the agenda for tomorrow's PREDICT Management Team call.
>
> Best,
>
> David

**PREDICT Management Call Agenda**
**Tuesday, February 6, 2017**
**10:00-11:00AM PDT/1:00-2:00pm EDT**
**#800-444-2801, Access code** REDACTED
**International Dial-in number: 310-765-4820 (toll charges apply)**

**Standing items**

**USAID Updates**

1. **Administrative items**
    a. Core (regular) funding update
    b. Feedback on P2 additional testing request
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    a. Myanmar and viral testing plans with LBVD
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We will follow-up with an agenda early next week.

Enjoy the weekend,

David

<PREDICT MT Call (2.6.18).docx>

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**Subject:** RE: PREDICT Management Team Call - Tuesday February 6 2018 @ 10AM PST/1PM EST
**Sent:** Fri, 16 Mar 2018 20:20:07 +0000

Hi Andrew. I'm waiting on some additional information needed to help me respond to your question. Stay tuned.

Thanks! Have a great weekend!
Liz

*Elizabeth Leasure*
*Financial Operations Manager*
*One Health Institute*
REDACTED *(cell)*
*530-754-9034 (office)*
*Skype: ealeasure*

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--

Andrew Clements, Ph.D.
Senior Scientific Advisor
Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health
U.S. Agency for International Development
Mobile phone: 1-571-345-6255
E-mail: aclements@usaid.gov

*For more information on USAID's Emerging Pandemic Threats program, see:* http://www.usaid.gov/ept2

**From:** Peter Daszak <daszak@ecohealthalliance.org>
**To:** Jonna Mazet <jkmazet@ucdavis.edu>, Leilani Francisco <francisco@ecohealthalliance.org>
**Cc:** "William B. Karesh" <karesh@ecohealthalliance.org>, Karen Saylors <ksaylors@metabiota.com>, Jason Euren <jeuren@metabiota.com>, Jon Epstein <epstein@ecohealthalliance.org>, Brian Bird <bhbird@ucdavis.edu>, "Christine Kreuder Johnson" <ckjohnson@ucdavis.edu>, Tracey Goldstein <tgoldstein@ucdavis.edu>, "Kevin Olival, PhD" <olival@ecohealthalliance.org>, David John Wolking <djwolking@ucdavis.edu>, REDACTED
**Subject:** RE: Bat book: West Africa version
**Sent:** Sat, 17 Mar 2018 17:24:37 +0000

Agree with that - it's good to see this ready to move out...

Cheers,

Peter

**Peter Daszak**
*President*

EcoHealth Alliance
460 West 34th Street – 17th Floor
New York, NY 10001

Tel. +1 212-380-4474
www.ecohealthalliance.org
@PeterDaszak
@EcoHealthNYC

*EcoHealth Alliance leads cutting-edge research into the critical connections between human and wildlife health and delicate ecosystems. With this science we develop solutions that prevent pandemics and promote conservation.*

**From:** REDACTED [mailto:REDACTED] **On Behalf Of** Jonna Mazet
**Sent:** Thursday, March 15, 2018 11:01 PM
**To:** Leilani Francisco
**Cc:** Peter Daszak; William B. Karesh; Karen Saylors; Jason Euren; Jon Epstein; Brian Bird; Christine Kreuder Johnson; Tracey Goldstein; Kevin Olival, PhD; David John Wolking; REDACTED
**Subject:** Re: Bat book: West Africa version

Thanks, Leilani,
I do not think we need an official clearance (and we don't have a process for that).
I would like to see us start using it and see how it goes.
We can add to EB agenda to discuss whether or not we need a "clearance" and by whom.
I'd say for now, the teams that are communicating with communities, should consider using it and get us their initial reactions and interpretations on response to the content and delivery.
Of course, I know that you/Karen may have specific plans for more rigorously evaluating its utility in certain areas. So when you're ready, I'd like to discuss that on EB, too.
Exciting,
Jonna

On Mon, Mar 12, 2018 at 3:00 PM, Leilani Francisco <francisco@ecohealthalliance.org> wrote:
Hi everyone,
Please find attached an updated version of the bat book for use in *West Africa*.

As the production of this version was time sensitive, updates include high priority feedback received after the All-Country meeting, as well as additional input gathered through internal focus groups. Please note this version no longer has the "DRAFT" watermark on it.

In the meantime, we will continue working on further edits, e.g., a version for Asia, etc. Also, if there is interest in talking through evaluation options for countries outside of West Africa, perhaps we could discuss on the next EB call.

Jonna,
Is this version now cleared for use in West Africa?

Best,
Leilani

--

**Leilani Francisco, PhD, MA, PMP**
*Senior Scientist | PREDICT-2 Senior Behavioral Risk Surveillance Coordinator*

EcoHealth Alliance
460 West 34th Street – 17th floor
New York, NY 10001

1.212.380.4493 (direct)
REDACTED (mobile)
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www.ecohealthalliance.org

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**From:** Leilani Francisco <francisco@ecohealthalliance.org>
**Sent:** Thu, 29 Mar 2018 13:06:54 -0400
**Subject:** RE: MT agenda March 28
**To:** Jonna Mazet <jkmazet@ucdavis.edu>

This looks amazing!
Thanks for sharing and best wishes,
Leilani

**From:** [redacted] **On Behalf Of** Jonna Mazet
**Sent:** Thursday, March 29, 2018 12:53 PM
**To:** [redacted]
**Cc:** William Karesh <karesh@ecohealthalliance.org>; Christine Kreuder Johnson <ckjohnson@ucdavis.edu>; Clements, Andrew (GH/HIDN <AClements@usaid.gov>; Eddy Rubin <erubin@metabiota.com>; Leilani Francisco <francisco@ecohealthalliance.org>; Peter Daszak <daszak@ecohealthalliance.org>; Alisa Pereira Emerging Threats Division <apereira@usaid.gov>; Elizabeth Leasure <ealeasure@ucdavis.edu>; David John Wolking <djwolking@ucdavis.edu>; Lindsay Parish <lparish@usaid.gov>; Cassandra Louis Duthil <clouisduthil@usaid.gov>; Karen Saylors <ksaylors@metabiota.com>; Amanda Andre <amanda.andre@ecohealthalliance.org>; Brooke Genovese <bgenovese@ucdavis.edu>; Alison Andre <andre@ecohealthalliance.org>; Catherine Machalaba <Machalaba@ecohealthalliance.org>; Ava Sullivan <sullivan@ecohealthalliance.org>; Evelyn Luciano <luciano@ecohealthalliance.org>; Molly Turner <turner@ecohealthalliance.org>; predict@ucdavis.edu; PREDICTMGT <predictmgt@usaid.gov>
**Subject:** Re: MT agenda March 28

Here's the lecture symposium I mentioned yesterday.
Have a good day,
Jonna

On Tue, Mar 27, 2018 at 2:58 PM, Eri Togami <etogami@ucdavis.edu> wrote:
Hi PREDICT management team,

Here is the agenda for your call tomorrow, March 28 at 9-10am PT/12-1pm ET.

Best wishes,
Eri

**PREDICT Management Call Agenda**
**Wednesday, March 28, 2018**
9:00-10:00AM PST/12:00-1:00pm EST
#800-444-2601, Access code [redacted]
International Dial-in number: 310-765-4820 (toll charges apply)

**USAID Updates**

1. **Administrative items**
   - Requests currently pending AO approval
   - Summer jams or other plans?
   - M&E workshops in Guinea and Sierra Leone (Pillar II)
   - M&E meeting in DC
   - West Africa travel updates

2. **Plans for additional testing**

3. **Bat book roll out and use beyond West Africa and with other interagency partners?**

4. **Napa semi-annual meeting plans (agenda attached)**

5. **Mission communications roundup (as needed)**

6. **Outbreak updates, if any**

7. **EPT partner collaboration/coordination updates (Billy)**

8. **Updates on proposals from consortium members?**

9. **Publication, media, and conference updates**

- Discovery Channel "Invisible Killers" airing March 29, 2018
- "Outbreak: Epidemics in a Connected World" exhibit at NMNH (May 18, 2018)
- NIH Changing Relevance of Material Transfer Agreements for Infectious Diseases, Georgetown (May 3-4, 2018)
- One Health Congress Saskatoon (June 22-25, 2018)
- International Conference on Emerging Infectious Diseases (ICEID) in Atlanta (August 26–29, 2018)
- International Meeting on Emerging Diseases and Surveillance (IMED) 2018 in Vienna, Austria (November 9-12, 2018)
- International Symposium of Veterinary Epidemiology and Economics (ISVEE) Thailand (November 12-16, 2018).

REDACTED
Fellow
One Health Institute
School of Veterinary Medicine
University of California, Davis

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**To:** Andrew Clements <aclements@usaid.gov>
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**Subject:** RE: PREDICT Management Team Call - Tuesday February 6 2018 @ 10AM PST/1PM EST
**Sent:** Tue, 17 Apr 2018 18:17:41 +0000

Hi Andrew. No, you didn't miss anything. I'm still working on this along with the multiple other financial reports that are due in the next couple weeks. You should get a response on this (and the core pipeline request) next week once Jonna and I are back from vacation. Does that timeline work?

Thanks,
Liz

*Elizabeth Leasure*
*Financial Operations Manager*
*One Health Institute*
REDACTED *(cell)*
*530-754-9034 (office)*
*Skype: ealeasure*

---

**From:** Andrew Clements [mailto:aclements@usaid.gov]
**Sent:** Monday, April 16, 2018 9:53 AM
**To:** Elizabeth Leasure
**Cc:** David John Wolking; Jonna Mazet; Alisa Pereira; Predict inbox
**Subject:** Re: PREDICT Management Team Call - Tuesday February 6 2018 @ 10AM PST/1PM EST

Hi Liz

I was out of the office the week before last. Did I miss an email from you regarding how long the Ebola pipeline is projected to last (100% expenditure)?

Thanks!

Andrew

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
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| | |
|---|---|
| **From:** | Andrew Clements <aclements@usaid.gov> |
| **To:** | Katherine Leasure <kaleasure@ucdavis.edu> |
| **CC:** | PREDICTMGT <predictmgt@usaid.gov> predict@ucdavis.edu <predict@ucdavis.edu>; Prof. Jonna Mazet <jkmazet@ucdavis.edu> |
| **Sent:** | 4/28/2018 7:17:49 AM |
| **Subject:** | Re: Change to Approved ITA - D. Zimmerman to Kenya |

Approved subject to Mission concurrence

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
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*Mobile phone: 1-571-345-4253*
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On Apr 27, 2018, at 11:50 PM, Katherine Leasure <kaleasure@ucdavis.edu> wrote:

Hi Andrew. Smithsonian Institution has submitted an amendment to the previously approved ITA for Dawn Zimmerman. The dates have been changed to allow Dawn to be in-country for rescheduled human surveillance activities. The previous and amended ITAs are below for reference. Please let me know if you have any questions. Thanks!

***AMENDED ITA:***
The Smithsonian Institution would like to request travel approval for Dr. Dawn Zimmerman to travel from Washington, DC, USA to Nairobi, Kenya for the period of May 19 (leaving US) to May 29 (returning to US), 2018 to participate in high-level meetings, assist with surveillance activities and trainings, and meet with members of the partner lab and country coordinator. *Please note, eCC will reflect dates in Kenya, May 20 to May 30.*

**Trip Purpose:** Dr. Zimmerman will assist the Kenyan PREDICT team with the following: 1) concurrent animal and human wet-season surveillance in Laikipia*; 2) evaluate lab testing progress and help with governmental reports for approval to release test results*; 3) guide data analysis* and manuscript preparation; 4) help with graduate student preparation for their dissertation (these are students working under P2 program); 5) meet partners working with PREDICT to discuss program winding up and any further training needs in surveillance capacity - field and lab (KWS, KEMRI, CVL, FAO, DVS); 6) guide community engagement efforts in one health based on risk factors identified from the surveillance*.
**critical to project implementation*

**May 19th** depart US
**May 20th** arrive NBO (usually PM flight, stay at Dusit D 2 Hotel in NBO)
**May 21st-24th** evaluate lab progress at Institute of Primate Research, lectures at UoN (pending scheduling); work with staff and grad students on data; meetings with partners for updates (KWS, DVS, FAO, KEMRI, CVL, USAID mission?) pending scheduling (stay at Dusit D 2 Hotel in NBO)
**May 25th** drive to Mpala
**May 26-27th** human surveillance and community engagement (best turn-out is over weekend)
**May 28th** return to NBO, depart in PM for US
**May 29th** arrive US

***PREVIOUS ITA:***
The Smithsonian Institution would like to request travel approval for Dr. Dawn Zimmerman to travel from Baltimore, MD, USA to Naimbi, Kenya from April 29 (depart US) to May 12 (return US), 2018 to participate in high-level meetings, assist with surveillance activities and trainings, and meet with members of the partner lab and country coordinator. *Please note, eCC will reflect dates in Kenya, April 30 to May 11.*

**Trip Purpose:** Dr. Zimmerman will assist the Kenya PREDICT team with the following: 1) concurrent animal and human wet-season surveillance in Laikipia*; 2) evaluate lab testing progress and help with governmental reports for approval to release test results*; 3) guide data analysis* and manuscript preparation, 4) help with graduate student preparation for their dissertation (these are students working under P2 program); 5) meet partners working with PREDICT to discuss program winding up and any further training needs in surveillance capacity - field and lab (KWS, KEMRI, CVL, FAO, DVS); 6) guide community engagement efforts in one health based on risk factors identified from the surveillance*.
*critical to project implementation

Tentative itinerary:
**Apr 29th** depart BWI
**Apr 30th** arrive NBO (usually PM flight, stay at Dusit D 2 Hotel in NBO)
**May 1st** evaluate lab progress at Institute of Primate Research in AM, drive to Mpala mid-day, set rodent traps / catch bats in PM
**May 2-4th** rodent, baboons, bat sampling
**May 5-6th** human sampling, community engagement
**May 7-8th** rodents/baboons in AM, transport back to NBO mid-day
**May 9-11th** lectures at UoN (pending scheduling), work with staff and grad students on data; meetings with partners for updates (KWS, DVS, FAO, KEMRI, CVL, USAID mission?) pending scheduling (stay at Dusit D 2 Hotel in NBO)
**May 11th** depart in PM for US
**May 12th** arrive BWI

**Katherine Leasure**
HR/Payroll/Financial Assistant
One Health Institute
University of California, Davis
530-752-7526
530-752-3318 FAX
kaleasure@ucdavis.edu

--
You received this message because you are subscribed to the Google Groups "PREDICTMGT" group.
To unsubscribe from this group and stop receiving emails from it, send an email to predictmgt+unsubscribe@usaid.gov.
To post to this group, send email to predictmgt@usaid.gov.
To view this discussion on the web visit https://groups.google.com/a/usaid.gov/d/msgid/predictmgt/03ef01d3dc71%24b9c6ac90%242db40bb0%24%40ucdavis.edu.

**From:** Andrew Clements <aclements@usaid.gov>
**To:** Tracey Goldstein <tgoldstein@ucdavis.edu>
**CC:** Jonna Mazet <jkmazet@ucdavis.edu>;Karen Saylors <ksaylors@metabiota.com>;Brian Bird <bhbird@ucdavis.edu>;David Wolking <djwolking@ucdavis.edu>;Elizabeth Leasure <ealeasure@ucdavis.edu>;Cara Chrisman <cchrisman@usaid.gov>;Alisa Pereira <apereira@usaid.gov>
**Sent:** 5/11/2018 4:24:48 PM
**Subject:** Re: Thinking ahead about possible animal sampling for Ebola in DRC

Thanks, Tracey.

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

On May 11, 2018, at 6:12 PM, Tracey Goldstein <tgoldstein@ucdavis.edu> wrote:

Hi All,

My thoughts, based on results from Sierra Leone, is that if there are bats *inside* the affected people's houses they would be worth sampling and also if there are any in the *immediate* vicinity (ie. trees immediately around the house in the yard). I think the sample size may be small but but the context would make the most sense, rather than going out into surrounding forests and caves.

We can see what others think about this?

Best, Tracey

On Fri, May 11, 2018 at 12:21 AM, Andrew Clements <aclements@usaid.gov> wrote:
Hi all,

In the event, that there may be a request at some point from DRC to survey animals in the area of the current Ebola outbreak to identify the animal reservoir, I wanted to discuss with you ahead of time so that we can be prepared.

First, is it worth doing? It seems all previous efforts around outbreaks have failed, but that may be a function of too few animals being sampled and/or sampling too late so that infected animals either cleared a transient infection or died. (The current outbreak may have started more than a month ago so it may have been a while since the spillover occurred.) Based on Predict's experience with EHP, are there things that you would recommend now for animal sampling (besides starting ASAP) such as focusing on specific animals, sampling at specific interfaces, or increasing the number samples? Anything else?

Assuming the answer to the Q above is 'yes', could Predict (assuming adequate resources are available) rapidly mobilize a field team to collect the number of samples you think would be needed in a number of locations? What would be ballpark estimates for how long that team would need to be in the field and the overall cost?

Happy to discuss more by phone.

Thanks!

Andrew

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

--

(530) 752-0422
(530) 752-3318
tgoldstein@ucdavis.edu

**From:** Kendra Chittenden <kchittenden@usaid.gov>
**To:** Peter Daszak <daszak@ecohealthalliance.org>
**CC:** Dennis Carroll (DCarroll@usaid.gov) <DCarroll@usaid.gov>;Andrew Clements (aclements@usaid.gov) <aclements@usaid.gov>;Alisa Pereira <apereira@usaid.gov>;PREDICTMGT (predictmgt@usaid.gov) <predictmgt@usaid.gov>;Alison Andre <andre@ecohealthalliance.org>;Aleksei Chmura <chmura@ecohealthalliance.org>;predict@ucdavis.edu <predict@ucdavis.edu>;Kevin Olival <olival@ecohealthalliance.org>;Noam Ross <ross@ecohealthalliance.org>;Anna Willoughby <willoughby@ecohealthalliance.org>
**Sent:** 5/15/2018 9:44:37 PM
**Subject:** [predict] Re: PREDICT Emerging Disease Insights - 2 pagers

thank you!

On Tue, May 15, 2018 at 4:12 PM, Peter Daszak <daszak@ecohealthalliance.org> wrote:

Dear All,

We had our last three PREDICT Emerging Disease Insight 2 pagers translated into French. Please circulate to your Francophone colleagues!

Cheers,

Peter

**Peter Daszak**

*President*

EcoHealth Alliance

460 West 34th Street – 17th Floor

New York, NY 10001

Tel. +1 212-380-4474

www.ecohealthalliance.org

@PeterDaszak

@EcoHealthNYC

*EcoHealth Alliance leads cutting-edge research into the critical connections between human and wildlife health and delicate ecosystems. With this science we develop solutions that prevent pandemics and promote conservation.*

**From:** Peter Daszak
**Sent:** Thursday, April 19, 2018 12:55 PM
**To:** Dennis Carroll (DCarroll@usaid.gov); Andrew Clements (aclements@usaid.gov); Alisa Pereira; PREDICTMGT (predictmgt@usaid.gov)
**Cc:** Alison Andre; Aleksei Chmura; predict@ucdavis.edu; Kevin Olival, PhD (olival@ecohealthalliance.org); Noam Ross; 'Anna Willoughby (awilloughby@ecohealthalliance.org)'
**Subject:** PREDICT Emerging Disease Insights - 2 pagers
**Importance:** High

Dear Dennis, Andrew, and Alisa

I am delighted to share with you the latest Emerging Disease Insights (EDIs) 2-pagers from our PREDICT Modeling and Analytics Team. These are 2-page reports on the analyses that our team is doing to guide surveillance and test out ideas about the risk of emergence of novel PREDICT viruses we discover. These three focus on:

1. Measuring viral discovery: Using the viral accumulation curves from PREDICT 1 to determine how many samples we need to collect and test to discover the majority of viruses in a host species

2. Identifying the next Zika virus: Analyzing all known flaviviruses to assess which ones have the characteristics that could allow them to emerge and spread.

3. Economic case for the GVP: Economic analysis of the Global Virome Project sampling and testing strategy, with an estimate of return-on-investment.

These EDIs are intended to be easily understood, provide an interesting background story based on PREDICT that demonstrates how we're using state-of-the-art modeling and analytics, and our data from PREDICT, to better understand the risk of disease emergence globally. Please share them widely within USAID and to other partners and people interested! They will also be available publicly from livescience.ecohealthalliance.org.

As mentioned at the Napa meeting – we are actively working on other Emerging Disease Insights to be completed this and next year, so please send any ideas you may have.

Comments are very welcome!

Cheers,

Peter

**Peter Daszak**

*President*

EcoHealth Alliance

460 West 34th Street – 17th Floor

New York, NY 10001

Tel. +1 212-380-4474

www.ecohealthalliance.org

@PeterDaszak

@EcoHealthNYC

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predictmgt+unsubscribe@usaid.gov

predictmgt@usaid.gov

https://groups.google.com/a/usaid.gov/d/msgid/predictmgt/

da1abeaaadc94c0b934c8f359bba1ad3%40MBX04B-IAD3.mex06.mlsrvr.com

--

**Kendra Chittenden, Ph.D. | Senior Infectious Disease Advisor| USAID** | mobile (703-209-5424) KChittenden@usaid.gov

**From:** Andrew Clements <aclements@usaid.gov>
**Sent:** Thu, 17 May 2018 10:52:17 +0200
**Subject:** Porcine deltacoronavirus
**To:** Peter Daszak <daszak@ecohealthalliance.org>, William Karesh <Karesh@ecohealthalliance.org>, Christine Kreuder Johnson <ckjohnson@ucdavis.edu>, Jonna Mazet <jkmazet@ucdavis.edu>

http://outbreaknewstoday.com/porcine-deltacoronavirus-potential-threat-humans-ohio-state-researchers-70406/

--

Andrew Clements, PhD
Senior Scientific Advisor
Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health
U.S. Agency for International Development
Mobile phone: REDACTED
E-mail: aclements@usaid.gov

*For more information on USAID's Emerging Pandemic Threats program, see:* http://www.usaid.gov/ept2

**From:** Andrew Clements <aclements@usaid.gov>
**Sent:** Wed, 23 May 2018 06:07:41 -0700
**To:** Jon Epstein <epstein@ecohealthalliance.org>
**Cc:** Dan Schar <dschar@usaid.gov>, Umesh Alavadi <ualavadi@usaid.gov>, Sara Heydari <sheydari@usaid.gov>, Xerses Sidhwa <xsidhwa@usaid.gov>, Rajesh Bhatia <rajeshbhatia@ecohealthalliance.org>, Predict inbox <predict@ucdavis.edu>, Peter Daszak <daszak@ecohealthalliance.org>, Evelyn Luciano <luciano@ecohealthalliance.org>
**Subject:** [predict] Re: Nipah virus: Outbreak in Kerala, India kills at least 10 - The Washington Post

Thanks, Jon. I also saw the mention of the bitten fruit and thought that sounded more likely to be the source than the well. The danger is they may be trying to reduce risk by doing something that may not be effective thereby giving people a false sense of security.

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

On May 23, 2018, at 2:58 PM, Jon Epstein <epstein@ecohealthalliance.org> wrote:

> Hey Andrew,
> No, those probably aren't fruit bats. They should be looking for Pteropus medius, which roosts in trees. Our experience from several outbreaks in Bangladesh has been that collecting urine from under roosts located in the area of the index case, as soon as possible and for several consecutive days, is the best way to detect Nipah virus.

It's theoretically possible that those bats in the well could carry a related henipavirus (there's evidence that insectivorous bats do) but I'd be very surprised if those bats were responsible for this outbreak. It will be important to see what NIV finds when they sequence the virus from patients. And it will also be good to know more about the source of exposure. The media suggested that the three initial cases ate bitten fruit from the ground.

Cheers,
Jon

Jonathan Epstein DVM, MPH, PhD

Vice President for Science and Outreach

EcoHealth Alliance
New York

(e) epstein@ecohealthalliance.org
(o) 212.380.4467
(m) REDACTED
@epsteinjon

On Wed, May 23, 2018, 6:24 AM Andrew Clements <aclements@usaid.gov> wrote:

> FYI

https://www.washingtonpost.com/news/to-your-health/wp/2018/05/22/rare-brain-damaging-virus-spreads-panic-in-india-as-death-toll-rises/

Jon: in your many years of bat experience, have you found that fruit bats live in wells?

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

**Sent:** Thu, 24 May 2018 17:43:14 -0700
**Subject:** DRC Ebola Response: Number of staff assisting
**From:** Jonna Mazet <jkmazet@ucdavis.edu>
**To:** Alisa Pereira <apereira@usaid.gov>
**Cc:** PREDICT-outbreak <predict-outbreak@ucdavis.edu>, "AOTR/Grant Manager Andrew Clements" <AClements@usaid.gov>

As requested:

The current total P-2 involvement count is currently **22 staff** supporting the ERC Ebola event, as of May 24. Details below:

- Metabiota (13)
    - In DRC (6) - **Charles Kumakamba** (coordination, liaison with MoH, technical advice, laboratory), **Albert Mbungu** (logistics), **Eric Mbala** (logistics), **André Benakuau** (logistics), **Grace Muyembe** (laboratory), **Frida Nkawa** (laboratory)
    - Global (7) - **Karen Saylors** (coordination, technical advice), **Matthew LeBreton** (coordination, technical advice),**Beth Edison** (coordination, financial management) ,**Dave McIver** (coordination, technical advice), **Dana Ellis** (supply chain management), **Christian Lange** (laboratory oversight and sample interpretation), **Amethyst Gillis** (laboratory oversight and sample interpretation)
- EHA (2) - **Billy Karesh**, **Anne Laudisoit** (consulting with colleagues in DRC & ground- truthing reports)
- UC Davis (6) – **Jonna Mazet, Brian Bird, Tracey Goldstein,** REDACTED **, Christine Kreuder Johnson, Meghan Doyle**
- Columbia University (1) – **Simon Anthony**

Information on neighboring countries:

- Tanzania (0)– non so far, team is looking into stockpiles and preparing an order of PPE, lab testing kits in case they are called. David Wolking will be informed if there are any changes.
- Rwanda and Uganda (0) – non so far, CCs asked to inform Kirsten Gilardi if there are any changes.

**Sent:** Wed, 30 May 2018 13:41:22 -0700
**Subject:** Re: EB agenda May 30
**From:** Jonna Mazet <jkmazet@ucdavis.edu>
**To:** "Tammie O'Rourke" <torourke@metabiota.com>
**Cc:** [redacted], "Valitutto, Marc" <ValituttoM@si.edu>, David John Wolking <djwolking@ucdavis.edu>, Amanda Fine <afine@wcs.org>, Brian H Bird <bhbird@gmx.ucdavis.edu>, Christine Kreuder Johnson <ckjohnson@ucdavis.edu>, "Churchill, Carolina" <cchurchill@wcs.org>, Corina Grigorescu Monagin <cgmonagin@ucdavis.edu>, Dawn Zimmerman <ZimmermanD@si.edu>, Eddy Rubin <erubin@metabiota.com>, Evelyn Luciano <luciano@ecohealthalliance.org>, Jon Epstein <epstein@ecohealthalliance.org>, Karen Saylors <ksaylors@metabiota.com>, Leilani Francisco <francisco@ecohealthalliance.org>, "Murray, Suzan" <MurrayS@si.edu>, Peter Daszak <daszak@ecohealthalliance.org>, Wouzrina A Smith <wasmith@ucdavis.edu>, Sarah Olson <solson@wcs.org>, Simon Anthony <sja2127@columbia.edu>, Tracey Goldstein <tgoldstein@ucdavis.edu>, William Karesh <karesh@ecohealthalliance.org>, Elizabeth Leasure <ealeasure@ucdavis.edu>, Kevin Olival <olival@ecohealthalliance.org>, Alison Andre <andre@ecohealthalliance.org>, Amanda Andre <amanda.andre@ecohealthalliance.org>, Megan M Doyle <mmdoyle@ucdavis.edu>, Ava Sullivan <sullivan@ecohealthalliance.org>, Molly Turner <turner@ecohealthalliance.org>, Emma Lane <lane@ecohealthalliance.org>, Brooke Genovese <bgenovese@ucdavis.edu>, "predict@ucdavis.edu" <predict@ucdavis.edu>
Summary of PREDICT contributions to Emerging Pandemic Threats (5-16-18)[TG_CKJ_DW] JM.pptx

Here's the updated slide per our discussion today.
Thanks for your help,
Jonna

On Wed, May 30, 2018 at 9:44 AM, Tammie O'Rourke <torourke@metabiota.com> wrote:

below is the indicator report for this period.

| Indicator | Total | NewInLast2Weeks |
|---|---|---|
| # countries with data | 30 | 0 |
| # animals sampled | 66668 | 423 |
| # humans sampled | 8903 | 496 |
| # human questionnaires | 10677 | 521 |
| # specimens | 396634 | 6912 |
| # tests | 273984 | 7578 |
| # animals tested | 23773 | |
| # humans tested | 3398 | |
| # animal specimens tested | 41670 | |
| # human specimens tested | 6833 | |
| # tests active testing ongoing | 2152 | |
| # sequences interpreted | 1718 | |
| # sequences waiting interpretation | 803 | |
| average days between event and data submission | 72 | |
| average days between event and data submission for data submitted in last 2 weeks | 49 | |
| number of events/test batches waiting for country input | 58 | |
| number of events/test batches waiting for IPI review | 56 | |

On Tue, May 29, 2018 at 2:50 PM, [redacted] wrote:

Hi PREDICT EB,

Here are your agenda and attachments for the EB call tomorrow.

Peter, I've added your CIV item to the agenda.

Best wishes,

[redacted]

**PREDICT Executive Board Meeting**

Wednesday, May 30, 2018

**9:00-11:00AM PST/12:00-2:00pm EST**

#800-444-2801, Access code [redacted]

International Dial-in number: 310-765-4820 (toll charges apply)

**USAID Updates**

1. **Budget issues & pipeline**

2. **Administrative items**
   - M&E meeting (slide attached, further revisions to be made)
   - Smithsonian September briefing
   - Dates for next semi-annual
   - USAID brown-bags
   - Determining disposition of samples and data
   - In-country PR staff & media outreach

3. **Outbreak updates (Ebola, monkeypox, Nipah)**

4. **Mission communications & country roundup essentials (CIV update)**

5. **Operations Team updates**
   - Behavior - Bat communications book and community engagement update and path forward
   - IM

- M&A
- EHP – 3-country surveillance wrap-up, possibly adding DRC
- Capacity
- Lab
- Surveillance
- EPT partner collaboration/coordination updates – OIE meeting and FAO Ebola webinar

## 6. New synergistic proposals

## 7. Publication, media, and conference updates

- Planetary Health annual meeting (May 29-31, 2018)
- AVMA meeting in Denver (July 13, 2018)
- "Outbreak: Epidemics in a Connected World" exhibit at NMNH (May 18, 2018)
- One Health Congress Saskatoon (June 22-25, 2018)
- International Conference on Emerging Infectious Diseases (ICEID) in Atlanta (August 26–29, 2018)
- International Meeting on Emerging Diseases and Surveillance (IMED) 2018 in Vienna, Austria (November 9-12, 2018)
- WDA Australasia meeting (Oct-November 2018)
- International Symposium of Veterinary Epidemiology and Economics (ISVEE) Thailand (November 12-16, 2018).
- Global Health Security 2019, Sydney (June 18-20, 2019)

--
*Tammie O'Rourke*
*Metabiota*
*Senior Information Management Developer*
*Emerging Pandemic Threats - PREDICT Program*
tel/ +1-250-618-2460 - skype tammie.orourke - www.eidith.org
URL: www.metabiota.com

# Summary of PREDICT-2 contributions to Emerging Pandemic Threats Program and GHSA

**What is PREDICT-2?** A global USAID project (2014-2019) to understand risks for zoonotic disease emergence and to improve prevention, detection, and response capabilities in-country, regionally, and globally.

**Where does PREDICT-2 work?** 28 countries in Africa, Asia, and Middle East that are "hot spots" for emerging zoonotic diseases (e.g. Avian Influenza, Ebola, Nipah, MERS, SARS, and unknown threats).

**What does PREDICT-2 do?** Put One Health in action through viral & behavioral surveillance in animals and humans; respond to zoonotic disease outbreaks; strengthen labs and prevention, detection, and response capabilities; expand the evidence base of One Health and zoonotic disease risks through data science and analytics; employ a multi-sectoral approach to understanding zoonoses and viral emergence.

**What has PREDICT-2 accomplished through March 2018?**

- Animal and human viral and/or behavioral surveillance in 28 countries
- Enabled >60 labs to detect viral threats to mitigate the next pandemic
- >68,000 animals and humans sampled and >5,000 human behavioral questionnaires completed to date
- >1,000 known and new viruses detected to date
- >4,000 people trained (PREDICT staff, students, government workers)
- Provided >60 protocols & guides to countries to respond to outbreaks & mitigate pandemics
- Developed risk-reduction resource to help communities change behavior to minimize spillover from bats
- Updated maps and models for risk of zoonotic threats locally and globally
- Strengthened multi-sectoral collaboration on zoonotic diseases
- Assisted governments in preparedness and response efforts for >30 zoonotic disease outbreaks

**What additional work will PREDICT-2 accomplish?**

- Identification and ranking of potentially zoonotic viruses for spillover and transmission risks to humans
- Identification of shared viruses in wildlife, livestock, and human populations
- Investigation of animal hosts for Ebola virus in West Africa

For more information, see: https://ohie.usaid.gov/sites/default/files/documents/1864/Predict-2-Summary.pdf and http://www.predict.global. PREDICT-2 publications can be found at: http://publications.predict.global

UCDUSR0002437

**From:** Dennis Carroll <dcarroll@usaid.gov>
**Sent:** Thu, 31 May 2018 14:39:55 -0400
**Subject:** UPDATE: The GVP Steering Committee Meeting June 11
**To:** Guy Vernet <guy.vernet@fondation-merieuxusa.org>, "Lipkin, Ian W." <wil2001@cumc.columbia.edu>, "Capua,Ilaria" <icapua@ufl.edu>, Gian Luca Burci <gian-luca.burci@graduateinstitute.ch>, Prasert Auewarakul <prasert.aue@mahidol.ac.th>, Oyewale Tomori [REDACTED], "FUKUDA, Keiji" <kfukuda@hku.hk>, Ariel Pablos [REDACTED], George F GAO <gaof@im.ac.cn>, "Morzaria, Subhash (FAORAP)" [REDACTED] "Subhash P Morzaria [REDACTED] Carlos M Morel <morel@cdts.fiocruz.br>, Renata Curi Hauegen <rcuri@cdts.fiocruz.br>, David Nunes Nabarro [REDACTED], Peter Bogner <peter@gisaid.org>, Brooke Watson <watson@ecohealthalliance.org>, Peter Daszak <daszak@ecohealthalliance.org>, Cara Chrisman <cchrisman@usaid.gov>, [REDACTED], Nathan Wolfe <nwolfe@metabiota.com>, Eddy Rubin <erubin@metabiota.com>, Jonna Mazet <jkmazet@ucdavis.edu>, "Mundaca-Shah, Ceci" <CMundaca@nas.edu>, Kathleen VICTOIR <kathleen.victoir@pasteur.fr>, sfh9@georgetown.edu
**Cc:** Ong Joanna <joannaong@hku.hk>
China to help ID unknown lethal viruses - Chinadaily.com.cn.html
GVP_ Building a global atlas of zoonotic viruses_ WHO Bulletin, Jan 2018.pdf
Draft SC Mtg Agenda DC 6.11.18.pdf
GVP Science Policy Forum 2.23.18 (2).pdf

GLOBAL VIROME PROJECT

May 31, 2018

Dear Colleagues,

Much has been happening on the GVP front since we last met on the edges of the Prince Mahidol Awards Conference in Bangkok. We've published two papers on the GVP, in Science Policy and the WHO Bulletin, and have been getting significant press attention, as illustrated by a recent article in the China Daily. The GVP also got a nice "shout out" at the Smithsonian's Museum of Natural History's exhibit, "Outbreak," as an example of why the world will be better able to prevent future epidemics.

There has also been significant maturation in our thinking on how GVP can best evolve from its current post-Bellagio "transitional state" to a fully operational global partnership. As those who were in attendance will recall, in Bangkok we introduced representatives of the Boston Consultancy Group (BCG), who had been hired under the auspices of the Governance Thematic Area to assist us in thinking more precisely about the operational "way forward" for the GVP. BCG had played a similar role in the formative stages of CEPI and GAVI. In the course of their consultancy, BCG was able to interview a broad cross-section of the international community to get their thoughts, insights, and suggestions as to what would be essential ingredients for GVP to be a successful enterprise. It is on the basis of this outreach that we are now asking members of the Steering Committee to consider a package of actions covering GVP's organizational structure, staffing, funding, and outreach for your guidance.

On June 11, we are inviting each of you to participate in a half day meeting to review specific recommendations that address GVP's:

- Near and long-term operational vision (*The Go Forward Vision*) with particular focus on actions needed to support the limited launch of field operations (during an "incubation period") that are designed to "test" the systems required to go to full scale operations
- Organizational structure (*Towards a Governance Structure*) required during this two year "incubation period"
- Need to establish itself as a legal entity and find an immediate "home" (*Establish a Legal Home*)
- Budget requirements to support operations over the next two year (*Incubation Period Budget*)
- Outreach plans for the coming year (*Global Outreach: Year One*)

Collectively, the decisions made about the operational way forward, organizational structure, staffing and funding will lay the foundation for making a strong business case for the GVP. We are now at a critical juncture as we move from the "idea" to the "reality" of the GVP. The next year will be a pivotal period as we seek to expand the financial and political investment in the GVP.

The meeting will be held in Washington DC at the National Academy of Medicine (see below for venue location). For those unable to join us in person we have also arranged for a call-in line (see below). To maximize the efficiency of the meeting **we are sending you by FedEx the entire packet of briefing materials** that will be used to guide our discussions. This meeting of the Steering Committee is intended as a "decision-making" forum and as such we will be specifically asking participants to consider a number of actions for "approval," "approval with modification," or "rejection" (a *Decision Sheet* identifying those items is included in the packet).

I am looking forward to what I believe will be an important and productive dialogue. In the interim, if you have any questions, comments or early feedback on the materials, please use this feedback form: https://goo.gl/forms/fssddGcGfbflmP5d2.

As a special treat for those joining us in person, following the meeting we will arrange a visit to the Smithsonian's Museum of Natural History exhibit "Outbreak".

All my best,



Dennis Carroll

**The GVP Steering Committee Meeting**

**Date:** June 11, 2018
**Time:** 09:00 – 1:00
**Venue:** Room 101 at the National Academies Keck Center, 500 5th Street NW, Washington, DC, 20001
**Call in number:** US/Canada: REDACTED
International: (888) 330-1716
**Participant Pin:** REDACTED

# China to help ID unknown lethal viruses

By WANG XIAODONG-SHAN JUA | China Daily | Updated: 2014-05-22 07:23

Quarantine workers at Qingdao airport in Shandong province test samples for the Ebola virus on Aug 11, 2014.[Xie Hao/For China Daily]

**Global effort aims to find disease vectors that can jump from animals to humans**

China will help lead a project to identify unknown viruses from wildlife to better prepare humans for major epidemics — if not global pandemics. The project is to be launched this year, according to one of the country's top health officials.

The Global Virome Project will start in China and Thailand with field work to collect samples from wild animals and analyze the viruses detected, said Gao Fu, head of the Chinese Center for Disease Control and Prevention.

"Scientists will collect virus samples from animals such as bats and rats for study using techniques like next generation (DNA) sequencing to find whether new viruses exist," he said.

The project, estimated to cost up to $1.2 billion, is expected to take 10 years and involves many countries including the United States, Brazil and Nigeria.

Through more intensive and extensive study of viruses from animals that could infect humans, it may be possible to deal with viruses using preemptive controls and prevention instead of passive, reactive measures, Gao said.

"We all know there are almost certainly new viruses that could cause the next global pandemic, but based on the existing early warning capacity for diseases, we do not know, for example, which virus will cause an epidemic," Gao said.

"We are sure that new virus strains will appear in the future along with changes in our ecology, environment and human behaviors."

For instance, humans' abuse of antibiotics has lead to the potential development of superbugs.

"There are many viruses living in wild animals, so we can identify viruses and thoroughly study those that could pass to humans," Gao said. "Ideally we can develop vaccines and a diagnosis for each viruses even before they cause human epidemics."

It is known that 263 viruses can infect humans, but scientists estimate there may be more than half a million viruses that live in birds and mammals and that are unknown to humans that may be capable of infecting humans, and they are the primary subject of the project's research, Gao said.

Even if a large number of such unknown viruses are identified, it is possible that just a small fraction of them have the ability to cause major epidemics that cause human deaths, he said.

However, considering the huge cost of a major epidemic like SARS to human health and economics, the findings of the project still have the potential to greatly reduce losses through improved early diagnosis and identification of hosts vulnerable to a new virus after an outbreak, according to Gao.

A similar project carried out by the U.S. Agency for International Development proved the feasibility of the Global Virome Project and provides helpful experience, he said.

The USAID project, known as Predict and launched in 2009, with China a participant, led to findings of more than 1,000 viruses previously unknown to humans. The project cost was over $170 million, he said.

Some of the technologies used for that project have proved reliable and economically affordable and can be used for the Global Virome Project, Gao said.

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- Chinese scientists blame bats for spreading pig virus

**Photo**



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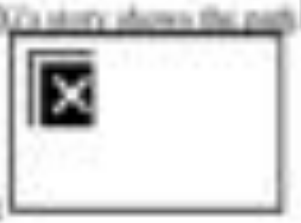

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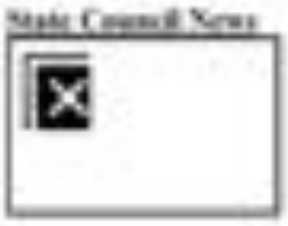

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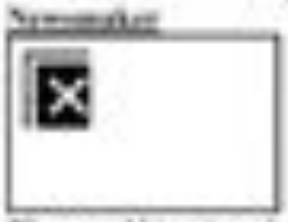

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POLICY FORUM

Scientists prepare to collect a blood sample from a Rousettus sp. fruit bat in Thailand to test for novel viruses. The Global Virome Project aims to identify and characterize the majority of currently unknown viruses in key wildlife groups, including rodents, nonhuman primates, and bats.

INFECTIOUS DISEASES

# The Global Virome Project

## Expanded viral discovery can improve mitigation

By **Dennis Carroll, Peter Daszak, Nathan D. Wolfe, George F. Gao, Carlos M. Morel, Subhash Morzaria, Ariel Pablos-Méndez, Oyewale Tomori, Jonna A. K. Mazet**

Outbreaks of novel and deadly viruses highlight global vulnerability to emerging diseases, with many having massive health and economic impacts. Our adaptive toolkit—based largely on vaccines and therapeutics—is often ineffective because countermeasure development can be outpaced by the speed of novel viral emergence and spread. Following each outbreak, the public health community bemoans a lack of prescience, but after decades of reacting to each event with little focus on mitigation, we remain only marginally better protected against the next epidemic. Our ability to mitigate disease emergence is undermined by our poor understanding of the diversity and ecology of viral threats, and of the drivers of their emergence. We describe a Global Virome Project (GVP) aimed to launch in 2018 that will help identify the bulk of this viral threat and provide timely data for public health interventions against future pandemics.

Nearly all recent pandemics have a viral etiology with animal origins, and with their intrinsic capacity for interspecies transmission, viral zoonoses are prime candidates for causing the next great pandemic (*1*, *2*). However, if these viruses are our enemy, we do not yet know our enemy very well. Around 263 viruses from 25 viral families are known to infect humans (*3*) (see the figure), and given the rate of discovery following identification of the first human virus (yellow fever virus in 1901), it is likely many more will emerge in the future (*4*). We estimate, from analysis of recent viral discovery data (*5*), that ~1.67 million yet-to-be-discovered viral species from key zoonotic viral families exist in mammal and bird hosts—the most important reservoirs for viral zoonoses (supplementary text).

By analyzing all known viral-host relationships (*3*, *6*), the history of viral zoonoses (*7*), and patterns of viral emergence (*2*), we can reasonably expect that between 631,000 and 827,000 of these unknown viruses have zoonotic potential (supplementary text). We have no readily available technological countermeasures to these as-yet-undiscovered viruses. Furthermore, the rate of zoonotic viral spillover into people is accelerating, mirroring the expansion of our global footprint and travel networks (*1*, *8*), leading to a nonlinear rise in pandemic risk and an exponential growth in their economic impacts (*8*).

### PROMISING PILOT, CHALLENGING SCALE

Since 2009, the U.S. Agency for International Development (USAID) has conducted a large-scale pilot project, spanning more than 35 countries over 6 years at a cost of around $170 million, to evaluate the feasibility of preemptively mitigating pandemic threats. Other previous studies had begun to conduct targeted viral discovery in wildlife (*9*), and develop mitigation strategies for the emergence of avian flu, for example. However, the USAID Emerging Pandemic Threats (EPT) PREDICT project is the first global-scale coordinated program designed to conduct viral discovery in wildlife reservoir hosts, and characterize ecological and socioeconomic factors that drive their risk of spillover, to mitigate their emergence in people (*10*).

Working with local partners and governments, wildlife and domestic animals and at-risk human populations in geographic hotspots of disease emergence (*2*) are sampled, and viral discovery conducted. A strategy to identify which novel viruses are most at risk of spillover has been developed (*11*), and further work is conducted on these to characterize them prior to, or in the early stages of, spillover. Metadata on the ecology of wildlife–livestock–human transmission interfaces, and on human behavioral patterns in communities, are concurrently analyzed so that strategies to reduce spillover can be developed (supplementary text). To date, EPT PREDICT has discovered more than 1000 viruses from viral families that contain zoonoses, including viruses involved in recent outbreaks (*12*), and others of ongoing public health concern (*13*). The focus of EPT PREDICT on capacity building, infrastructure support, training, and epidemiological analysis differs substantially from the GVP's emphasis on large-scale sampling and viral discovery. However, to discover the bulk of the projected remaining 1.67 million unknown viruses in animal reservoirs and characterize the majority of 631,000 to 827,000 viruses of highest zoonotic potential requires overcoming some challenges of scale.

The first challenge is cost. To estimate this, we analyzed data on field sampling and laboratory expenditures for viral discovery from (*5*, *10*), and estimates of unknown viral diversity in mammalian and avian hosts (supplementary text). We estimate that discovery of all viral threats and characterization of their risk for spillover, using currently available technologies and protocols, would be extremely costly at over $7 billion (supplementary text). However, previous work shows that viral discovery rates are vastly higher in the early stages of a sampling program, and that discovering the last few, rare, viruses is extremely costly and time-consuming owing to the number of samples required to find

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them (3) (supplementary text). We used data on rates of viral discovery (3) to estimate that the substantial majority of the viral diversity from our target zoonotic reservoirs could be discovered, characterized, and assessed for viral ecology within a 10-year time frame for ~$1.2 billion (16% of total costs for 75% of the viromes, considering some fixed costs) (fig. S1). Those viruses remaining undiscovered will, by the nature of sampling bias toward more common host species, represent the rarest viruses with least opportunity for spillover, and therefore reduced public health risk. Their discovery would require exponentially greater sampling effort and funding that could be better spent on countermeasures for the more likely threats (supplementary text).

Stakeholders from Asia, Africa, the Americas, and Europe, spanning industry, academia, intergovernmental agencies, nongovernmental organizations (NGOs), and the private sector, began meeting in 2016 to design a framework for the governance, management, technical operation, and scope of the GVP. Key efforts include developing finance streams; establishing a transparent, equitable implementation strategy; designing data- and sample-sharing protocols; developing laboratory and metadata platforms; targeting of host taxa and sampling sites; analyzing return on investment; forming collaborative field and laboratory networks; developing risk characterization frameworks for viruses discovered; designing a strategy to assess and mitigate risk behaviors that facilitate viral emergence; and planning in-country capacity building for sustainable threat mitigation. Funding has been identified to support an initial administrative hub, and fieldwork is planned to begin in the first two countries, China and Thailand, during 2018.

With outputs intended to serve the global public good, the GVP is developing a transparent and equitable strategy to share data, viral samples, and their likely products, including benefits derived from future development of medical countermeasures. These build on the Nagoya Protocol to the Convention on Biological Diversity and the Pandemic Influenza Preparedness Framework, negotiated by the World Health Organization (WHO). The international collaborative nature and global ownership of the project should help leverage funding from diverse international donors, including government agencies focused on national virome projects or on international development projects in other countries, and private-sector philanthropic donors focused on technology and big science.

The diversity of tasks required to conduct the GVP should reduce the potential for it to divert funds from current public health programs. For example, discrete work streams on targeted sampling of wildlife, on bioinformatics, and on behavioral risk analysis fall within the focus of current scientific research programs in a range of donor agencies. Governments and corporations with specific results and geographic responsibilities have been approached to finance subprojects relevant to their sectors (e.g., capacity development, surveillance of specific taxa, geographically focused activities, medical countermeasure development, training, surveillance, and technological platforms). In addition, leaders in China and a number of countries have begun developing national virome projects as part of the GVP, leveraging current research funding to include GVP sites.

Technological challenges include safe field sampling in remote locations and cost-effective laboratory platforms that can be standardized in low-income settings. To achieve these goals, existing national, regional, and international networks will need to be enhanced and expanded within standardized sampling and testing frameworks. Existing networks of field biologists from environment ministries, academic institutions, and conservation and health NGOs may assist in surveillance. National science and technology agencies, regional One Health platforms, transboundary disease surveillance networks, Institut Pasteur laboratories, WHO, United Nations Food and Agricultural Organization, and the World Organization for Animal Health collaborating and reference centers and viral discovery laboratories, including USAID EPT PREDICT, are currently involved in planning these activities around a decade-long sampling and testing time frame. A monitoring and evaluation strategy is being developed based on analysis of viral discovery rates against predicted viral diversity, to identify when to halt surveillance and testing as the GVP progresses. Stakeholders will also tackle the challenge of how to decide when enough potentially dangerous viruses have been discovered in a host species or region to call for action to reduce underlying drivers of emergence (e.g., hunting and trading of a wildlife reservoir).

> ***"...the GVP goals...improve capacity to detect, diagnose, and discover viruses in vulnerable populations..."***

Laboratory platforms developed by USAID EPT PREDICT have proven capacity to identify novel viruses and are relatively inexpensive and reliable, being based on polymerase chain reaction using degenerate primers that target a range of viral families of known zoonotic potential. However, scaling up to a full global virome project will require discovery of three orders of magnitude more viruses in a similar time frame. Technological solutions will be needed to increase the speed and efficiency, and reduce the cost, of sequence generation. These will likely include next-generation sequencing and other unbiased approaches to identify evolutionarily distinct viral clades.

A key challenge is how to assess the potential for novel viruses to infect people or become pandemic (14). The EPT PREDICT project (11) and others (2, 6) have developed preliminary zoonotic risk characterization frameworks based on viral and host traits and the ecological and demographic characteristics of the sampling site. These approaches will be used in the GVP to triage novel viruses for further characterization to assess their zoonotic capacity (supplementary text). In vitro receptor binding analyses coupled with in vivo models have proven useful in this capacity for some viral families [e.g., coronaviruses (15)]. Although this is not yet feasible for all potentially zoonotic viral clades, applying these techniques to a larger viral data set as the GVP progresses will allow validation of risk frameworks and may increase our capacity to predict zoonotic potential. However, advancing these goals will require new collaboration among lab virologists, epidemiologists, and modelers, innovative approaches to field-testing the boundaries of virus-host relationships, and support across agencies that often fund separate virology, public health, evolutionary biology, and biodiversity modeling initiatives.

## INVESTMENTS, RETURNS

The cost of the GVP represents a sizable investment and, even if a large number of potential zoonoses are discovered, only a minority is likely to have the potential to cause large-scale outbreaks and mortality in people (1, 2, 7). However, given the high cost of single epidemic events, data produced by the GVP may provide substantial return on investment by enhancing diagnostic capacity in the early stages of a new disease outbreak or by rapidly identifying spillover hosts, for example. Recent analysis of the exponentially rising economic damages from increasing rates of zoonotic disease emergence suggests that strategies to mitigate pandemics would provide a 10:1 return on investment (1, 8). Even small reductions in the estimated costs of a future influenza pandemic (hundreds of billions of dollars) or of the previous SARS (severe acute respiratory syndrome) epidemic ($10 billion to $30 billion) could be substantial. The goal of the GVP is to improve efficiency in the face of these increasing viral

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spillover rates by enhancing (not replacing) current pandemic surveillance, prevention, and control strategies. If we were to invest only in surveillance for known pathogens (our current business-as-usual strategy), our calculations suggest we would protect ourselves against less than 0.1% of those viruses that could conceivably infect people, even using the lower bounds of our uncertainty for our viral estimates (i.e., 203 viruses known from humans out of 263,824 unknown potential zoonoses; supplementary text).

The potential benefits of the GVP may be enhanced to maximize public health benefits (supplementary text) by (i) optimizing sampling to target species most likely to harbor "missing zoonoses" (6), or to target emerging disease hotspot regions most likely to propagate major disease outbreaks (7); (ii) using human and livestock syndromic surveillance to identify regions for wildlife sampling proximal to repeated outbreaks of severe influenza-like-illnesses, fevers of unknown origin, encephalitides, livestock "abortion storms," and other potential emerging disease events; (iii) initially targeting RNA viruses, which caused 94% of the zoonoses documented from 1960 to 2010; and (iv) fostering economies of scale and adoption of technological innovation as the GVP ramps up. This includes use of laboratories that can facilitate regional sample processing, development of centralized bioinformatics platforms, and improved logistics for sample collection and transport. We also expect the cost of testing and sequencing to decrease as technology is enhanced, much as the development of next-generation sequencing reduced genetic sequencing costs by up to four orders of magnitude in a decade.

The accelerated pace of viral discovery under the GVP will make the virological, phylogenetic, and modeling approaches used in pandemic preparedness more data-rich, and likely more effective. For example, having the sequence data for thousands, rather than a few, viruses from a single family could extend vaccine, therapeutic, or drug development to a wider range of targets, leading to broad-spectrum vaccines and other countermeasures. Identification of novel viruses may be useful to programs like the Coalition for Epidemic Preparedness Innovations (CEPI) in assessing the breadth of action of candidate vaccines and therapeutics, and in expanding their efficacy. More broad-scale prevention approaches could provide immediate return on investment prior to vaccine and countermeasure development, which would require substantial investment and time. For example, metadata on viral reservoir host identity, geography, seasonality, proximity to people, and drivers of emergence will refine our mechanistic understanding of spillover and enhance published models of emerging infectious diseases risk (3, 6). Identification of novel viruses in hunted, traded, or farmed wildlife species could be used to enhance biosecurity in markets and farming systems, reducing public health risk, increasing food security, and assisting in conservation of hunted species. The presence of hosts harboring high-risk novel viruses in proximity to human populations may allow targeted follow-up to examine evidence of spillover and design intervention strategies (supplementary text). Ultimately, the benefits of the GVP may include enhancing our understanding of viral biology, such as drivers of competition or cooperation among viruses within hosts, genomic underpinnings of host-virus coevolution, processes underlying deep evolution of viral clades, and the identification of novel viral groups (15).

The regions targeted by the GVP are largely highly biodiverse, rapidly developing countries in the tropics, which often have low capacity to deal with public health crises (1). The expanded laboratory capacity, field sampling, and data generation intrinsic to the GVP goals will therefore improve capacity to detect, diagnose, and discover viruses in vulnerable populations within regions most critical to preventing future pandemics. This enhanced capacity may also help improve diagnosis and control for endemic diseases, as well as the portion of the virome that remains undiscovered.

The Human Genome Project in the 1990s catalyzed technological innovation that dramatically shortened the time and cost for its completion, and ushered in the era of personalized genomics and precision medicine. The GVP will likely accelerate development of pathogen discovery technology, diagnostic tests, and science-based mitigation strategies, which may also provide unexpected benefits. Like the Human Genome Project, the GVP will provide a wealth of publicly accessible data, potentially leading to discoveries that are hard to anticipate, perhaps viruses that cause cancers and chronic physiological, mental health, or behavioral disorders. It will provide orders-of-magnitude more information about future threats to global health and biosecurity, improve our ability to identify vulnerable populations, and enable us to more precisely target mitigation and control measures to foster an era of global pandemic prevention. ■

## GVP targeting strategy

The project will capitalize on economies of scale in viral testing, systematically sampling mammals and birds to identify currently unknown, potentially zoonotic viruses that they carry




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### SUPPLEMENTARY MATERIALS

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Science

# The Global Virome Project

Dennis Carroll, Peter Daszak, Nathan D. Wolfe, George F. Gao, Carlos M. Morel, Subhash Morzaria, Ariel Pablos-Méndez, Oyewale Tomori and Jonna A. K. Mazet

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**Global Virome Project**
**Steering Committee Meeting**
June 11th, 2018, 9:00 am – 1:00 pm

Room 101, National Academies Keck Center, 500 5th Street NW, Washington, DC, 20001
US/Canada: REDACTED
International: (888) 330-1716
Participant Pin: REDACTED

**Agenda**

| Time | Agenda Item | Presenters/Facilitators |
|---|---|---|
| 8:30 – 9:00 | Arrival & Registration | All Participants |
| 9:00 – 9:15 | Introduction<br>• Welcoming Remarks<br>• Introductions<br>• Rules of Order | TBD |
| 9:15 – 10:00 | Go Forward Vision | TBD |
| 10:00 – 10:45 | Towards a Governance Ecosystem | TBD |
| 10:45 – 11:15 | Establishing a Legal "Home" | TBD |
| 11:15 – 11:45 | Incubation Period Budget | TBD |
| 11:45 – 12:15 | Global Outreach: Year One | TBD |
| 12:15 - 12:45 | Selection Committee | TBD |
| 12:45 – 1:00 | Closing Remarks<br>• Summary of Decisions<br>• Next Steps | TBD |
| 1:00 - 2:00 | Lunch | All Participants |
| 2:00 - onwards | Outing to Outbreak Exhibit Smithsonian Museum of Natural History | All Participants |

# Building a global atlas of zoonotic viruses

Dennis Carroll,[a] Brooke Watson,[b] REDACTED Peter Daszak,[c] Jonna AK Mazet,[d] Cara J Chrisman,[e] Edward M Rubin,[f] Nathan Wolfe,[g] Carlos M Morel,[h] George F Gao,[i] Gian Luca Burci,[j] Keiji Fukuda,[k] Prasert Auewarakul & Oyewale Tomori[l]

At the Prince Mahidol Awards Conference on 30 January 2018 in Bangkok, Thailand, policy- and decision-makers, experts, researchers, donors and private sector representatives from across the globe came together to introduce and explore the dynamics of the Global Virome Project. The project is an innovative 10-year proposed partnership to develop a global atlas of most of the planet's naturally occurring potentially zoonotic viruses. The project aims to transform the study of emerging diseases by building an unprecedented database of viruses in their ecological contexts. This foundation of information on viral sequences, geographic ranges and host distributions will be used to drive the development of prevention efforts against future threats. This international alliance will connect the next generation of scientists, build capacity at hotspots of viral emergence and promote equitable access to data and strategies to prevent epidemics.

Despite the human and economic impact of viral epidemics, the world is not well enough prepared for the next emerging viral outbreak. Global trends indicate that new microbial threats will continue to emerge at an accelerating rate, driven by our growing population, expanded travel and trade networks, and human encroachment into wildlife habitat.[1] Most emerging viruses are zoonotic, that is, transferred between vertebrates and humans.[2] Nearly all zoonoses originate in mammalian or avian hosts;[3,4] for example, type 1 human immunodeficiency virus (HIV-1) originated in chimpanzees and Ebola virus in bats.[5] Estimations show that there are more than 1.6 million mammalian and waterfowl viruses, spanning 25 viral families known to cause human infections.[6] Compared to just over 260 viruses known in humans,[7] the unknown viruses represent 99.9% of potential zoonoses. These viruses usually remain undetected until they cause disease in humans.

Discovering and characterizing viruses in wildlife reservoirs is economically and technologically challenging. However, recent initiatives, including the PREDICT project of the United States Agency for International Development's Emerging Pandemic Threats programme, have shown that systematic viral discovery, even in countries with limited laboratory infrastructure, is feasible.[8,9] Previous studies have identified mammalian species,[10] geographic regions[11] and zoonotic viral transmission pathways[12,13] with increased risk of zoonotic disease emergence. These data enable targeting of viral discovery in wildlife to expand our knowledge of likely zoonotic agents with a high potential for spillover to people. The PREDICT project has already discovered over 1000 viruses, including novel Severe Acute Respiratory Syndrome (SARS)-like coronaviruses that can infect human cells.[14]

The Global Virome Project seeks to significantly expand the scale of targeted viral discovery over a decade-long sampling and laboratory testing period.[1] An international consortium of leading disease ecologists, public health practitioners, veterinarians, epidemiologists, biologists and laboratory scientists designed the project.[1] The project's working groups of ecologists, epidemiological modellers and field biologists will select sampling sites and species that harbour the greatest number of unknown zoonoses,[1] and researchers will systematically collect and characterize viruses and their associated metadata in these areas. Protocols for the project's implementation, including training, sampling, specimen handling, laboratory testing, reporting and data management are being developed by the PREDICT project, which has been operating for eight years in over 35 countries.[8,9] The Global Virome Project will operate as a federation of national and regional projects led by in-country researchers, who are in turn connected to a global hub that provides standardized protocols and monitors progress.

The Global Virome Project seeks to identify the majority of unknown viral diversity, catalogue the ecological conditions at sampling sites, and collect metadata that can be used to analyse the risk of viral spillover into humans. These data will be housed in an open-access database available to the global health community. Such a data set can be used to develop, train and test machine learning algorithms to identify patterns among viruses, classify traits that are more common in zoonoses than in other viruses, and predict which viruses have an increased risk of emerging in humans.

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To ensure equitable sharing of benefits from this project, a working group for ethical, legal and social implications has been an integral part of the Global Virome Project since its inception. All research conducted as a part of the Global Virome Project will hold to ethical standards that ensure sharing, including authorship and intellectual property. Central to the ethos of the Global Virome Project is the commitment to building scientific and response capacity in the areas that need it most.

## Building capacity

Novel viruses usually emerge in regions where dense human populations and biodiversity intersect.[11] However, these areas often have limited laboratory, surveillance and health system infrastructure, which delays detecting emerging pathogens and preventing their potential to become pandemic.[12] Thus, to be effective, pandemic prevention should take place at the source of viral spillover events, before they spread regionally.[13] The Global Virome Project seeks to make data on novel potential zoonotic viruses available to public health agencies that face undiagnosed illness in humans and animals. The project has the potential to benefit human and animal health through broad measures, such as: (i) using polymerase chain reaction assays for an expanded diversity of potentially zoonotic viral families to shorten the time between outbreak detection and pathogen identification; (ii) strengthening global epidemic preparedness through investment and training in epidemiological surveillance, field biology, laboratory techniques and biosafety; (iii) identifying high-risk pathogens in wildlife populations that have high contact with people (for example hunted species and peridomestic species); (iv) establishing sample biobanks, making data and samples available for public health risk assessments and mitigation as well as more detailed pathogen studies; and (v) identifying intervention strategies for human behaviours that increase the risk of novel viral spillover.

## Enhancing our understanding

The Global Virome Project will catalyse new approaches to identify the viruses that represent the greatest threat to human or animal health. The project will use artificial intelligence across the largest viral data set ever assembled, similar to machine learning techniques that are used in genomics to identify gene function, expression and disease biomarkers.[11] The project will use a risk assessment framework that includes data on viral phylogeny, host traits and ecological conditions where the virus exists, as well as a series of viral characteristics known to be associated with spillover, to triage viruses for further characterization.[3] The scale of the project's viral testing will also enable piloting and enhancing novel testing platforms technologies, such as virome capture and sequencing.[14]

The project is ambitious but feasible, enabled by technological developments that allow for rapid and affordable genetic and viral sequencing. The project is time-bound and limited in scope and has tangible progress metrics. In the past, the Human Genome Project, another ambitious science project, sequenced and mapped the human genome, starting with a focus on the genes with the greatest relevance to people. The ultimate success of the Human Genome Project is in the medical advances made after the project's conclusion. Similarly, the Global Virome Project aims to focus testing on the minimum number of mammalian and waterfowl samples that have the greatest potential of harbouring viruses with zoonotic potential. The exclusion of invertebrates, plants, fish and other hosts from the project's core focus is a deliberate intent to address zoonotic disease. The legacy of the Global Virome Project will probably consist of the countermeasures, diagnostics, vaccines, policies and systems that it enables. Thus, this project has the potential to achieve for pandemics and large-scale epidemics what the Human Genome Project is just beginning to do for personalized medicine.[15]

## Novel countermeasures

The development of countermeasures to viral threats requires significant time and investment, and it is unlikely that these would be developed during the initial Global Virome Project phases. The recently launched Coalition for Epidemic Preparedness Innovations represents a critical step to address known viral threats, such as the Middle East respiratory syndrome coronavirus, Lassa fever and Nipah virus, for which vaccine or countermeasure development is challenging.[16] The Global Virome Project aims to complement the coalitions' innovations by characterizing the size, structure and composition of the pool of unknown viruses related to the viral targets on which the coalition is focused. For example, if a candidate vaccine against Middle East respiratory syndrome could be tested against hundreds of near relatives of that same syndrome, vaccines that have broader prevention capacity could be selected and rolled out to provide better protection against future emergence of this syndrome. This approach could enhance biotechnological efforts to move from single-virus countermeasures to ones that target a whole family of viruses.[17]

## Project investment

In a single outbreak in one year, the Severe Acute Respiratory Syndrome virus wiped between 10 and 50 billion United States dollars (US$) of value from Asian stock markets due to disrupted trade and commerce.[18,19] Influenza pandemics are estimated to cause an average of US$ 570 billion in economic damages per year to the global economy,[20] and these costs will rise as our economies expand and become more interconnected. The Global Virome Project will cost US$ 1.2 billion, which is less than 0.2% of this estimated loss[3] and less than the estimated US$ 2.2 billion loss in gross domestic product due to forgone economic growth in Guinea, Liberia, Sierra Leone in 2015 alone during the 2013–2016 Ebola virus disease outbreak.[21] Much like the Global Fund, Gavi, the Vaccine Alliance and other international public health initiatives, the Global Virome Project will likely rely on a broad mix of funding streams from governments, development agencies, research agencies, private foundations and industries. Considering the increasing inevitability of pandemics and their substantial economic impact, the next generation of scientists and field workers trained through this project will have the capacity to monitor viral evolution throughout the coming years. Furthermore, the project's open database will catalyse technological advances in risk assessment, diagnostics and countermeasures. ■

**Competing interests:** None declared.



UCDUSR0002452

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UCDUSR0002453

**From:** Andrew Clements <aclements@usaid.gov>
**Sent:** Mon, 4 Jun 2018 04:12:41 -0400
**Subject:** Re: Meeting with USAID
**To:** "Valitutto, Marc" <ValituttoM@si.edu>
**Cc:** "predictmgt@usaid.gov" <predictmgt@usaid.gov>, "Murray, Suzan" <MurrayS@si.edu>, "Zimmerman, Dawn" <ZimmermanD@si.edu>, "Shields, Lindsey" <ShieldsL@si.edu>, Ohnmar Aung <[redacted]>, Jonna Mazet <jkmazet@ucdavis.edu>

Thanks, Marc. Glad it went well.
Andrew

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

On Jun 1, 2018, at 11:25 PM, Valitutto, Marc <ValituttoM@si.edu> wrote:

> Hi All,
>
> Dr. Ohnmar Aung and I visited the USAID Global Health Security office today to represent Myanmar/ Smithsonian and to discuss our P2 status and progress in the country. Karen Cavanaugh, the Burma Mission Public Health Director organized and encouraged the meeting through Ohnmar, both of whom happen to be visiting DC this week.
>
> We spent the better part of an hour with Cara Chrisman and Amalhin Shak on introductions, communication updates, and generally expressing the success we have had with integrating P2 and its project mission within the GOM's One Health Strategy and within the universities and communities. Overall, Cara and Amalhin were very welcoming and offered support on behalf of their team.
>
> On our departure, we briefly met with Dennis Carroll who shared his appreciation for Ohnmar and the work she's doing in Myanmar. Overall, I nice face to face introduction and a chance to share our encouraging progress in the country.
>
> Let me know if you have any questions,
> Marc
>
> ---
>
> **Marc T. Valitutto, VMD**
>
> Global Health Program | **Wildlife Veterinary Medical Officer**
>
> Smithsonian Conservation Biology Institute
> National Zoological Park | 3001 Connecticut Avenue NW | Washington DC 20008
> T US: +01 202 633 4892 | T Myanmar: [redacted] | F [redacted] | valitutto@si.edu

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To post to this group, send email to predictmgt@usaid.gov.
To view this discussion on the web visit https://groups.google.com/a/usaid.gov/d/msgid/predictmgt/CE3CFBF0-B419-444C-BF11-84B49DA541D7%40si.edu.

**From:** Andrew Clements <aclements@usaid.gov>
**Sent:** Mon, 11 Jun 2018 08:55:12 -0700
**Subject:** Fwd: Policy recommendations from Clade X, our pandemic exercise
**To:** "Subhash Morzaria (FAORAP)" <[redacted], [redacted] Jonna Mazet <jkmazet@ucdavis.edu>, djwolking@ucdavis.edu, William Karesh <Karesh@ecohealthalliance.org>, daszak@ecohealthalliance.org, brennanr@who.int, "Michael J. Ryan" <ryanm@who.int>

FYI

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
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*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

Begin forwarded message:

**From:** Ricardo Echalar <rechalar@usaid.gov>
**Date:** June 11, 2018 at 3:06:25 PM GMT+2
**To:** ETD Mail List <ghsdanitmaillistusaid@usaid.gov>, echappell@usaid.gov
**Subject: Fwd: Policy recommendations from Clade X, our pandemic exercise**

Sent from my iPhone

Begin forwarded message:

**From:** Johns Hopkins Center for Health Security <jhchsevents@jhu.edu>
**Date:** June 11, 2018 at 9:00:14 AM EDT
**To:** rechalar@usaid.gov
**Subject: Policy recommendations from Clade X, our pandemic exercise**
**Reply-To:** jhchsevents@jhu.edu

[redacted]

Dear Colleagues,

As you know, the Johns Hopkins Center for Health Security hosted the Clade X pandemic tabletop exercise on May 15, 2018 in Washington, DC. The exercise surfaced policy dilemmas and preparedness gaps in the face of a plausible catastrophic pandemic caused by a novel engineered pathogen. Clade X demonstrated the potential grave outcomes that could result from a fast-moving, severe pandemic if we lack the ability to quickly produce and distribute effective

medical countermeasures and fail to significantly strengthen our preparedness, both in the United States and around the world.

Our staff at the Center for Health Security emerged inspired and energized, eager to build momentum for important policy research and advocacy work on pandemic preparedness. I invite you to explore and share our Center's initial policy recommendations we presented at the conclusion of the exercise and other Clade X materials now online, along with YouTube videos of the exercise segments and media coverage in The Washington Post, The New Yorker, NPR's Science Friday, MIT Technology Review, and Al Jazeera digital (AJ+)

We look forward to continuing our work with you and others committed to making the world more prepared to prevent, detect early, and respond rapidly to pandemics.

Thank you and take care.

Sincerely,

Tom Inglesby, MD
*Director*

Anita Cicero, JD
*Deputy Director*

Eric Toner, MD
*Senior Scholar and Project Lead for Clade X*

Johns Hopkins Center for Health Security | 621 E. Pratt Street, Suite 210, Baltimore, MD 21202

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**From:** [redacted]
**To:** Jonna Mazet <jkmazet@ucdavis.edu>
**Subject:** RE: Time Sensitive -Response to recent Commentary in Nature on the GVP
**Sent:** Fri, 15 Jun 2018 16:48:45 +0000
Response to Holmes et al v4_OT_ET.docx

Hi Jonna,

Here are my minor edits.

[redacted]

**From:** Pablos-Mendez, Ariel [mailto:ap39@cumc.columbia.edu]
**Sent:** Wednesday, June 13, 2018 4:03 AM
**To:** Oyewale Tomori <[redacted]>
**Cc:** Peter Daszak <daszak@ecohealthalliance.org>; George F Gao (gaof@im.ac.cn) <gaof@im.ac.cn>; Carlos Morel <[redacted]>; Subhash (FAORAP) Morzaria <[redacted]>; Subhash P Morzaria <[redacted]>; Ariel Pablos-Mendez <[redacted]>; Nathan Wolfe <nwolfe@metabiota.com>; Jonna Mazet <jkmazet@ucdavis.edu>; Eddy Rubin <erubin@metabiota.com>; Dennis Carroll (DCarroll@usaid.gov) <DCarroll@usaid.gov>; Brooke Watson <watson@ecohealthalliance.org>; Cara Chrisman <cchrisman@usaid.gov>; [redacted]; Hongying Li <li@ecohealthalliance.org>
**Subject:** Re: Time Sensitive -Response to recent Commentary in Nature on the GVP

Thanks and good job again Peter. Consider modifying the sentence in the third paragraph to: "While GVP's data may assist models to predict emergence, its goal is specifically to discover new viruses in families that threaten public and livestock health,". Cheers, Ariel

Secondly, the authors cite the GVP as part of a misinformed goal of predicting viral emergence. However, the goal of the GVP is not to predict emergence, but specifically to discover new viruses in families that threaten public and livestock health, from key wildlife zoonotic reservoir species.

Sent from my iPad
On Jun 13, 2018, at 5:02 AM, Oyewale Tomori <[redacted]> wrote:

> Thanks Peter
> appropriate response. Great graphics on budgets, Please see attached with comments for your consideration. I agree to co-author the response
>
> Regards
>
> Oyewale
>
> *Oyewale TOMORI*
> Tel: [redacted]
>
> On Mon, Jun 11, 2018 at 4:54 PM, Peter Daszak <daszak@ecohealthalliance.org> wrote:
> Dear Co-authors,
>
> Some of you have already seen a critique of predictive approaches to pandemic prevention that cites our GVP paper and was published in *Nature* last week:
>
> https://www.nature.com/articles/d41586-018-05373-w
>
> I feel that it is important to respond, given the high profile nature of the journal, and the inaccuracies of assumptions and analysis this article contains. Brooke, Dennis and I have therefore drafted a response that we'd like you to look at. There are three key issues we highlight:

1. That the surveillance vs. prevention argument is a false dichotomy

2. Inaccurate comparison of GVP vs. other budgets (and please look at the PDF file that re-creates the Figure from the *Nature* Comment).

3. Direct value of GVP data for mitigating outbreaks

Please read the response, make very brief edits, and let us know if you will join as an author. I'm hoping to respond rapidly, **so if you can get any comments back by Friday 15th June (This Friday), that would be much appreciated!!**

We will then circulate further to the SC of the GVP to see if others will also sign on to this.

Cheers,

Peter

**Peter Daszak**
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---

**From:** Peter Daszak
**Sent:** Thursday, March 22, 2018 12:37 PM
**To:** 'George F Gao (gaof@im.ac.cn)'; 'Carlos Morel'; 'Subhash (FAORAP) Morzaria [REDACTED]'; 'Subhash P Morzaria [REDACTED]'; 'Ariel Pablos-Mendez'; 'Oyewale Tomori'; 'ap19@cumc.columbia.edu'; 'Dennis Carroll (DCarroll@usaid.gov)'; 'Nathan Wolfe'
**Cc:** 'Jonna Mazet'; Brooke Watson; 'Cara Chrisman'; [REDACTED]; Hongying Li
**Subject:** Time Sensitive - another letter to Science about the GVP - Needs your response
**Importance:** High

Dear Co-authors,

We've now received a 'letter' about our Science paper (see attachment 'aat5918_Other_seq1_vq.doc'). As you'll see, this is from the same authors as the 'Technical Comment' that we already responded to. I checked with *Science*, and they have asked us to respond, so I drafted a response (attached) which Jonna has helped with. I now need all of you to read the response, then either agree to be an author of that response and send me any edits or comments, or decline to be listed as an author.

Note that we are allowed 600 words maximum and 10 references. We're currently at ~560 words, so please don't add a lot of text!

Also, like the Technical Comment, *Science* editors often will choose not to publish the correspondence, but in this case, if they do it will appear in the journal in print. I've therefore argued back strongly against the points raised by these authors, and made sure to focus the response back onto the GVP (and away from PREDICT), so we get value if

it is published.

Please can I ask all of you to respond by email ASAP, and certainly by **5pm Monday March 26th** .

At that point, I'll insert edits, confirm authorship and send this back to *Science* for them to decide on the merits of the discussion, ahead of the deadline.

Cheers,

Peter

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<Response to Holmes et al v4_OT.docx>

Like Drs. Holmes, Rambaut, and Anderson[1], we lament the human tragedy resulting in lost lives from the recent Ebola virus disease outbreak in the Democratic Republic of the Congo, and agree that more should be done to prevent and respond to emerging infectious diseases. Outbreaks like this are precisely the reason we believe new approaches, including the Global Virome Project (GVP)[2], are necessary and complementary to current surveillance efforts. Indeed, the GVP's stated aim is to achieve its ambitious goals "by enhancing (not replacing) current pandemic surveillance, prevention, and control strategies"[3].

Holmes *et al* build their argument on inaccurate and misleading analysis of program budget and aims. Firstly, their figure compares the annual budget for one government agency in one country (NIAID, USA) to a 10-year budget for a global program (the GVP). Leaving aside whether NIAID is the appropriate and only agency dealing with pandemic prevention and viral discovery in the USA, correcting their calculation to include a 10-year timeframe pro-rated (via country's GDP) to the global scope of the GVP, demonstrates that Holmes *et al.* inflated GVP's relative cost by a factor of 40. Additionally, the GVP is a finite 10-yr project, whereas the annual budget of NIAID, and the global cost of fighting outbreaks, will likely continue *ad infinitum* unless we invest in new prevention strategies such as the GVP. The authors comment that "making promises about disease prevention and control that cannot be kept will only further undermine trust". We respectfully respond that distrust is born when misleading figures based on inaccurate data are published.

Secondly, the authors cite the GVP as part of a misinformed goal of predicting viral emergence. However, the goal of the GVP is not to predict emergence, but specifically to discover new viruses in families that threaten human and animal health, from key wildlife zoonotic reservoir species. The vastly expanded viral sequence data will be tied to metadata on the ecology of wildlife hosts sampled, as well as the environmental and socio-economic data at the site of sampling. In other words, it will create exactly the type of data required to test the theories of spillover that Holmes *et al.* rightly point out are currently hampered by a paucity of data. For example, having sequence data for relatives of known pathogens could rapidly allow development of serological and PCR assays to examine their potential for spillover into humans, including through syndromic surveillance.

Finally, the authors dismiss the potential of viral discovery programs such as the GVP for outbreak mitigation. In our paper[2], we list a series of public health benefits of the GVP, not least of which is the building of laboratory and field surveillance capacity in biodiverse EID hotspot countries. Identification of novel viruses can enhance the speed and breadth of diagnostic capacity for at-risk human and livestock populations. For example, the viral pathogen responsible for an outbreak of severe diarrheal disease in pigs in southern China that led to over 20,000 deaths was identified as a bat-origin coronavirus due to prospective wildlife sampling and viral discovery[3]. Expanding the diversity of known viruses may also enhance countermeasure and vaccine development. For example, sequencing protein encoding regions from novel SARS-, Ebola-, or Nipah-like viruses, could be used to enhance the coverage of vaccines under development that target these proteins based on the few known isolates.

Surveillance is a critical component of pandemic prevention, and we enthusiastically support Holmes *et al.* in advocating for increased surveillance in at-risk areas. However, pitting surveillance against basic research on virology is disingenuous. We strongly believe that improving our response to viral threats today need not come at the cost of neglecting the viral threats of tomorrow.

Proposed Authorship:

Peter Daszak*, Dennis Carroll, Brooke Watson, Eddy Nathan D. Wolfe, George F. Gao, Carlos M. Morel, Subhash Morzaria, Ariel Pablos-Méndez, Oyewale Tomori, REDACTED, Cara Chrisman, Jonna A. K. Mazet

Additional authors (and their countries) we could reach out to sign on:
Keiji Fukuda, Hong Kong
David Nabarro, UK
...Other GVP SC members...

References


1 Holmes, E. C., Rambault, A. & Andersen, K. G. Pandemics: spend on surveillance, not prediction. *Nature* **558**, 180-182 (2018).
2 Carroll, D. *et al.* The Global Virome Project. *Science* **359**, 872-874 (2018).
3 Zhou, P. *et al.* Fatal swine acute diarrhoea syndrome caused by an HKU2-related coronavirus of bat origin. *Nature* **556**, 255-258, doi:10.1038/s41586-018-0010-9 (2018).

**Sent:** Wed, 20 Jun 2018 19:27:21 -0700
**Subject:** Fwd: Nipah Bangladesh slides
**From:** Jonna Mazet <jkmazet@ucdavis.edu>
**To:** Kristin Burns <kburns@ucdavis.edu>
**Cc:** Eunah Regina Cho <eecho@ucdavis.edu>
IDHC-Nipah-V4.pptx

Here's one for our Bangladesh country coordinator in the Saturday session,
Jonna

---------- Forwarded message ----------
From: **Jon Epstein** <epstein@ecohealthalliance.org>
Date: Wed, Jun 20, 2018 at 5:03 PM
Subject: Nipah Bangladesh slides
To: Jonna Mazet <jkmazet@ucdavis.edu>
Cc: Ariful Islam <arif@ecohealthalliance.org>

Hi Jonna,
Attached are the slides for Arif's presentation. 12 slides not counting title and acknowledgments and we could cut one of the background slides to shorten it further.

Let us know what you think.

Cheers,
Jon

P.S. I noticed the conf. online program has Arif's affiliation as icddrb instead of EHA. Do you happen to know who to contact to correct it?

--

**Jonathan H. Epstein DVM, MPH, PhD**

*Vice President for Science and Outreach*

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# Nipah in Bangladesh: when epidemics become endemic

Ariful Islam and Jonathan H. Epstein
EcoHealth Alliance

International One Health Congress, 2018

UCDUSR0002463

Nipah Virus Encephalitis

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- Emerging zoonotic paramyxovirus (Henipavirus)
- Reservoir: fruit bats (Pteropus spp)
- Mode of transmission
  - Eating or drinking fruits contaminated with bat secretions
  - Human-to-human transmission
- One of the 10 most urgent epidemic threats (WHO)



Pteropus fruit bat



UCDUSR0002464

Emergence of Nipah from Southeast to South Asia

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- [illegible]
- [illegible]
- [illegible]

Nipah virus outbreaks, Bangladesh

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*P. medius* ecology in Bangladesh

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- Relatively abundant
- Prefer to move in highly fragmented / humanized landscape
- Close association with people
- Shared focus research with bats, livestock and people



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UCDUSR0002469

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UCDUSR0002470

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- [illegible]
- [illegible]
- [illegible]
- [illegible]





UCDUSR0002471

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- Assisting Government of Bangladesh in Nipah outbreak investigations
  - Bat sampling
  - Testing samples at [illegible]
- Participation in One Health Secretariat meetings
- Detection of [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]



SFS

## Nipah outbreak in Kerala, India May 2018

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- May 2018
- [redacted]
- [redacted]
- [redacted]



[redacted]

## Conclusion

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- [redacted]
- [redacted]
- [redacted]
- [redacted]



UCDUSR0002474

## Acknowledgement

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SFS

**From:** Jon Epstein <epstein@ecohealthalliance.org>
**Sent:** Wed, 20 Jun 2018 20:49:08 -0600
**Subject:** Re: Nipah Bangladesh slides
**To:** Jonna Mazet <jkmazet@ucdavis.edu>

Hey, no worries. I'll talk to Arif and ask him to address endemnicity. We'll also shorten.
-Jon

Jonathan Epstein DVM, MPH, PhD

Vice President for Science and Outreach

EcoHealth Alliance
New York

(e) epstein@ecohealthalliance.org
(o) 212.380.4467
(m) REDACTED
@epstcinjon

On Wed, Jun 20, 2018, 8:26 PM Jonna Mazet <jkmazet@ucdavis.edu> wrote:

> Hi Jon,
> Slides look great. Probably hard to get through all of that in 10 mins. Not sure of what will be said, but slide 6 may be able to be cut? Also was really hoping for Arif to mention something about moving from epidemic phase to endemic scenario. He may be planning to do that without a slide on that, though.
> A couple of super minor things if you want them:
>
> - Slide 3: capitalize second bullet to match others. There's something weird on the bottom.
> - Bullets weird on slide 4.
> - Slide 10: capitalize testing
>
> You could try David DePooter <d.depooter@onehealthplatform.com> for the affiliation switch. They had originally listed him as EHA, USA. I asked them to switch the country to Bangladesh, as it is important that the session show the international participation. I noticed that not only did they change it to Bangladesh, but they changed the affiliation to icddrb. I thought Arif must have told them to do that. Not sure why they did it -- must have pulled it from his other abstract or something. If you ask for a change, please make sure they keep Bangladesh on there.

Thanks very much for the look & prep,
Jonna

On Wed, Jun 20, 2018 at 5:03 PM, Jon Epstein <epstein@ecohealthalliance.org> wrote:

> Hi Jonna,
> Attached are the slides for Arif's presentation. 12 slides not counting title and acknowledgments and we could cut one of the background slides to shorten it further.

Let us know what you think.

Cheers,
Jon

P.S. I noticed the conf. online program has Arif's affiliation as icddrb instead of EHA. Do you happen to know who to contact to correct it?

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1.917.385.5315 (mobile)

web: ecohealthalliance.org

Twitter: @epidemjon

*EcoHealth Alliance leads cutting-edge scientific research into the critical connections between human and wildlife health and delicate ecosystems. With this science, we develop solutions that prevent pandemics and promote conservation.*

**From:** Jon Epstein <epstein@ecohealthalliance.org>
**Sent:** Thu, 21 Jun 2018 07:18:04 -0600
**Subject:** Re: Nipah Bangladesh slides
**To:** Ariful Islam <arif@ecohealthalliance.org>
**Cc:** Jonna Mazet <jkmazet@ucdavis.edu>
IDHC-Nipah-V5.pptx

Here's the latest version of the slides.
-Jon

On Thu, Jun 21, 2018 at 7:17 AM, Jon Epstein <epstein@ecohealthalliance.org> wrote:

> It's up to Jonna,
> If Prof Flora is willing she could certainly speak to how the government handles Nipah virus.

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Sorry, it's really frustrating !

Prof. Nitish and I did not receive the visa

Prof. Flora, Director IEDCR is going to attend the congress. if it is ok, I could ask her to present the Nipah slides .

With best,
Arif

On Thu, Jun 21, 2018 at 6:54 PM, Jon Epstein <epstein@ecohealthalliance.org> wrote:

> Arif,
> That's really disappointing and frustrating, I'm sorry.

Unfortunately, I'm not going to be at the Congress.

Jonna, it's your call as to whether you'd still like to include this piece.
I could ask Mindy to give the presentation.

-Jon

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> Since, I will not be at conference due to visa problem. Ithink, you can present the Nipah presentation in the congress.

Sorry for inconvenience !

Arif

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Let us know what you think.

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Twitter: @epstein[illegible]

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THE 5TH INTERNATIONAL

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# Nipah in Bangladesh: when epidemics become endemic

Ariful Islam and Jonathan H. Epstein
EcoHealth Alliance

International One Health Congress, 2018

UCDUSR0002481

Nipah Virus Encephalitis

THE 5TH INTERNATIONAL one health CONGRESS

- Emerging zoonotic paramyxovirus (Henipavirus)
- Reservoir: fruit bats (Pteropus spp)
- Mode of transmission
  - Eating or drinking fruits contaminated with bat secretions
  - Human-to-human transmission
- One of the 10 most urgent epidemic threats (WHO)



Pteropus fruit bat



UCDUSR0002482

Emergence of Nipah from Southeast to South Asia

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- [illegible]
- [illegible]
- [illegible]

Nipah virus outbreaks, Bangladesh

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*P. medius* ecology in Bangladesh

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- Relatively abundant
- Prefer to move in highly fragmented / humanized landscape
- Close association with people
- Shared focus resources (earth balls, livestock and people)



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UCDUSR0002486

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- One Health Secretariat
- Ripple is considered endemic and built projects for seasonal outbreaks
- Integration of human & animal surveillance
- Active hospital surveillance
- Integration outbreak response in PREDICT
- Anthropological study
- Simple interventions





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- [illegible]
- [illegible]
- [illegible]
- [illegible]





UCDUSR0002488

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- Assisting Government of Bangladesh in Nipah outbreak investigations
  - Bat sampling
  - Testing samples at subtitrial
- Participation in One Health Secretariat meetings
- Detection of US arrivals in P. medius test: need Nipah like strains?



SFS

Nipah outbreak in Kerala, India May 2018

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one health CONGRESS

- May 2018
- [redacted]
- [redacted]
- [redacted]



## Conclusion

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- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]



SFS

## Acknowledgement

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one health CONGRESS


[redacted]




SFS

UCDUSR0002492

**From:** Jon Epstein <epstein@ecohealthalliance.org>
**Sent:** Fri, 22 Jun 2018 21:45:13 -0600
**Subject:** Re: Nipah Bangladesh slides
**To:** Jonna Mazet <jkmazet@ucdavis.edu>
**Cc:** Ariful Islam <arif@ecohealthalliance.org>

Ugh. Sorry.

Let me tell you, you're not missing much, even if it is (somehow) #18 on the NY Times list of places to go in 2018...

52 Places to Go in 2018
https://nyti.ms/2Eu3PWK

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@epsteinjon

On Fri, Jun 22, 2018, 11:32 PM Jonna Mazet <jkmazet@ucdavis.edu> wrote:

> Thanks -- I think the session will be fine with those who are there. My flight had weather troubles, missed my connection & now I won't be there either.
> Note to selves: no meetings in Saskatoon.
> Take care,
> Jonna

On Thu, Jun 21, 2018 at 6:18 AM, Jon Epstein <epstein@ecohealthalliance.org> wrote:

> Here's the latest version of the slides
> -Jon

On Thu, Jun 21, 2018 at 7:17 AM, Jon Epstein <epstein@ecohealthalliance.org> wrote:

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-

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**Sent:** Fri, 22 Jun 2018 21:43:45 -0700
**Subject:** Fwd: Nipah Bangladesh slides
**From:** Jonna Mazet <jkmazet@ucdavis.edu>
**To:** Tracey Goldstein <tgoldstein@ucdavis.edu>
IDHC-Nipah-V5.pptx

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THE 5TH INTERNATIONAL

one health CONGRESS

# Nipah in Bangladesh: where epidemics become endemic

Ariful Islam and Jonathan H. Epstein
EcoHealth Alliance

International One Health Congress, 2018

UCDUSR0002501

Nipah Virus Encephalitis

THE 5TH INTERNATIONAL One health CONGRESS

- Emerging zoonotic paramyxovirus (Henipavirus)
- Reservoir: fruit bats (Pteropus spp)
- Mode of transmission
  - Eating or drinking fruits contaminated with bat secretions
  - Human-to-human transmission
- One of the 10 most urgent epidemic threats (WHO)



Pteropus fruit bat



UCDUSR0002502

Emergence of Nipah from Southeast to South Asia

THE 5TH INTERNATIONAL

one health CONGRESS

- [illegible]
- [illegible]
- [illegible]

Nipah virus outbreaks, Bangladesh

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*P. medius* ecology in Bangladesh

THE 5TH INTERNATIONAL
One health CONGRESS

- Relatively abundant
- Prefer to reside in highly fragmented / humanized landscape
- Close association with people
- Blurred focus reserves (earth balls, livestock and people)



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UCDUSR00025O6

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UCDUSR0002507

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UCDUSR0002508

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One health CONGRESS

- Assisting Government of Bangladesh in Nipah outbreak investigations
  - Bat sampling
  - Testing samples at subtitrial
- Participation in One Health Secretariat meetings
- Detection of US arrivals in P. medius test: need Nipah like strains?



SFS

Nipah outbreak in Kerala, India May 2018

THE 9TH INTERNATIONAL

one health CONGRESS

- May 2018
- [redacted]
- [redacted]
- [redacted]



[redacted]

Conclusion

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one health CONGRESS

- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]



SFS

UCDUSR0002511

## Acknowledgement

THE 5TH INTERNATIONAL

one health CONGRESS

[redacted]



UCDUSR0002512

**From:** Dennis Carroll <dcarroll@usaid.gov>
**Sent:** Tue, 3 Jul 2018 05:05:38 -0700
**Subject:** Re: [gvp] Form Submission - New Form - Joining the GVP
**To:** [redacted]
**Cc:** Jonna Mazet <jkmazet@ucdavis.edu>, Peter Daszak <daszak@ecohealthalliance.org>, Cara Chrisman <cchrisman@usaid.gov>, Eddy Rubin <erubin@metabiota.com>, Nathan Wolfe <nwolfe@metabiota.com>

Per my previous email- we need to develop a standard approach to responding when we find the query of interest
d

Sent from my iPhone

On Jul 3, 2018, at 11:17 AM, [redacted] > wrote:

> An inquiry from a viral discovery group in Hungary. I took a glance at their papers and they seems legitimate. Would anybody be available to reach out?
> [redacted]

---

**From:** 31021015240n behalf of
**Sent:** Friday, June 29, 2018 14:51
**To:** gvp@ucdavis.edu
**Subject:** [gvp] Form Submission - New Form - Joining the GVP

**Name:** Krisztian Banyai

**Email Address:** [redacted]

**Subject:** Joining the GVP

**Message:** To whom it may concern,

I am the leader of a research team 'Momentum Pathogen Discovery Group' at the Institue of Veterinary Medical Research, Hungarian Academy of Sciences, Budapest, Hungary. The group was established in 2011 with the primary aim to identify novel viruses in domestic animals (livestock and pets) and wild animals. Since then we have published over 160 scientific papers (https://www.ncbi.nlm.nih.gov/pubmed/?term=%22banyai+k%22) many of which describing new virus discovery/diversity and viral emergence.

I would be grateful if you could share any information concerning the opportunities to join the Global Virome Project. Please do not hesitate to ask any questions that may be needed for your consideration.

Sincerely,
Krisztián Bányai

(Sent via *Global Virome Project*)

**From:** Andrew Clements <aclements@usaid.gov>
**Sent:** Thu, 12 Jul 2018 12:10:28 +0200
**Subject:** Re: feedback from EOC meeting
**To:** Dorothy Peprah <dpeprah@usaid.gov>
**Cc:** Brian Bird <bhbird@ucdavis.edu>, Bangura James J [REDACTED], Jonna Mazet <jkmazet@ucdavis.edu>, Tracey Goldstein <tgoldstein@ucdavis.edu>, Kendra Chittenden <kchittenden@usaid.gov>

One minor suggestion. Modify the last sentence to read:
"All partners are working with Government of Sierra Leone to improve animal **and human infectious** disease surveillance systems for prevention, detection and response to zoonotic diseases and supporting the institutionalizing One Health coordination mechanisms."

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

On Jul 12, 2018, at 11:48 AM, Dorothy Peprah <dpeprah@usaid.gov> wrote:

> Hi James,
>
> Please replace the USAID part of the findings to say:
>
> USAID is the lead U.S. Government agency providing foreign development and humanitarian assistance. PREDICT is one of six projects currently supported by USAID in Sierra Leone as part of the Global Health Security Agenda (GHSA). The GHSA is a global partnership to help build countries' capacity to help create a world safe and secure from infectious disease threats, including zoonotic diseases. GHSA coordinates and integrates efforts and initiatives across multiple sectors, providing a framework that allows countries to accelerate progress towards meeting international standards, including the International Health Regulations (IHR) and Performance of Veterinary Services (PVS) Pathway capacities in an efficient and effective manner. Other USAID GHSA partners in Sierra Leone include World Health Organization (WHO), UN's Food and Agricultural Organization (FAO), International Federation of the Red Cross (IFRC), JHUCCP's Breakthrough ACTION and DAI's Preparedness and Response project. All partners are working with Government of Sierra Leone to improve animal disease surveillance systems for prevention, detection and response to zoonotic diseases and supporting the institutionalizing One Health coordination mechanisms.
>
> Dorothy

On Thu, Jul 12, 2018 at 9:33 AM, Andrew Clements <aclements@usaid.gov> wrote:

> Hi Brian and James,
> Does it make sense to also state that there is no evidence to date of any known natural livestock infections with the new virus?

Andrew

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

On Jul 12, 2018, at 11:28 AM, Dorothy Peprah <dpeprah@usaid.gov> wrote:

> Brian,

Thanks for the quick turnaround on this. I assume James will finalize and forward to GoSL.

Dorothy

On Thu, Jul 12, 2018 at 4:59 AM, Brian Bird <bhbird@ucdavis.edu> wrote:

Hi everyone,

I discussed these earlier today with Tracey and James. Please find attached our revisions on these for further use by GoSL.

We left the USAID blurb as it was so that you could easily drop in whatever y'all think is best.

All changes are tracked.

Have a good evening/morning.

-Brian

Brian H. Bird DVM, MSPH, PhD

Global Lead Sierra Leone and

Multi-Country Ebola operations

PREDICT-USAID

One Health Institute

1089 Veterinary Medicine Dr.

School of Veterinary Medicine

University of California, Davis

Email: bhbird@ucdavis.edu

Skype: brianhbird1

http://www.vetmed.ucdavis.edu/ohi/predict/index.cfm

Dorothy Peprah, Ph.D, MPH
Global Health Security Agenda Advisor
USAID Guinea & Sierra Leone

REDACTED

Dorothy Peprah, Ph.D, MPH
Global Health Security Agenda Advisor
USAID Guinea & Sierra Leone

REDACTED

**From:** Andrew Clements <aclements@usaid.gov>
**Sent:** Wed, 8 Aug 2018 08:03:40 -0700
**Subject:** Re: DRC Outbreak Strain
**To:** Karen Saylors <ksaylors@metabiota.com>
**Cc:** Jonna Mazet <jkmazet@ucdavis.edu>, David Wolking <djwolking@ucdavis.edu>

Thanks, Karen.
I don't see the Beni virus (that you mentioned was different than the Mangina virus) on this tree. I'd be interested in more information on that when it becomes available.

Andrew

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
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*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

On Aug 8, 2018, at 4:40 PM, Karen Saylors <ksaylors@metabiota.com> wrote:

> My pleasure Andrew.
> For your visibility, I'm attaching the official INRB Statement on sequencing for both Ebola outbreaks, Equateur and North Kivu, which I just received. It includes a nice phylogenetic tree that shows where both Ebola Zaire strains sit.
>
> Thanks,
> Karen

On Wed, Aug 8, 2018 at 7:05 AM, Andrew Clements <aclements@usaid.gov> wrote:

> Thanks, Karen

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

On Aug 7, 2018, at 11:40 PM, Karen Saylors <ksaylors@metabiota.com> wrote:

> Hi Andrew.
> Per your request for follow up on today's INRB sequencing results:
>
> INRB has sequenced and obtained 2 complete genomes of the strain Ebola Zaire – Mangina. According to phylogenetic analyses, this Ebola Zaire strain is different from that of Equateur (Zaire Bikoro). So this is a new outbreak...
>
> Please note that the Beni strain is also different from the Ebola Mangina strain, which is closely related to the one from Likati, which characterized the 2017 DRCoutbreak.
>
> thanks,
> Karen

<INRB Statement final.pdf>

**From:** Andrew Clements <aclements@usaid.gov>
**Sent:** Fri, 17 Aug 2018 01:46:58 -0700
**Subject:** Re: PREDICT International Travel Requests
**To:** Katherine Leasure <kaleasure@ucdavis.edu>
**Cc:** PREDICTMGT <predictmgt@usaid.gov>, Predict inbox <predict@ucdavis.edu>, Jonna Mazet <jkmazet@ucdavis.edu>

Austria travel approved.
All other travel approved subject to mission concurrence.

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

On Aug 17, 2018, at 2:25 AM, Katherine Leasure <kalcasure@ucdavis.edu> wrote:

*Please find below international travel requests for your review and approval. Please let me know if you have any questions. Thanks!*

1. Li (China): $1950 airfare/$377 (Beijing), $262 (Kunming), $407 (Guangzhou) max daily per diems
2. Feferholtz (Indonesia): $1350 airfare/$362 (Jakarta) max daily per diem
3. Lane (Ethiopia): $3000 airfare/$400 (Addis Ababa) max daily per diem
4. Mazet (Mongolia): $4,200 airfare **business class required* [REDACTED] $285 (Ulaanbaatar) max daily per diem
5. Goldstein (Austria): $1250 airfare/$360 (Vienna) max daily per diem
6. Duong (Indonesia): $850 airfare/$393 (Bali) max daily per diem
7. Hui (Indonesia): $850 airfare/$393 (Bali) max daily per diem

Travel Requests –

1. EcoHealth Alliance would like to request travel approval for Hongying Li to travel from Newark, New Jersey, USA to Beijing, Kunming, Guangzhou, and Guangdong, China from September 4-20, 2018 to attend scientific meetings and PREDICT field work.

**Trip purpose**: On September 6-7, Li will attend the Scientific Workshop on Viral Respiratory Disease co-hosted by the National Institutes of Health and Chinese Academy of Medical Sciences (PREDICT in-country partner) in Beijing; from September 8-16, Li will join the PREDICT field data collection in Yunnan (human surveillance) and Guangdong (bat surveillance) provinces with local team; from September 17-19, Li will attend the World Conference on Science Literacy hosted by China Association for Science and Technology on the parallel session hosted by China CDC on "Science Literacy, Sustainable Development of Global Public Health" to share success stories from PREDICT.

2. EcoHealth Alliance would like to request travel approval for Dr. Yasha Feferholtz to travel from New York, NY, USA to Jakarta, Indonesia from September 6-22, 2018 to meet with INDOHUN partner and working in data analysis and economic modeling of DEAL project.

**Trip purpose**: Dr. Feferholtz will meet with INDOHUN coordinator and principal investigator Dr. Wiku Adisasmito, co-investigator Dr. Lilis Heri Mis Cicih, project specialist Miss. Nurul Maretia Rahmayanti, and M&E and data specialist Miss Nisa Vidya Yuniarti to develop data analysis and economic modeling for DEAL project.

3. UC Davis would like to request approval for Jennifer Lane to travel from Davis, CA, USA to Addis Ababa, Ethiopia from September 8-21, 2018 to support the PREDICT Ethiopia team with concurrent human and wildlife surveillance and training activities. **Dr. Lane will travel to Georgia for other projects from September 9-13, supported by other funding. The days she will be in Ethiopia for PREDICT activities will be September 13-21.*

**Trip Purpose:** Dr. Lane, PREDICT East Africa Field Veterinarian, will provide programmatic support to the PREDICT Ethiopia team and country coordinators during her trip. She will work with partners Addis Ababa University (AAU) and the Ethiopian Public Health Institute (EPHI) in their combined concurrent surveillance activities. Dr. Lane will be visiting the field sites to participate in the final rounds of concurrent human and wildlife surveillance, as well as working with laboratory teams to facilitate sample organization in anticipation of sample export for confirmatory testing.

4. UC Davis would like to request travel approval for Dr. Jonna Mazet to travel from San Francisco, CA, USA to Ulaanbaatar, Mongolia from September 17-22, 2018, for meetings with in-country PREDICT team members and other EPT partners. **Dr. Mazet will travel to Denmark for a speaking engagement September 22-25 (supported by other funding), before returning to California.*

**Trip purpose:** In Mongolia, Dr. Mazet will conduct meetings with implementing partners of PREDICT-2 Mongolia and government officials, to be determined. She will also attend a field sampling trip with the field team and country coordinator, Dr. Enkhtuvshin Shiilegdamba. Dr. Mazet will also use this opportunity to meet with the PREDICT-2 Mongolia team and collaborate on an implementation strategy for community data dissemination and outreach.

5. UC Davis would like to request travel approval for Dr. Tracey Goldstein to travel from New York, NY, USA to Vienna, Austria from Nov 8- Nov 12, 2018 to present at the International Meeting on Emerging Diseases and Surveillance (IMED) meeting. From Vienna, Austria she will return to Davis, CA, USA.

**Trip purpose**: Dr. Goldstein will give a talk on the Bombali virus if the late breaker abstract is accepted for a presentation at IMED.

6. UC Davis would like to request approval for Veasna Duong to travel from Phnom Penh, Cambodia to Bali, Indonesia from October 27 to November 5, 2018 to present in the PREDICT session at the Wildlife Disease Association Australasian Section's meeting.

**Trip Purpose:** Dr. Veasna Duong will travel to Indonesia to present on the PREDICT project's work and findings in Cambodia during a PREDICT session being held as part of the Wildlife Disease Association Australasian Section's meeting in Bali.

7. UC Davis would like to request approval for Vibol Hul to travel from Phnom Penh, Cambodia to Bali, Indonesia from October 27 to November 5, 2018 to join the PREDICT session at the Wildlife Disease Association Australasian Section's meeting.

**Trip Purpose:** Mr. Vibol Hul will travel to Indonesia to participate, on behalf of PREDICT Cambodia, in the PREDICT session being held as part of the Wildlife Disease Association Australasian Section's meeting in Bali.


Katherine Leasure
One Health Institute
University of California, Davis
530-752-7526
530-752-3318 FAX
kaleasure@ucdavis.edu


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| | |
|---|---|
| **From:** | Andrew Clements <aclements@usaid.gov> |
| **To:** | Katherine Leasure <kaleasure@ucdavis.edu>;ualavadi@usaid.gov <ualavadi@usaid.gov> |
| **CC:** | PREDICTMGT <predictmgt@usaid.gov>;Predict inbox <predict@ucdavis.edu>;jkmazet@ucdavis.edu <jkmazet@ucdavis.edu>;Daniel Schar (RDMA/OPH) <dSchar@usaid.gov> |
| **Sent:** | 9/10/2018 7:02:52 PM |
| **Subject:** | Re: Time Sensitive: PREDICT International Travel Request (J. Epstein) |

Approved subject to mission concurrence.

Umesh: please see request below for concurrence.

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

On Sep 10, 2018, at 3:12 AM, Katherine Leasure <kaleasure@ucdavis.edu> wrote:

Hi Andrew. Please find below an international travel request for Jon Epstein to India. I'm very sorry for the late submission. This was my error; the request from EHA got lost in a backlog of emails. Please let me know if you have any questions. Thank you!

1. Epstein (India): $1700 airfare/$288 (Kerala) max daily per diem

Travel Request –

1. EcoHealth Alliance would like to request travel approval for Jon Epstein to travel from New York City, NY, USA to Kerala, India from September 23-26, 2018 for a meeting with FAO, state health officials, in-country partners and Country Coordinator of PREDICT-India.

**Trip purpose**: As Regional Lead of PREDICT- India, Dr. Jon Epstein will visit Kerala to attend a meeting to discuss PREDICT project activities. FAO, state health officials, in-country partners and the PREDICT- India Country Coordinator plan to discuss PREDICT's role in the prevention of disease emergence in India, including outbreak preparedness.

**Katherine Leasure**
One Health Institute
University of California, Davis
530-752-7526
530-752-3318 FAX
kaleasure@ucdavis.edu

--
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To post to this group, send email to predictmgt@usaid.gov.
To view this discussion on the web visit https://groups.google.com/a/usaid.gov/d/msgid/predictmgt/01e901d448a3%245ecaa300%24165fe900%24%40ucdavis.edu.

**From:** Umesh Alavadi <ualavadi@usaid.gov>
**To:** Clements, Andrew (GH/HIDN) <aclements@usaid.gov>
**CC:** Katherine Leasure <kaleasure@ucdavis.edu>;predictmgt@usaid.gov <predictmgt@usaid.gov>;predict@ucdavis.edu <predict@ucdavis.edu>;jkmazet@ucdavis.edu <jkmazet@ucdavis.edu>;Daniel Schar <dSchar@usaid.gov>;Brian Holler <bholler@usaid.gov>;Reuben Swamickan <rswamickan@usaid.gov>
**Sent:** 9/11/2018 8:06:23 AM
**Subject:** Re: Time Sensitive: PREDICT International Travel Request (J. Epstein)

Hi,
Mission concurs with the request.
We would like to meet Jon Epstein while he is in Delhi India, kindly share his plan or we can coordinate with him directly also.
Thanks
Umesh

On Tue, Sep 11, 2018 at 12:32 AM Andrew Clements <aclements@usaid.gov> wrote:
Approved subject to mission concurrence.

Umesh: please see request below for concurrence.

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

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**Katherine Leasure**

One Health Institute

University of California, Davis

530-752-7526

530-752-3318 FAX

kaleasure@ucdavis.edu

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To view this discussion on the web visit https://groups.google.com/a/usaid.gov/d/msgid/predictmgt/01e901d448a3%245ecaa300%24165fe900%24%40ucdavis.edu.

**From:** Elizabeth Leasure <ealeasure@UCDAVIS.EDU>
**To:** Andrew Clements <aclements@usaid.gov>
**Cc:** Jonna Mazet <jkmazet@ucdavis.edu>, Predict inbox <predict@ucdavis.edu>, David John Wolking <djwolking@ucdavis.edu>, Hannah R Chale <hrchale@UCDAVIS.EDU>, Christine Kreuder Johnson <ckjohnson@UCDAVIS.EDU>, PREDICTMGT <predictmgt@usaid.gov>
**Subject:** RE: New subaward request: USAMRIID (POP start 10/1/18)
**Sent:** Wed, 19 Sep 2018 16:33:47 +0000

Thanks, Andrew!

*Elizabeth Leasure*
*Financial Operations Manager*
*One Health Institute*
REDACTED *(cell)*
*530-754-9034 (office)*
*Skype: ealeasure*

**From:** Andrew Clements <aclements@usaid.gov>
**Sent:** Tuesday, September 18, 2018 12:33 PM
**To:** Elizabeth Leasure <ealeasure@UCDAVIS.EDU>
**Cc:** Jonna Mazet <jkmazet@ucdavis.edu>; Predict inbox <predict@ucdavis.edu>; David John Wolking <djwolking@ucdavis.edu>; Hannah R Chale <hrchale@UCDAVIS.EDU>; Christine Kreuder Johnson <ckjohnson@UCDAVIS.EDU>; PREDICTMGT <predictmgt@usaid.gov>
**Subject:** Re: New subaward request: USAMRIID (POP start 10/1/18)

Hi Liz,

AOR approved.

Andrew

Andrew Clements, Ph.D.
Senior Scientific Advisor
Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health
U.S. Agency for International Development
Mobile phone: 1-571-345-6353
E-mail: aclements@usaid.gov

*For more information on USAID's Emerging Pandemic Threats program, see:* http://www.usaid.gov/ept2

On Fri, Sep 14, 2018 at 9:56 PM Elizabeth Leasure <ealeasure@ucdavis.edu> wrote:

Hi Andrew. Please find attached a request for approval to establish a new subaward with the U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID) for serology, which includes a requested start date of 10/1/18. USAMRIID is a USG entity, and as such, only AOR approval is required (per previous guidance from AO Ryland Marbray). Please note that this subaward may be revised at a later date to increase the ceiling to accommodate the inclusion of serological testing for non-PREDICT samples (costs to be paid from non-PREDICT funds). The exact number of samples to be added (and fund source) is currently TBD. If/when the decision is made to amend the subaward to include additional samples/funds, we will be sure to consult with you and make sure you are aware of any desired changes.

If you have any questions or need anything else to approve, please let me know.

Thanks,
Liz

*Elizabeth Leasure*
*Financial Operations Manager*
*One Health Institute*
REDACTED *(cell)*
*530-754-9034 (office)*
*Skype: ealeasure*

**Sent:** Tue, 27 Nov 2018 12:09:43 -0500
**Subject:** Re: ATCC PowerPoint 26NOV18
**From:** Jonna Mazet <jkmazet@ucdavis.edu>
**To:** "Vines, Randy" <rvines@atcc.org>
**Cc:** Cara Chrisman <cchrisman@usaid.gov>, Dennis Carroll <dcarroll@usaid.gov>, Eddy Rubin <erubin@metabiota.com>, "Leonelli, Joseph" <jleonelli@atcc.org>, Michael Glass <michael@mantasolution.com>, "Mullins, Ted" <tmullins@atcc.org>, Sam Halabi <sfh9@georgetown.edu>

Thank you very much, Randy. We appreciate the time & enthusiasm of the whole ATCC team.
The meeting was very informative for me and presented exciting possibilities.
Looking forward to exploring more,
Jonna

Jonna AK Mazet, DVM, MPVM, PhD

Professor of Epidemiology & Disease Ecology
Executive Director, One Health Institute
Global Director, PREDICT Project of USAID Emerging Pandemic Threats Program

School of Veterinary Medicine
University of California
1089 Veterinary Medicine Drive
Davis, CA 95616, USA
+1-530-752-3630
onehealthinstitute.net

For scheduling and logistical issues, please contact:
Ms. Brooke Genovese
bgenovese@ucdavis.edu
+1-530-752-3630

On Tue, Nov 27, 2018 at 11:58 AM Vines, Randy <rvines@atcc.org> wrote:

Hi All,

Thank you again for taking the time to come to ATCC to continue our discussions. The slides we presented are attached.

Conversations amongst our group following the meeting reflected high interest and enthusiasm in GVP and its potential to re-frame viral disease research and preparedness.

We look forward to exploring ways in which we could apply our experience and capabilities in biological materials management to support this work.

Sincerely,

Randy



**Randy Vines, Ph.D.**
Account Manager

Federal Business Development

ATCC Federal Solutions

10801 University Boulevard
Manassas, VA 20110-2209
Tel: (703) 365-2700 ext. 2407

Cell: REDACTED
Fax: (703) 365-2701
Email: rvines@atcc.org

**From:** Cara Chrisman <cchrisman@usaid.gov>
**Sent:** Tue, 27 Nov 2018 15:10:18 -0500
**Subject:** GVP - Thursday Call Canceled + ATCC PowerPoint
**To:** [redacted], Nathan Wolfe <nwolfe@metabiota.com>, Peter Daszak <daszak@ecohealthalliance.org>, Dennis Carroll <dcarroll@usaid.gov>, Eddy Rubin <erubin@metabiota.com>, Jonna Mazet <jkmazet@ucdavis.edu>, maher@ecohealthalliance.org, Andrew Clements <aclements@usaid.gov>
ATCC GVP Meeting Presentation 26NOV18.pdf

Hi Team,
Given the P-2 semiannual meeting on Thursday, we will be canceling the GVP call and reconvening the week after. If you have any agenda items to discuss before then, please circulate by email.

Also, for those who were unable to attend, please find attached the presentation that ATCC shared with us during the visit to their Manassas site. It was a great opportunity to learn more about their work and the possibility for either future collaboration or learning from their work. We can discuss more next week.

Hope everyone had a wonderful Thanksgiving!

Best,
Cara

Cara J. Chrisman, PhD
Senior Infectious Diseases Technical Advisor
U.S. Agency for International Development (USAID) Contractor
Bureau for Global Health, Office of Infectious Disease, Emerging Threats Division
2100 Crystal Drive, CP3-8091A, Arlington, VA 22202
Desk: (571) 551-7413
Cell: [redacted]
E-mail: cchrisman@usaid.gov

*GHSI-III - Social Solutions International, Inc. prime contractor*

---------- Forwarded message ---------
From: **Vines, Randy** <rvines@atcc.org>
Date: Tue, Nov 27, 2018 at 12:01 PM
Subject: ATCC PowerPoint 26NOV18
To: Dennis Carroll <dcarroll@usaid.gov>, Cara Chrisman <cchrisman@usaid.gov>, Jonna Mazet <jkmazet@ucdavis.edu>, Eddy Rubin <erubin@metabiota.com>, Sam Halabi <sfh9@georgetown.edu>
Cc: Leonelli, Joseph <jleonelli@atcc.org>, Mullins, Ted <tmullins@atcc.org>, Michael Glass <michael@mantasolution.com>

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Sincerely,

Randy



**Randy Vines, Ph.D.**
Account Manager

Federal Business Development

ATCC Federal Solutions

10801 University Boulevard
Manassas, VA 20110-2209
Tel: (703) 365-2700 ext. 2407

Cell: [redacted]
Fax: (703) 365-2701
Email: rvines@atcc.org

ATCC

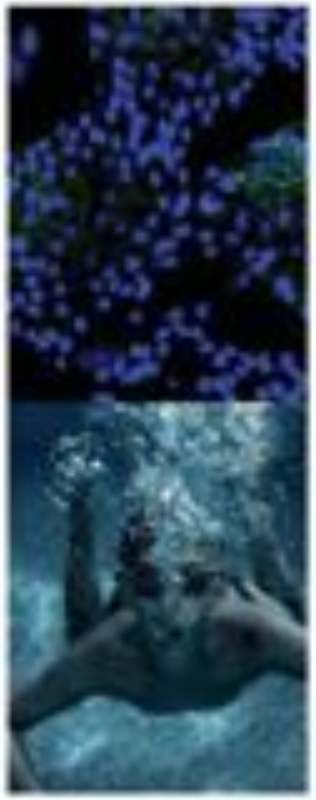
ATCC Overview presented to the

# Global Virome Project

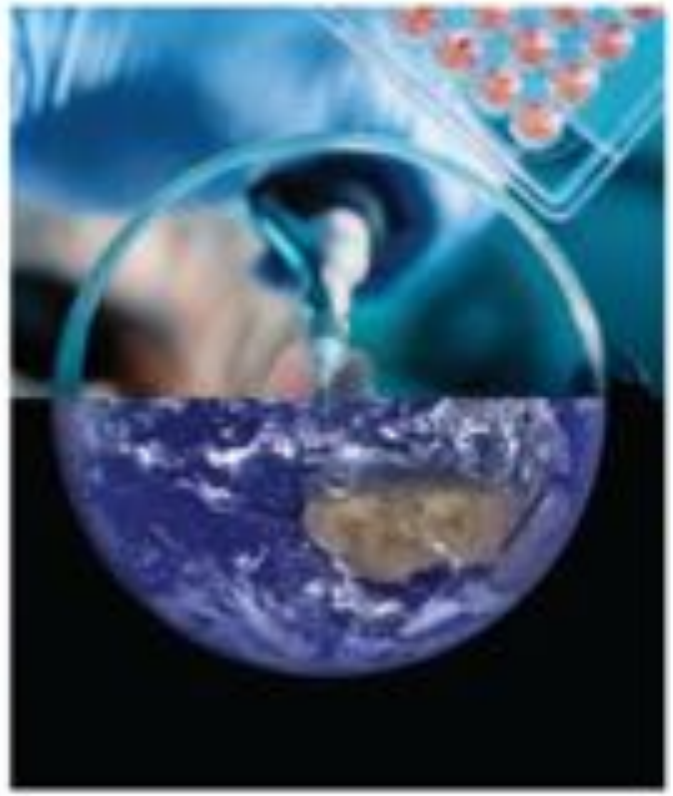
November 26, 2018

**Ted Mullins**, PhD
**Rebecca Bradford**, MBA, MS, PMP
**Nancy Jewell**, PhD, PMP

Credible Leads to Incredible™










# AGENDA

- About ATCC, Facilities & Certifications
- Government Focus Areas
- Program Highlights
- Capabilities and Promoting Sustainability



UCDUSR0002531

# About ATCC

*Established partner to global researchers and scientists*

- ATCC, a non-profit organization founded in 1925, is the world's premiere biological materials resource and standards development organization
- ATCC supports and collaborates with the scientific community by providing industry-standard biological products and innovative solutions
- ATCC has an exemplary team of 450+ employees; over one-third with advanced degrees

**COMMERCIAL CUSTOMERS**

- Domestic (70%)
- International (30%)

**FEDERAL CLIENTS**

- Support to federal government for >50 years
- Including NIAID, CDC, NCI, FDA, DoD, DHS

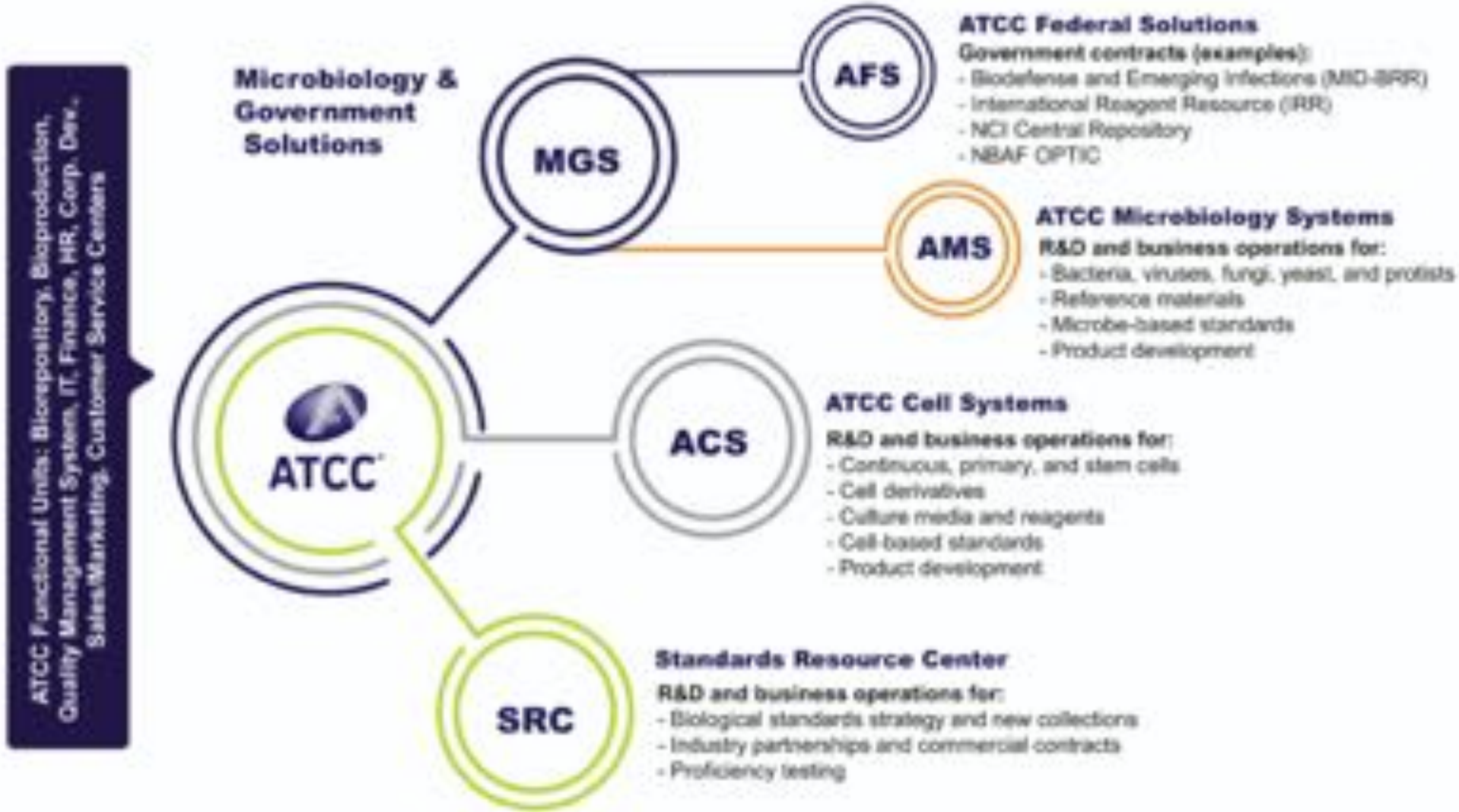




ATCC

UCDUSR0002532

# Organizational Structure






ATCC

UCDUSR0002533

# ATCC Facilities

- **Manassas, Va.: 165,835 ft²**
  - 24/7 on-site security
  - 24/7 back-up electrical power

  **57,700 ft² laboratory space**
  - 49,000 ft² of BSL-1&2
  - 8,700 ft² of BSL-3
  - Custom product assembly suites

  **26,000 ft² repository**
  - 200 freezers for the storage of biomaterials, including +4°C, -20°C, -80°C, $LN_2$

  **82,135 ft² infrastructure**
  - Customer/tech service, shipping, finance, contracts, marketing, administration, office space

- **Gaithersburg, Md.: 30,820 ft²**
  - 24,180 ft² laboratory and office space 6,640 ft² repository

- **Expertise and equipment:** microbiology, virology, cell biology, molecular biology, infectious diseases, PCR (e.g., standard PCR, ddPCR, RT-PCR, qPCR), Next Generation Sequencing, bioinformatics, automated DNA extraction, MALDI-TOF mass spec





ATCC
UCDUSR0002534

# Certifications and Accreditations

**ISO 9001:2015 Certification for quality management system**

Demonstrates commitment to quality products, customer service, and continued improvement

**ISO 13485:2003 Certification for the design, development, production, testing, and distribution of medical devices**

Applies to synthetic molecular standards, the HIV surveillance kit, and other diagnostic and research kits

**ISO Guide 34:2009 Accreditation for production**

Applies to Certified Reference Materials (CRMs)

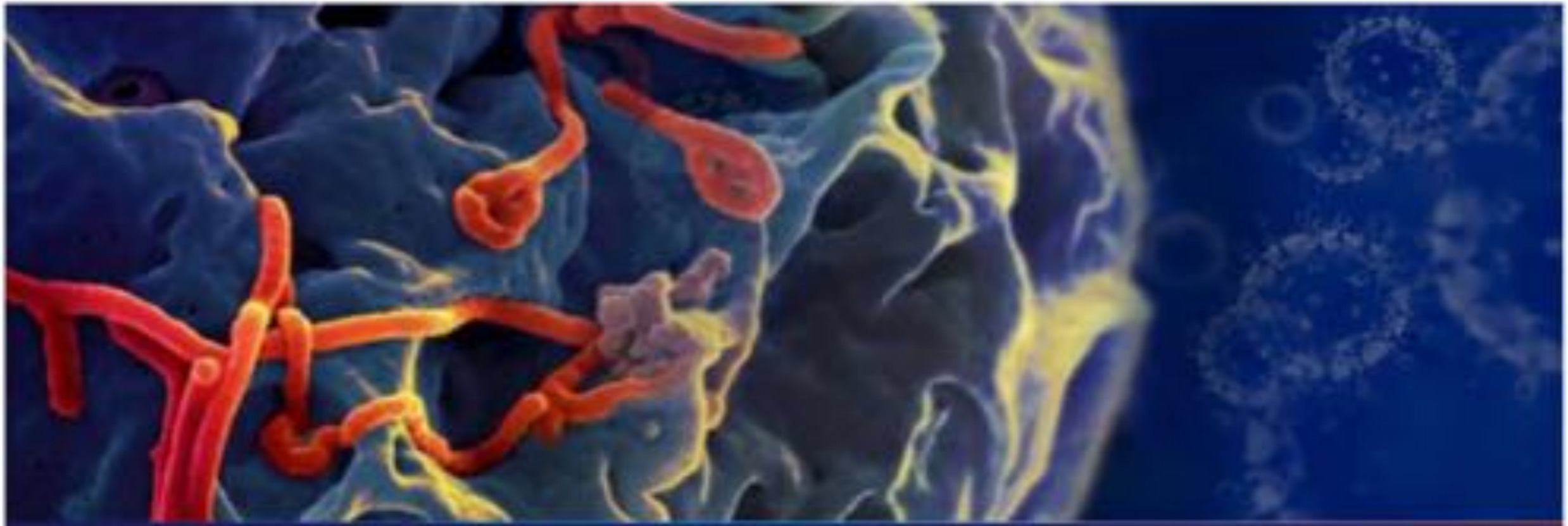
**ISO/IEC 17025:2005 Accreditation for testing**

Applies to all ATCC cultures, derivatives, and bioproducts tested in our laboratories





UCDoSR0002535



# ATCC Federal Solutions (AFS)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# **AFS** Focus Areas



## GLOBAL HEALTH

- Emerging Infectious Diseases
- Pandemic Response
- Medical Countermeasure Development
- Assay Development and Verification
- Reagent Procurement, Preparation, Functional Testing
- Public Health Lab Support



## CLINICAL STUDY SUPPORT

- Collection Kit Development and Distribution
- Worldwide Shipping, Logistics and Permits
- Sample Tracking
- Sample Processing
- Short- and Long-term Storage



## BIODEFENSE

- Biological Select Agents and Toxins (BSAT) Acquisition, Characterization, Manufacture and Distribution
- Agent Inactivation and 3rd Party Confirmation Testing
- Assay Development and Verification
- Reagent Procurement, Preparation, Functional Testing
- Biorepository Operation and Management



ATCC

UCDUSR0002537

# Current Government Collaborators

*ATCC products, technologies and expertise support government efforts to improve health worldwide*

**DEPARTMENT OF HEALTH AND HUMAN SERVICES**

- **National Institutes of Health** (NIH)
  - National Institute of Allergy and Infectious Diseases (NIAID)
  - National Cancer Institute (NCI)
- **Centers for Disease Control and Prevention** (CDC)
  - National Center for Immunization and Respiratory Diseases (NCIRD)
  - National Center for Health Statistics (NCHS)
- **U.S. Food and Drug Administration**
  - Center for Biologics Evaluation and Research (CBER)

**DEPARTMENT OF HOMELAND SECURITY**

- **Science and Technology Directorate / Office of National Laboratories**
  - National Bio and Agro-Defense Facility (NBAF)

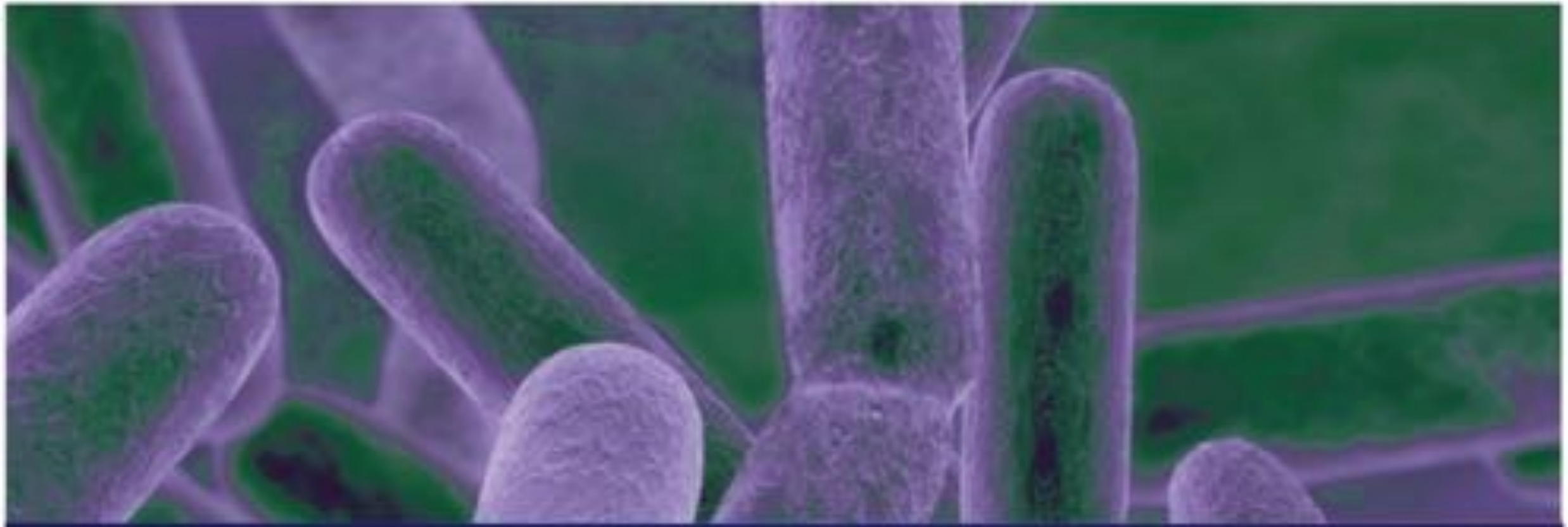
**DEPARTMENT OF DEFENSE**

- **Walter Reed Army Institute of Research** (WRAIR)
- **U.S. Army Medical Research Institute of Infectious Diseases** (USAMRIID)





ATCC
UCDUSR0002538



# Microbiology and Infectious Disease Biological Research Repository (MID-BRR)



ATCC

UCDUSR0002539

# MID-BRR

*Microbiology and Infectious Disease Biological Research Repository*

## Mission

- Provide NIAID with a central repository for the acquisition, authentication, production, preservation, storage, and distribution of a broad range of unique and quality assured research materials for the infectious disease research community that will aid in the development and evaluation of vaccines, therapeutics, and diagnostics.

## Scope

- Reagents, tools and information covering NIAID's Category A, B, and C priority pathogens, emerging infectious disease agents, non-pathogenic microbes and other microbiological materials of relevance to the research community.





ATCC
UCDUSR0002540

# MID-BRR Scope

**Acquire Research Reagents in Support of NIAID's Research Agenda**

- Facilitate deposits from the research community, NIAID/NIH sponsored programs and subcontracted production

**Produce & Preserve Research Reagents Using Best Practices**

- Produce and expand from low passage seed stock maintaining minimal passage number
- Preserve and store in secure facilities with backup storage and power
- Operate under ISO guidelines for Quality Assurance at ATCC

**Authenticate Reagents - Identify, Characterize & QC Materials**

- Include assessment of genotype and phenotype
- Ensure viability, purity and functionality

**Distribute Reagents to Program Registrants**

- Register qualified researchers with BEI Resources for reagent access
- Ensure compliance with federal, state, local, and international regulations
- Promote the resource through a web portal and outreach activities



ATCC
UCDUSR0002541

# Diversity of Reagents

- Viruses
- Bacteria
- Parasitic protists
- Pathogenic fungi
- Parasitic worms
- Rickettsiales
- Arthropod vectors
- Host and vector cell lines
- Toxins
- Anti-microbial Compounds
- Nucleic acids
  - Genomic DNA/RNA
  - Expression vectors
  - Sequenced clones
- Antigens
- Monoclonal antibodies
- Hybridomas
- Convalescent antisera
- Ancillary reagents





ATCC
UCDUSR0002542

# Materials are Acquired from Varied Resources

**Sources of Deposits include:**

- NIAID Initiatives
- The research community
- Existing domestic and international collections
- Field collections
- Clinical isolates
- Contract production of related materials when needed





ATCC
UCDUSR0002543

# Program Emphasis over time

- **2003 Focus:** Establish a bioresource for biodefense and emerging infectious disease agents.
- **2010 Focus:** Integrate and consolidate the functions carried out by numerous NIAID-supported repositories into BEI Resources
- **2016 Focus:** Achieve efficient use of resources and provide the flexibility needed to respond to changing priorities.





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UCDUSR0002544

# BEI Resources Web Portal

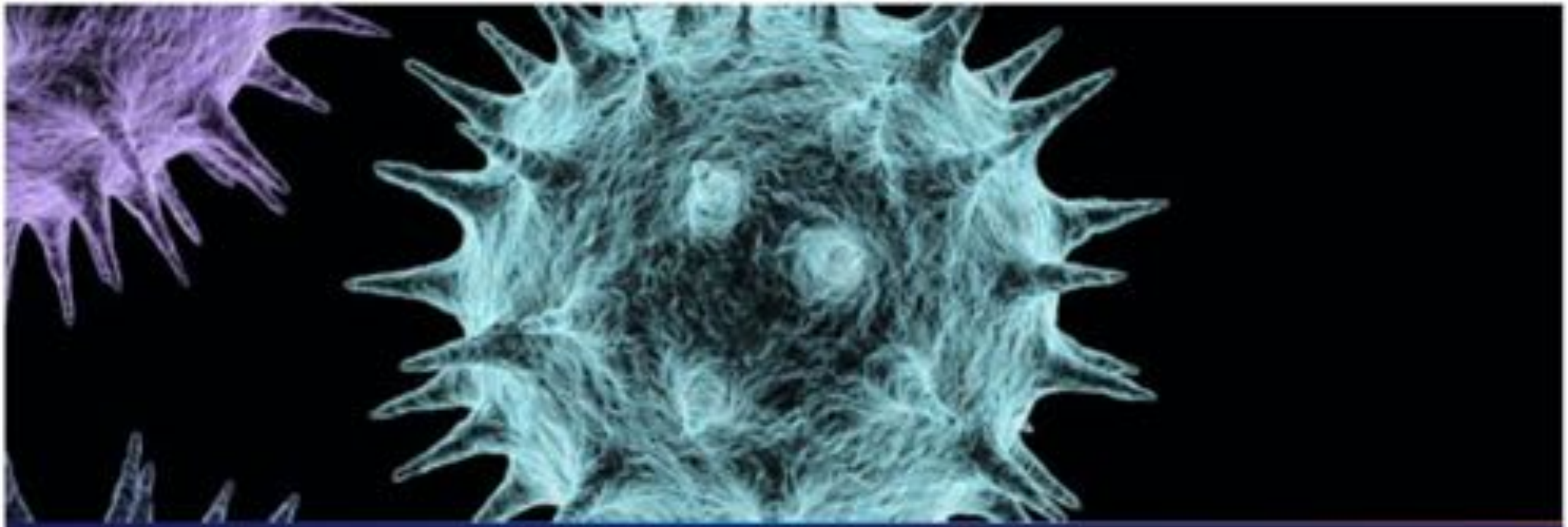



www.beiresources.org

- **Registration**
  - Application
  - Material transfer agreement
  - Profile of institution
  - Biographical sketch of PI
  - Proposed scope of use
  - Laboratory facility description
- **Ordering**
  - Requests must be made online
  - Some materials require govt. permits
  - Materials are available at no cost
- **Depositing**
  - On line Deposit Information Form



ATCC



# International Reagent Resource (IRR)



ATCC

UCDUSR0002548

# IRR

*International Reagent Resource*

## Mission

- To acquire, authenticate, and produce reagents that scientists need to carry out basic research and develop improved diagnostic tests, vaccines, and detection methods. Provide registered users with reagents, tools and information for studying and detection of influenza virus.

## Scope

- Reagents, tools and information for studying and detection of respiratory pathogens. Public health labs use the reagents across the globe for the surveillance of newly emerging strains of influenza. By centralizing these functions within the IRR, access to and use of these materials in the scientific and public health community is monitored and quality control of the reagents is assured.





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# IRR Scope

## Produce & Preserve Research Reagents using Best Practices

- Produce, procure and assemble influenza reagents and other research materials for the characterization of circulating seasonal and novel viruses
- Preserve and store in secure facilities with backup storage and power
- Operate under ISO guidelines for Quality Assurance at ATCC

## Authenticate Reagents - Identify, Characterize & QC Materials

- Include assessment of genotype and phenotype
- Ensure viability, purity and functionality

## Distribute Reagents to Program Registrants

- Register qualified researchers with IRR for reagent access
- Ensure compliance with federal, state, local, and international regulations
- Promote the resource through a web portal and outreach activities

## Minimize the Impact of an Influenza Pandemic

- Ensure the ability to quickly ramp up production and distribution activities to surge levels in the event of a pandemic or public health emergency


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# Diversity of Reagents

- Viruses
- Bacteria
- Host and vector cell lines
- rRT-PCR Kits (IVD, RUO and EUA)
- Annual WHO Influenza Reference Reagent Kit
- Evaluation Panels
- Recombinant proteins

- Nucleic acids
  - Genomic DNA/RNA
  - Expression vectors
  - Sequenced clones
- Antigens
- Monoclonal antibodies
- Hybridomas
- Convalescent antisera
- Ancillary reagents





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# Response to Public Health Emergencies



## H1N1pdm09

- Assembled and distributed an IUO rRT-PCR kits for detection of H1N1pdm09 within 1 week
- Within two weeks IRR distributed 286 kits globally, as well as 300 kits to all 50 states within the USA, the District of Columbia and Puerto Rico
- Shipped out 3,526 rRT-PCR kits to over 150 countries and territories from April 30, 2009 through July 31, 2010
- Provided CDC with weekly reports on orders and shipments of kits to worldwide labs



## H7N9

- Assembled and distributed both RUO and EUA rRT-PCR kits for detection of H7N9 within 1 week
- Within 13 days of the first kit being released, IRR distributed kits to 92 labs in 48 states domestically and 23 labs in 23 countries worldwide.
- Provided CDC with weekly reports on orders and shipments of kits to worldwide labs



## Zika

- Procured reagents specific to the CDC ZIKA response and distributed those reagents worldwide
- IRR shipped 2312 Zika support items in 277 shipments to 105 laboratories in 39 countries during 2017
- Provided CDC with weekly reports on orders and shipments of kits to worldwide labs



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UCDUSR0002550

# IRR Web Portal



www.internationalreagentresource.org

- **Registration**
  - Application
  - User Agreement
  - Acknowledgment of IRR User Agreement
  - Biosafety checklist
- **Ordering**
  - Requests must be made online
  - Some materials require government permits
  - Materials are available at no cost



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# ATCC Capabilities Relevant to the GLOBAL VIROME PROJECT



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# Microorganisms, Assays and Standards

- **MICROORGANISMS**
  - Decades of experience acquiring, producing, characterizing and distributing viruses and bacteria including emerging infectious disease agents, Category A, B, and C priority pathogens (and near neighbors), and non-pathogenic microbes
  - Quality Control analysis by genotypic / phenotypic characterization (e.g., Next Generation Sequencing, MALDI-TOF, antimicrobial resistance determination)
  - Ability to design, produce and distribute custom panels for proficiency testing and R&D efforts
- **TESTING SUPPORT / ASSAY DEVELOPMENT**
  - Reagents and panels for microbiological testing of pathogens, indicator organisms, and normal flora
  - Assay development and verification
- **STANDARDS**
  - American National Standards Institute (ANSI) accredited to develop standards and protocols to serve as critical benchmarks for development, validation, and implementation (e.g., NGS standards)



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# Certified Materials

## Influenza A Virus (H1N1)






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UCDUSR0002554

# Biorepository Expertise

- **BIOREPOSITORY**
  - ATCC's repository is self-sustaining and contains >9 million specimens
  - Founder of the International Society for Biological and Environment Repositories (ISBER)
  - Experts in strain deposit, patent deposit, storage, management, distribution, and licensing
  - Maintain physical and electronic separation of multiple repositories
  - Manage off-site repositories
  - Assurance of long-term storage of valuable assets





ATCC
UCDUSR0002555

# Global Logistics

## Applying cold chain and regulatory expertise to worldwide distribution

- Certified in global distribution services of high-risk biomaterials
- BSL-2,3,4 commerce-controlled agents and select agents
- Distribution to more than 150 countries – direct and through 12 international distributors
- Experience with federal regulations for all countries
- Compliance with U.S. export and import requirements
- Exceptional success rate in high-risk shipments
- Permits and licenses
- Human, animal, and plant pathogens
- Cold chain management




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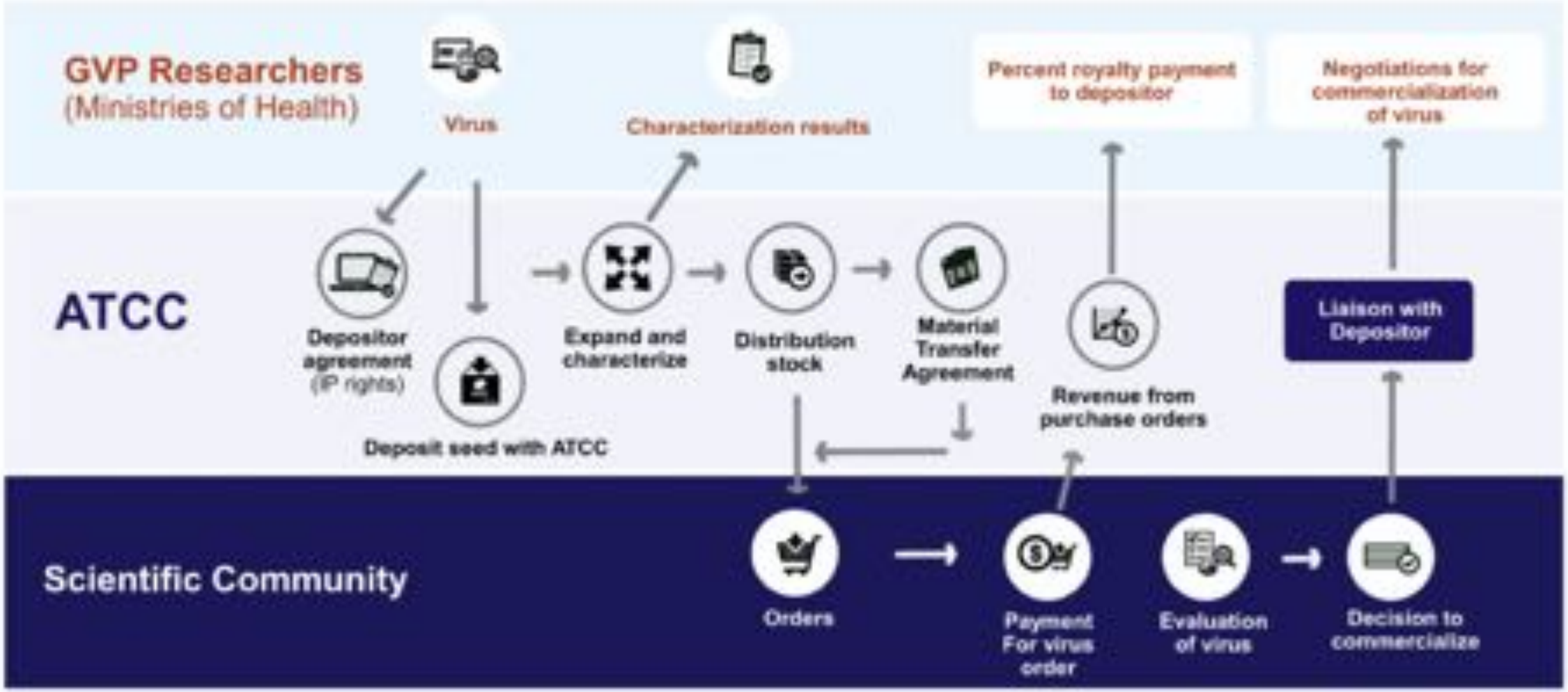
UCDUSR0002556

# Promoting Sustainability for GVP Researchers





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ATCC

UCDUSR0002558

**From:** Anthony, Simon J. <sja2127@cumc.columbia.edu>
**To:** Jon Epstein <epstein@ecohealthalliance.org>;Jonna Mazet <jkmazet@ucdavis.edu>
**CC:** Jim Desmond <desmond@ecohealthalliance.org>
**Sent:** 12/13/2018 5:21:11 PM
**Subject:** Re: Memo

Edits from me.

Cheers!
S.

**From:** Jon Epstein
**Date:** Thursday, December 13, 2018 at 12:21 PM
**To:** Jonna Mazet
**Cc:** Jim Desmond , "Anthony, Simon J."
**Subject:** Memo

Jonna,
Jim and I have each reviewed the memo and it's accurate.

Cheers,
Jon

--
**Jonathan H. Epstein DVM, MPH, PhD**
*Vice President for Science and Outreach*
EcoHealth Alliance
460 West 34th Street, Ste. 1701
New York, NY 10001

1.212.380.4467 (direct)
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web: ecohealthalliance.org
Twitter: @epsteinjon
***EcoHealth Alliance leads cutting-edge scientific research into the critical connections between human and wildlife health and delicate ecosystems. With this science, we develop solutions that prevent pandemics and promote conservation.***

Memo: Confidential
Prepared by PREDICT, Liberia Lead, Dr. Jon Epstein and
PREDICT, Virology co-Lead Dr. Simon Anthony

PREDICT Ebola virus finding:
A *Mineopterus inflatus* bat was sampled on Sept 17, 2016 from Nimba county, northern Liberia.

The sample was shipped to New York in accordance with all appropriate permits and permissions, as planned for the Liberia portion of the Ebola Host Project. Columbia received the sample April 12, 2017.

An oral swab was tested using two consensus PCR assays (the PREDICT assay targeting the family *Filoviridae*, and a published assay targeting the genus *Ebolavirus* ) and 2 qPCR assays specific for Ebola Zaire (EBOV) June 1-11, 2018.

Both qPCR assays specific for EBOV were positive, but the CTs were very high (>37) suggesting a very low viral load. The two consensus PCR assays were negative. The sample was then repeated on all 4 assays and only 1 of the EBOV-specific qPCR assays was positive. Interpretation was that the specimen was 'presumptive positive' and required confirmation by sequencing. Other samples from that animal were negative for filoviruses on PCR.

The presumptive positive specimen was sequenced on an Illumina MiSeq platform June 12-27 2018.

Sequence data were received July 6th; however, results were inconclusive. Material was then sent for repeated sequencing July 11th by Illumina HiSeq.

Illumina HiSeq data received on August 13th. Some sequences mapped to EBOV, however, less than 17% of total genome was recovered, and only in short reads (no large contigs). Analyses of these data suggested the bat was positive for the species *Zaire ebolavirus* (prototype virus: EBOV)

In Sept 2018, the specimen was sent for a 3rd round of sequencing by HiSeq to try and recover more of the genome.

Data received October 2018 with a few additional reads to provide a total of 18% of the genome. At this point, the sample was exhausted. Suggested speciation remained *Zaire ebolavirus*.

Serology: rVSV-pseudotype virus neutralization assays were optimized and performed on serum from the positive bat: Aug 12-Sep 12. Serum neutralized rVSVs for several ebolaviruses including Zaire – suggesting the presence of anti-ebolavirus neutralizing antibodies.

Oct 18 - Country Coordinator Dr. Jim Desmond met with NPHIL Director Tolbert Nyenswah and Chief Scientist Dr. Mosoka Fallah. Jon Epstein joined by phone. Results were communicated.

We said they were preliminary results, that they came from a single bat from Nimba county, that an oral swab from *Miniopterus inflatus* bat was positive for EBOV by qPCR and sequencing, and that we had neutralizing activity (suggesting the presence of antibodies) against ebolaviruses.

Discussed:

- Preferable to get full genome sequence to confirm that the virus is ebolavirus (species Zaire Ebolavirus) and determine how it is related to the 2014 outbreak strain.
- That qPCR data indicated a very low copy number (ct > 37), which would explain why our consensus PCR assays were negative (qPCR is more sensitive) and why we only recovered 18% of the genome by sequencing.
- Discussed that given the high ct (low copy number) the chances of virus isolation were low to none (this is based on many previous discussions with CDC about the viral load that is generally required for virus isolation). We had a duplicate sample in VTM stored at NPHIL, so we discussed inactivating that sample to additional sequencing. We agreed that the most important thing was to try and confirm whether or not the virus is actually the outbreak strain and to try to generate more sequence.
- We discussed that we would like to inform other govt partners as per PREDICT protocol including FDA and MOA.
- Tolbert and Fallah suggested that we wait until we have more information before sharing these results with other govt entities.
- We discussed conducting additional and repeated sampling of this bat population to determine prevalence and any seasonal shedding patterns -- they agreed this would be useful.
- We discussed developing a communication strategy once we completed additional workup.
- I requested that we inform the USAID mission (Tara Milani). Tolbert agreed to call Tara and to invite her an in-person meeting the following week.
- I offered to come to Liberia to attend in person and discuss the results - they agreed.
- We discussed working closely together to support NPHIL on communications and interpretation of results, and that the Government of Liberia would control public information dissemination.

The information was well-received, and we agreed we'd follow up a week later in person when we met with USAID mission.

On October 22nd an ITA was approved for Jon Epstein to travel to Monrovia on October 23rd.

Jim helped coordinate an unofficial meeting at NPHL offices with Tara Milani, Mosoka Fallah, and Jon Epstein.

We met, reviewed the same information with Tara, and discussed next steps. Tara agreed to keep information confidential.

Tolbert expressed a desire to keep the information confidential until we had completed further workup, then we would reconvene and discuss next steps in terms of communication strategy

Tara said that USAID would follow the govt of Liberia's guidance on public communication

He consented again to shipping remaining bat samples (after inactivation) to CII for further workup (sequencing).

Friday Nov 2nd, met with Mosoka Fallah in NYC at his request. He asked to see the lab at CII. (he was already in the US for other meetings).

Met Simon and Ian and Simon gave a tour. Simon showed Mosoka figures of serology results from the sample, and we debriefed Simon on conversation in Monrovia the prior week. Mosoka was very happy to see the lab and meet Simon, Ian, and lab staff.

After careful consideration of the sequence in-hand and the recent experience of the Predict team with high-consequence pathogens, we now feel that it is prudent to encourage the Government of Liberia to move forward with preparations for communication of the finding.

The remaining sample has been received at Columbia, but it will not be tested until a member of the team from the Liberia Government can come to New York to be trained during that testing. Because we have enough sequence to speciate, we believe it prudent to recommend to the govt and the Mission that they prepare a messaging strategy and move forward with communications.

In order to ensure that we communicate in advance of any new health issues, we support a positive and proactive strategy that emphasizes that nothing has changed in the country (the virus has probably been present in hosts there for many years) but that we can confirm that it is best to reduce risk by refraining from contact with bats. We also would like to encourage proactive messaging to avoid killing of bats, which can increase human health risk by both facilitating contact with bats and their bodily fluids and stressing the bat populations allowing for increased viral transmission opportunities.

**Sent:** Thu, 13 Dec 2018 11:29:34 -0800
**Subject:** Re: Memo
**From:** Jonna Mazet <jkmazet@ucdavis.edu>
**To:** Jon Epstein <epstein@ecohealthalliance.org>
**Cc:** David J Wolking <djwolking@ucdavis.edu>, "Anthony, Simon J." <sja2127@cumc.columbia.edu>, James Desmond <desmond@ecohealthalliance.org>

We just realized that some of the versions there were tracked. Getting clean ones and reposting for all.
J

On Thu, Dec 13, 2018 at 11:23 AM Jon Epstein <epstein@ecohealthalliance.org> wrote:

Hi Jonna,
Could you please give access to Jim and me to the Box that contains the communications documents from SL so that we have them as reference when we draft Liberia versions?
Cheers,
Jon

On Fri, Dec 14, 2018 at 12:42 AM Jonna Mazet <jkmazet@ucdavis.edu> wrote:

Final & mark-up.
Thanks to all,
J

On Thu, Dec 13, 2018 at 10:21 AM Anthony, Simon J. <sja2127@cumc.columbia.edu> wrote:

Edits from me.

Cheers!

S.

---

**From:** Jon Epstein <epstein@ecohealthalliance.org>
**Date:** Thursday, December 13, 2018 at 12:21 PM
**To:** Jonna Mazet <jkmazet@ucdavis.edu>
**Cc:** Jim Desmond <desmond@ecohealthalliance.org>, "Anthony, Simon J." <sja2127@cumc.columbia.edu>
**Subject:** Memo

Jonna,

Jim and I have each reviewed the memo and it's accurate.

Cheers,

Jon

--

Jonathan H. Epstein DVM, MPH, PhD

*Vice President for Science and Outreach*

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Twitter: @epsteinjon

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--
Jonathan H. Epstein DVM, MPH, PhD

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Twitter: @epsteinjon

*EcoHealth Alliance leads cutting-edge scientific research into the critical connections between human and wildlife health and delicate ecosystems. With this science, we develop solutions that prevent pandemics and promote conservation.*

**From:** aclements@usaid.gov
**To:** jkmazet@ucdavis.edu <jkmazet@ucdavis.edu>;anthony@ecohealthalliance.org <anthony@ecohealthalliance.org>;Jon Epstein <epstein@ecohealthalliance.org>;tgoldstein@ucdavis.edu <tgoldstein@ucdavis.edu>;tmilani@usaid.gov <tmilani@usaid.gov>;cchrisman@usaid.gov <cchrisman@usaid.gov>;apereira@usaid.gov <apereira@usaid.gov>;bhbird@ucdavis.edu <bhbird@ucdavis.edu>
**Sent:** 12/17/2018 7:24:45 PM
**Subject:** Invitation: Call: Liberia Mission, PREDICT mgmt team, and PREDICT/HQ @ Fri Dec 21, 2018 8am - 9am (PST) (jkmazet@ucdavis.edu)

**Call: Liberia Mission, PREDICT mgmt team, and PREDICT/HQ** more details »

Will send call in number separately…

Fri Dec 21, 2018 8am – 9am

jkmazet@ucdavis.edu

- aclements@usaid.gov
- anthony@ecohealthalliance.org
- Jon Epstein
- tgoldstein@ucdavis.edu
- jkmazet@ucdavis.edu
- tmilani@usaid.gov
- cchrisman@usaid.gov
- apereira@usaid.gov
- bhbird@ucdavis.edu

Yes - Maybe - No more options »

Google Calendar

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**From:** Jonna Mazet <jkmazet@ucdavis.edu>
**To:** Andrew Clements <aclements@usaid.gov>
**CC:** Tracey Goldstein <tgoldstein@ucdavis.edu>;Brian Bird <bhbird@ucdavis.edu>;David J Wolking <djwolking@ucdavis.edu>;PREDICTMGT <predictmgt@usaid.gov>
**Sent:** 12/20/2018 6:12:09 PM
**Subject:** Re: Marburg - Press

Yes, I agree, unrealistic on first point -- also not possible with Cooperative Agreement, academic freedom, first amendment, etc.
We did wait & release at the same time as GoSL scheduled their release, and in fact helped the GoSL write their press release. Did same last time, but the GoSL never issued said release on Bombali. This time better, but I understand they delayed press conference at last minute until tomorrow (but press was present at their meeting when they released the finding officially today), though their press release did go out, as far as we know.
Just keeping the facts straight,
Jonna

P.S. I jumped the gun about not having positive feedback first. Brian get the kudos email at 8:52, with the other bit starting at 9:11.

On Thu, Dec 20, 2018 at 11:00 AM Andrew Clements <aclements@usaid.gov> wrote:
turns out the mission has unrealistic expectations:

- wants final clearance on UCD and WaPo articles

- wants all partners to wait until the GOSL puts out a press release before issuing their own

Andrew Clements, Ph.D.
Senior Scientific Advisor
Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health
U.S. Agency for International Development
Mobile phone: 1-571-345-4253
E-mail: aclements@usaid.gov

*For more information on USAID's Emerging Pandemic Threats program, see: http://www.usaid.gov/ept2*

On Thu, Dec 20, 2018 at 7:26 PM Jonna Mazet <jkmazet@ucdavis.edu> wrote:
Yes, Mission has expressed discontent to Brian, and he is trying to get the WaPo to add USAID to the article online -- this is a huge lift and ask by us to that level of paper., but we'll see. Can't speak to CDC press release, except to say that last time we saw a draft, both were in. Our team has been working incredibly hard, as you know to manage this whole thing peacefully & it has come off with very little drama. Note that we put USAID everywhere and logo'ed everything. Brian says he mentioned 50 times in his interview with WaPo.

As a note, would be nice to first hear some praise for those efforts from the Mission and for not letting this thing go off the rails, before complaints especially since we are all so wiped out by this stuff at this busy time of the year. Oh well. Newspapers often don't list funders or even institutions. I get in trouble all of the time for not being shown to be affiliated with UCD because the journalists choose to leave it off. Bummer on this one is that it appears that the other organizations, including CDC are mentioned, so just USAID seems to have been dropped. We'll see what we can do, but....

CONGRATULATIONS TO ALL OF US FOR PULLING OFF SMOOTH COMMUNICATIONS SO FAR WITH THE GOVERNMENT WITHOUT VIOLENCE, PANIC, OR THREATS! YOU ALL HAVE DONE A GREAT JOB, INCLUDING ANDREW, IN TRYING TO MAKE ALL SECTORS HAPPY AND INFORMED WHILE NOT RELEASING INFO IN ADVANCE OF THE GOVERNMENT AND APPROPRIATE CHANNELS.

Even got some press ;) Great job, all!
Jonna

On Thu, Dec 20, 2018 at 10:09 AM Andrew Clements <aclements@usaid.gov> wrote:
FYI. USAID is not mentioned in the CDC press release which seems to be the basis for the WaPo and Reuters articles which also do not mention USAID. Mission not thrilled.

https://www.cdc.gov/media/releases/2018/p1220-marburg-found-in-bats.html

https://www.reuters.com/article/us-leone-health/sierra-leone-fruit-bats-infected-with-ebola-like-marburg-virus-idUSKCN1OJ23C

https://www.washingtonpost.com/health/2018/12/20/deadly-marburg-virus-found-bats-sierra-leone/?utm_term=.60cad50f7ec8

**From:** Jon Epstein <epstein@ecohealthalliance.org>
**Sent:** Fri, 21 Dec 2018 00:50:46 -0500
**Subject:** Re: FAQ sheet for Ebola
**To:** Brian Bird <bhbird@ucdavis.edu>
**Cc:** "Anthony, Simon J." <sja2127@cumc.columbia.edu>, Peter Daszak <daszak@ecohealthalliance.org>, Tracey Goldstein <tgoldstein@ucdavis.edu>, Jim Desmond <desmond@ecohealthalliance.org>, Corina Grigorescu Monagin <cgmonagin@ucdavis.edu>, Jonna Mazet <jkmazet@ucdavis.edu>
PREDICT Liberia Short Report Ebolavirus finding_Dec 2018_d1.docx

Thanks guys. I'll revise the FAQ sheet accordingly. Meanwhile, here's a first draft of the background 2-pager, based on Brian's Bombali short report.
Note, I've deliberately left off a map figure at the request of the DG of NPHIL, who requested that we hold off on specifying the exact location of the finding for now.

Cheers,
Jon

On Thu, Dec 20, 2018 at 9:27 PM Brian Bird <bhbird@ucdavis.edu> wrote:

> Some comments and edits from me… generally we should be specific about what was found in Liberia vs. "West Africa" where needed… I imagine there will be sadly lots of finger pointing across the borders now in that the various countries are the "sources" of these viruses etc. The only winner in that so far will be Guinea!
>
> This will also be political dynamite in the context of the Liberian government to message properly… so that people don't think that "Ebola is back." Of course, it never really left from the reservoir, but that's not the message that was celebrated by everyone in 2016….
>
> I'd highly recommend some boots on the ground over there with cool and level heads to keep the discussions and preparations on target for whenever the official release date will be. If Sierra Leone is a guide, this will be thornier than a blackberry bush.
>
> Talk to you in the morning,
>
> -b
>
> ---
>
> **From:** Jonna Mazet <jkmazet@ucdavis.edu>
> **Date:** Thursday, December 20, 2018 at 5:39 PM
> **To:** Jon Epstein <epstein@ecohealthalliance.org>
> **Cc:** Brian Bird <bhbird@ucdavis.edu>, Simon Anthony <sja2127@cumc.columbia.edu>, Peter Daszak <daszak@ecohealthalliance.org>, Tracey Goldstein <tgoldstein@ucdavis.edu>, Jim Desmond <desmond@ecohealthalliance.org>, Corina Grigorescu Monagin <cgmonagin@ucdavis.edu>
> **Subject:** Re: FAQ sheet for Ebola
>
> Looking good to me. See my suggested edits attached. It is still missing either the 1-2 page briefer or at least an introductory paragraph about the discovery, what it means, and why it is a good thing. That piece is critically needed. If

you sent separately in another email that I haven't gotten to yet, I apologize and will find it.

Thanks,

Jonna

On Thu, Dec 20, 2018 at 3:18 PM Jon Epstein <epstein@ecohealthalliance.org> wrote:

Jonna and Brian,

Attached is a draft FAQ sheet for Ebola, which is based on both the Bombali and Marburg FAQ you developed. I included some reference to Marburg virus as it relates to Ebola, figuring the Liberia govt would get asked about the Marburg finding in Sierra Leone as well. I passed on the full Marburg FAQ to Dr. Fallah already.

I'd appreciate your comments on this draft. Dr. Fallah at NPHIL has requested this information by tomorrow, although he just let me know that he's not going to meet with the health minister until Saturday as she's unavailable tomorrow. Comments by noon tomorrow would be great.

Cheers,
Jon

--

Jonathan H. Epstein DVM, MPH, PhD

*Vice President for Science and Outreach*

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USAID | PREDICT
FROM THE AMERICAN PEOPLE

## Discovery of Zaire Ebolavirus in Liberia in Bats
## PREDICT-Liberia

PREDICT, a project of USAID's Emerging Pandemic Threats (EPT) program, was initiated in 2009 and works along with other Global Health Security Agenda (GHSA) partners to strengthen global capacity for detection and discovery of potentially zoonotic viruses with epidemic and pandemic potential, including viruses related to the Ebola, influenza, and Zika viruses that have been recent causes of devastating disease outbreaks. In Liberia, as in every country where PREDICT operates, we work hand-in-hand with governmental and non-governmental stakeholders to develop and implement activities that are designed to strengthen surveillance and laboratory capabilities and ensure lasting positive effects from our engagements.

As a result of the 2013-2016 Ebola virus outbreak in Liberia, Sierra Leone, and Guinea, PREDICT is engaged in a focused effort to better understand the sources for Ebola and other related filoviruses by finding the virus's animal origins, determining the potential for virus spillover into humans or other animals, and strengthening capacity to build and reinforce emerging disease surveillance and detection systems.

There are currently, six known species of closely related viruses referred to as 'ebolaviruses.' These include Ebola virus (EBOV; Zaire ebolavirus, the cause of the 2013-2016 West Africa EVD outbreak), Bundibugyo virus (BDBV), Sudan virus (SUDV), Taï Forest virus (TAFV), Reston virus (RESTV), and the newly discovered Bombali virus (BOMV) which was found in bats in Sierra Leone by the Sierra Leone PREDICT team.

Despite the detection of Ebola in humans over 40 years ago, decades of research and several high-quality studies in specific geographic areas over the last twenty years, a comprehensive, long-term, simultaneous, multi-country coordinated investigation into the sources for Ebola, including a wide taxonomic range of potential virus hosts, has never been conducted. The main purpose of PREDICT activities in Liberia, is to try to identify which animals carry the virus and understand how common the virus may be among animal populations, and how this host distribution will affect the risks of future outbreaks.

Since 2016, PREDICT has been working in Liberia in close partnership with the National Public Health Institute of Liberia, the Ministry of Health, the Ministry of Agriculture, The Forest Development Authority (FDA) and is led by EcoHealth Alliance and the Society for Conservation of Nature, Liberia (SCNL). Over this time, our team has sampled over 5,300 animals (primarily bats and some rodents) at 15 sites across the country including sites in Nimba, Lofa, Montserrado, Bong, and Grand Cape mount counties. These animal samples are transported safely and securely to our laboratories in Monrovia and the United States where they are then tested to determine if any them are infected with Ebola or other related or unknown filoviruses. A large majority of the >5,300 animals sampled have been bats due to scientific evidence that a number of different bat species may be potential reservoir hosts for the virus.

Our work, in Liberia is part of a larger and comprehensive, multi-year effort in all three affected countries (Sierra Leone, Guinea, and Liberia) to identify a broad range of possible of the animal hosts for all filoviruses that could serve as a source of human infections, as well as the behaviors and conditions associated with increased likelihood of another outbreak – information that is key to reducing the risk of future outbreaks. In addition to these goals we strive to increase national capacities in the areas of Integrated One Health Approaches for Zoonotic Disease Surveillance and Preparedness, Laboratory Systems Strengthening, and Workforce Development and Capacity Strengthening for the sustainable improvement of Sierra Leone's ability to tackle public health challenges with a highly skilled and dedicated national cadre of health workers.

USAID | UC DAVIS VETERINARY MEDICINE | WCS | EcoHealth Alliance | METABIOTA

USAID | PREDICT
FROM THE AMERICAN PEOPLE

## EBOLAVIRUS FINDING IN LIBERIA

- 1 bat of the family Miniopteridae (species *Miniopterus inflatus*) tested positive for Zaire ebolavirus by PCR and had neutralizing antibodies against Zaire ebolavirus in its serum. Genomic sequence covering approximately 20% of the genome was obtained by next generation sequencing.
- The positive bat was sampled in September 2016 in Nimba County. Testing was conducted at the PREDICT partner lab at the Center for Infection and Immunity (CII), Columbia University, New York between June and September 2018.
- These bats are small (<20g) and eat insects. They prefer to live in forest, caves and mines. They are commonly found throughout West, Central, and East Africa. The positive bat appeared to be healthy at the time of sampling. Bats do not become visibly sick when infected by
- Genetic sequence information confirms that the virus detected is Zaire ebolavirus, but at this time it can not be determined whether or not it is the exact same virus that caused the recent EVD epidemic in Liberia, Sierra Leone, and Guinea.
- The discovery presented here represents the first detection of Zaire ebolavirus in a bat in West Africa and provides the first clue as to which species may naturally harbor Ebola virus in the region.
- While this virus is known to be fatal in humans, there have been **no human Ebola cases associated with this finding**.
- This finding provides important new information about how people can protect themselves from exposure to Ebola virus by avoiding contact with these bats and by avoiding entering caves or mines where these bats live.
- Further work is needed to understand how commonly these bats are infected with Ebola, and exactly how this virus compares genetically to the strain that spread through Liberia, Guinea, and Sierra Leone during the 2014 outbreak is ongoing.

USAID | UC DAVIS VETERINARY MEDICINE | WCS | EcoHealth Alliance | METABIOTA

**From:** Andrew Clements <aclements@usaid.gov>
**To:** Jonna Mazet <jkmazet@ucdavis.edu>;Brian Bird <bhbird@ucdavis.edu>
**Sent:** 12/21/2018 10:56:05 AM
**Subject:** SL feedback

Got this from the SL mission: the GoSL has a very strong reaction to the WaPo article! They are concerned about the message, very negative (deadly virus), that has now many implications on the image of the country...

I responded this way: If the GoSL and USG took the lead in issuing a press statement, there would be more control of the narrative. Ideally, the host government and USG statements *would* go out simultaneously and use the same or complementary language. The GoSL not issuing a written press briefing meant that the Embassy and Mission could not so others wrote their own statements. My suggestion is for the GoSL to be more active in this process in the future. Not issuing a written press release and then hoping others will write things certain way seems to me to be very passive and overly optimistic.

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Andrew Clements, Ph.D.
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E-mail: aclements@usaid.gov

*For more information on USAID's Emerging Pandemic Threats program, see* http://www.usaid.gov/ept2

**From:** Jonna Mazet <jkmazet@ucdavis.edu>
**To:** Andrew Clements <aclements@usaid.gov>
**CC:** Brian Bird <bhbird@ucdavis.edu>
**Sent:** 12/21/2018 2:31:53 PM
**Subject:** Re: SL feedback

Thanks very much, Andrew!

We'll also follow-up with our government partners and see where the concerns lie and their seriousness. As you said, if you brief the press, as the Gov't of Sierra Leone did (and I applaud them for that), there will likely be articles. And the press will write what they will. We all try our best to put a very positive spin on what I believe is a very positive finding from a preparedness perspective and a cutting edge position for Sierra Leone. As you know, we coordinated our press release with both CDC and the Government of Sierra Leone. We have chains with "track changes" documents and timing points, etc. My suggestions were all around putting the positive message in and up front (something the other partners weren't thinking about in the beginning).

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It sounded to us yesterday that the concerns may have been stemming from CDC also not getting their press release out at the agreed time and/or that there was some misstep between Atlanta and Salone CDC branches on reviews and clearances. Things, again outside of our control, seem to have started some complaints that might have snowballed into other complaints/concerns. We'll explore further. As you also know and are defending (again, thank you), we tried very hard to coordinate and inform (ask permission) about everything we were and are doing -- both the Gov't and Mission. We followed all of their recommendations and timing desires. Our materials almost mirror theirs because we developed them together. We even suggested a single release with CDC (none from Davis), and CDC said that they couldn't do joint releases and that we should both do one with consistent language.

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Nothing here complaining -- only thanking you for your support, and giving you the information we have about the situation.

Talk to you in a bit,
Jonna

On Fri, Dec 21, 2018 at 3:56 AM Andrew Clements <aclements@usaid.gov> wrote:
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**To:** Jonna Mazet <jkmazet@ucdavis.edu>
**CC:** Brian Bird <bhbird@ucdavis.edu>
**Sent:** 12/21/2018 2:54:58 PM
**Subject:** Re: SL feedback

Thanks, Jonna.

I didn't say it earlier—but should have—you all did a great job again and were super diligent throughout the process again to make sure everything was aligned. Thanks for all that hard work!

I just wanted you to see that there were some possible issues, although this may be specific to only certain people. I saw an email from the Ambassador back to State Dept and it was all positive—proactive, working with GoSL, protecting health of citizens, etc. We also got a thumbs up from the acting head of the GH Bureau for our work.

So let's not let the little things distract from what has been a huge success. Can't please all of the people all of the time.... :)

Andrew

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

On Dec 21, 2018, at 4:31 PM, Jonna Mazet <jkmazet@ucdavis.edu> wrote:

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**From:** Brian Bird <bhbird@ucdavis.edu>
**To:** Andrew Clements <aclements@usaid.gov>;Jonna Mazet <jkmazet@ucdavis.edu>
**Sent:** 12/21/2018 3:48:11 PM
**Subject:** Re: SL feedback

Thank you Andrew, for your great emails and support this morning!

These are all much appreciated and I hope will help keep everything in perspective.

Have a great weekend!

-Brian

**From:** Andrew Clements
**Date:** Friday, December 21, 2018 at 7:55 AM
**To:** Jonna Mazet
**Cc:** Brian Bird
**Subject:** Re: SL feedback

Thanks, Jonna.

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**From:** Elizabeth Leasure <ealeasure@UCDAVIS.EDU>
**To:** Andrew Clements <aclements@usaid.gov>
**Cc:** Alisa Pereira <apereira@usaid.gov>, Cara Chrisman <cchrisman@usaid.gov>, predict Sympa List <predict@ucdavis.edu>, Jonna Mazet <jkmazet@ucdavis.edu>, David John Wolking <djwolking@ucdavis.edu>
**Subject:** Re: Dates for PREDICT All Country meeting
**Sent:** Thu, 21 Feb 2019 22:39:42 +0000

Hi Andrew. Thanks for sharing your preferred dates. I'll circle up with the team and get back to you. We're planning on three full days.

Thanks,
Liz

Elizabeth Leasure
Financial Operations Manager
One Health Institute
University of California, Davis
Cell: REDACTED

---

**From:** Andrew Clements <aclements@usaid.gov>
**Sent:** Thursday, February 21, 2019 12:17 PM
**To:** Elizabeth Leasure
**Cc:** Alisa Pereira; Cara Chrisman; predict Sympa List; Jonna Mazet; David John Wolking
**Subject:** Re: Dates for PREDICT All Country meeting

Look like the best week for me is Sep 16-20 with a preference for the meeting being Sep 18-19 (but may be some flexibility). Were you thinking 2 days or 3?

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

On Feb 20, 2019, at 6:43 PM, Elizabeth Leasure <ealeasure@ucdavis.edu> wrote:

> Hi Andrew. Just following up regarding your preferred dates for the All Country meeting. We're at a point now where we need to start obtaining quotes from meeting venues and visas for participants from certain countries. If you could provide a range of dates that work for you, we can circle back with EB to pick the optimal date.
>
> Thanks,
> Liz
>
> *Elizabeth Leasure*
> *Financial Operations Manager*
> *One Health Institute*
> REDACTED *(cell)*
> *530-754-9034 (office)*
> *Skype: ealeasure*

**From:** Andrew Clements <aclements@usaid.gov>
**Sent:** Wed, 6 Mar 2019 09:55:14 +0100
**To:** David J Wolking <djwolking@ucdavis.edu>
**Cc:** PREDICTMGT <predictmgt@usaid.gov>, Predict inbox <predict@ucdavis.edu>
**Subject:** [predict] follow up on Kenya close out request

Hi David,

I was just looking for the email from Andrew Thaiyah from the Kenya mission, but did not see one. Can you send me the email in which he makes the request for close out?

Thanks!

Andrew

Andrew Clements, Ph.D.
Senior Scientific Advisor
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**From:** "Alisa Pereira" <apereira@usaid.gov>
**To:** "Elizabeth Leasure" <ealeasure@UCDAVIS.EDU>
**Cc:** "Andrew Clements" <aclements@usaid.gov>, "Lindsay Parish" <lparish@usaid.gov>, "predictmgt@usaid.gov" <predictmgt@usaid.gov>, "predict Sympa List" <predict@ucdavis.edu>, "David John Wolking" <djwolking@ucdavis.edu>, "Jonna Mazet" <jkmazet@ucdavis.edu>, "Hannah R Chale" <hrchale@UCDAVIS.EDU>
**Subject:** Re: Question: Restriction for Trafficking in persons (PREDICT)
**Sent:** Fri, 25 Jan 2019 18:23:23 +0000

Dear Liz,

You are correct. The DRC activities have been fully obligated with FY17 funds, and as such, are allowed to proceed as planned. Unfortunately, for the other countries, we are still waiting for guidance. We have submitted information on the types of activities planned within the impacted countries, but have not received an exemption to proceed once funding becomes available. We will keep you posted as information becomes available.

Thanks
Alisa

**Alisa Pereira, Senior Public Health Advisor**
USAID, Contractor
Bureau for Global Health, Office of Infectious Disease, Emerging Threats Division
2100 Crystal Drive, CP3-0001, Arlington, VA 22202
Phone:202-997-9966
Email: apereira@usaid.gov

*GHSI-III - Social Solutions International, Inc. prime contractor*

On Fri, Jan 25, 2019 at 12:41 PM Elizabeth Leasure <ealeasure@ucdavis.edu> wrote:

> Hi Andrew, Lindsay, and Alisa. We recently received an email from one of our Country Coordinators in DRC alerting us to potential funding allocation restrictions in DRC related to the Trafficking and Victims Protection Act (TVPA) and DRC's current status as a Tier 3 country. The email came from Andre-Guy Soh in the USAID/DRC OAA office and was followed up by Jean-Felly Numbi at the Mission (emails below for your reference). Can you confirm whether or not this restriction applies to the PREDICT-2 cooperative agreement? As you know, DRC is an Ebola-funded country, and all of our Ebola funds have been obligated. Since we appear to be able to continue operating with existing funds, this TVPA restriction may not have any impact on PREDICT in DRC, however there are other core-funded countries (including China and Roc) for which all funds have not yet been obligated, as we are still awaiting the obligation of the remainder of our Y5 core budget. Any guidance you can provide regarding the applicability of this restriction and any actions we should be taking to ensure compliance would be most helpful and appreciated.
>
> *Quick Google Translation from Jean-Felly Numbi's email:*
>
> Trafficking in Persons (TIP): this restriction under which the DRC fell among many other countries, see the message below, CTB, FAO, Predict 2 Davis are still under this restriction therefore you will not receive new money as long as not raised. Of course it will be up but we do not know when. The lifting of this measure is gradual because other projects of the DRC have just been authorized to start implementation by supporting the government. It's the restriction that suspends doing business with the government concerned. What to do?
>
> Thank you,

Liz

*Elizabeth Leasure*

*Financial Operations Manager*

*One Health Institute*

REDACTED *(cell)*

*530-754-9034 (office)*

*Skype: ealeasure*

**From:** Beth Edison <bedison@metabiota.com>
**Sent:** Wednesday, January 23, 2019 7:31 AM
**To:** Elizabeth Leasure <ealeasure@UCDAVIS.EDU>
**Cc:** predict Sympa List <predict@ucdavis.edu>; Karen Saylors <ksaylors@metabiota.com>
**Subject:** Fwd: Restriction for Trafficking in persons.

Hi Liz,

Charles, our CC in DRC, received the below email from the mission. What he's saying is that DRC is on the list of countries that is restricted by the TVPA act and that no new money will be allocated until these restrictions are lifted. Apparently some organizations have already received an email advising the restriction has been lifted but FAO, CBT and UC Davis are still restricted and no new money will be allocated for DRC until an email is received. We are allowed to continue operating with funds already received.

Have you heard anything about this at all? I did a brief search for a list of countries and haven't found one yet, but it's possible that other PREDICT countries might be affected as well. If I find more info, I will send it along.

Thanks,

Beth

---------- Forwarded message ---------

From: **Charles Kumakamba** <ckumakamba@metabiota.com>
Date: Wed, Jan 23, 2019 at 1:07 AM
Subject: Fwd: Restriction for Trafficking in persons.
To: Karen Saylors <ksaylors@metabiota.com>, Beth Edison <bedison@metabiota.com>

FYI!

---------- Forwarded message ---------
From: **Jean-Felly Numbi** <jnumbi@usaid.gov>
Date: mer. 23 janv. 2019 10 h 01
Subject: Restriction for Trafficking in persons
To: Jean Pierre Kabuayi <[redacted]>, Charles Kumakamba <ckumakamba@metabiota.com>

Bonjour Jean Pierre et Charles,

Merci pour le message sur le shutdown en rapport avec la mis en oeuvre des activités sur terrain.
En effet, il ya deux situations différentes à ce sujet à savoir :
**1) Le shut-down** qui est le retard d'approbation du budget du gouvernement américain par le Congrès suite aux tractations entre le président Trump et les démocrates. Comme conséquence c'est le retard pour l'argent attendu de cette année en cours. Cependant si votre projet a encore un solde de l'année passée dans ce cas vous continuez avec la mise en oeuvre si le plan d'action est déjà approuvé. Tous nous attendons le New Money de cette année quand le shut-down sera levé.

2) **Trafficking in Persons (TIP)** : cette restriction sous laquelle la RDC est tombée parmi tant autres pays,
voir le message ci-dessous,CTB, FAO, Predict 2 Davis sont encore sous cette restriction par conséquent vous ne recevrez new money tant pas levée. Bien sûr elle sera levée mais on ne sait pas quand. La levée de cette mesure est progressive car autres projets de la RDC viennent d'être autorisées de commencer la mise en oeuvre en appuyant le gouvernement. C'est la restriction suspend de faire le business avec le gouvernement concerné. Que faire? Encore une fois si vous avez de l'argent du solde de l'année passée, je vous conseillerais de continuer les activités prioritaires de cette année car on ne sait pas quand la mesure sera levée.

Merci. Je suis disponible pour toute autre information.

Jean-Felly.

---------- Forwarded message ---------
From: **Andre-Guy Soh** <asoh@usaid.gov>
Date: Wed, Dec 12, 2018 at 2:24 PM
Subject: Update Concerning Impact of Trafficking-in-Persons Legislation on USAID awards
To: Andre-Guy Soh <asoh@usaid.gov>

Dear partners,

On November 28, I informed you that the U.S. Government was in the process of clarifying the effects of restrictions imposed by the Trafficking and Victims Protection Act of 2000 (the "TVPA") on U.S. Government activities in all Tier 3 designated countries.

We have received clearance for a limited number of awards, and have informed the organizations and contractors concerned.

If you have not received an email from USAID/DRC indicating that the U.S. Government has determined that your award is NOT COVERED by TVPA restrictions, then we are still unable to provide

any assurance that additional funds will be obligated into your respective awards due to the potential application of TIP restrictions.

We understand this situation may create difficulties for program operations. While we wait for further guidance from Washington, feel free to reach out to your AOR/CORs for any questions you may have.

Regards,

AG

**Andre-Guy Soh**
Contracting/Agreement Officer
Office of Acquisition and Assistance (OAA) | USAID/Democratic Republic of Congo
**U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT**
REDACTED

Reply Reply all Forward

--

**Jean-Felly Numbi**

USAID-DRC TB& Infectious Disease Advisor

Office Phone #:

Cellular Phone # REDACTED

--

Beth Edison

Program Manager | Metabiota

(250)739-8987

**From:** Jonna Mazet <jkmazet@ucdavis.edu>
**To:** Elizabeth Leasure <ealeasure@ucdavis.edu>
**CC:** predict Sympa List <predict@ucdavis.edu>;Hannah R Chale <hrchale@ucdavis.edu>;David John Wolking <djwolking@ucdavis.edu>
**Sent:** 5/9/2019 4:28:35 AM
**Subject:** Re: Remaining budget for TVPA countries

Hi Liz,
It looks good.
I made some edits to the first box headings to be even more explicit. If they are okay with you & clear, please remove the red and use those headings in the other boxes. The one I wasn't sure about was:
"Equipment/Supplies for Sustainability paid by US Org". I don't know what that means, especially the "Sustainability" word, which is a very charged word in USAID speak. Are you trying to show things bought in the US and shipped to the countries? If so, it matters what these are. For example, if they are supplies for the subs to do testing & they won't be doing testing, then the costs will go away or need to be transferred to a US org to do the testing. If they are freezers for long-term storage of samples (Sustainability?), they would just go away because we aren't going to do nice things for these countries anymore. So we better touch base on these things tomorrow.
Thanks,
J

On Wed, May 8, 2019 at 6:04 PM Elizabeth Leasure <ealeasure@ucdavis.edu> wrote:

Hi Jonna. Based on our discussion and the clarification I got from Amalhin by phone, I put together the spreadsheet attached (also copied below). I'm hoping this format captures what you were wanting to present in response to Andrew's email and that it will be easy for Andrew and Amalhin to understand. The figures currently in the "Obligated/Spent from FY17 funds" portion of the spreadsheet only reflect amounts obligated to the Global lead partner for the TVPA countries, not Global costs obligated to or spent by non-lead partners on behalf of those countries. I'll work on updating those figures tomorrow, but I wanted to get a read from you on the format and if there are any changes you would like made. Let me know what you think.

| | **Approved Year 5 Budget (New Y5 plus Y4 Carryover)** | | | | |
|---|---|---|---|---|---|
| | *In-country Subs* | *In-country Staff Paid by US org* | *In-country travel, outreach, testing, other paid by US org* | *Equipment/ Supplies for Sustainability paid by US Org* | *Global/US cos on behalf of TVPA countr* |
| ***China*** | 691,893 | - | - | - | 734,7 |
| ***Lao PDR*** | 52,556 | 99,074 | 132,451 | 47,482 | 896,4 |
| ***Myanmar*** | - | 81,254 | 63,692 | - | 779,1 |
| ***RoC*** | 39,118 | - | - | 35,503 | 657,7 |
| | 783,567 | 180,328 | 196,143 | 82,985 | 3,067,0 |

| | **Year 5 Budget Obligated/Spent to date (from FY17 funds)** | | | | |
|---|---|---|---|---|---|
| | In-country Subs | In-country Staff Paid by US org | In-country travel, outreach, testing, other paid by US org | Equipment/ Supplies for Sustainability paid by US Org | Global/US cost on behalf of TVPA country |

| | | | | | |
|---|---|---|---|---|---|
| ***China*** | 345,947 | | | | |
| ***Lao PDR*** | 10,282 | 20,984 | 24,379 | 8,664 | |
| ***Myanmar*** | - | 32,502 | 25,477 | | |
| ***RoC*** | 19,559 | | | 17,751.56 | |
| | 375,788 | 53,486 | 49,856 | 26,415 | |

| | **Balance of Y5 Budget Pending Obligation from FY18 funds (if approved fc** | | | | |
|---|---|---|---|---|---|
| | In-country Subs | In-country Staff Paid by US org | In-country travel, outreach, testing, other paid by US org | Equipment/ Supplies for Sustainability paid by US Org | Global/I on beha TVPA c |
| ***China*** | 345,947 | - | - | - | |
| ***Lao PDR*** | 42,274 | 78,090 | 108,072 | 38,818 | |
| ***Myanmar*** | - | 48,753 | 38,215 | - | |
| ***RoC*** | 19,559 | - | - | 17,752 | |
| | 407,780 | 126,842 | 146,287 | 56,570 | |

Thanks!

Liz


*Elizabeth Leasure*

*Financial Operations Manager*

*One Health Institute*

[redacted] *(cell)*

*530-754-9054 (office)*

*Skype: ealeasure*


**From:** predict-request@ucdavis.edu <predict-request@ucdavis.edu> **On Behalf Of** Elizabeth Leasure
**Sent:** Monday, May 6, 2019 12:09 PM
**To:** Jonna Mazet <jkmazet@ucdavis.edu>; David John Wolking <djwolking@ucdavis.edu>
**Cc:** predict Sympa List <predict@ucdavis.edu>
**Subject:** [predict] RE: Remaining budget for TVPA countries

Hi Jonna, I ran some numbers in response to Andrew's email. Taking a very narrow interpretation of what qualifies as "in-country costs," I come up with the numbers below. Andrew's figure is way higher than any numbers I could come up with based on just in-country costs being TVPA restricted for FY18, so I can only assume that he's including Global costs on behalf of these countries when coming up with his numbers. Based on my very limited definition of restricted TVPA costs, I come up with $1.065M budgeted for in-country

costs in Y5, which leaves $595K when subtracting carryover amounts obligated to date for those countries. If you see this before our call on Wednesday, let me know if there are any other scenarios I should run regarding numbers, as I imagine we would prefer that as little be deduced from our pending obligation as possible. Thanks!

| | Y5 in-country budgets | Obligated to date from Y4 carryover | Balance Un-obligated for Y5 |
|---|---|---|---|
| China | 691,893 | 345,947 | 345,947 |
| RoC | 74,621 | 37,311 | 37,311 |
| Lao PDR | 202,005 | 39,122 | 162,883 |
| Myanmar | 97,336 | 48,107 | 49,229 |
| | 1,065,855 | 470,486 | 595,369 |

| **Contractual** | |
|---|---|
| Institute of Microbiology, Chinese Academy of Sciences (detail below) | 156,567 |
| Wuhan Institute of Virology subagreement (detail below) | 194,446 |
| Yunnan Institute of Endemic Diseases Control and Prevention (detail below) | 154,532 |
| Guangjian Zhu (field technician/coordinator)(includes stipend, field supplies, travel costs) | 186,348 |
| | . |
| **Total Contractual** | **691,893** |

Lao PDR

| | |
|---|---|
| 67,397 | In-country staff |
| 1,968 | Community outreach travel |
| 25,000 | Sustainability equipment |
| 15,294 | Sustainability under 5K |
| 52,556 | In-country subs |
| 39,790 | Indirects |
| 202,005 | |

Myanmar

| | |
|---|---|
| 60,000 | CC contract |
| 1,800 | CC domestic travel |
| 16,800 | Lab technician at LBVD |

| | |
|---|---|
| 13,400 | In-country costs (outreach, communications) |
| 5,336 | Indirects |
| 97,336 | |

RoC

| | |
|---|---|
| 39,118 | LNSP |
| 6,904 | Sustainability equipment |
| 21,666 | Sustainability under 5K |
| 6,933 | Indirects |
| 74,621 | |

*Elizabeth Leasure*

*Financial Operations Manager*

*One Health Institute*

REDACTED (cell)

*530-754-9014 (office)*

*Skype: ealeasure*

**From:** Andrew Clements <aclements@usaid.gov>
**Sent:** Friday, May 3, 2019 5:50 PM
**To:** Elizabeth Leasure <ealeasure@UCDAVIS.EDU>
**Cc:** Jonna Mazet <jkmazet@ucdavis.edu>; David John Wolking <djwolking@ucdavis.edu>
**Subject:** Remaining budget for TVPA countries

Hi Liz,

According to our calculations, the total planned FY18 funding for the 5 TVPA countries is $3.61 million. Is that correct?

Our assumption is that if we cannot program in these countries, then this amount is not needed in the upcoming obligation.

Thanks!

Andrew

*Andrew P. Clements, Ph.D.*

*Senior Scientific Advisor*

*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*

*U.S. Agency for International Development*

*Mobile phone: 1-571-345-4253*

*Email: aclements@usaid.gov*

UCDJSR0002590

PRODUCED IN NATIVE FORMAT

**From:** Elizabeth Leasure <ealeasure@UCDAVIS EDU>
**To:** Andrew Clements <aclements@usaid.gov>
**CC:** Jonna Mazet <jkmazet@ucdavis.edu>;David John Wolking <djwolking@ucdavis.edu>;predict Sympa List <predict@ucdavis.edu>;ashek@usaid.gov <ashek@usaid.gov>;cchrisman@usaid.gov" <cchrisman@usaid.gov>;Alisa Pereira <apereira@usaid.gov>
**Sent:** 5/9/2019 2:27:06 PM
**Subject:** RE: Remaining budget for TVPA countries

Hi Andrew. I was able to connect with Amalbin by phone, and she clarified what she is needed. We're working on it now.

Thanks,
Liz

*Elizabeth Leasure*
*Financial Operations Manager*
*One Health Institute*
REDACTED *(cell)*
*530-754-9054 (office)*
*Skype: ealeasure*

**From:** Andrew Clements
**Sent:** Thursday, May 9, 2019 1:47 AM
**To:** Elizabeth Leasure
**Cc:** Jonna Mazet ; David John Wolking ; predict Sympa List ; ashek@usaid.gov; cchrisman@usaid.gov; Alisa Pereira
**Subject:** Re: Remaining budget for TVPA countries

Hi Liz,

Amalbin came up with the calculation, so I'll let her respond to how it was done.

Andrew

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

On May 9, 2019, at 12:05 AM, Elizabeth Leasure <ealeasure@ucdavis.edu> wrote:

Hi Andrew. Can you give me an idea of how you arrived at your $3.61M figure? The Y5 PREDICT budget is a bit more complicated than usual given that it includes carryover funds from Y4 in addition to the new funding for Y5, and we need to account for amounts that have been obligated to partners for TVPA countries from the FY17 funds received to date. A double exercise, I just need a bit more info as to what you're looking for. Are you using the fully-loaded country budgets to arrive at your figure, or are you just including the in-country budgets for implementing partners? As mentioned previously, in order to ensure the best return on USAID's long-term investment in these countries and include them in our global analyses for the project, we need to continue to fully-fund the Global budgets of U.S.-based consortium partners so that our Global staff can continue to work on the data and analyses for these countries. Any clarification you can provide would be most helpful.

Thanks,
Liz

*Elizabeth Leasure*
*Financial Operations Manager*

*One Health Institute*
[redacted] *cell*
*530-754-9054 (office)*
*Skype: ealeasure*

**From:** Andrew Clements <aclements@usaid.gov>
**Sent:** Friday, May 3, 2019 5:50 PM
**To:** Elizabeth Leasure <ealeasure@UCDAVIS.EDU>
**Cc:** Jonna Mazet <jkmazet@ucdavis.edu>; David John Wolking <djwolking@ucdavis.edu>
**Subject:** Remaining budget for TVPA countries

Hi Liz,

According to our calculations, the total planned FY18 funding for the 5 TVPA countries is $3.61 million. Is that correct?

Our assumption is that if we cannot program in these countries, then this amount is not needed in the upcoming obligation.

Thanks!

Andrew

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

| | |
|---|---|
| **From:** | Katherine Leasure <kaleasure@ucdavis.edu> |
| **To:** | PREDICTMGT <predictmgt@usaid.gov> |
| **CC:** | Predict inbox <predict@ucdavis.edu>;Jonna Mazet <Jkmazet@ucdavis.edu> |
| **Sent:** | 5/13/2019 10:04:38 PM |
| **Subject:** | PREDICT International Travel Requests |

*Please find below international travel requests for your review and approval. Please let me know if you have any questions. Thanks!*

1. O'Rourke, O'Rourke (USA): $579 airfare each/$196 (Davis) max daily per diem
2. Nga (USA): $1600 airfare/$196 (Davis) max daily per diem
3. Grange (USA): $1500 airfare/$196 (Davis), $174 (Tahoe City) max daily per diems

Travel Requests –

1. Metabiota would like to request travel approval for Tammie O'Rourke and Daniel O'Rourke to travel from Nanaimo, British Columbia, Canada to Davis, California USA from June 4-9, 2019 to meet with the UC Davis global team and assist with the training for the PREDICT-2 Data Conference being held.

**Trip purpose:** To meet with UCD global team and assist with training for the PREDICT-2 UCD Data Conference.

2. Wildlife Conservation Society (WCS) would like to request travel approval for Nguyen Thi Thanh Nga to travel from Ha Noi, Viet Nam to Davis, California, USA from June 4-15, 2019 to participate in the PREDICT-2 UCD Data Conference.

**Trip purpose:** The workshop will develop essential in-country capacity to understand, visualize, analyze and interpret country level PREDICT-2 data, and generate a framework for consistent and rigorous analysis for anticipated future publications. Nguyen Thi Thanh Nga will represent PREDICT Viet Nam on behalf of WCS.

3. UC Davis would like to request travel approval for Dr. Zoe Grange to travel from Dunblane, Scotland to Davis, California, USA from August 1-17, 2019 for meetings with Jonna Mazet and the UCD PREDICT global team, and to present at WDA 2019.

**Trip purpose**: Zoe Grange will travel to Davis to meet with Jonna Mazet and the PREDICT global team to finalize a country roll-out plan for the Spillover tool, and to prepare the accompanying documents, etc., that we will need to provide our international colleagues to see the Spillover tool used most efficiently. In addition, Zoe will meet with the PREDICT global team to help prepare the final report and plan/contribute to sections on similar products and tools including the M&A section. Zoe will also present the risk ranking application for PREDICT viruses at the Wildlife Disease Association Annual International Conference in Tahoe City, CA.

--
**Katherine Leasure**
HR/Payroll/Financial Assistant
One Health Institute
530-752-7526

**From:** Eunah Regina Cho <eecho@ucdavis.edu>
**To:** David John Wolking <djwolking@ucdavis.edu>, Jonna Mazet <jkmazet@ucdavis.edu>
**Subject:** FW: PREDICT 2019 Semi-annual report
**Sent:** Wed, 22 May 2019 16:43:59 +0000

Hi all,
The 2019 Semi-Annual Report is now available for download on the PREDICT site: https://ohi.vetmed.ucdavis.edu/programs-projects/predict-project/reports

Cheers,
Eunah

**From:** Andrew Clements <aclements@usaid.gov>
**Sent:** Monday, May 20, 2019 2:05 AM
**To:** David John Wolking <djwolking@ucdavis.edu>
**Cc:** Cara Chrisman <cchrisman@usaid.gov>; Alisa Pereira Emerging Threats Division <apereira@usaid.gov>; Amalhin Shek <ashek@usaid.gov>; predict Sympa List <predict@ucdavis.edu>; PREDICTMGT <predictmgt@usaid.gov>; Eunah Regina Cho <eecho@ucdavis.edu>
**Subject:** Re: PREDICT 2019 Semi-annual report

Hi David,

Sorry for the delay. No issues with this semi-annual report so consider it approved and final.

Andrew

Andrew Clements, PhD
Senior Scientific Advisor
Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health
U.S. Agency for International Development
Mobile phone: 1-571-345-6193
E-mail: aclements@usaid.gov

*For more information on USAID's Emerging Pandemic Threats program, see* http://www.usaid.gov/pandemic

On Wed, May 1, 2019 at 11:13 PM David J Wolking <djwolking@ucdavis.edu> wrote:
Hi there,

Here is the updated report. We corrected the map in the preface to accurately depict PREDICT's GHSA countries.
Coming next week
is the M&E Excel file for Tiffany along with the appendix containing our project's maps and models for this period of performance.

Best,

David

On Tue, Apr 30, 2019 at 4:26 PM Cara Chrisman <cchrisman@usaid.gov> wrote:
Hi David,

Thanks so much for sending, just confirming that this version came through!

Best,
Cara

Cara J. Chrisman, PhD
Senior Infectious Diseases Technical Advisor
U.S. Agency for International Development (USAID) Contractor
Bureau for Global Health, Office of Infectious Disease, Emerging Threats Division

2100 Crystal Drive, CP3-8091A, Arlington, VA 22202
Desk: (571) 551-7413
Cell: REDACTED
E-mail: cchrisman@usaid.gov

*GHSI-III - Social Solutions International, Inc. prime contractor*

On Tue, Apr 30, 2019 at 6:45 PM David J Wolking <djwolking@ucdavis.edu> wrote:

Hi there,

Please find attached the final version of PREDICT's 2019 Semi-annual report. It's a pretty great edition, hope you like it.

Enjoy!

David

**From:** Elizabeth Leasure <ealeasure@UCDAVIS.EDU>
**To:** Andrew Clements <aclements@usaid.gov>
**Cc:** Jonna Mazet <jkmazet@ucdavis.edu>, predict Sympa List <predict@ucdavis.edu>, David John Wolking <djwolking@ucdavis.edu>, Hannah R Chale <hrchale@UCDAVIS.EDU>, Alisa Pereira <apereira@usaid.gov>
**Subject:** New subaward request: Johns Hopkins (POP start 6/20/19)
**Sent:** Mon, 17 Jun 2019 19:17:52 +0000
Sub-Award Letter_Hopkins.pdf
BASIS OF SELECTION MEMO_Hopkins.pdf
AOR Checklist for Subaward Consent_UCD subaward to Hopkins_PREDICT.docx
Johns Hopkins draft subaward.pdf

Hi Andrew. Please find attached a request for approval to establish a new subaward with Johns Hopkins University for serology, which includes a requested start date of 6/20/19. Johns Hopkins is a domestic institution of higher education, and as such, only AOR approval is required. **Please note that this subaward will only be established if/when the balance of the Y5 core budget is obligated**. If you have any questions or need anything else to approve, please let me know.

Thanks,
Liz

*Elizabeth Leasure*
*Financial Operations Manager*
*One Health Institute*
REDACTED *(cell)*
*530-754-9034 (office)*
*Skype: ealeasure*

June 17, 2019

**ACTION MEMORANDUM**

**TO:** **Patricia Bradley, Agreement Officer, USAID**

**FROM:** **Elizabeth Leasure, Financial Operations Manager, PREDICT-2**

**SUBJECT:** **BASIS OF SELECTION**

1. **This document was prepared by** the University of California, Davis as prime recipient of the PREDICT-2 cooperative agreement (AID-OAA-A-14-00102) for the Emerging Pandemic Threats (EPT-2) Program.

2. **The nature and/or description of the action being approved including estimated value:** This is a request to approve a subaward to Johns Hopkins University for $32,750. Under this action, Johns Hopkins University will provide serological testing of 200 PREDICT-2 samples.

3. **Description of the assistance program or assistance activity under the proposed action:** As part of USAID's Emerging Pandemic Threats (EPT-2) program, the PREDICT-2 project is conducting global surveillance to detect and prevent spillover of pathogens of pandemic potential that can move between animals and people. Specific activities include: strengthening surveillance and laboratory capacities in order to monitor animals and people at high-risk interfaces for novel pathogens that may pose a significant public health threat; characterizing human and ecological drivers of disease spillover, evolution, amplification, and spread from animals to people; strengthening and optimizing models for predicting disease emergence and using this information to improve surveillance; and supporting outbreak response when requested.

4. **The facts and rationale that justifies selection of the subrecipient and other options explored:** The facts and rationale that justifies selection of the subrecipient and other options explored: Johns Hopkins University has a long history of medical and diagnostic advancement for the improvement of human health. The Division of Immunology in the Department of Pathology at Johns Hopkins University, working in collaboration with several other prestigious universities and medical institutions, has developed VirScan (Xu et al. 2015), a comprehensive serological profiling platform that detects antibodies to over 100 human pathogens using systematic viral epitope scanning. The pathogens assessed include many of the targeted viral testing categories used in PREDICT, in addition to other prevalent infectious viruses. Using VirScan, we will be able to broadly screen additional serology samples that cannot be accommodated by other testing options we currently have in-place. VirScan has been found to perform comparable to classical serum antibody tests for single viruses in detecting known infections and distinguishing between exposures to related viruses. In addition to being a high-throughput method that allows comprehensive analysis

of antiviral antibodies in human serum, the analysis requires less than 1 µl of serum, allowing us to save remaining serum for follow-up testing of positive samples.

Xu, G.J., Kula, T., Xu, Q., Li, M.Z., Vernon, S.D., Ndung'u, T., Ruxrungtham, K., Sanchez, J., Brander, C., Chung, R.T. and O'Connor, K.C., 2015. Comprehensive serological profiling of human populations using a synthetic human virome. Science, 348(6239), p.aaa0698. DOI: 10.1126/science.aaa0698

Submitted:



Elizabeth Leasure, PREDICT-2
University of California, Davis

6/17/19
Date

June 17, 2019

Patricia Bradley
Agreement Officer
USAID
M/OAA/GH/HIDN

**Reference:** Cooperative Agreement No. AID-OAA-A-14-00102; PREDICT-2

**Subject:** **Johns Hopkins University subaward**

**Through:** Andrew Clements, Agreement Officer's Representative;

**Cc:** Alisa Pereira, Deputy Director, Emerging Threats Division

Dear Ms. Bradley:

As part of our attached request for subaward approval to issue a subagreement to Johns Hopkins University in Baltimore, Maryland, the Regents of the University of California, Davis campus is pleased to present the following budget narrative that supports the detailed subagreement budget, which is also attached. In developing its budget Johns Hopkins University in Baltimore, Maryland sought to offer exceptional value to USAID by combining realistic and reasonable cost estimates that reflect the complexity and needs of the program.

As the basis for its cost estimates, Johns Hopkins University in Baltimore, Maryland has used a combination of vendor quotes, current data, labor rates, and quotes and costing information provided by their team. To facilitate review, we have organized this budget narrative to be consistent with the format of the budget.

Subawardee: Johns Hopkins University in Baltimore, Maryland

Subaward Program Title: PREDICT-2

Purpose: Perform VirScan analysis and ArboScan analysis on 200 serum samples and run the data through the pipeline which generates enrichment scores for each peptide and summary statistics at the protein and organism level.

Anticipated Subaward POP: June 20, 2019 through September 30, 2019

Subaward Ceiling: $32,750

Award Type: Subagreement

Sincerely,



Elizabeth Leasure
PREDICT Financial Operations Manager
One Health Institute
University of California, Davis
530-754-9034
ealeasure@ucdavis.edu

**BUDGET JUSTIFICATION**

**A. Key Personnel** ($986)

Site PD/PI: H. Benjamin Larman, Ph.D., (0.12 calendar months), will serve as site PD/PI for the PREDICT serology subcontract. Dr. Larman is an Assistant Professor in the Immunology Division of the Pathology Department. As a graduate student with Steve Elledge, he developed the PhIP-Seq/VirScan technology. Dr. Larman will oversee the proposed work related to sample screening and data analysis.

**B. Other Personnel** ($8,664)

Research Technologist: Divya Mohan, (1.2 calendar months) has been trained to characterize serum samples and perform automated PhIP-Seq screening in the Larman Lab. She will assist in the expansion of the new ArboScan phage library and sample screening.

Postdoctoral Fellow: Thiagarajan Venkataraman, Ph.D., (1.2 calendar months) has been trained in the Larman Lab to perform library expansion and characterization. Dr. Venkataraman will be responsible for the expansion and QC of the ArboScan library.

**FRINGE BENEFITS** ($2,564)
Fringe benefits are calculated at 34% for all Johns Hopkins University faculty and staff. Fringe benefits are calculated on 19.3% for all postdoctoral fellows who receive a wage.

**C. Equipment**

None requested.

**D. Travel**

None requested.

**E. Participant/Trainee Support Costs**

None requested.

**OTHER EXPENSES**
None requested.

**F. Other Direct Costs**

**RESEARCH SUPPLIES** ($7,786)
Next generation DNA sequencing costs (including fees for use of liquid handling robotics in the ChemCORE): $3,893
Molecular biology reagents: $3,893 (magnetic Dynabeads for antibody and RNA capture, oligonucleotides, Herculase II DNA polymerase, IgA capture antibodies)

**G. Indirect Costs** ($12,750)
F&A Rates: Facilities and Administrative Costs for Johns Hopkins University are calculated on a Modified Total Direct Cost basis (total direct costs excluding equipment). The Johns Hopkins University federally negotiated rate agreement for organized research conducted on campus is 63.75% based on the latest agreement dated 06/15/2018.

**Subaward Consent**

| | | |
|---|---|---|
| Subawardee:<br>Johns Hopkins University | Subagreement No. (attached):<br>A15-0146-S0XX (TBD)<br>Subagreement Modification No: N/A | Dollar Value:<br>$32,750<br>Period of Subaward: 6/20/19-9/30/19 |
| Recipient:<br>Regents of the University of California, Davis campus | Prime Award No: AID-OAA-A-14-00102 | Agreement Officer (AO):<br>Patricia Bradley |
| Agreement Officer Representative (AOR) Name:<br>Andrew Clements | AOR Signature: | Date: |

The AOR must complete this checklist prior to approving any subawards. **For any response other than "Yes," the AOR must provide a written explanation to the AO. AO concurrence is required prior to subaward approval for any "no" response.** Upon successful completion (all responses are "Yes") of the checklist, the AOR can provide notice to the recipient that the AOR approves the subaward.

A copy of the completed package (checklist, subaward request with supporting documents, and AOR approval letter) must be provided to the AO (via email) at the same time that approval is provided to the prime recipient in order to maintain the agreement file. AOR is also responsible for maintaining their own records of approvals.

1. Did the Prime provide the AOR with a copy of the subaward? Yes☐ No ☐

   Explanation to AO:_____

2. Did the AOR verify that the provisions from the prime award flow down to subrecipients? Yes☐ No ☐

   Explanation to AO:_____

3. Did the AOR verify that the subrecipient is not on the Excluded Parties List (Debarred, Suspended, and Ineligible Contractors? Yes☐ No ☐

   Explanation to AO:_____

4. Did the AOR verify that the subrecipient is **not** on the OFAC list as ineligible? Yes☐ No ☐

   Explanation to AO:_____

5. Has the prime provided justification and rationale for selecting the sub awardee? Yes☐ No ☐

Explanation to AO:_____

6. Is the requirement of the particular activity or services technically justified within the existing program description?
Yes☐ No ☐

Explanation to AO:_____

7. Has the AOR reviewed the detailed budget line items and determined them to be fair and reasonable and within the applicable rules and regulations?
Yes☐ No ☐

Explanation to AO:_____

8. Has the prime made a responsibility determination of the subrecipient? Yes☐ No ☐

Explanation to AO:_____

9. If this is a no-cost extension is the period of the extension less than 9 months? Yes☐ No ☐

Explanation to AO:_____

10. Did the AOR verify that the prime demonstrated that the subrecipient is **not** a non-U.S.foreign government or parastatal? Yes☐ No ☐

Explanation to AO:_____

11. Has AOR verified that the subagreement does **not** include; construction, pharmaceutical, vehicles, agricultural commodities, or other restricted goods? Yes☐ No ☐

Explanation to AO:_____

12. Has AOR verified that the subagreement does **not** include a change in the program description or the approved budget of the prime recipient?
Yes☐ No ☐

Explanation to AO:_____



This form only applies to Subagreements under Assistance *(including ceiling increases & extensions)*, not to Contracts under Assistance Awards, nor to Assistance Grants under Contracts(LACCs). NOTE: Ceiling increases must not exceed the ceiling of the Prime Award.

USCDUSR00002604

**AGREEMENT NUMBER A15-0146-SXXX**

**BETWEEN**

**THE REGENTS OF THE UNIVERSITY OF CALIFORNIA**

**AND**

**JOHNS HOPKINS UNIVERSITY**

This Agreement is made and entered into by and between **The Regents of the University of California (University)**, a public institution of higher education acting for and on behalf of its Davis Campus, and **Johns Hopkins University (Participating Institution)**, an institute of higher education located in Baltimore, Maryland.

WHEREAS, University has received **Cooperative Agreement Number AID-OAA-A-14-00102 (Prime Agreement)** from **USAID (Prime Sponsor)** in support of the project entitled "Emerging Pandemic Threats Program 2 PREDICT-2" effective October 1, 2014;

WHEREAS, Prime Agreement provides authorization and funds for Participating Institution participation;

WHEREAS, Participating Institution has the facilities and skilled personnel necessary to pursue the objectives and fulfill the requirements of this Agreement;

WHEREAS, it is of mutual interest and benefit of University and the Participating Institution to collaborate;

WHEREAS, Participating Institution has agreed to perform the work hereunder as a collaborating Institution under a subaward relationship.

NOW THEREFORE, University and Participating Institution mutually agree as follows:

1. **General**. The terms of this Agreement are intended to be in concert with the terms and conditions of the Prime Agreement which is hereby incorporated by reference and attached as **Exhibit A**. Participating Institution hereby agrees to be bound by the terms and conditions of the Prime Agreement identified in Article 25 of this Agreement. For all actions requiring Prime Sponsor's prior approval, as identified in the Prime Agreement, Participating Institution must obtain prior written approval from University.

2. **Scope of Work.** The objectives of the Project are consistent with and will further the purposes of the Prime Agreement received by the University. The Participating Institution understands that the work of the Project is an integral part of the University's program plan.

   The Participating Institution shall enable its Principal Investigator to perform the work described in the work plan submitted to the University, incorporated by reference as **Exhibit B** (the "Project"). The actual performance of that work shall conform with all aspects of the Project proposal as submitted including:

   **A.** The description of the specific objectives of the Project;

   **B.** The description of the expected inputs, outputs, and indicators of the Project accomplishments;

   **C.** The description of any relationships with other Projects funded by the University under the previously referenced Prime Agreement;

   **D.** The description of the managerial responsibilities of the Project; and

   **E.** The description of arrangement for Project work in foreign sites.

3. **Period of Performance.** The performance period of this Agreement is June 20, 2019 through September 30, 2019.

4. **Reports.** Participating Institution's reports shall be incorporated into University's reports which are required to be submitted to the Prime Sponsor in accordance with the terms of the Prime Agreement. All reports shall be submitted to the following contact, unless otherwise directed:

Jonna Mazet Veterinary Medicine
One Shields Avenue
Davis, CA 95616-8686
jkmazet@ucdavis.edu

A. **Technical Reports.** Participating Institution shall provide University written progress reports for period of performance identified in Article 3 quarterly, or upon the request of the Principal Investigator, in a format required by the Prime Agreement.

B. **Patent Reports**. In accordance with 37 CFR 401.14, Participating Institution shall notify University's Administrative Officer, as stated in Article 6D, within two months after Participating Institution's inventor discloses invention(s) in writing to Participating Institution's personnel responsible for patent matters.

C. **Final Patent Report**. Participating Institution shall provide University's Administrative Officer, as stated in Article 6D, a written Final Patent Report within forty-five (45) days of the termination date of this Agreement. A negative report is required.

D. **Final Technical Report.** Participating Institution shall provide University a written Final Technical Report within forty-five (45) days of termination of this agreement in a format required by the Prime Agreement. The final technical report shall include, at a minimum, a summary statement of progress toward the achievement of the originally stated aims.

E. **Final Financial Report.** Participating Institution shall provide University a written Final Financial Report within forty-five (45) days of termination of this Agreement in the format required by the Prime Agreement.

5. **Allowable Cost, Compensation, Invoices.**

A. For the performance of work specified herein, University shall pay those expenses, direct and indirect, incurred by Participating Institution in accordance with the attached **Subaward Budget**, incorporated herein as **Exhibit C**. Allowable reimbursable Project costs shall be those costs incurred in accordance with the detailed Project budget, including its line item categories, as approved by the University for this Project. The maximum allowable costs for the period June 20, 2019 through September 30, 2019 under this Agreement is **Thirty Two Thousand Seven Hundred Fifty US Dollars ($32,750 USD).**

B. **Ceiling Increases.** Increases to the ceiling of this subaward are not guaranteed and depend upon project needs, available funding, and approval of annual budgets by USAID.

C. **Travel.** All international travel is to be approved in advance. For any additional travel not already approved and incorporated in the Budget, Participating Institution shall submit a request to University's Project Director at least five weeks in advance of the anticipated foreign travel and the request shall include the following information: the number of trips, the number of individuals per trip, and the origin and destination countries or regions. This request will be submitted via an email sent to the contact in Article 5J below, and will be approved on a case-by-case basis.

D. **Participant Training**. All in-country and third-country training using USAID funds is to be approved in advance. All J-1 Visas for exchange visitors attending US-based training using USAID funds are to be issued by USAID in accordance with the instructions provided in USAID ADS 252. The University will coordinate J-1 Visa issuance with USAID Missions and central offices. Participating Institution is to notify University at least 120 days in advance of US-based training. Any proposed changes to the approved training activities must be submitted to the University for prior approval.

E. **Limitations on Reimbursement**. In addition to the foregoing limitations, the University obligation to reimburse the Participating Institution is subject to the following conditions:

1. All moneys provided for costs shall be expended in the amounts for the purposes indicated in the Budget, unless otherwise approved in writing by the University, provided:

   a. That funds shall not be rebudgeted for additional international trips except with the prior written approval of the University; and

   b. That rebudgeting of funds for the purpose of purchasing an item of equipment valued at $5,000 or more shall require the prior written approval of the University; and

   c. That rebudgeting of funds for the purpose of purchasing any restricted items, as defined in Standard Provisions, will require the prior written approval of the University, and the request shall include the type of item, the amount to be spent, and the authorized geographic code; and

   d. Without the written prior approval of the University, Participating Institution shall not rebudget funds to or allotted for participant training if the rebudget would result in changes to the approved training activities.

F. Costs must be expressed in U.S. dollars using an exchange rate applicable at the time the invoice is submitted. Please see the Prime Agreement for Mandatory Terms and Conditions regarding Facilities and Administrative Costs (F&A).

G. The University shall reimburse the Participating Institution for indirect costs in accordance with 2 CFR 200.331 (a)(4). Indirect costs reimbursed shall not exceed the amount indicated in the appropriate Budget line item category

H. Participating Institution must obtain prior written approval of University's Administrative Officer to rebudget funds where prior approval is required for such rebudgeting. Carry forward of unobligated funds requires prior approval.

I. The Participating Institution shall be obligated to refund to the University an amount or amounts equal to the sum of direct and indirect costs reimbursed by the University to the Participating Institution that is ultimately determined by either or both the University and USAID as unallowable.

J. Payment shall be on a cost reimbursement basis. Participating Institution shall submit monthly invoices that reflect expenditures incurred that provide detail commensurate with that appearing in the approved budget; invoices shall be numbered sequentially, and shall reference Agreement Number A15-0146-S021. Release of payment will be based upon notification and approval by the Principal Investigator that adequate documentation and corroboration of costs has been received. Participating Institution's invoices shall be submitted to:

Elizabeth Leasure
VM: One Health Institute

1089 Veterinary Medicine Drive
Davis, CA 95616-8671
ealeasure@ucdavis.edu

K. Participating Institution's final invoice shall be submitted to University not later than forty-five (45) days after expiration or termination of this Agreement.

6. **Key Personnel**

A. The scope of work supported by this Agreement shall be under the general guidance and technical direction of University's Jonna Mazet, Principal Investigator under the Prime Agreement.

B. Participating Institution's Principal Investigator Benjamin Larman shall be responsible to the Participating Institution for the proper management and conduct of the activities hereunder. Participating Institution's Principal Investigator may be replaced only with the approval of University.

C. All communications regarding the technical, scientific, and programmatic aspects of this Agreement shall be between University's Jonna Mazet (or approved designee) and Participating Institution's Benjamin Larman (or approved designee).

D. University's Administrative Officer responsible for matters of administration of the Agreement, including assistance in identification and interpretation of relevant policies and provisions, is:

Paula Noble
Contracts & Grants Officer
Office of Research, Sponsored Programs
1850 Research Park Drive, Suite 300
University of California
Davis, California 95618
(530) 754-7700
FAX (530)752-0333
subawards@ucdavis.edu

E. Participating Institution's Administrative Officer responsible for the coordination of fiscal and administrative management aspects of this Agreement is:

F. Communications and correspondence regarding the fiscal and administrative aspects of this Agreement shall be between the designated Administrative Officers.

7. **Records and Audits.**

A. Participating Institution certifies by signing this Agreement that it complies with the Uniform Guidance, will provide notice of the completion of required audits and any adverse findings which impact this subaward as required by parts 200.501- 200.521, and will provide access to records as required by parts 200.336, 200.337, and 200.201 as applicable.

University reserves the right to inspect, upon University's reasonable advance notice and during normal business hours, Participating Institution's physical facilities, all aspects of the Statement of Work undertaken under this Agreement, and all books, records, and documents of any kind pertaining to this Agreement. Participating Institution agrees to provide copies of any records or other documentation to University in a timely fashion as reasonably requested by University. Participating Institution will keep all usual and proper records relating to performance of the Statement of Work for a minimum period of three (3) years after completion of closeout of this Agreement and after the final document has been submitted to University.

Participating Institution expressly acknowledges its understanding that its activities pursuant to this Agreement and all records pertaining thereto may be subject to audit by the Prime Sponsor, and Participating Institution agrees to cooperate fully in the performance of any such audit.

8. **Indemnification**.

A. University shall defend, indemnify and hold Participating Institution, its officers, employees and agents harmless from and against any and all liability, loss, expense (including reasonable attorneys' fees), or claims for injury or damages arising out of the performance of this Agreement but only in proportion to and to the extent such liability, loss, expense, attorneys' fees, or claims for injury or damages are caused by or result from the negligent or intentional acts or omissions of University, its officers, agents, or employees.

B. Participating Institution shall defend, indemnify and hold University, its officers, employees and agents harmless from and against any and all liability, loss expense (including reasonable attorneys' fees), or claims for injury or damages arising out of the performance of this Agreement but only in proportion to and to the extent such liability, loss, expense, attorneys' fees, or claims for injury or damages are caused by or result from the negligent or intentional acts or omissions of Participating Institution, its officers, agents, or employees.

9. **Disputes.** Resolution of disputes of a technical nature shall be resolved through good faith negotiations. Any dispute arising under or related to this Agreement shall be resolved to the maximum possible extent through negotiations and settlement. Failing settlement, despite good faith efforts by both parties, any such unresolved issues shall be arbitrated in accordance with the American Arbitration Association.

10. **Termination of Agreement**. Upon termination, Participating Institution must take immediate action to cease all expenditures financed by the Agreement and to cancel all unliquidated obligations to the extent possible. The Participating Institution may not enter into any additional obligations under the Agreement after receiving the notice of termination other than those reasonably necessary to effect the close out of the Agreement. Except as provided below, no further reimbursement will be made after the effective date of termination.

As soon as possible, but in any event no later than 90 days after the effective date of termination, the Participating Institution must repay to University all unexpended USAID funds that were not otherwise obligated prior to the effective date of termination by a legally binding transaction applicable to the Agreement. If the funds paid to the Participating Institution before the effective date of termination are not sufficient to cover the Participating Institution's obligations under a legally binding transaction, then the Participating Institution may submit a written claim for such amount to

USAID University within 120 days after the effective date of termination. The Agreement Officer will determine the amount(s) to be paid to the Participating Institution under the claim in accordance with the "Allowable Costs" provision of the Agreement. This agreement terminates, and authority to expend awarded funds shall cease, under any one of the following conditions:

A. The Prime Agreement is not extended past the end of the Period of Performance.

B. USAID cancels the Prime Agreement or reduces the available funding level.

C. USAID mandates ceasing activities in a geographic region or disallows continuance of the research as set forth in the Project.

D. The host government(s) formally objects to the presence of the Project or principal participants in the Project.

E. The Participating Institution's Principal Investigator resigns from the Project or the Participating Institution, or has not performed satisfactorily.

F. The Participating Institution has terminated the agreement with University.

G. The Participating Institution fails to comply with the terms of the Standard Provisions and/or tenets of this Agreement.

H. Evidence of gross incompetence and/or malfeasance by the Participating Institution.

11. **Authorized Geographic Code.** The authorized geographic code for procurement of goods and services under this Agreement is 937 – the United States, the cooperating/Participating Institution country, and developing countries other than advanced developing countries, and excluding prohibited sources.

12. **Program Income.** Program income is not expected to be generated by the Participating Institution. However, any program income that is generated shall be accounted for as program income and will be added to the Project, in accordance with 2 CFR 200.

13. **Subcontractors.** The Participating Institution's intention to procure services from a contractor (as defined in 2 CFR 200.330 b) by the Participating Institution under this Agreement must be identified in the Participating Institution's detailed Project proposal/work plan and detailed budget unless the intended subcontract is under the Simplified Acquisition Threshold (reference 2 CFR 200.88) and the entity providing the service is not a foreign governmental entity or parastatal. Any deviation from this condition requires the express written approval of the University. The Participating Institution shall make certain that any and all subcontracts issued under this Agreement to a contractor shall include the appropriate mandatory clauses (available at https://www.acquisition.gov/far/current/html/52_301Matrix.html) and flow-down provisions applicable to subcontracts issued under this Agreement. The Mandatory Flow-Down Provisions for U.S. Subcontractors are incorporated herein as Exhibit E, and the Mandatory Flow-Down Provisions for Foreign Subcontractors are incorporated herein as Exhibit F.

No subcontract issued by the Participating Institution shall relieve the Participating Institution from any obligation, responsibility, or liability to the University issuing from each and every term and condition of this Agreement.

Prior approval and flow-down requirements outlined in this section do not apply to contracts intended to procure services from individuals.

14. **Subrecipients.** The Participating Institution's intention to involve a subrecipient (as defined in 2 CFR 200.330 a) under this Agreement must be identified in the Participating Institution's detailed Project proposal/work plan and detailed budget. Any deviation from this condition requires the

express written approval of the University. The Participating Institution shall make certain that any and all subawards which it may issue under this Agreement to a subrecipeint shall include the same terms and conditions regarding financial, property, and operational reporting requirements as those to which the Participating Institution is subject to under the terms and conditions of this Agreement. Further, any subrecipients that receive a subaward under this Agreement must complete the Mini-Audit Questionnaire, incorporated herein as Exhibit D, once per project year.

No subaward issued by the Participating Institution shall relieve the Participating Institution from any obligation, responsibility, or liability to the University issuing from each and every term and condition of this Agreement.

Prior approval and flow-down requirements cutlined in this section do not apply to contracts intended to procure services from individuals.

**15. Inventory and Property Management.**

The Participating Institution shall:

**A.** Take title to property, where authorized by the terms and conditions of the Prime Agreement, in such a way that the Participating Institution's financial records identify the source of funds; and

**B.** Reimburse the University for any costs or expenditures for which the University has compensated the Participating Institution and which either the University or USAID determines to be a disallowable cost; and

**C.** Comply with all equipment inventory and property management instructions which may hereafter be issued by the University and made applicable to the Participating Institution. A physical inventory will be conducted at least once per year, and the Principal Investigator will confirm in writing that the inventory of equipment purchased with funds under this Agreement is complete and correct; and

**D.** At the end of the subaward, all equipment and property held by the Participating Institution shall revert title to the University for use by other projects within the host country (reference USAID 2 CFR 200), and only if the University determines no use for the equipment within existing projects in-country, the equipment will then be disposed of as per USAID guidelines.

**16. Mandatory Standard Provisions.**

**A.** The following mandatory standard provisions are incorporated into this Agreement by reference with the same force and effect as if they were given in full text, shall hereinafter be referred to as "Domestic Mandatory Standard Provisions," and shall apply if the Participating Institution is an organization of the United States:

1. All provisions of 2 CFR 200; and

2. The Mandatory Standard Provisions for U.S. Nongovernmental Organizations revised 7/22/15 as provided in https://www.usaid.gov/ads/policy/300/303maa.

**B.** The following mandatory standard provisions are incorporated into this Agreement by reference with the same force and effect as if they were given in full text, shall hereinafter be referred to as "Foreign Mandatory Standard Provisions," and shall apply if the Participating Institution is not an organization of the United States:

1. The USAID's ADS 303mab, Standard Provisions for Non-U.S. Nongovernmental Organizations revised 7/22/15 (available for download at USAID website https://www.usaid.gov/ads/policy/300/303mab).

17. **Assignment.** Participating Institution shall not assign or transfer any responsibilities hereunder without the prior written consent of University.

18. **Protection of Human Subjects.** If human subjects are involved in the Project, Participating Institution shall conduct the activities in accordance with the Department of Health and Human Services regulations codified at 45 CFR 46 - Protection of Human Subjects. In such event, Participating Institution shall provide the designated University's Administrative Officer documentation that it is operating in accord with an approved Assurance of Compliance and shall cite the Assurance identification number. Participating Institution shall ensure that all personnel participating in the Project complete the education requirement on the protection of human subjects, as prescribed by the National Institutes of Health (NIH) in NIH Notice OD-00-039, and shall provide the designated University's Administrative Officer evidence that all such personnel have completed the requisite educational training. If planned activities involving human subjects are not exempt from said DHHS regulations, Participating Institution shall additionally provide certification of the review and date of approval by the Participating Institution's institutional review board, or equivalent thereof, of the planned involvement of human subjects in the Project. If applicable, the study protocol will also be reviewed and approved by the Institutional Review Board at the University of California, Davis.

19. **Care and Treatment of Laboratory Animals.** Participating Institution shall establish and maintain proper measures to ensure the appropriate care and use of live vertebrate animals involved in research supported by this Agreement, in accordance with the Animal Welfare Act as amended (7 USC 2131 et seq.) and the regulations promulgated thereunder by the Secretary of Agriculture (9 CFR, Subchapter A) pertaining to the care, handling, and treatment of warm-blooded animals held or used for research, teaching, or other activities supported by Federal funds. If Participating Institution's research hereunder involves vertebrate animals, execution of this document by Participating Institution's authorized official certifies that Participating Institution has on file with the NIH OPRR an approved Animal Welfare Assurance. Participating Institution shall submit to University's Administrative Officer verification of approval by Participating Institution's Institutional Animal Care and Use Committee of the planned care and use of animals in research activities to be supported hereunder.

20. **Alterations and Amendments.** No alteration or amendment of this Agreement shall be valid unless made by an instrument in writing, signed by authorized representatives of Participating Institution and University. No such alteration or amendment shall be construed to alter or amend any provisions of this Agreement unless expressly so stated in such written instrument.

21. **Debarment and Suspension.** Participating Institution certifies by signing this Agreement that neither it nor its principals are presently debarred, suspended, proposed for debarment, declared ineligible or voluntarily excluded from participation in this transaction by any federal department or agency.

22. **Insurance**. Participating Institution agrees to maintain, for the duration of this Agreement, insurance or a program of self-insurance, in an amount that will be adequate to cover its obligations hereunder, and upon request, will provide the University with proof of insurance showing that such insurance is in place.

23. **Data, Publication and Copyrights**. Participating Institution shall have the right to copyright, publish, disclose, disseminate, and use, in whole or in part, any data and information developed by Participating Institution under this Agreement. Participating Institution shall provide University an advance copy of all materials intended for disclosure. All materials must comply with applicable provisions of the Prime Agreement.

    A. The Participating Institution is encouraged to give public notice of the receipt of this Agreement and announce progress and accomplishments. The Participating Institution agrees that in the release of information relating to this Agreement, such release shall include a statement to the effect that the Project or effort depicted was or is sponsored by

USAID Agreement Number AID-OAA-A-14-00102 that was awarded to The Regents of the University of California and subcontracted to Participating Institution, and the content of the information does not necessarily reflect the position or the policy of the U.S. Government, USAID, or University, and no official endorsement should be inferred.

B. The Participating Institution must provide copies of notices or announcements to the University, USAID's Agreement Officer's Representative (AOR), and to USAID's Office of Legislative and Public Affairs in advance of release, as practical. Press releases or other public notices must include a statement substantially as follows:

*"The U.S. Agency for International Development administers the U.S. foreign assistance program providing economic and humanitarian assistance in more than 80 countries worldwide."*

For the purpose of this provision, "information" includes news releases, articles, manuscripts, brochures, advertisements, still and motion pictures, speeches, trade association proceedings, symposia, et cetera.

C. Any public communication which has not been approved by USAID must contain the following disclaimer:

*"This study/report/audio/visual/other information/media product (specify) is made possible by the generous support of the American people through the United States Agency for International Development (USAID). The contents are the responsibility of [insert recipient name] and do not necessarily reflect the views of USAID or the United States Government."*

D. The following provision is included per 2 CFR 200, Marking:

*"As a condition of receipt of this subaward, marking with the USAID identity of a size and prominence equivalent to or greater than the recipient's, subrecipient's, other donor's or third party's is required. In the event the recipient chooses not to require marking with its own identity or logo by the subrecipient, USAID may, at its discretion, require marking by the subrecipient with the USAID identity."*

E. Participating Institution agrees not to use the name of University or its employees in any advertisement, press release, or publicity notice with reference to this Agreement or any product or service resulting from this Agreement without sending an informational copy to University at the time of release or publication. Participating Institution will acknowledge USAID's and University's support in its above-defined publications, disclosures, disseminations, advertisements, press releases, and publicity notices unless USAID desires otherwise and so advises University, who in turn shall advise Participating Institution.

F. Subject to its legal ability to do so, Participating Institution hereby grants University license to use data created in the performance of this Agreement.

G. Participating Institution hereby grants to University an irrevocable, royalty-free, non-transferable, non-exclusive right and license to reproduce, make derivative works, display, and perform publicly any copyrightable or copyrighted material (including any computer software and its documentation and/or database) developed and delivered under this Agreement.

24. **Prime Agreement Provisions.** The following provisions of the Prime Agreement, suitably modified as follows, are hereby incorporated by reference and carry the same force and effect as if included in full text:

Recipient shall mean Participating Institution

C. Article M6, Subagreements (June 2012)
D. Article M8, USAID Eligibility Rules for Goods and Services (June 2012)
E. Article M11, Equal Participation By Faith-Based Organizations (June 2012)
F. Article M12, Preventing Terrorist Financing (August 2013)
G. Article M17, Travel and International Air Transportation (August 2013)
H. Article M20, Trafficking in Persons (June 2012)
I. Article M22, Limiting Construction Activities (August 2013)
J. Article RAA12, Reporting host Government Taxes (June 2012)
K. Article RAA25, Human Rights Violations and Sanctions Program in Burma (June 2015)
L. Article RAA24, Protecting Life in Global Health Assistance (May 2017)

25. **Entire Agreement.** The terms and conditions contained herein and in the following attachments constitute the entire Agreement between **The Regents of the University of California** and **Johns Hopkins University:**

**Exhibit A** – Prime Agreement
**Exhibit B** – Scope of Work
**Exhibit C** – Subaward Budget
**Exhibit D** – Mini-Audit Questionnaire
**Exhibit E** – Mandatory Flow-Down Provisions for U.S. Subcontractors
**Exhibit F** – Mandatory Flow-Down Provisions for Foreign Subcontractors
**Exhibit G** – Prohibition of Salary Supplements with PREDICT-2 Funds

IN WITNESS WHEREOF, the Parties have caused this contract to be effective as of the date specified in Article III above with signatory approval of their duly authorized representatives.

**THE REGENTS OF THE UNIVERSITY OF CALIFORNIA**

By: _____
Paula Noble
Contracts and Grants Officer

Date: _____

**JOHNS HOPKINS UNIVERSITY**

By: _____
Name:
Title:

Date: _____

USAID
FROM THE AMERICAN PEOPLE

September 29, 2014

Jonna AK Mazet, DVM, MPVM, PhD
Professor and Executive Director
School of Veterinary Medicine
University of California
One Health Institute
Davis, California 95616

Subject: Cooperative Agreement No. AID-OAA-A-14-00102 for PREDICT-2

Dear Dr. Mazet:

Pursuant to the authority contained in the Foreign Assistance Act of 1961, as amended, the U.S. Agency for International Development (USAID) awards to University of California, School of Veterinary Medicine, Davis, CA, hereinafter referred to as the "Recipient", the sum of $100,000,000 to provide support to the PREDICT-2 project as described in the Schedule of this award and in Attachment B, entitled "Program Description."

This Cooperative Agreement is effective October 1, 2014 and the obligation shall apply to expenditures made by the Recipient in furtherance of program objectives during the period of performance, beginning with the effective date 10/01/2014 and ending 09/30/2019. USAID will not be liable for reimbursing the Recipient for any costs in excess of the obligated amount or outside of the period of performance.

This Cooperative Agreement is made to the Recipient, on condition that the funds will be administered in accordance with the terms and conditions as set forth in Attachment A (Schedule), Attachment B (Program Description), and Attachment C (Branding Strategy and Marking Plan) and Attachment D (Standard Provisions) and Attachment E (Initial Environmental Examination), all of which have been agreed to by your organization.

Please sign this letter, where indicated on the second page, to acknowledge your receipt of the Cooperative Agreement, and return to the Agreement Officer at your earliest convenience.

Sincerely yours,

Patricia Bradley

Patricia Bradley
Agreement Officer
USAID

U.S. Agency for International Development
1300 Pennsylvania Avenue, NW
Washington, DC 20523
www.usaid.gov

Attachments:

A. Schedule
B. Program Description
C. Branding Strategy and Marking Plan
D. Standard Provisions
E. Initial Environmental Examination
F. Table of Acronyms

ACKNOWLEDGED:

BY: Ahmad Hakim-Elahi, Ph.D., J.D.
TITLE: Executive Director, Research Administration
DATE: September 30, 2014

Ahmad Hakim-Elahi, Ph.D., J.D.
Executive Director, Research Administration
Office of Research, Sponsored Programs
University of California, Davis
1850 Research Park Drive, Suite 300
Davis, CA 95618
(530) 754-7700, FAX (530) 754-8328

9/30/2014

Exhibit A

A. GENERAL

1. Amount Obligated this Action: $13,600,000.00
2. Total Estimated USAID Amount: $100,000,000.00
3. Total Obligated USAID Amount: $13,600,000.00
4. Cost-Sharing Amount (Non-Federal): $3,697,810.00
5. Activity Title: PREDICT-2
6. USAID Technical Office: GH/HIDN/PIOET
7. Tax I.D. Number: 94-6036494
8. DUNS No.: 04-712-0084
9. LOC Number: 29BBP

B. SPECIFIC

| | |
|---|---|
| Account ID | 1 |
| Account Template | GH-HN Program Funds |
| BBFY | 2014 |
| EBFY | 2015 |
| Fund | GH-C-AI |
| OP | GH/HIDN |
| Program Area | A11 |
| Dist Code | 936-4002 |
| Program Elem | A050 |
| BGA | 997 |
| SOC | 4100201 |
| Obligated Amount | $13,600,000 |
| Fund Type | Appropriated |
| Treasury Account Symbol | 19-1031-000 |
| Payment Office | M/CFO/CMP |
| Requisition Number | REQ-GH-14-000122 |

C. PAYMENT OFFICE

The USAID M/FM office prefers to receive invoices via email. When submitting invoices to USAID FM, in addition to the required submission to the Agreement Officer Representative (AOR), please send to:

Vendor invoices: loc@usaid.gov
Point of Contact: LOC Team Leader
Phone: (202) 567-5141
FAX: (202) 567-5264

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# ATTACHMENT A – SCHEDULE

## A.1 PURPOSE OF AWARD

The purpose of this Cooperative Agreement is to provide support for the program described in Attachment B to this Cooperative Agreement entitled "Program Description."

## A.2 PERIOD OF AWARD

1. The effective date of this Cooperative Agreement is October 1, 2014. The estimated completion date of this Cooperative Agreement is September 30, 2019.

2. Funds obligated hereunder are available for program expenditures for the estimated period beginning the effective date of the Agreement through completion date as shown in the Agreement budget below.

## A. 3 AMOUNT OF AWARD AND PAYMENT

1. The total estimated amount of this Award for the period shown in A.2.1 above is $100,000,000 not including required cost share of $3,697,810.

2. USAID hereby obligates the amount of $13,600,000 for program expenditures during the period set forth in A.2 above. The Recipient will be given written notice by the Agreement Officer if additional funds will be added. USAID is not obligated to reimburse the Grantee for the expenditure of amounts in excess of the total obligated amount.

3. Payment will be made to the Recipient by Letter of Credit in accordance with procedures set forth in 22 CFR 226

4. Additional funds up to the total amount of the Cooperative Agreement stated in A.3.1, above may be obligated by USAID subject to the availability of funds, satisfactory progress of the project, and continued relevance to USAID programs.

## A. 4 AWARD BUDGET

The following is the Award Budget, including local cost financing items, if authorized. Revisions to this budget shall be made in accordance with 22 CFR 226.

| Categories | USAID funding |
|---|---|
| Total Direct Costs | $ 93,513,570 |
| Indirect Costs | $ 6,486,430 |
| **Total Federal Share** | **$100,000,000** |
| Cost Share | $3,697,810 |
| **Total Program Amount** | **$103,697,810** |

Exhibit A

## A.5 INDIRECT COST RATE

Pending establishment of revised provisional or final indirect cost rates, allowable indirect costs shall be reimbursed on the basis of the following negotiated provisional rates and the appropriate base:

| Type | From: | To: | Rate % | Location | Application |
|---|---|---|---|---|---|
| Pred. | 7/1/2014 | 6/30/2015 | 55.50 | On campus | Organized Res. |
| Pred. | 7/1/2015 | 6/30/2016 | 56.50 | On campus | Organized Res. |
| Pred. | 7/1/2016 | 6/30/2018 | 57.00 | On campus | Organized Res. |
| Pred. | 7/1/2013 | 6/30/2018 | 26.00 | Off campus | Organized Res. |
| Pred. | 7/1/2014 | 6/30/2015 | 38.00 | On campus | Other Spons Act |
| Pred. | 7/1/2014 | 6/30/2015 | 24.50 | Off campus | Other Spons Act |
| Pred. | 7/1/2015 | 6/30/2016 | 38.50 | On campus | Other Spons Act |
| Pred. | 7/1/2015 | 6/30/2016 | 24.50 | Off campus | Other Spons Act |
| Pred. | 7/1/2016 | 6/30/2018 | 39.00 | On campus | Other Spons Act |
| Pred. | 7/1/2016 | 6/30/2018 | 25.00 | Off campus | Other Spons Act |
| Pred. | 7/1/2013 | 6/30/2018 | 50.00 | On campus | Instruction |
| Pred. | 7/1/2013 | 6/30/2018 | 26.00 | Off campus | Instruction |
| Pred. | 7/1/2013 | 6/30/2018 | 22.70 | Primate Ctr | Core Grant (1) |
| Pred. | 7/1/2013 | 6/30/2018 | 54.40 | Primate Ctr | Non-Core Fed (1) |
| Pred. | 7/1/2013 | 6/30/2018 | 8.00 | Off campus | IPA (2) |
| Prov. | 7/1/2018 | until amended | | (3) | |

Base of Application

Modified total direct costs, consisting of all salaries and wages, fringe benefits, materials, supplies, services, travel and subgrants and subcontracts up to the first $25,000 of each subgrant or subcontract (regardless of the period covered by the subgrant or subcontract) . Modified total direct costs shall exclude equipment, capital expenditures, charges for patient care, student tuition remission, rental costs of off-site facilities, scholarships, and fellowships as well as the portion of each subgrant and subcontract in excess of $25,000.

(1) Primate Center - The California National Primate Research Center (CNPRC) Non-Core Federal rate (54.4%) is applied only to the direct research costs of Federally sponsored awards excluding the National Center for Research Resources (NCRR) Core Grant. All recoveries from application of this rate represent university F&A expenditures allocated to the CNPRC (22.7%) and CNPRC-specific F&A expenditures (31.7).

(2) Intergovernmental Personnel Act Agreements.

(3) Use the same rates and conditions as those cited for fiscal year ending June 30, 2018.

## A.6 TITLE TO PROPERTY

Property Title will be vested with the Recipient.

## A.7 AUTHORIZED GEOGRAPHIC CODE

The authorized geographic code for the procurement of services and commodities for the cooperative agreement is 937.

## A.8 COST SHARING

The Recipient agrees to expend cost share in an amount not less than $3,697,810 under this agreement. All cost sharing contributions shall be in accordance with 22 CFR.226.23 and Standard Provisions on Cost Sharing or Matching and are subject to audit.

## A.9 PROGRAM INCOME

The Recipient shall account for Program Income in accordance with 22 CFR 226.24 (or the Standard Provision entitled Program Income for non-U.S. organizations). Program Income earned under this award shall be added to the total estimated amount of the program.

## A.10 SUBTANTIAL INVOLVEMENT

Substantial involvement during the implementation of this Agreement must be limited to approval of the elements listed below:

1. Approval of all annual implementation plans, budgets, and all modifications which describe the specific activities to be carried out under the Agreement, subawards, and progress reports;

2. Approval of key personnel to include the following positions:
    a. Project Director
    b. Operations Manager
    c. Senior Biological and Ecological Surveillance Coordinator
    d. Senior Behavioral Surveillance Coordinator
    e. EPT-2 Liaison

3. Approval of Monitoring and Evaluation Plans - USAID involvement in monitoring progress toward achievement of the Objective and Expected Results during the course of the Agreements and in monitoring financial expenditures;

4. Collaboration or joint participation of USAID with the Recipient in accomplishing specific elements in the program description where there are specific elements in the Program Description for which USAID's technical knowledge would benefit the Recipient's successful accomplishment of stated program objectives, to include:

a. Concurrence on the substantive provisions of sub-awards, including work plans, monitoring and evaluation plans, budgets, timelines, personnel, reporting (programmatic and financial), and any modifications.

b. Collaborative involvement in the selection of sub-awardees, grantees, and other partners.

c. USAID will be involved in the substantive direction/re-direction of inter-relationships with other projects as described in section D.3., USAID Management.

5. As appropriate, other monitoring as described in 22 CFR 226.

**A.11 REPORTING REQUIREMENTS**

a. Initial Work Plan to be submitted within 60 days of signing the cooperative agreement and Annual Work Plans for subsequent years to be submitted 30 days prior to the start of the new year.

b. Semi-annual reports shall be due 30 days after the reporting period. Annual Reports shall be submitted 90 calendar days after the award year in accordance with 22 CFR 226.51(b).

c. Final Evaluation Report: to be submitted 90 calendar days after the expiration or termination of the award which is in accordance with 22 CFR 226.51(b).

d. Financial Reporting: in accordance with 22 CFR 226.52, the SF 425 and SF 272 will be required on a quarterly basis.

**A.12 SPECIAL PROVISIONS**

**A.12.1 SUBAWARD BUDGET APPROVAL**

The subaward budget for Metabiota, Inc. is not pre-approved and AO approval post award is required. While the subaward to Metabiota doesn't need to be competed, the detailed budget, and budget notes have to be submitted to the Administrative AO within 60 days from the award date of this agreement. This budget approval will not be delegated to the AOR.

**A.12.2 COUNTRY-BY-COUNTRY BREAKDOWN OF EXPENDITURES**

The quarterly expenditure reports shall be sent to the AOR, no later than 45 calendar days after the end of each quarter. The quarterly expenditure report shall include, at minimum, obligations to date, the approved budget, expenditures to date, accruals to date, and the balance remaining. The report shall be broken down by country and core funds. Both field support and core funds must be tracked by program directive. In some cases, there will be multiple sources of funding for an activity, but the implementer must be able to demonstrate in the budget, expenditures and balances the flow of the money from multiple sources. The budget line items should include the major categories.

The recipient should list each country, included in the program, and the total amount expended for each country under the award for the reporting period in the "remarks" block on the "Federal

Financial Report" forms SF 425 or SF 425a, or on a separate sheet of paper with the "Request for Advance or reimbursement" SF270.

## A.12.3 ENVIRONMENTAL COMPLIANCE

An Initial Environmental Examination (IEE) has been approved for the PREDICT-2 Project (see Attachment E). The IEE covers activities to be implemented under this cooperative agreement. USAID has determined that a **Negative Determination with conditions** applies to one or more of the proposed activities. This indicates that if these activities are implemented subject to the specified conditions, they are expected to have no significant adverse effect on the environment. The recipient shall be responsible for implementing all IEE conditions pertaining to activities performed under this award.

1. As part of its initial Work Plan, and all Annual Work Plans thereafter, the recipient, in collaboration with the USAID Agreement Officer's Representative (AOR) and Mission Environmental Officer or Bureau Environmental Officer, as appropriate, shall review all ongoing and planned activities under this cooperative agreement to determine if they are within the scope of the approved Regulation 216 environmental documentation.
2. If the recipient plans any new activities outside the scope of the approved Regulation 216 environmental documentation, it shall prepare an amendment to the documentation for USAID review and approval. No such new activities shall be undertaken prior to receiving written USAID approval of environmental documentation amendments.
3. Any ongoing activities found to be outside the scope of the approved Regulation 216 environmental documentation shall be halted until an amendment to the documentation is submitted and written approval is received from USAID.

Unless the approved Regulation 216 documentation contains a complete environmental mitigation and monitoring plan (EMMP) or a project mitigation and monitoring (M&M) plan, the recipient shall prepare an EMMP or M&M Plan describing how the recipient will, in specific terms, implement all IEE and/or EA conditions that apply to proposed project activities within the scope of the award. The EMMP or M&M Plan shall include monitoring the implementation of the conditions and their effectiveness.

When the approved Regulation 216 documentation is (1) an IEE that contains one or more Negative Determinations with conditions and/or (2) an EA, the recipient shall integrate a completed EMMP or M&M Plan into the Initial Work Plan or the subsequent Annual Work Plans, making any necessary adjustments to activity implementation in order to minimize adverse impacts to the environment.

**End of Attachment A**

# ATTACHMENT B – PROGRAM DESCRIPTION
# PREDICT-2

**Technical Approach**

In recognition of the realized and forecasted costs of emerging infectious diseases in both lives lost and dollars spent on response, treatment, and control, our consortium proposes to partner with USAID to continue to shift the prevention and surveillance paradigm upstream to: identify and better characterize pathogens of known epidemic and unknown pandemic potential; recognize animal reservoirs and amplification hosts of human-infectious viruses; and efficiently target intervention action at human behaviors which amplify disease transmission at critical animal-animal and animal-human interfaces in hotspots of viral evolution, spillover, amplification, and spread. To achieve these objectives, we will operationalize effective One Health platforms by increasing knowledge and functional technological capacity in local, national, and regional contexts. Critical capacity improvements will be attained in cross-sectoral communications and engagements for surveillance system design, field sampling, laboratory techniques, behavioral risk characterization, information management, public data dissemination, and data analytics and forecasting (e.g. viral ecology, geospatial analysis, pathogen and behavioral risk assessment, integrated pandemic risk analyses, risk communication). Instead of the broad approach needed in EPT-1, we propose to focus efforts on the highest risk locations and interfaces, where animals and people share changing landscapes, and diseases of unknown origin continue to take a significant toll.

Building on the surveillance activities and data made publically available in PREDICT-1, high-risk animal-to-animal and animal-to-human disease transmission interfaces have been integrated here into three major pandemic risk pathways: land conversion for commercialization, intensification of animal production systems, and animal value chains (see figure at right depicting the three major pathways that drive viral emergence in EPT-2 countries that we propose to target in PREDICT-2 and the associated hypothetical change in zoonotic emergence risk). We will use an epizonal approach to target these disease emergence and transmission pathways, characterizing the whole geographic, ecological, and sociological space, from pre-spillover conditions that drive viral evolution, through transmission of zoonoses, to circumstances of pathogen amplification and spread. This approach will facilitate the shaping and optimization of policies and practices that can reduce disease transmission risk through sound, science-based risk mitigation interventions at the community and industrial scale.

*Objective 1: Biological and ecological risk characterization*

Our consortium is well positioned to enhance the in-country and regional operational platforms, partnerships, and knowledge of best practices in field sampling and data collection recently gained from advances in zoonotic pathogen surveillance at high-risk animal-human disease transmission interfaces. For PREDICT-2, we propose a strategic, highly focused approach to identify the biological and ecological drivers and host-pathogen dynamics at high-risk interfaces within three

**critical pathways of disease emergence and spread in Asia and Africa.**

**1.1. Targeted monitoring of zoonotic viruses with pandemic potential at specific high-risk interfaces** Surveillance for zoonotic viruses, implemented together with in-country and EPT-2 partners, such as CDC, WHO, and FAO, will be prioritized at field sites most reflective of the processes underlying pathways for viral evolution, spillover, amplification, and spread.

**1.1.a. Biological surveillance:** to the extent feasible, data sets collected at all field sites will include:

i) Standardized, concurrent, and selectively longitudinal sampling of wildlife, livestock, and at-risk human populations with high levels of contact with animals, with special focus on influenza-like illness (ILI), severe acute respiratory infection (SARI), and fever of unknown origin (FUO) patients.

ii) Standardized collection of data on human movements, behaviors, and practices and the ecological conditions governing these aspects of human ecology (see Obj. 2).

iii) Detection and characterization of pathogens and evidence of infectivity and transmissibility among animal hosts and people.

iv) Analyses of key viral characteristics in combination with data collected on hosts, ecological drivers, human behaviors and practices, exposure rates, and ecological conditions for more precise ranking of high-risk interfaces and identification of key processes influencing the evolution, spillover, amplification, and spread of viral threats.

v) Establishment of collaborative platforms and national partnerships for longitudinal monitoring of viral threats at high-risk interfaces in conjunction with EPT partners and projects. Our intention is to facilitate wildlife, livestock, and human biological surveillance at all targeted high-risk disease emergence pathways (see 1.1.b. below). An initial scoping effort will be necessary on a country-by-country basis to identify sites for sampling activities based on potential to inform on disease emergence pathways and location within an epidemiological zone. Once locations are selected, we will assess feasibility for using existing in-country platforms and collaborating with in- country government partners, CDC, FAO, etc. on sampling activities.

vi) Simultaneous collection of human, livestock, and wildlife samples, as well as environmental and behavioral data, across the pathways described below (1.1.b.) in all intensive countries and most, if not all, less intensive countries. We will partner with in-country ministries, universities, and NGOs to achieve this goal in addition to fully coordinating sampling with FAO, CDC, and WHO in countries where they are actively collecting data for EPT-2. In some countries, the PREDICT-2 team will likely lead sample collection for people and all animals, while in others one or more of our partners may lead a section of the collection. In either scenario, we intend to collect human and animal samples aligned in time and space. In addition, we plan to test samples from livestock and humans using the successfully designed and employed platform used on wildlife samples in PREDICT-1.

**1.1.b. High-risk pathways for disease emergence and spread:**

i)**Land conversion for commercialization:** We propose focused, standardized biological surveillance for pathogens in rapid and dramatically changing landscapes under circumstances that bring potentially immunologically stressed or naïve individuals into contact with potential spillover organisms.

- New settlements and vulnerable human populations due to extractive industry growth.

conflict, economic hardship, and developing tourism: We will sample in temporary settlement communities in high biodiversity areas that constitute hotspots for disease emergence, as well as in the source communities of workers and their food animals. Sudden incursion into previously pristine areas and settlements with poor infrastructure are frequently associated with new exposure to animal reservoirs, subsequent introduction of infectious diseases, and movement of infected people through local and long-range travel.

- Sampling activities and viral characterization will target wild and domestic animals and people in new settlements with ongoing land-use change (such as mining/oil extraction camps, refugee/migrant worker camps, urban slums, and high-risk ecotourism sites) and vulnerable and highly mobile human populations at these sites within transboundary epizones connected by migration and human travel.
- Key pandemic risk factors identified through previous work will be further characterized by quantifying viral sharing among hosts and determining whether viral diversity and number of new viruses in animals and humans (disaggregated by gender) are higher at sites with new settlements, as well as evaluation of whether geographic distribution of viruses is associated with measures of animal and human mobility, resulting in high-risk epizones and heightened potential for global spread.

- Agricultural conversion in biodiversity hotspots: Cultivated systems cover one quarter of the earth's land surface, and conversion to cropland has been identified as one major driver of emerging infectious disease (EID) events. Agricultural intensification and subsistence farming is a high-risk interface common to all EPT-2 target countries. Crops are commonly raided by wildlife; peri-domestic animal populations (e.g. rodents) often exploit these niches; workers and consumers (including livestock) are exposed to zoonotic diseases in contaminated crops; and amplification and point source spread of disease occurs through shared food sources.
  - In coordination with EPT partners, standardized animal and human sampling activities and viral characterization will target agricultural land adjacent to highly biodiverse regions, such as palm oil plantations, and sentinels for likely routes of spread through transport and trade of agricultural products.
  - Surveillance results will be compared with baseline data from a small number of pristine and light-use sites to identify how rapidly this pathway increases EID risk.

ii) **Intensification of animal production systems:** We propose expanded biological surveillance along a continuum from rural pastoral settings to large-scale animal production systems with varying biosecurity, which facilitate frequent direct human-livestock contact and intermingling with wildlife species.

- Sampling activities and viral characterization will target wild and domestic animals and at-risk people (disaggregated by gender) in a range of production systems that are regionally connected by animal transport within epizones.
- Key pandemic mechanisms identified through previous work will be further characterized in this pathway, including the use of viral traceback and genetic approaches to determine whether co-mingling of wild and domestic animals in low biosecurity systems across the epizone leads to broader viral sharing and expanded host ranges, higher probability of human-to-human transmissibility, and geographic spread.

iii) **Animal value chains:** Collaborative work with FAO, CDC, and others has examined the routes and magnitude of the $350B wildlife trade which provides opportunities for pathogen transmission among domestic animals and co-mingling wild animals transported for consumption, medicinal uses, or to be kept as pets. We propose to focus our biological

surveillance activities along the wildlife and domestic animal value chains from remote naturally biodiverse regions to densely populated urban areas actively trading in varied animal species and products.

- We will characterize known and novel animal and human viruses and high-risk communities, describe animal and human mobility, identify high-risk nodes in the value chain using network analyses, and combine ecological and behavioral risk data (disaggregated by age, culture, and gender) to identify risk factors associated with viral evolution, spillover, amplification, and spread.
- We will also map out local and global trade routes to predict the spread of pathogens and, combined with our knowledge of pathogen diversity in wildlife hosts globally, predict the likelihood of a new pathogen spreading through value chains within an epizone and globally.

**1.2. Characterization of climate and ecological factors**

We propose the collection of standardized data at regular intervals on climatic and ecological factors identified as important drivers of pandemic risk via their effects on viral evolution, spillover, amplification or spread, including common measures of weather (temperature, precipitation), climatic envelopes, specific land cover, and anthropogenic land-use change activities at field sites prioritized for surveillance as above.

**1.2.a. Climate, land use change, and niche modeling:** We will integrate host and viral ecological niche model projections with viral and host phylogeographic analyses and current and future land use change scenarios to identify sites of future epizones where reservoir hosts will potentially co-exist based on climate and land conversion projections, flagging areas of concern for virus emergence.

**1.2.b. Characterizing ecological risk and predicting spillover:** We will continue to advance knowledge of ecological changes, including conversion of land from forest to crops and changes in human population density, that are recognized drivers for disease emergence. Employing geospatial analytical tools we will map and quantify high- risk ecological and behavioral data along our primary pathways of emergence. We will then integrate this spatial risk information with our host and pathogen databases and the phylogenetic and life-history predictors of zoonotic risk, creating a spatially-explicit, macroecological and behavioral framework to model the drivers of viral evolution, spillover risk, amplification, and spread, enabling us to compare pandemic risk within and between specific epizones. Here, life- history refers to the specific characteristics of different host species that affect their demographics and can influence their ability to harbor zoonotic agents. For example, some animal host species have higher reproductive rates, and this can lead to rapid population growth, heightened transmission of viruses, and increased risk of spillover to people. In PREDICT-1, we gathered information on these characteristics, as well as information about the viral diversity in different wildlife species. In PREDICT-2, we propose to analyze how host life history and viral diversity, as well as environmental change and human risk behavior, influence the likelihood of heightened viral evolution, spillover, amplification, and spread.

**1.3. Longitudinal monitoring of viruses to track changes in geographic and host distribution, genetic sequences, transmissibility, infectivity, and viral evolution**

**1.3.a. Viral detection and discovery:** Virus detection across high-risk interfaces within the specified pathways for emergence will be performed using a combination of consensus PCR (cPCR) and high through-put sequencing (HTS), a strategic approach to combine high

sensitivity with broad reactivity to discover novel viruses from many different hosts and sample types. Consensus PCR permits the "universal" amplification of viruses within a given viral family or genus, and the subsequent discernment of strains (both known and new). To guard against the potential of cPCR to miss viruses that are divergent or not among the initial targeted viral families, the application of the more inclusive but less sensitive HTS allows for the capture of a very broad diversity of viruses because it amplifies all viral nucleic acids present in the sample. We plan to use cPCR as our main discovery tool in all countries for biological surveillance (humans, wildlife, and domestic animals) on selected sample types based on interface and contact (i.e. potential for exposure) between animals and people and apply HTS to a subset of these samples for more detailed characterization. Serological assays will also be developed for targeted screening of prior exposure to selected, key pathogens and pathogen clades and will be used to identify previous and potentially ongoing spillover in animal and human populations at high-risk interfaces and amplification zones (see 1.3.c.).

**1.3.b. Target viral families:** In PREDICT-1 the list of target families/genera was necessarily broad and included families that, despite their (perceived) lower pandemic risk, had sufficient abundance and diversity in wildlife to act as useful targets for laboratory capacity building and successful training using the PREDICT protocols. If the successful bidder for PREDICT-2, we propose to focus our activities on viral families of potential pandemic (Tier 1) or epidemic (Tier 2) significance, as well as those with previous association with ILI, SARI, FUO, and hemorrhagic disease. Tier 1 will include viral families, such as corona-, paramyxo- and influenza viruses, and testing for these families will be conducted on selected, longitudinally-collected samples based on interface and type of contact with humans, wildlife, and domestic animals (performed in coordination with local partners, CDC, WHO, and FAO) in all target epizones. Tier 2 will include viral families, such as retro-, arena-, filo-, flavi-, bunya-, reo-, rhabdo-, picorna-, alpha-, adeno-, and pox- viruses, and will be conducted along with Tier 1 families in intensive-engagement regions; however, not all of these families will be applied equally to all samples. Selection of families from this list (for Tier 2 testing) and additions to Tier 1 testing will be adaptive in both high and low intensive countries and will depend on several criteria, including:
(1) the need to have consistent data across pathways for emergence; (2) high-risk interface; (3) need for knowledge on a particular viral family in a given region/epizone; (4) presence of undiagnosed human disease for which a given family might reasonably include an etiologic agent; and (5) resource availability after formal priority setting.

**1.3.c. Serology to characterize exposure in human and animal populations and detect spillover:** Because viral infections are often self-limiting in a host, PCR tests directed at detecting viral shedding and the potential for active transmission usually reveal lower numbers of positives than serological tests which may identify up to 100% of individuals previously exposed to a virus. Once key pathogens are identified in a particular epizone, we will, on a selective basis, develop serological assays to screen populations of people and animals (both livestock and wildlife) at high-risk interfaces to determine whether pathogen sharing has occurred. Serological assays may also be used to trace novel pathogens found in acutely ill human subjects back to potential animal reservoirs and amplification hosts. Serology may be used to characterize the frequency of host jumping within specific amplification zones, such as on farms and in markets, by screening animal populations that are in close contact at high density. We will develop in- country capacity to utilize serological assays developed under this

project, focusing on platforms that are readily available and practical to use in partner countries (e.g. ELISA assays).

1.3.d. **Mapping viral diversity and evolution:** We will integrate host-pathogen evolutionary and ecological data and viral phylogenies into analyses of global viral diversity and viral phylogeography using publically available data from PREDICT-1, longitudinal and other data collected during PREDICT-2, and the published literature. This activity will allow us to better understand how viruses evolve within the three emergence pathways and which viral clades are more likely to spillover in which host species assemblages (e.g. in wildlife/livestock markets) to answer key questions on the rules governing pandemic viral risk.

**1.4. Expanded characterization of viruses to better understand pandemic potential, geographic and host distribution, and genetic diversity**

Viruses detected from Tier 1 families that have a wider range of hosts, are related to known pathogens, are detected in new or unusual host species, or cluster with known pathogens found in other host taxa will be targeted for further characterization. Full genome sequencing and virus isolation will allow for accurate taxonomic placement, characterization of virus-host cell receptor interactions, improved understanding of host diversity and the evolutionary processes that shape viral diversity (e.g. reassortment/recombination), and the design of assays to investigate human exposure to these agents. Viruses from Tier 2 families may be similarly characterized if they have high host plasticity, are novel or related to a known pathogen, found at high frequencies at high-risk interfaces, and/or detected in species with known exposure to people with clinical disease.

**1.5. Characterization of pathogens for Influenza-Like Illnesses (ILI), Severe Acute Respiratory Infections (SARI), and Fevers of Unknown Origin (FUO)**

The study of diseases of unknown origin (DUO) provides an important tool for the identification of new and previously undetected pathogens that have the capacity to infect and potentially spread in human populations. Laboratory examination of syndromic surveillance samples are needed to identify novel agents in association with ILI, SARI, FUO, as well as other syndromes, such as hemorrhagic fever and encephalitis. In addition to the viral detection approaches described above, cPCR targeting conserved genes (e.g. 16s) will be used when appropriate to identify the full range of bacterial pathogens in specimens from DUO patients. As with our viral testing, we will adopt a tiered approach (described below) that will utilize the equivalent of viral family-level PCR with follow up characterization to identify new bacterial agents in the DUO specimens.

Consensus PCR for 16s rRNA: Unlike viruses, all bacteria share a conserved RNA called 16s rRNA. The presence of 16s in all bacteria means they can all be readily detected using PCR primers that target this gene. This removes the need to test for many different families or genera one after the other (as we do with viruses), or in the event of resource constraints, to have to choose which families to include/exclude from our testing strategy. This approach saves on resources and time and also prevents sample exhaustion because all bacteria are considered in one assay (important if we are also considering viral agents). That said, this 'universal amplification' also makes the 16s approach extremely vulnerable to false positives because of frequent sample contamination. Bacteria commonly found in the environment, on skin, in lab reagents (buffers, enzymes), or equipment are all known to contaminate diagnostic samples readily and often lead to false positives. Very careful sample collection and laboratory processing protocols must be followed in order to reduce the number of false positive results. We have already established laboratory procedures for handling samples for bacterial diagnostics (including sterile handling

practices, UV sterilization of equipment and tubes, filtration of buffers, and the inclusion of numerous extraction and PCR controls), and part of our resource allocation in PREDICT-2 will include training and implementation of these protocols in PREDICT-2 labs.

Follow-up of 16s rRNA positives: While the 16s approach will identify the presence of bacteria in a given sample and identify the family to which that bacteria belongs, the sequence obtained is rarely sufficient to distinguish down to the species or strain level. The ability to resolve the taxonomy of bacteria is particularly important because several families contain some species/strains that are common in the environment and others that are capable of causing human disease. Distinguishing between an innocuous environmental/commensal bacteria and a potential pathogen will (often) therefore require additional targeted testing. We have already designed assays capable of rapidly identifying all of the major human bacterial pathogens and plan to implement these assays in the event of a 16s positive sample to confirm the specific species present. In the event that these species-specific assays are all negative (suggesting a novel pathogen), we will move to deep-sequencing and possible culture to further characterize the bacteria present.

Characterization and association with disease: Understanding the role of bacteria in the disease state observed is also an important consideration; however, demonstrating causation for bacterial agents can be problematic. Bacterial infections can often occur as a secondary response to a primary viral infection (e.g. *Streptococcus pneumoniae* associated with influenza infections), so combining bacterial testing on DUOs with our viral testing strategy will be important in our interpretations. Equally, many of the approaches we would use to demonstrate causation for viruses (such as immunohistochemistry, in-situ hybridization, copy number analyses) are not appropriate for bacteria because of their (mostly) extracellular biology and their potential for rapid overgrowth in the event of poor sample collection. In the event that additional work to demonstrate causation is required, we will use serology and (where possible) pathology and epidemiologic tools to establish this link.

We will also collaborate with established surveillance networks, such as the CDC, Department of Defense (DOD/DTRA), and the WHO/GISRS, to assist with etiological identification of new agents that may pose epidemic threats in the targeted disease emergence pathways, as well as other identified hotspots of human disease. Along with EPT partners, we will identify clinical settings for new studies where prospective samples can be collected in parallel with animal samples (domestic and wild) to detect novel viruses associated with these syndromes. These data will be analyzed in conjunction with behavioral questionnaires and extensive travel histories to assist in understanding human behaviors and practices that underlie the risk of emergence and spread. This work will align pathogen presence across the human-animal interface to better characterize pathogen sharing in time and space. We will compare novel agents detected in people with diseases of unknown origin to novel animal agents to assess animal hosts and regions of heightened risk for potential spread, which will also feed into identifying behaviors and practices (disaggregated by sex, age, social/ethnic group, livelihood strategy) that have the potential to mitigate disease emergence.

The PREDICT consortium has approval for human subjects research (including human biological sampling) in China, Malaysia, Rwanda, Uganda, Cameroon, and DRC. We also have a US exemption (from UCD) for IRB review that allows our team to: 1) perform diagnostic testing on archived human samples in DRC, Cameroon, Gabon, Malaysia, and Indonesia; 2) interview human subjects regarding their occupational and recreational contact with animals in Uganda, Tanzania, Nepal, and Malaysia; and 3) interview human subjects during outbreak response activities to obtain

data on health and contact with animals that may inform on the outbreak in all EPT-1 countries.

Once study design and field logistics are finalized for PREDICT-2, we anticipate 2-6 weeks start-up time may be needed for additional UCD IRB approvals and 2-12 months time for in-country approvals for biological and behavioral sampling of human subjects, with the latter varying substantially from country-to-country. As mentioned above, we will rely on existing in-country platforms that match our biological surveillance design whenever feasible. As necessary, we will implement surveillance platforms and lead field activities to ensure that sampling of wildlife, domestic animals, and humans is aligned in space and time along targeted disease emergence pathways. Regardless of which partner leads surveillance efforts, we will ensure the activities are collaborative and conducted with the appropriate global and in-country ethical clearances, in addition to guaranteeing that data and key findings are shared across in-country and international partners in a timely manner.

**1.6. Mainstreaming PREDICT testing protocols and comparing speed and cost-effectiveness of viral screening approaches with standard methods**

To ensure that our discovery strategy is both economically and scientifically robust, we will continue to evaluate the ability of our assays to detect diverse viruses by partnering with the CDC, WHO, FAO, and OIE reference labs around the world to compare the performance of our approach to commonly-used assays, including those for detecting specific influenza subtypes, as was performed in China during the H7N9 outbreak. For example, we already have commitments from FAO to partner on pilot projects in National Veterinary laboratories (e.g. beginning in Vietnam, Indonesia, Cameroon, and Malaysia) to test livestock samples with PREDICT viral screening protocols. Results obtained will enable assessments of the ability of these protocols to detect known and new viral pathogens in livestock samples in high-throughput labs (through PREDICT-1 we have shown the utility of these protocols in samples collected from wildlife and people) and will be compared with results found in other surveillance groups (animals and people) in the same areas. We anticipate conducting similar activities in National Public Health Laboratories in collaboration with the appropriate ministries, the WHO, and CDC.

As mentioned above, in PREDICT-1 we performed a small pilot project in China with the Guangdong Centers for Disease Control and Prevention and Guangdong Provincial Institute of Public Health to compare the cost and effectiveness of analysis between the WHO H7N9 real time assay and influenza diagnostic platforms with PREDICT pan-influenza A PCR protocols during the H7N9 outbreak. In PREDICT-2, we expect to expand this comparison by partnering with national laboratories to perform follow-up testing with PREDICT pan-influenza A PCR protocols on samples that tested negative using traditional influenza diagnostic platforms (i.e. only H1N1 and H5N1 screening that occurs routinely in most countries) to detect additional subtypes that may be circulating and assess the utility of a broader approach for screening. Pilot projects such as these are planned in National Veterinary Laboratories, such as at the National Animal Health Centre in Laos. Diagnostic protocols will also be shared with all EPT-2 partners or other agencies/organizations as requested and approved by USAID, and facilitated discussions will help to bring in new ideas and lessons learned from all partners to develop and optimize strategies. The proposed Pathogen Detections Leads (T. Goldstein, S. Anthony) will be responsible for ensuring these projects are piloted and will work closely with the proposed Director (J. Mazet), laboratory teams, and proposed EPT Liaison (W. Karesh).

We will also work with national and international partners to establish new approaches to

coordinated sampling and investigations for zoonotic diseases of pandemic potential by developing strategies which combine simultaneous sampling of humans (both biological and behavioral data), livestock, and wildlife at key interfaces or points of potential contact along the value/production chains outlined above. Both the ongoing and optimized sampling/investigation protocols and diagnostic approaches will be shared with the OHW and P&R projects for integration into pre-service and in-service training and hence, will facilitate adoption into standard practices by in-country professionals and curricula for future public health and animal health professionals. Data will also contribute to One Health analyses described in Obj. 4.

**1.7. Technical support for viral surveillance and laboratory testing**

Technical support will build on platforms and partnerships developed under EPT-1, with emphasis on further increasing capacities in collaborating laboratories and expanding collaborations with national laboratories and those testing livestock and human samples in coordination with FAO, OIE, CDC, and WHO. We have an established system of regional and global multidisciplinary communications and supply chains and will continually optimize feasible and cost effective strategies for procurement of field and laboratory supplies, as well as best practices in areas such as personal safety and ethical treatment of animals and humans involved in field investigations. These same communication lines enable regular and highly effective two-way transfer of knowledge between local and world-renowned experts in medicine, epidemiology, animal health, virology, ecology, comparative pathology, and social science, which can contribute to the efforts of the EPT PREPAREDNESS AND RESPONSE project (P&R) and ONE HEALTH WORKFORCE project (OHW). Together, we will continue to advance technology and improve local efficiencies and capabilities by harnessing our collective procurement, communication, and training strengths in support of the surveillance, laboratory, and outbreak activities proposed here.

**1.8. Assistance to host country partners in outbreaks**

Outbreaks in people and animals (domestic and wild) are real-world, real-time viral events that present unique opportunities for assisting collaborating country governments and applying animal sampling, pathogen discovery, hazard mitigation, and risk communication strategies under realistic scenarios and timelines. Furthermore, they are excellent scenarios under which the strengths and strategies of PREDICT-2, as well as P&R and OHW, can be demonstrated and tested. We will build upon previous outbreak experience to better understand the biological and ecological drivers, as well as the human behaviors and practices that contribute to virus evolution, spillover, amplification, and spread. Our teams will be trained, equipped, and supplied in a constant state of preparedness for contributing technically and substantively to focused outbreak response, including employing human-animal contact survey activities. Outbreak response synergies will result from strong ministerial linkages and institutional collaborations already in place (or built as needed), positioning PREDICT-2 teams for invitation by in-country governments from the outset, and allowing for close coordination with FAO, CDC, DOD/DTRA, and WHO partners. Data gained in conducting targeted surveillance during and between disease outbreaks will inform on new or modified policies and practices for outbreak preparedness and response, which will form the basis for coordinating with EPT P&R and OHW partners on recommendations to national task forces, One Health platforms, and the plans and activities of the Global Health Security Agenda (GHSA) partners and others.

*Objective 2: Behavioral risk characterization*

Human behaviors and practices are key risk components for pathogen spillover, amplification, and

spread. High-risk behaviors of people living and working in close contact with domestic and wild animals directly influence their zoonotic disease risk. We will characterize the type and frequency of contact among people, domestic animals, and potential wildlife reservoirs and investigate the correlation of specific human behaviors and zoonotic disease risk across sites, combining qualitative and quantitative methodologies to more deeply understand the behavioral mechanisms of high-risk pathways for disease emergence and spread. We will identify potential control points and behavior change options, field-piloting strategies to gauge individual and community willingness and uptake potential in order to determine which behavioral change interventions might be taken to scale. We will also focus on high-risk behaviors outside these pathways when and where there is specific evidence for pandemic risk identified through biological surveillance and qualitative research.

Activities characterizing behavioral risk will be disaggregated by age, sex, social/ethnic group, and livelihood strategy, and paired with wildlife, domestic animal, and human viral surveillance in each high-priority epizone. These investigations will fill a global need for more data and analyses on the diversity of high-risk activities, occupational risks, and age- and gender-specific hazards that will inform realistic and practical intervention strategies to support EPT and GHSA goals.

**2.1. Standardized approach to study human behavioral risk**

We will combine quantitative and qualitative research methods to identify and monitor behaviors, attitudes, practices, and socio-cultural norms and conditions that facilitate animal-human and animal-animal contact and influence the spillover, amplification, and spread of zoonotic pathogens. Risky behaviors and practices will be characterized through standardized surveys and observation of contact events (defined by direct and indirect transmission modalities). We will use extensively field-piloted surveys to initially characterize behavioral risk. A combination of quantitative household surveys, human- animal contact questionnaires, direct participant observation (focal follows), qualitative structured interviews, ethnographic observation, and participatory focus groups with people living or working in sites within defined high-risk pathogen emergence and transmission pathways will be conducted.

**2.1.a. Overall approach:** We have brought together a talented team with extensive experience in behavioral studies. In addition to the advantage realized by the training and expertise of the new members, the whole team will benefit from the experience gained during PREDICT-1, in which behavioral studies were designed directly in concert with the novel work of zoonotic viral detection and the identification and characterization of spillover and further transmission risk from wildlife. Our approach is designed to be iterative and begins with targeted ethnographic assessments and observations conducted in natural settings at biological and ecological surveillance sites. These provide a framework to gain rapid understanding of human-animal interactions and the actions/meanings surrounding these interactions, as well as for the exploration of unanticipated knowledge, such as the presence and rationale for taboos on certain human-animal interactions. These data in combination with the knowledge base already developed by in-country teams during PREDICT-1, will directly inform the development of detailed surveys with a consistent and systematic approach across countries for all three pathways but with specifics tailored for successful administration in each country and culture.

Alignment of the behavioral studies will coincide with the biological surveillance to maximize the understanding of risk and reconcile information gathered on transmission risk with the actual presence of potentially zoonotic pathogens. Timing will roughly coincide across countries, so that training and initial work is completed in the first 18 months, full surveys will

begin in year 2, analyses will be conducted in year 3, and in-depth potential intervention point surveys will continue in years 3, 4, and 5. Triangulated analyses that incorporate ethnographic, observational, and behavioral and biological survey data will be used to identify very high-risk potential intervention points. This process will be used to garner a greater understanding of the potential intervention points, as well as to inform directions for activities and evaluations of pilot interventions.

Country Coordinators will oversee the work. However, they will not be completely responsible for the design and supervision of the activities. Work will be undertaken by local teams, which may include small subawards to local experts, such as anthropologists and social scientists at local universities. We do anticipate hiring at least one employee under the Country Coordinator to be the local Point of Contact (PoC) for the behavioral studies in each country who ideally has some training in this area. These PREDICT-2 behavioral risk PoCs will be recommended by local partners, vetted by the Country Coordinators, and jointly interviewed and hired by the Country Coordinator and the Senior and/or Deputy Behavioral Risk Coordinators. Just as was done in PREDICT-1 for biological surveillance, training modules will be developed by the globally-based Behavioral Risk Team in conjunction with local partners to ensure quality and consistency across countries and to facilitate training of all local teams. Also similar to PREDICT-1, global personnel from the Behavioral Risk Team will travel to each country to deliver tailored training on the developed protocols specific to the needs of the in-country personnel and partners.

**2.1.b. Building upon previous behavioral studies:** In PREDICT-1, we systematically conducted behavioral risk characterization in three countries for the Deep Forest project, only two of which are within the geographic focus of PREDICT-2: Malaysia and Uganda. These household surveys were conducted along only one of the pathways (land conversion) proposed for PREDICT-2, not along animal production or trade pathways. We will therefore build upon these two studies by: 1) adding the other proposed approaches (e.g. ethnography and qualitative work described below); 2) conducting larger, deeper surveys (e.g. including children because their behavior is likely to be different and important for zoonotic risk); and 3) conducting surveys along the two other pathways for emergence. While these activities are resource-intensive, we will balance the resource needs by being more focused in our locations and scope of questions and having a better estimate of required sample sizes (based on our Deep Forest experience). This effort will validate the data generated from the surveys as well as account for recall error and biases. For instance, from preliminary Deep Forest data on human-animal contact, we know that self-reported data on hunting can be less reliable in countries where it is explicitly illegal and laws are enforced. In PREDICT-2, the focal follows, ethnographic, and observational studies described below will allow us to collect data on the frequency of contact with different animals and specific behaviors that may be associated with both increased risk and avoidance of detection by authorities.

**2.1.c. Structured surveys and ethnographic data collection:** Standardized surveys, open-ended interviews, focus groups, and focal follows will be conducted to characterize behavioral risk in all intensive countries. Data collection will involve quantifying the frequency, type, and duration of observed or reported contact events with wildlife and domestic animals. Data will be collected on zoonotic risk behavior and risk perception pertinent to regional beliefs and practices, for example behaviors associated with bushmeat hunting, butchering, and market visitation in the Congo Basin and wet market practices in Southeast Asia. A standardized subset of questions will be included in all surveys administered across pathways and epizones to generate comparative data on

behavioral risk. Special attention will be given to contact with animals identified through biological surveillance as potential zoonotic pathogen reservoirs (i.e. wildlife) or intermediate or amplifying hosts (e.g. pigs, poultry, cattle, camels). Data will be disaggregated by age, sex, social/ethnic group, and livelihood strategy. Sub-populations identified as having high rates of contact will be targeted for viral surveillance if not already included in the biological surveillance strategy. For example, because many animal handling practices (raising, butchering, selling in markets) are socially and culturally circumscribed to women, women will be considered a particularly important sub-population, and gender roles will be explored in-depth to gauge relative zoonotic risk within communities. Comparative data that will emerge from these surveys include: (1) types of animals contacted; (2) the frequency, duration, and type of encounter with key animals and potentially infective fomites; (3) characterization of indirect contact (i.e. contaminated food or environment); (4) how contact may vary by ethnicity, gender, livelihood strategies, and other socio-economic factors; (5) activities associated with high levels of contact with key animals; (6) livestock abundance and interactions with wildlife and people; (7) economic incentives that drive high-risk activities; (8) perceptions and awareness of disease transmission; and (9) economically-viable alternatives to high-risk activities. Findings will be informative for training in EPT OHW and for providing technical and operational assistance during outbreak investigations. In addition, to assess the mobility of populations within emergence and transmission pathways and across epizones, we will use a standardized occupancy survey to spatialize human occupancy and further characterize contact risk.

**2.1.d. High-risk Pathways for disease emergence and spread:**

i)**Land conversion for commercialization:** Particularly intense land use change in tropical regions supports behavioral drivers that may directly facilitate contact between potentially susceptible hosts and novel pathogenic microbial communities, especially where primary forest is opened up for mining, logging, plantation development, oil and gas extraction, encampments, and developing tourism.

- Focal follows: This method has previously been used by social scientists interested in assessing foraging patterns and human-animal interactions, including pathogen transmission between humans and non-human primates. Focal subject follows involve observing a particular individual for up to 24 hours and recording the specific activities in which the individual is engaged. Since self-reported data on hunting and other particularly high-risk activities can be unreliable, we will supplement data by following high-risk focal individuals during daily activities, using trained observers from within the local communities.
- Ecotourism/recreation surveys and global travel: Within this pathway and in many countries where wildlife populations are diverse and charismatic, ecotourism and other recreational activities bring an added risk for pandemic emergence, bringing travelers into contact with wildlife and people who contact animals frequently. We will target travelers and the workers that support them to examine their contact with wildlife and their health at the time of exposure to evaluate the overall epizonal risk and likelihood of global spread. In addition, broader surveys of travelers will assess willingness of individuals to travel in different health states to PREDICT-2 countries and will be used in combination with publically available travel data to continue to refine the risk of global spread of EIDs.
- Occupancy survey for human migration/mobility: Additional survey effort will be employed at high priority sites using a randomized point or transect survey design to get an unbiased estimate of the number of people occupying and moving through landscapes with varying characteristics. We will use geographic information systems (GIS) to develop spatial models

from these surveys that will use environmental and geographic covariates to produce an overall human occupancy map for each appropriate epizone. These data will complement currently available human population density maps that are frequently used in associative analyses of disease emergence, providing a more accurate picture of human occupancy by accounting for human population movement, rather than relying on the usual method of fixed household data censuses. Results will support EPT P&R efforts and local WHO programs.

ii) **Intensification of animal production systems:** To characterize behavioral risk in domestic animal farming systems and build upon the work conducted to date by FAO, we propose to implement a targeted occupational health study to identify specific behaviors and practices that could increase risk of cross-species transmission, viral amplification, and spread. We will also use observational studies (as described above) to characterize livestock production systems across an intensity gradient (rural systems, intermediate/peri-urban systems, large intensive farms) following FAO frameworks. We expect that zoonotic virus amplification in livestock production systems will increase with the degree of intensification primarily due to increased host animal density (as reported for H5N1 influenza) and also by facilitating novel interactions among species that may have had no prior contact (as reported for Nipah virus in Malaysia). In conjunction with FAO, we will support work examining how intensification also encourages greater frequency of movement of people and vehicles on and off farms for animal exchange and export to market, which may further increase the risk of pathogen spread.

- Occupational Health Study: In cooperation with our in-country teams, local health and agricultural agencies, FAO, and other agencies where appropriate, we will implement a standardized survey to identify people with exposure to domestic animals (and farmed wildlife). We will recruit participants for biological sample donation to correlate viral infection with specific behaviors and practices that may increase risk of exposure, including collaboration with local hospitals receiving individuals when presenting with symptoms. In conjunction with our biological surveillance in intensive countries, we will implement longitudinal cohort surveys with highly exposed farmers, transporters, and market workers. We will use serological tests for viral exposure in the longitudinal cohorts, as well as viral-family PCR screening for people when they are ill. We will thus be able to monitor past exposure and circulating viruses and potentially identify spillover in cohabiting human/animal populations, as well as identify emerging diseases of unknown origin.
- Observational studies: In conjunction with FAO and using existing data to target study sites, we will characterize the three levels of intensification in domestic animal farming systems including measures of animal abundance; type of enclosure; number of enclosures on the farm; approximate size; and general observations on farm structure, conditions, and hygiene (fecal matter in enclosure, mixed species, number of animals, open/ventilated, etc.). We will also assess other risky practices such as slaughtering, butchering, close contact with animals in high-density production (closed spaces), and other biosecurity risks.

iii) **Animal value chains:** Identified by some as the highest risk setting for the emergence of pandemic threats, animal value chains may present the best targets for pandemic prevention and strategic intervention. Therefore, we will investigate human behaviors that contribute to risk in this pathway.

- Systematic behavioral studies will employ standardized survey and observational methodologies described above to assess risk in animal value chains in selected countries at key locations within identified epizones. Specific data to be collected include species composition in markets, origins and types of products, volume, length of time in market, condition of animal meat, market size, market structure, proximity of live animals to one another, sanitary conditions, and human-animal contact type and frequency.
- Consumer surveys and market observations: In collaboration with FAO where feasible, we will determine which factors drive food preference, purchase, and consumption. Data from market and consumer surveys will be used to inform policy by evaluating and communicating the relative contribution to market disease risk by: variety and volume of taxa sold in markets, rate of animals turnover, sources of animals sold, location and method of slaughter, ethnocultural and socioeconomic influences on consumption decisions, and the revenue generated from live or butchered animals at each stage of the value chain.
- Wildlife farm surveys: We will conduct behavioral contact surveys and in-depth structured interviews of wildlife farmers and workers and economic analyses of wildlife farming to assess the risks and viability of alternatives to wild-origin trade in parallel with in-depth viral characterization of animals and people on farms.

**2.2 Incorporating behavioral data into predictive models**

We will measure key indicators of high-risk contact (e.g. frequency of contact, type of contact) among demographic groups (gender, ethnicity, age, location, religion, etc.) in order to identify subpopulations at high risk. We will use multivariate analyses to determine the relationship between high-risk contact indicators and land development index (for pathway 1), farming system change data (for pathway 2), and animal product demand data (for pathway 3), as well as metrics of ethnicity, gender, age, religion, socioeconomic status, knowledge, and attitudes, to understand the factors that influence different types and frequencies of contact. Specific high-risk contact behaviors commonly reported and associated with increased risk based on biological surveillance data will be targeted for further in-depth study to advise on suitable intervention approaches.

Quantitative data on human-animal contact generated from the surveys will be combined with biological and ecological surveillance data and used to predict spillover risk across targeted landscapes. Data from the behavioral surveys will inform on two components of our spillover risk model: 1) the probability of contact and 2) the probability of transmission. These data will be integrated with the biological and ecological surveillance data to evaluate risk among the three different disease emergence pathways (land conversion, animal production systems, and animal value chains) to identify key targets for disease control and behavior change. Contact rates will be extrapolated by combining survey population data on particular behaviors (consuming wildlife, butchering animals, working in markets, etc.) with demographic-specific population density data to arrive at population level behavior and exposure estimates.

**2.3. Identification of potential intervention points**

We will integrate data from biological surveillance, behavioral risk characterization, and economic and anthropologic studies using a dynamic analytical framework to identify potential targets for intervention to reduce the risk of viral amplification and spread. The framework builds on analytical approaches described elsewhere in this proposal, including extrapolating risk to the landscape and comparing the relative risk of similar systems in different countries. The framework is dynamic

because it can be used in combination with data on sampling and testing, as detailed above, to assess rapidly- evolving situations (e.g. a new wildlife farming system or a newly reported wildlife trade market chain) in a timely manner. We will use micro and macro-level behavioral and socioeconomic analyses for each pathway to identify the incentives for high and low-risk behaviors and the likely acceptability and cost-effectiveness of potential alternatives. This activity will be conducted with governments, experts in the field, and other EPT-2 partners to help identify and pilot evidence-based intervention points at the population level and determine topic areas where zoonotic risk-reduction interventions might be taken to scale at a regional level to support EPT P&R and OHW and for consideration by in-country governments and USAID for additional uses.

*Objective 3: Global surveillance networks and analysis*

Access to accurate, comprehensive, and timely biological surveillance and behavioral risk data is critical to predicting and responding to emerging diseases. Efficient data sharing and exchange is maximized through the use of user-friendly and standardized data organization platforms and ensures that information collected by disparate parties can be seamlessly integrated for detection of early warning signals, as well as for multi-national analyses across epizones. Our integrated consortium will use an internal data storage and sharing platform that will improve the ease of collection, synthesis, storage, access, and dissemination of relevant animal and human (age- and sex-disaggregated), spatially-explicit epidemiological, and ecological data that will help countries comply with IHR and OIE reporting obligations.

**3.1. Standardized data collection**

**3.1.a. Standardized human and animal data management:**

We have created an internal information networking system that has facilitated data collection in over 20 countries across disparate ecological, cultural, and linguistic situations and facilitated sharing of those data with country governments, international organizations, and the general public. Together with our partners at HealthMap, who implemented field data collection tools in the aftermath of the 2010 Haiti earthquake (OutbreakMD) and the 2010 Deepwater Horizon oil spill (GulfMedic), we will further refine our system to develop and deploy new field data collection tools to improve the data entry interface. Specifically, we will adapt these tools to optimize collection of standardized data on human and animal hosts and pathogens; behaviors and risks of disease emergence; and drivers, ecological conditions, and transmission interfaces (as well as other critical epidemiological information) during standard surveillance and outbreak situations. Deployment of improved data collection tools will reduce the time associated with data collection and curation, as improved point-of-entry validation tools will reduce the need for labor- intensive data cleaning and verification. We will improve our current data entry temporal standards (e.g. within 2 weeks of data collection) by using tools that reduce the need for recording data on paper and subsequent transcription (i.e. allowing electronic entry of data at time of sample collection). We propose to align standardized data collection approaches for both known and novel viral detection and influenza monitoring activities, across the three pathways, so as to construct longitudinal datasets and allow insight into ILI, SARI, FUO, and their underlying etiologies. We will work to develop the capacity for these databases to be hosted and managed locally, yet enable controlled sharing globally.

**3.1.b. Biosurveillance data collection:**

To further add to the world's understanding of novel disease emergence events (beyond EPT-2 activities) and help target PREDICT-2 surveillance strategies, publicly available information

(ProMED and HealthMap) on emerging diseases will be collected, filtered, geo-referenced, and integrated with human and animal field surveillance data.

i)HealthMap alerts are reports of disease outbreaks, collected by HealthMap's automated process. Updating 24/7/365, the system monitors, organizes, integrates, filters, visualizes, and disseminates publicly available information about these priority diseases. PREDICT-2 surveillance data will be provided to host-country governments as test results are finalized and interpreted and, combined with HealthMap alerts, will deliver near real-time intelligence on a range of emerging pathogens to governments for near real-time intelligence to inform on disease surveillance and mitigation actions, before public release authorization is given by the government. The process of internal (government) circulation of data is at the discretion of our ministry partners and does not preclude eventual public release of data. We will work with our government partners to reduce the time it takes for public release of data, with a goal of eventual "near real-time" public release of data, with the caveat that this release is always at the discretion of our government partners. Because the HealthMap alerts are derived from publicly available information (e.g. news stories, blogs, press releases etc.), they do not require data sharing authorization. As in PREDICT-1, we will continue to work with ProMED and HealthMap to optimize the digital searches to report improved public data on the HealthMap PREDICT interface.

ii) In addition to tracking disease events reported digitally, we have developed a low-cost local media surveillance program and tools for tracking rumors (e.g. the Vaccine Sentimeter, http://www.healthmap.org/vissy/) that we propose to adapt to track and distinguish between "good" (reliable) and "bad" (unreliable) outbreak rumors. Our process for distinguishing "good" and "bad" rumors (i.e. distinguishing signal from noise in remotely sensed, digital media) involves a multi-stage process wherein reports are evaluated based on source reliability, report redundancy, or repetition (e.g. are there multiple sources for the report?), language on certainty in the report (e.g. suspected versus confirmed), as well as likelihood of the report given our epidemiological understanding. Validated reports will then be integrated into the PREDICT public data site (www.healthmap.org/predict) and used along with other data sources to provide information to host-country governments, USAID, EPT partners, and other partners on developing epidemiological situations as they arise. For example, during the Ebola outbreak in Uganda in 2011, daily summaries of validated media reports were provided to USAID and PREDICT staff who participated in the Zoonotic Disease National Task Force.

iii) We also plan to employ biosurveillance platforms to move beyond the reporting of events to increase pre-event awareness. Building on the success of the wildlife trade surveillance tool (healthmap.org/wildlifetrade), we propose to develop an experimental "outbreak sensitization" tool that maps real-time alerts on known disease drivers and integrates them with hotspot data to provide information to local health stakeholders and EPT OHW and P&R in order to sensitize them to the potential for disease events. EPT partner staff in PREDICT-2 countries will be trained in the use and management of these data, linking to better response and contributing to countries meeting IHR standards.

### 3.2. Global data synthesis

We will build on and extend the Global Animal Information System (GAINS) to create a new secured and internal globally accessible database to house aggregated (anonymized) human behavioral risk, biological surveillance, and outbreak information. Once approved for release by participating country governments, data will be made freely available through the public facing side

of PREDICT-2's dissemination tools (see 3.3 below), along with novel analytic and visualization tools.

3.2.a. **PREDICT-2 database:** In order to meet national and international privacy regulations and local country government requirements for data collection and release, we will use an internal database for the consortium that will provide the access and integration capabilities necessary for biological, ecological, and behavioral risk characterization, as well as tracking for progress on project deliverables and for annual data reviews (Obj. 6). Linkages will be created to allow national governments to link local databases to the PREDICT-2 database for integration of PREDICT-2 data collected in their country into national systems. Specifically, we will expand the current internal PREDICT database, the Global Animal Information System (GAINS), which currently includes data on animal hosts and associated diagnostic testing, to house additional data to enable examination of broader epidemiological dimensions of disease emergence. Thus as we move forward, for all sampling sites and events we will be able to include data on the animal hosts sampled, anthropogenic drivers and interfaces, and human behavior risk factors for analysis in the context of the pathogens present. This enhanced system will allow us to combine and examine data as needed for presentation by PREDICT staff to host-country governments, USAID, and EPT and other partners in a manner that provides a comprehensive view of the processes of disease spillover and amplification.

3.2.b. **Development of an open access database on global respiratory pathogens:** Publicly releasable data collected during PREDICT-2 will be integrated with influenza monitoring databases (e.g. EpiFlu). In addition, a specimen-information repository will be developed to allow researchers and public health officials to deposit and exchange metadata on respiratory illnesses to facilitate specimen exchange, matching those with specimens to those with the diagnostic capabilities to determine etiologies. Measures to protect data sharing agreements between providers and diagnostic laboratories will be implemented. These data will be integrated with formal and informal data on respiratory cases obtained via web-mining of HealthMap and curation by ProMED.



3.2.c. **Identifying and characterizing changing epizones for viruses with known pandemic potential:** As described above, we will employ an epizonal approach that encompasses geographic, ecological, and sociological space, from pre-spillover conditions through transmissio of zoonoses to circumstances of pathogen amplification and spread. Thus, data collection, organization, and integration tools will be critical for ongoing identification and characterization of active epizones. For example, the epizone for SARS-CoV includes the wildlife markets of Guangdong where it amplified and spread, but also the whole wildlife trade along Southern China back to Yunnan Province, where we identified an unusually diverse cluster of bat SARS-like CoVs capable of infecting

human cells (see figure at left). We will use global data extractable from our platforms to conduct combined phylogeographic, ecological, and epidemiological analyses to better define and recognize epizones for known and novel viruses and identify regions within these epizones where viral evolution is enhanced and pandemic potential increased.

3.2.d. **Actionable surveillance improvements and risk mitigation strategies** will be developed throughout the PREDICT-2 project. We will use modeling and other analytics to evaluate optimal surveillance strategies for biological and behavioral data collection. As the results of PREDICT-1 are being analyzed now, we anticipate honing our surveillance strategies even further than proposed here based on the most productive data sources in PREDICT-1 (interfaces, locations, prioritized viral families, etc.), just as we have done with sample size estimates and sample type and host selection throughout PREDICT-1. Modeling platforms are constructed as concepts of pathogen risk develop within and outside of the EPT team, and modeling outputs are generated regularly (weekly to monthly), as the platforms are optimized and new data become available. There was a disconnect in this process during PREDICT-1 because of the necessary time lag needed to build sampling and laboratory capacity. The capacity building in those areas now being successful, we anticipate more real-time adaptive management of the surveillance arm of the project using modeling and analytics. That said, these adaptive changes have always occurred and will continue – what will primarily be different is the communication with USAID on how we are using the data and models in order to base internal decisions. We do not anticipate a dramatic change in the pace at which modeling activities are generating information for a broader, public audience. The most appropriate use of PREDICT-2 models will be to improve surveillance strategies and generate further hypotheses regarding pathogen emergence, amplification, and spread. We do, however, anticipate testing those hypotheses and validating the generated models with PREDICT-1 and -2 data on an on-going basis throughout PREDICT-2. We will also generate intervention and control scenarios and analytically evaluate probabilities for best investments using mathematical models. These will be run on an on-going basis, first based on likely assumptions and then refined as appropriate data are generated by PREDICT-2 and the collaborating EPT partners.

### 3.3. Global data dissemination

Ultimately, data are of use in disease forecasting, prevention, response, and mitigation strategies only if available to the stakeholders that require them for decision-making. Local authorities will be provided with PREDICT-2 results for policy use, response, and meeting IHR and OIE reporting obligations either via PREDICT-2 country coordinator communications or directly via linkages between the PREDICT-2 database and national systems. PREDICT-2 data released for public access by governments will be distributed using a globally accessible public portal www.healthmap.org/predict. We will also incorporate processed risk-characterization data, coupled with clearly documented cross-cutting forecasting of risk resulting from the characterization process.

3.3.a. **Specific types of data and information** that we will make accessible through this portal or that our website will include:

i)**PREDICT-2 standardized biological surveillance data**, including potential pathogens

detected.

ii) **Database on influenzas and other respiratory pathogens**, including a repository of metadata on available human respiratory illnesses of unknown origin and PREDICT-2 surveillance data on zoonotic viruses of known and unknown pandemic potential. This database will include analytic, forecasting, and visualization tools. Role- based security will be implemented so as to allow health officials access to surveillance data collected in their countries before data are approved for general public release, as necessary.

iii) **Digital disease alerting data** from systems such as HealthMap and ProMED. We will also provide push alerts so that stakeholders can be immediately notified of disease alerts and new samples collected.

iv) **Baseline risk information** developed through ongoing analyses, such as hotspot forecasting.

v) **Training materials and tools for real-time data collection and management during outbreaks** (e.g. the PREDICT data collection tool described above, Epi Info, NovaModeler etc.) shared with EPT partners.

vi) **Protocols and guides** for conducting biological surveillance and behavioral risk characterization (made available in multiple languages upon request) and shared with EPT OHW, P&R, and other EPT partners.

**3.3.b. Global data dissemination goal:** Facilitate sharing and integration of PREDICT-2 and other host country data on behaviors related to disease risk and surveillance and test results into global data streams to support IHR, OIE, and GHSA goals of data sharing. Training on how to access and utilize the data and project findings will be conducted in several ways. First, as a readily available online resource, written guides and protocols developed in PREDICT-1 and -2 will be shared to provide detail to in-country teams for working with the data sets and platforms. Additionally, webinars and workshops for interactive training will be offered to introduce end-users to key aspects of the data sets and platforms while providing a forum for them to also ask questions. Specific training sessions may be provided to focus on the basic skills needed to manage and analyze data such as bioinformatics, epidemiologic analyses, and risk mapping. The goal is to build intellectual capacity and enhance the abilities of stakeholders to appropriately interpret and analyze data. As the training gaps and most useful platforms are identified across EPT partners over time (see above), our training materials and workshops will be updated to address the current needs of end-users in an effort to facilitate science-based management. We anticipate that even more useful to many decision makers than the data themselves will be the syntheses and interpretations that our expert in-country project teams will produce in the form of regular project updates, reports, and publications. These products will be shared with stakeholders and ministries as they become available, and meetings will be held to discuss the findings, train on interpretation and implications, and foster dialogue to move towards science-based policy development that enhances cross-sectoral collaborations and helps to prevent disease emergence.

*Objective 4: Validation of One Health approaches*

Our team assisted in developing the World Bank's report "People, pathogens, and our planet: the economics of one health", which explored country investments in One Health infrastructure and the potentially realized cost efficiencies. It documented continued keen interest from country governments and international organizations for implementation of One Health strategies but highlighted that a concerted, coordinated, and comprehensive valuation of the benefits of and best

practices for adopting a One Health approach has not been formally conducted. Building on the One Health practices operationalized in EPT-1 countries and at global levels, we propose to undertake a systematic and dedicated effort for validating One Health approaches by gathering and evaluating data and presenting One Health case studies. EPT lessons learned will be utilized along with comparative data available from other national and regional activities to evaluate the utility of One Health approaches using all available evidence.

**4.1. Promoting policies and practices that reduce the risk of virus evolution, spillover, amplification, and spread**

**4.1.a. Multidisciplinary and inter-ministerial best practices:** We believe that One Health approaches can assist in the development of more integrated high-level interventions for the reduction of risk from emerging pathogens. Working with EPT partners (locally and internationally), we will develop the evidence base to support the strategic application of these policy approaches, as well as their institutionalization.

i) Case studies: We will compile and create case studies for situations in which a One Health approach has been used, backed with economic analyses (when available), as well as outcome measures (e.g. DALYs, incidence, mortality, joint multi-departmental, multi-sectoral training or surveillance activities; qualitative data, etc.) to provide evidence-based support for One Health strategies. In-country government partners, as well as partners from other EPT-2 projects, FAO, WHO, CDC, World Bank, and other local, regional, and intergovernmental entities will be engaged in prospective and retrospective assembly of information to validate the use of One Health approaches, complemented by findings from literature and external data that can be applied to EPT-2 contexts.

ii) Gender equality and integration of under-represented populations: We will gather and analyze data on gender equality and integration to elucidate how comprehensive representation contributes to a more successful One Health approach, noting that unique determinants may influence gender-specific risks, as well as the success of risk mitigation and prevention strategies. We will work with P&R to help determine and encourage best practices for overcoming gender bias in One Health efforts, as well as provide information to P&R, OHW, and other EPT partners on populations that could be further integrated into One Health approaches (e.g. economically, culturally, and occupationally).

**4.1.b. Support for national One Health platforms and outbreak response:** Through assessment and validation of approaches that facilitate broad and sustained engagement, including data sharing, sufficient workforce development, improved technical capacity, and harmonization of disease surveillance systems, we will contribute to overcoming the obstacles of disciplinary silos at local levels that have impeded public health progress. Working with EPT partners at local levels and in the context of meeting IHR and OIE reporting obligations, we will support efforts to more effectively utilize One Health platforms.

**4.2. EPT-2 Partner coordination**

**4.2.a. The EPT Liaison:** Because of the scope and complexity of the EPT Program, we propose the inclusion of an EPT Liaison at the Key Personnel level (see Staff section below). The PREDICT-2 EPT Liaison will promote strong communication and data sharing opportunities that support One Health approaches throughout the EPT-2 programs themselves and in partner countries and international forums. Together, we believe our efforts in close

coordination with other EPT-2 partners and stakeholders (especially FAO, CDC, WHO, OHW, and P&R) will demonstrate the value of adopting One Health approaches for biological surveillance, capacity building, and outbreak response, in terms of indicators such as cost, time efficiency, and health outcomes, as well as investments in One Health training and curricula development. The EPT Liaison will manage the processes of disseminating information and best practice guidance (see 4.2.d. below) to policy makers, increasing the likelihood of adoption of One Health-promoting policies and practices for national preparedness and prevention efforts. The impact will be further broadened by engagement with policy processes and policy-making institutions (including private sector) at local, national, regional, and international scales. For example, at country levels, coordination will be promoted with EPT-2 program partners, including local agencies representing health, livestock, and wildlife, and local implementing representatives of USG agencies and global organizations, including FAO and WHO, to jointly share One Health validation findings and best practice recommendations. Concurrently, efforts will also occur at global levels, by collaboratively engaging with leadership of EPT-2 and GHSA partners and intergovernmental organizations to broaden support and resources for One Health approaches.

i) The PREDICT-2 EPT Liaison will promote strong communication and data sharing opportunities that support One Health approaches throughout the EPT-2 programs themselves and in partner countries and international forums. His focus will be on communications with the FAO, CDC, WHO, OHW, and P&R, as well as making sure that the country coordinators are making all efforts to maintain active and productive communications with in- country partners, especially USAID Missions and host-country ministries. The EPT Liaison will manage the processes of disseminating information and best practice guidance, including dissemination of the following through in-person, electronic, and conference call communications:

- Annual Global Key Findings Review meetings with USAID and EPT-2 Partners
- Organized quarterly or semiannual conference calls or webinars on topical areas, such as behavioral studies, surveillance, analytics, gender equity, etc.
- PREDICT-2 quarterly reports (or sections of reports indicated by USAID)
- Quarterly country-level reports or written briefings (similar to bulleted country-specific Quarterly Partner Updates in PREDICT-1)
- Country Coordinator updates on activities and findings at quarterly or monthly country-level meetings as determined by the USAID local Mission
- Monthly or biweekly telephone updates with USAID for key PREDICT-2 staff
- Public posting of results from human, livestock, and wildlife testing on the PREDICT-2 public website (through HealthMap) as soon as approved by government authorities
- Updated protocols and guides for conducting biological surveillance and behavioral risk characterization

ii) In addition, the PREDICT-2 EPT Liaison will examine One Health case studies within the PREDICT-2 countries and begin to amass a case for implementing One Health approaches if the data continue to support the paradigm shift. He will draft messages for policy makers, increasing the likelihood of adoption of One Health-promoting policies and practices for national preparedness and prevention efforts. The impact will be further broadened by engagement with policy processes and policy-making institutions (including private sector) at local, national, regional, and international scales. If possible, the capacity for achieving articulation with the policy process will be developed with the Country Coordinators through

hands-on training and webinars. Concurrently, efforts will also occur at global levels via the EPT Liaison and other PREDICT-2 Key Personnel collaboratively engaging with leadership of EPT-2 and GHSA partners and intergovernmental organizations to broaden support and resources for One Health approaches.

iii) On an *ad hoc* or requested basis, we will also provide to USAID and other EPT Programs (as indicated by USAID):

- Immediate notification of findings of urgent public or animal health significance
- Activities and findings from participation in emergency response activities
- Analyses and graphical interpretations of key findings as agreed upon with USAID and PREDICT-2 staff (similar to quad charts developed at the end of PREDICT-1)
- PowerPoint presentations developed on project findings
- Briefing Sheets on specific topics, findings, or trends
- Updated risk information developed through ongoing analyses, such as interface characterization and hotspot forecasting
- Case studies on One Health approaches, backed with economic analyses and outcome measures (e.g. DALYs, incidence, mortality, etc.) to provide evidence-based support for One Health strategies, as described above
- Meetings with USAID and other EPT program personnel to collaborate on efforts stemming from project findings or trends
- Peer-reviewed publications to increase awareness in the public health community and drive pandemic prevention strategies globally

**4.2.b. Surveillance and outbreak response:** Through ongoing coordination with partners, we will monitor where One Health approaches are being utilized in surveillance and outbreak response situations for comparison with other contemporary (single-silo) outbreak responses to determine differences in effectiveness, using indicators such as frequency of outbreaks, length of time to outbreak containment, morbidity and mortality, and identification of animal host species involvement. Where identified, the costs of disease outbreak response and control measures will be compared to costs of implementation of One Health strategies to calculate and demonstrate potential savings from prevention obtained through One Health approaches. Given its health and economic impacts, cross-species transmission potential, and viral evolution dynamics, influenza will provide ample opportunity to investigate this objective and will offer common ground for working closely with FAO and WHO in gathering information. Additionally, official reports submitted to the OIE will provide further insight on species and numbers of animals affected by reportable diseases to feed into assessments of impacts of influenza and other diseases as part of the evaluation of One Health approaches.

**4.2.c. Advancing socioeconomic arguments:** In year three, we propose to organize a workshop with the World Bank in collaboration with USAID and other EPT-2 and World Bank stakeholders. The workshop will conduct an evaluation of new information at the five-year mark of the World Bank's report on One Health investments (published in 2012) and be designed to yield information for the production of a number of audience-targeted documents with evidence-based guidance on where One Health approaches are highly suited to assist in the prevention and control of emerging pandemic threats. We will also conduct global scale analyses of the economics of pandemic mitigation vs. adaptation policies directly applied to the World Bank/FAO One World, One Health capacity building plan.

**4.2.d. Sharing of lessons learned among EPT projects:** We will use information acquired

and best practices developed in the implementation of biological surveillance and behavioral risk characterization to help identify core competencies that can be proposed for incorporation into curricula for the One Health Workforce (OHW). Specifically, insight gained about the type and structure of cost-effective investments in a One Health workforce, as well as the multidisciplinary sectors represented and associated core competencies, will be shared with the OHW project on an ongoing basis and at the annual data sharing meetings. Additionally, evidence-based strategies will be validated for their use in support of effective One Health platforms and shared accordingly with the P&R program to inform best practices and activities being implemented at national levels. Tools developed by PREDICT-2, including mechanisms for promoting gender equity in risk assessments and population-based interventions, sampling and testing protocols, human-animal contact surveys, and outbreak response planning practices, will be shared with the P&R project and other EPT partners for utilization in national preparedness plans for public health events. Additional support for hands- on training and curriculum development is described below.

*Objective 5: Overall capacity strengthening*

We plan to add depth and scope to trans-disciplinary One Health platforms using a systems approach to classify and track biological surveillance and behavioral risk characterization advances, thereby strengthening the capacities of the surveillance systems in each PREDICT-2 country and region. An adaptive management style will be utilized to assess progress and set capacity building priorities on an annual basis so that the most current information can be used in response to key opportunities and challenges. Activities will build on and support all strategic areas of focus for EPT-2; however, key areas of emphasis will include increasing technological capacities in collaborating laboratories and expanding to include more human and national laboratories in coordination with FAO, CDC, and WHO, as well as enhancing information management and data analysis through technology transfer and training for in-country collaborators and host country governments.

**5.1. Systems approach to capacity building for wildlife, livestock, and human surveillance**

We will focus on continued training for field sampling and survey design, advanced laboratory training, information management, and technology transfer to address all areas from managing field data to tracking laboratory samples and results. In addition, introductory sequence analysis and epidemiologic data analysis, risk assessment, and cross-sectoral collaboration strengthening will be introduced. Within each PREDICT-2 country, five core components will be evaluated and tracked over time:

i)Biological Sampling and Behavioral Survey Design: Continued protocol refinements for animal and human sampling and behavioral surveys will be made and distributed in multiple languages. Similarly, we will continue to improve cold chains and transportation infrastructure to increase the quality and quantity of samples being collected and tested from remote field sites. PREDICT-2 activities will supplement currently available resources and training activities, especially in systematic survey design, and as needed in newly added EPT countries. Additional protocols will be developed and standardized for collection of behavioral and risk mitigation data at field sites.

ii) Laboratory Testing: We will continue to strengthen local laboratory capacity in basic cPCR protocols, as well as for use of serological assay protocols using our pathogen detection and discovery framework (see Objective 1 above). Focused areas for additional training for pathogen discovery and characterization include specific training for Tier 1 viral families in all

countries where capacity does not already exist and the additional training for Tier 2 families in countries targeted for intense engagement. It also includes the need to expand our activities (and where required, training) to include human and national laboratories in all countries. More emphasis and training will be provided on appropriate specimen selection based on pathway of emergence and spread among people, wildlife, and domestic animals; biosafety and biosecurity (e.g. appropriate handling of samples during extraction and storage); trouble- shooting viral family PCR protocols; and the interpretation of results. Introductory training in basic pathogen sequence analysis and bioinformatics will also be provided, as well as training in PCR assay design to facilitate rapid local outbreak response where necessary, and to ensure the persistence of skills that protect the long-term viability of this diagnostic platform. Additionally, reference panels will be developed and deployed to all participating laboratories to perform quality control and assessments of laboratory analytical procedures. Training will include opportunities in US- based laboratories when possible, as well as instruction by visiting laboratory technicians. Materials will also be made available to assist with and provide content for developing curricula by OHW programs to train the next generation of laboratory diagnosticians.

iii) Information Management: The use of digital data collection and databases is common practice in developed countries but is not yet a standard approach in many developing countries. In PREDICT-2, we aim to train key personnel from PREDICT teams, laboratories, and ministries in target countries to better manage field data, track laboratory sample and results data, interpret data, and analyze results by providing training resources and common best practices so that countries may enhance their abilities to manage and work with large datasets.

iv) Risk Assessment: An understanding of patterns of risk factors and disease transmission informs risk management and disease control strategies. The ability to describe, map, and model data is therefore imperative for all surveillance activities. PREDICT-2 activities will include providing training on basic data analysis tools, spatial mapping, and disease modeling to key constituents and training programs in the target countries so that they can understand and engage with our global disease modeling and analytics teams to inform new models of refined risk and disease control potential at key interfaces around the world.

v) Cross-sectoral Collaborations: Institutionalizing One Health approaches to disease surveillance, control, behavioral risk characterization, and outbreak response requires horizontal as well as vertical integration into government ministries and stakeholder organizations. We aim to support One Health Platform activities by fostering dialogue and providing data to inform on policy across disciplines and sectors at local and national levels through meetings, workshops, and coordinated field activities.

### 5.2. Coordinated capacity development across EPT projects

We will coordinate with other EPT-2 projects, such as OHW and P&R, to identify and assist with needs for training the next generation at universities and ministries associated with One Health networks, especially OHCEA and SEAOHUN, to better prepare the future workforce for positions in laboratories, ministries, and other organizations and to successfully maintain surveillance systems. Similarly, Field Epidemiology Training Programs may benefit from interactions with PREDICT-2 personnel and projects as part of developing the next generation of One Health professionals. Coordinated training activities across the EPT program may range from short, intensive workshops to provisional fellowships to long- term on-the-job training or academic degree endeavors, depending on the target audience and competencies.

Opportunities for practical field experiences will be provided for appropriate EPT trainees based on

fit and EPT project alignment.

Our consortium has extensive training experience that ranges from developing new curricula to implementing short- and long-term trainings in classroom, laboratory, and field settings. Depending on the identified needs and gaps in training, we are prepared to contribute to pre-service training in coordination with the One Health Workforce that may involve: 1) developing protocols and curricula, 2) virtual and in-person training sessions on topics related to the PREDICT-2 scope, and 3) field activities that provide real-life experience for trainees to practice skills and enrich competencies. Training topics include surveillance strategies, wildlife management, field veterinary services, laboratory diagnostics, epidemiologic outbreak investigation and response, research methods, information management, risk assessment, medical anthropology, public health, environmental health, and policy development. During PREDICT-1 we tailored our trainings depending on the needs of individuals and organizations, and whereas classes and workshops worked well for some audiences, longer-term internship placements at field and laboratory sites served as the formative experiences for other trainees. In the past, we have also utilized mock scenarios and interactive online case studies to foster real-time and globally networked team thinking that gives trainees virtual experiences as preparation for what they may deal with in their daily activities throughout their careers. We will closely coordinate with the OHW team to identify needs and develop a plan for our participation in pre-service training for the One Health networks. The convening and coordination will be the responsibility of the PREDICT EPT Liaison with finalization of plans and implementation then falling under the responsibility of the Capacity Strengthening Lead.

***Objective 6: Assisting in the organizing of annual data review meetings for USAID's PIOET program*** In close coordination with other EPT-2 projects and partners (including FAO, CDC, WHO, etc.), we will organize annual data reviews to optimize and refine ongoing and future activities. The data review meetings will serve to improve global databases, flow of information, and pace of data sharing, and thus will promote the overall success of the PIOET program. Enabling collaborative, focused and ongoing data sharing and associated communication among EPT-2 program stakeholders will also assist in avoiding duplication and maximizing synergies across projects. This objective is especially important for optimizing EPT-2's potential, given the breadth of data collected across partners and the implications of ongoing information yielded by iterative analyses that build on prior findings, as demonstrated in EPT-1.

**6.1. Meeting participants and content**

By bringing together EPT-2 projects and partners, the meetings will build on data from EPT-1 and EPT-*plus* to facilitate progress in compiling robust and targeted longitudinal data sets. Collaboration with CDC and FAO will be a key component. The involvement of EPT-2 projects, as well as international organizations and other stakeholders, allows for compilation of a variety of data, including information yielded from on-the-ground efforts, as well as those collected through global reporting systems. The data review meetings will facilitate the examination of available data for population-based analyses and will allow a platform for identifying state of the art practices, sharing of key findings, and strengthening of partnerships that could inform risk-reductive policies and practices. Selected country-level discussions will be used to strengthen One Health platforms and produce recommendations to be utilized by EPT P&R around sustained cross- sectoral collaboration, including data sharing. Review of data collected related to investments in the One Health workforce will be vital to compiling lessons learned and developing and advancing

curricula. Finally, meetings will be key for compiling and improving global data sets of influenza and other respiratory pathogens (benefitting from coordination with FAO, CDC, WHO, and others) and exploring optimized ways to link bio-surveillance data to response through "IT portals" (including crucial input gained from CDC and WHO's well-established systems) that advance global networks for real-time biosurveillance. The meetings will also serve to explore ideas for additional or potential data sets that would help advance EPT-2 projects' and partners' contributions to the goals of the PIOET program.

**6.2. Ensuring appropriate representation**

To ensure gender equity is promoted in the data review process, including for development and testing of data collection tools, participants themselves will be balanced across sectors and gender and will be requested to bring sex-, age-, and culture-disaggregated data sets to facilitate analyses and sharing of disaggregated data as appropriate. The data reviews will guide recommendations for programmatic adjustments, such as broadening research and intervention focus to more effectively integrate specific high-risk and/or underserved or underrepresented populations (e.g. to overcome gender, age, socio-economic, and other biases).

**6.3. Frequency and agenda development**

At least one annual global key findings review meeting will be held, with participation from key stakeholders, including representatives from PREDICT-2, P&R, OHW, FAO, WHO, CDC, as well as other in-country participants and external partners identified by USAID. In close consultation with USAID staff and PREDICT-2 Key Personnel, PREDICT-2's EPT Liaison will coordinate and develop the agenda(s), incorporating topics and opportunities identified during ongoing collaborations and communications with EPT-2 partner points of contacts and key stakeholders in order to synthesize input and identify key issues to be addressed. In addition, we will leverage opportunities for using EPT-2 regional and country- level meetings to conduct targeted country and region-specific data review, as well as provide agenda inputs, identify data sharing needs, and prepare data frameworks for the annual global data review meetings. Summaries of key discussions and findings and recommended programmatic adjustments as approved by USAID will be compiled and distributed following each annual meeting.

**Monitoring and Evaluation**

We will use a robust monitoring and evaluation (M&E) plan to track progress on PREDICT-2's goals of identifying and characterizing pathogens of known epidemic and unknown pandemic potential; classifying animal reservoirs and amplification hosts of human-infectious viruses; and targeting intervention action at human behaviors which amplify disease transmission at critical animal-animal and animal-human interfaces in hotspots of viral evolution, spillover, amplification, and spread. Our project indicators, detailed in the Monitoring and Evaluation Table below, will quantitatively assess how well the proposed PREDICT-2 objectives contribute to the desired goals and end of project results presented by USAID in RFA-OAA-14-000019. This proposed M&E plan will be implemented in conjunction with USAID to track project progress in close coordination with other EPT-2 projects, as well as with in-country and international partners. We believe these indicators will also aid us in effectively managing the project for timely achievement of project targets and provision of results. During the first 30 days of project implementation, PREDICT-2 Key Personnel will work with USAID to further refine the proposed M&E plan. Once finalized, measurable progress towards indicators will be assessed semi- annually with USAID and annually

with external advisers to hone activities and adapt work plans to ensure targeted end- of-project results are met.

To this end and in addition to evaluations prescribed by USAID or in compliance with guidance provided by other US Government agencies/initiatives, we will establish a two-tiered evaluation system consisting of semi-annual assessment of progress on our M&E plan by the key personnel, consortium leads, and USAID and an annual assessment, estimated at three intensive days of effort, by an External Advisory Panel (PREDICT-2 EAP) managed by the PREDICT-2 EPT Liaison. The PREDICT-2 EAP members will be selected based on their experience conducting successful US government projects and their in-depth knowledge of USAID monitoring and evaluation. The initially proposed members provide a range of multidisciplinary experience and knowledge across the entire spectrum of emerging disease issues facing humans, domestic animals, and wildlife. We intend to keep the EAP to a limited number of highly qualified individuals and therefore have chosen to initially invite Dr. Pierre Formenty (WHO), Dr. James Hughes (Emory University and formerly of CDC), Dr. Subhash Morzaria (FAO), and Dr. Ronald Waldman (the George Washington University and formerly of WHO, CDC, and USAID). Qualifications of our proposed PREDICT-2 EAP members are provided in their resumes (Annex A).

In evaluation of progress on each activity, we will assess the scope and quality of partner engagement, especially in- country ministries, FAO, CDC, WHO, OHW, and P&R. Also critical will be the measurement of gender representation in each activity and the provision of capacity building in core competencies and skills in disease surveillance, response, prevention, and control as described above. To the extent applicable, we will use US Centers for Disease Control and Prevention "Updated guidelines for evaluating public health surveillance systems" (MMWR 50 (RR13);1-35) to evaluate the effectiveness and impact of our surveillance activities and capacity building, particularly as they relate to the viruses detected, quality of the data collected, presentation of data and key findings to national and international partners, timeliness of reporting activities, and representativeness of the key interfaces and epizones targeted for surveillance.

We have designed our monitoring and evaluation plan and indicators to target major goals and impacts for each PREDICT-2 objective. These objectives were designed to contribute to each new EPT-2 strategic area of focus by establishing longitudinal datasets for understanding drivers and human behaviors needed to inform on policies to reduce the risk of zoonotic virus emergence and strengthening real-time biosurveillance and preparedness for public health events, while investing in One Health workforce and platforms. In the table below, we show sample indicators of success, their corresponding suggested timeframe, along with key project outcomes and data sources.

Exhibit A

## PREDICT-2 Monitoring and Evaluation Table

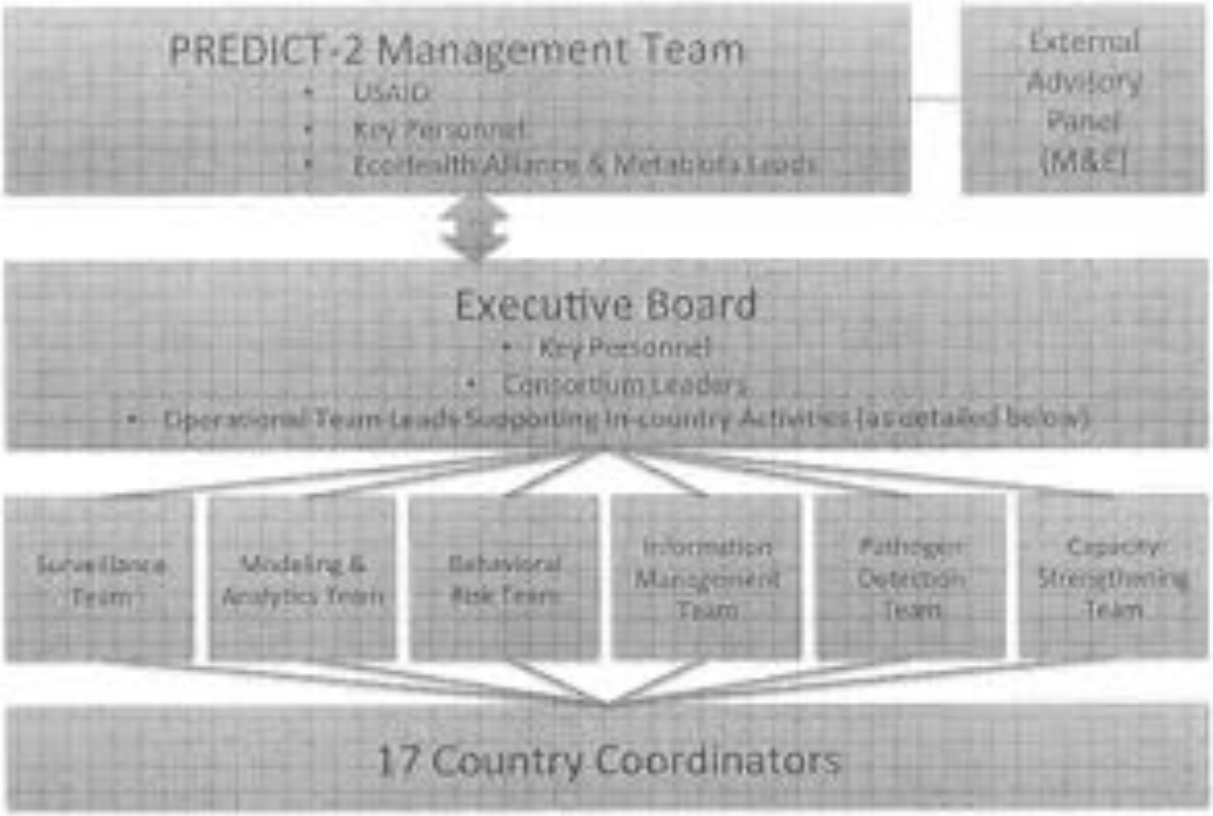
| Objective & Activity | Indicator & Timeframe | Outcome and End of Project Result with Data Source |
|---|---|---|
| **Objective 1: Biological and ecological risk characterization** | | |
| Identify, sequence and collect longitudinal data for at least one priority family of zoonotic viruses with known pandemic potential | Percent of PREDICT-2 countries conducting surveillance in epicenter(s) and collecting longitudinal data on at least one pathogen of known pandemic capacity<br><br>Timeframe: initiate epicenter surveillance in all intensive countries by end of Year 1 and all less intensive countries by middle of Year 2; semi-annual/annual assessment of country progress | Enhanced in-country disease surveillance, laboratory and data synthesis capability for detection and response to zoonotic diseases, biological strengthening of transdisciplinary teams skilled in One Health approaches to disease surveillance, and identification and more precise ranking of high-risk interfaces and key epidemiologic zones involved in disease amplification and spread<br><br>Data sources: wildlife, domestic animal, and human pathogen detection data; ecological data; risk characterizations for animal-to-animal and intensive animal-to-human transmission; results from phylogeographic and ecological analyses; and key findings from longitudinal monitoring |
| Identify high-risk interfaces and ecological and climatic conditions facilitating transmission of viruses from animals to people | Percent of PREDICT-2 countries conducting analysis of risk factors associated with virus evolution, spillover, amplification, and spread<br><br>Timeframe: initiate in all intensive countries by mid and all less intensive countries by middle of Year 2; semi-annual/annual assessment of country progress | Enhanced in-country capacity to synthesize biological, ecological, and behavioral data to evaluate risk factors influencing virus evolution, spillover, amplification, and spread; strengthening of transdisciplinary teams skilled in One Health approaches to disease surveillance, identification and more precise ranking of high-risk interfaces and key epidemiologic zones involved in disease amplification and spread<br><br>Data sources: biological surveillance data; niche models, and host-virus ecologic analyses, and of Year 1 characterization of viruses for zoonotic and pandemic potential in wildlife, domestic animals, and people, including high-risk human cohorts and ILI, SARI, FUO patients with measured animal contact data |
| **Objective 2: Behavioral risk characterization** | | |
| Identify behaviors and practices facilitating animal-animal and animal-human contact | Percent of PREDICT-2 countries conducting surveys of animal-animal and animal-human contact<br><br>Timeframe: initiate in all intensive countries by end Year 1 and all less intensive countries by middle Year 2; semi-annually/annual assessment of progress | Enhanced in-country behavioral risk monitoring and data synthesis capability for identification of behaviors, practices, and conditions that facilitate animal-animal and animal-human contact, standardized determination of information on risk of zoonotic human disease, ranking of key intervention points, and validation of interventions to reduce risk of zoonotic disease evolution, spillover, amplification, and spread<br><br>Data sources: standardized structured household survey, occupational surveys, consumer surveys, and local follow-on data across the range of risk country settings to generate comparative data on human-animal and animal-animal contact |
| **Objective 3: Global surveillance networks and analysis** | | |

Exhibit A

| | | |
|---|---|---|
| Utilize data management systems for collection and dissemination of standardized ecological and behavioral surveillance and outbreak data | Percent of PREDICT-2 countries contributing biological and behavioral data to PREDICT-2 data management systems<br><br>Timeframe: targeting all countries by end of Year 1; semi-annual/annual assessment of country progress | Improved global disease datasets, information networking and data sharing, enhanced rapid dissemination and integration of biological surveillance, behavioral, and outbreak data, to inform pandemic preparedness<br><br>Data sources: PREDICT-2 database for animal and human biological, ecological, and behavioral data; data collection tools for surveillance and outbreak response; outbreak monitoring systems in coordination with Global Health Security Initiative Early Alerting and Reporting Project |
| **Objective 4: Validation of One Health approaches** | | |
| Gather data and conduct analyses to evaluate One Health approaches | Percent of PREDICT-2 countries quantitatively evaluating One Health Approaches<br><br>Timeframe: initiate in all intensive countries by end of Year 2 and all less intensive countries by middle of Year 3; semi-annual/annual assessment of country progress | Evidence generated for policy makers and partners on effectiveness and economic benefits of One Health approaches and workforce<br><br>Data sources: One Health case studies; measures of stakeholder and organizational participation; integration of animal, human, and ecological surveillance and risk characterization; gender equity in One Health workforce; costs savings and cost mitigation; DALYs in outbreaks; time to detection, response, control of outbreaks; dissemination of information and tools generated by PREDICT-2; sustained One Health programs; and global One Health policies |
| **Objective 5: Overall capacity strengthening** | | |
| Strengthen training of the country staff | Percent of PREDICT-2 countries with government personnel participating in training in field sampling, information management, laboratory techniques and assay development, and risk characterization<br><br>Timeframe: targeting all intensive countries by end of Year 2 and all less intensive countries by middle of Year 3; semi-annual/annual assessment of country progress | Enhanced in-country trans-disciplinary skills, competencies, and knowledge in One Health approach to biological surveillance and risk characterization<br><br>Data sources: semi-annual reports characterizing and summarizing number of individuals cross trained in One Health trans-disciplinary approaches in biological surveillance, laboratory testing, information management, data analysis, and risk characterization; quality control and assessment of laboratory analytical procedures and assay development in collaborating laboratories |
| **Objectives 6: Assisting in the organizing of annual data review meetings for USAID's PREDICT program** | | |
| Coordinate effective data review meeting(s) with other EPT partners and USAID and engage EPT partners in data sharing and data review | Number of annual data review meetings engaging key national and international organizations and EPT partners in data sharing and data review<br><br>Timeframe: at least one annual meeting initiated at end of Year 1, consider needs for additional or regional meetings annually | Evidence shared among EPT partners and national and international partners for key findings from biological, ecological, and behavioral risk characterization, training of in-country staff, and benefits of One Health approaches<br><br>Data sources: PREDICT-2 semi-annual reports, meeting agendas, and key findings shared |

**Organization and Management**

**1. PREDICT-2 ORGANIZATIONAL CHART**




**2. MANAGEMENT PLAN**

Our consortium is a functionally collaborative and fully integrated working team that benefits from the experience of world leaders in zoonotic disease surveillance, epidemiology, disease ecology, and behavioral risk characterization. Building upon existing personnel resources from UC Davis (UCD), EcoHealth Alliance (EHA), Metabiota (MB), the Smithsonian Institution (SI), Wildlife Conservation Society (WCS), and other global health leaders, the *Director* will facilitate the efficient accomplishment of all PREDICT-2 objectives, as well as careful monitoring, evaluation, and adaptive project management, through the organizational structure (Organizational Chart) depicted above. The implementation of previous and ongoing, collaborative and complex zoonotic pathogen projects has allowed the consortium to test the function and feasibility of this working group and optimize the productivity of the team using this structure. The Management Team, made up of USAID representatives, the Key Personnel (detailed above, pending approval by USAID), and the EHA and MB organizational leads, will meet by teleconference twice per month to track the progress of PREDICT-2 activities and make operational adjustments to assure management functionality and achievement of project goals and end-of-project deliverables. To guarantee fiscal responsibility and responsiveness to the needs of the program, the Director will review and approve budgets to ensure they are appropriate to the work proposed, consistent with applicable rules and guidelines, and are committing sufficient resources to achieve in-country objectives. The Director will conduct periodic reviews with the Operations Manager to assess ongoing budgetary needs and will include the

Management Team in financial decisions needed to adaptively manage the project successfully.

As discussed in the Monitoring and Evaluation section above, external guidance will be provided to the Management Team by an External Advisory Panel (EAP). In addition to assessing PREDICT-2 progress according to USAID-approved M&E, this group of distinguished scientists will review activities and plans and advise on priorities, strategic focus, and broader partner collaboration. All have extensive experience in leadership and management of large agencies and projects or programs with operations in developing countries. We will also benefit from the EAP's knowledge, experience, and extensive contacts, which will facilitate achieving the objectives of the project.

An Executive Board, consisting of the Key Personnel, the most senior representative of the core consortium (EHA, MB, WCS, SI), and the Operational Team Leads will shape the management of all activities and ensure that all 17 countries are receiving the support needed to achieve the in-country objectives according to their approved work plans. The Executive Board will meet at least monthly to review country activities, identify programmatic gaps, determine progress toward objectives, and coordinate capacity-building and training plans. To respond to emergencies or unforeseen needs, additional conference calls will be convened by the Director or at the request of any of the Executive Board members. In addition to regular conference calls, there will be at least two face-to-face meetings annually of the Executive Board, as well as an approximately annual meeting of the Executive Board with the Country Coordinators and leaders of the PREDICT-2 laboratories for the purpose of information exchange, lessons learned-sharing, and coordination.

All consortium partners will have representatives on each of the operational teams illustrated in the organizational chart above. For example, the Behavioral Risk Team will be led by Dr. Maureen Miller from EcoHealth Alliance, and she will be supported by a deputy – Dr. Karen Saylors of Metabiota, Dr. Alex Nading of UCD, Dr. Suzan Murray of the Smithsonian, and Dr. Sarah Olson of the Wildlife Conservation Society. Others involved in the behavioral risk work and in the team as needed and appropriate include: the Country Coordinators (n = 17); Country Behavioral Risk leads, including Jusuf D. Kalengkongan (Indonesia), Lanesh Thanda and Alice Mathew (Malaysia), Mwakozi Mwanzalila (Tanzania), Diture (Uganda), and other PoCs (sometimes contracted to local universities as in the focused work during PREDICT-1, approx. 17); Elizabeth Loh (EHA); Toph Allen (EHA); Emily Hagan (EHA); David Wolking (UCD); Kirsten Gilardi (UCD); Paulina Zielinska (UCD); Corina Monagin (MB); and Molly Voss Fannon (SI). In addition, the PREDICT-2 Operational Teams (in conjunction with PREDICT-2 and USAID leadership) will reach out to and contract with appropriate in-country and global teams as needed to complete the work most excellently and expeditiously. For this behavioral risk example, our consortium has been offered partnership by the teams led by Steve Luby of Stanford, Susan Zimicki of FHI 360, Dee Bennett of Another Option, and Andreas Salomonsen currently consulting for the World Bank, among others. We will enthusiastically engage partners, such as these and others as appropriate, in targeted implementation of the project and in other activities, like the evaluation of behavioral interventions.

Day-to-day management of the project and implementation of activities to achieve objectives will be the responsibility of each of the 17 Country Coordinators with the support of the personnel and structure described above. Country Coordinators will be in almost constant (electronic) contact with the Operational Team Leads to ensure consistent work plan implementation. Almost all Country Coordinators are citizens of the PREDICT-2 countries with extensive experience in project management and implementation of surveillance (see Resumes in Annex F). In many cases, they are embedded in local organizations (ministries, universities, or NGOs), as those organizations have aligned missions with PREDICT-2 activities and are likely to help build the support for continuing country activities at the end of PREDICT-2. The duties of the Country Coordinators include:

- Plan and coordinate local biological surveillance and behavioral risk characterization activities and ensure that written standardized protocols are implemented;
- Coordinate field teams and supervise data collection, handling, and tracking from collection to the laboratory or centralized database;
- Coordinate and organize in-country capacity assessment, trainings, and meetings with ministry officials, local partners, and trainees to disseminate information and improve interpretation of surveillance data;
- Facilitate equipment and supply acquisition and distribution;
- Coordinate diagnostics with laboratory personnel including sample processing, testing, and tracking and delivery of data into the PREDICT-2 database;
- Manage data entry, including quality assurance;
- Identify, recruit, and track in-country trainees, including OHW pre-service and P&R in-service candidates;
- Produce and disseminate reports, as required, that document country activities and findings;
- Assess development of local capacity for sustainable surveillance, risk characterization, intervention acceptance, and outbreak response;
- Liaise with local governments and stakeholders to improve information sharing and facilitate approval of data release to the general public; and
- Liaise with local OHW, P&R, CDC, WHO, and FAO personnel to ensure cross-cutting activities.

Because of the complexity of a project that involves many partners working in over 17 countries, and a budget of $100 million, some specialized staff will be required for implementation, especially to ensure cost-effective administration of activities. Our staffing plan is based on previous experience administering international programs and our knowledge that excellent surveillance and behavioral risk characterization through a distributed management structure requires adequate staffing and diligent supervision to guarantee success. We will adaptively manage the PREDICT-2 project to ensure that staffing and staff placement is appropriately matched to the level of project activities.

**End of Attachment B**

Exhibit A

# ATTACHMENT C – BRANDING STRATEGY AND MARKING PLAN
# PREDICT-2

## I. BRANDING STRATEGY

Estimated Costs

All estimated costs associated with branding and marking the PREDICT program are included in the Budget Table below. Items such as stickers were procured in PREDICT 1 and the program maintains some inventory; items to be used at USAID funded meetings such as banners (when necessary) are budgeted at an estimated $9,000 per year across the program's countries' supplies line items in the estimated PREDICT 2 budget. Communications materials (see item 4 below) are primarily developed at UC Davis by our program staff and Content Manager, as described in the estimated budget; those costs are included in salary line items.

**Budget Table**

| Item and use | Cost |
|---|---|
| **Banners and signs**: USAID, UC Davis, and sub-grantees branded banners with graphic identities to be displayed prominently at all USAID funded meetings, gatherings and presentations. | $9,000, budgeted within supply costs in countries anticipating meetings |
| **Stickers**: Branded as described below to be used for marking of equipment. | No additional cost – procured in PREDICT 1 |
| **Reports and Training Materials**: USAID branding incorporated as specified below. | No additional cost |
| **Website and UC Davis promotional publications**: Inclusion as a Partner and acknowledgement as donor (at no cost). | No additional cost – budgeted in communication salaries |

Intended Name of the Program

**Name of Program:** PREDICT

Where appropriate, the name is accompanied by USAID Graphic Identity, UC Davis Logo, Sub-grantee logos. See attached proposed logo and letterhead to be used as necessary and appropriate.

Audiences

**Primary Audience:** Members of the national, state, and local governments, community-based leaders, local community members, and civil society organizations where the PREDICT project is active. Focus will be on stakeholders, involving both genders, ranging from local individuals to highest levels of government.
Communication materials for these target groups will range from posters to reports and media such as TV, radio, and press presentations. In addition, regular correspondence with multiple units of USAID (including mission officers in countries of operation), appropriate US Government offices (as recommended and approved by the USAID AOTR), and international health organizations with which PREDICT will operate collaboratively (e.g. WHO, OIE, FAO).

**Secondary Audience**: International community, governments, bi-lateral and multi-lateral donors, international NGOs, and others working on emerging infectious diseases from wildlife sources.

Planned Communication

*Main Program Message: Building capacity to detect zoonotic pathogens, identifying drivers of transmission, and reducing the risk for spillover, amplification and spread, thereby protecting human health and minimizing threats from pandemic disease.*

**Training materials, pamphlets, etc.:** Similar to our communications efforts in PREDICT-1, we will make training manuals available to the public and keep and maintain both a website with program information and pamphlets or handouts for individual country activities and impacts. Examples of these works can be found at http://www.vetmed.ucdavis.edu/ohi/predict/index.cfm

**Press and Promotional Activities:** In all USAID-funded and related activities, the PREDICT Program, our collaborators, and sub-grantees will consistently undertake the following steps to highlight USAID's collaboration and support:

**TEXTUALLY:** UC Davis and sub-grantees and their partners will include references to USAID support in press releases, websites, and fact sheets relating to PREDICT Program Activities.

**VERBALLY:** UC Davis and sub-grantees and their partners will ensure that USAID is publicly credited in speeches, public presentations, training workshops, and community meetings when referencing project activities.

**VISUALLY:** The USAID identity will be prominently displayed on all written reports and training and program materials regarding PREDICT activities. The USAID graphic identity will always be equal to or more prominent than the logos of UC Davis, its sub-grantees or implementing partners. UC Davis will provide graphical templates to be used for PREDICT letterhead and for graphic identity blocks on UC Davis and sub-grantee communications and materials in the implementation of PREDICT. These graphical templates will be reviewed and approved by the USAID AOTR and Communications Officer prior to use. In PREDICT regions and countries, activities may be implemented by UC Davis and one or more sub- grantees. Approved graphical templates will be provided to the individual sub-grantees in the instances where using the general template with all sub-grantees represented may be inappropriate. USAID, UC Davis, and sub-grantees will be included as follows: the USAID graphic identity will be prominently displayed, and UC Davis and sub-grantee logos will be displayed to the right or below the USAID graphic identity. English versions of the USAID graphic identity will be used on reports, publications, and materials. Materials produced will be pre-reviewed by the USAID Communications Officer as required. If pre-review is not possible, the communications disclaimer will be placed clearly as outlined in the USAID Branding policy.

**IN MEDIA:** USAID will be notified of all public events, workshops, and activities. USAID will be acknowledged at all media events and reporting on the activities of the project. Media coverage of the work may include local radio, local TV, international TV, film, webcasts and reporting, magazines, and radio.

**PHOTOS and STORIES:** USAID and UC Davis jointly-approved press releases and captioned digital photos will be provided at each official media event. Noteworthy or especially interesting stories and photos will be sent to the USAID punctually. Materials produced will be pre-reviewed by USAID, as required. If pre-review is not possible, the communications disclaimer will be placed clearly as outlined in the USAID Branding policy.

Governments and/or Ministries

UC Davis and sub-grantees will acknowledge USAID on all publications. UC Davis and sub-grantees will also acknowledge local governments and their ministries as appropriate (i.e. ministries of environment, health, agriculture, wildlife conservation, tourism, etc.) as they collaborate in implementation of the various project activities.

**Other Groups**

UC Davis and sub-grantees will acknowledge local partners, that may include universities and public or private research institutions, that are instrumental in the local or regional implementation of the PREDICT program. UC Davis and sub-grantees will co-brand jointly-produced materials and activities where appropriate and consistent with USAID and local government requirements. UC Davis will acknowledge other donors for jointly funded activities and materials.

UC Davis will acknowledge other institutions for jointly-implemented, -funded, and -produced materials as appropriate. Other organizations with whom we have been engaged in selected activities will be acknowledged.

USAID will always receive prominence on materials and activities.

## II. MARKING PLAN

**Program Deliverables To Be Marked**

Consistent with the detail provided above, UC Davis and its sub-grantees will mark all of the following with the USAID Graphic Identity as described:

**Public Communications**
- Reports
- Public Service announcements
- Promotional Materials
- Information Products

**Events**
- Training workshop materials
- Events supported by USAID and PREDICT-supported personnel, such as conferences, seminars, etc...

**Commodities**

Equipment (non-administrative), Program Materials (non-administrative)

**Program Deliverables**

| Description of communications, commodities, and program materials | How Marked | When and Where Marked | Exceptions to Labeling |
|---|---|---|---|
| Equipment | USAID identity, UC Davis or sub-grantees identity and inventory number | Upon receipt, USAID prominently displayed and UC Davis or sub-grantees to the right or below the USAID graphic identity. | none |

| | | | |
|---|---|---|---|
| Selected Infrastructure | Signs with USAID identity, UC Davis or sub-grantees identities and local government | As appropriate, USAID, UC Davis, and sub-grantees prominently and together. | none |
| Final programmatic report | USAID identity, UC Davis, and sub-grantees identities | At publication, USAID upper or lower left and UC Davis and partner graphic identities displayed to the right or below the USAID graphic identity. | none |
| Specific activity reports | USAID, UC Davis, and sub-grantees | At publication, USAID upper or lower left and partner logos displayed to the right or below the USAID graphic identity. | none |
| Training materials | USAID, UC Davis, and sub-grantees | At publication, USAID upper or lower left, and partner logos displayed to the right or below the USAID graphic identity. | none |
| Project website | USAID identity, UC Davis, and sub-grantees | At publication, USAID listed with other partners and donors (i.e. UC Davis and sub-grantees) same size text | none |
| Program Deliverables not planned to mark with the USAID Identity | N/A – there are no deliverables that fit this category; however, the instructions required inclusion in the table | N/A – there are no deliverables that fit this category; however, the instructions required inclusion in the table | N/A |

**Presumptive Exception Requests**

No exceptions are currently requested; however, we reserve the right to request such exceptions should extraordinary circumstances warrant them.

**Proposed Logo and Letterhead Examples**







End of Attachment C

# ATTACHMENT D – STANDARD PROVISIONS FOR U.S. NONGOVERNMENTAL ORGANIZATIONS

## I. MANDATORY STANDARD PROVISIONS FOR U.S. NONGOVERNMENTAL ORGANIZATIONS

### M1. APPLICABILITY OF 22 CFR PART 226 (MAY 2005)

a. All provisions of 22 CFR 226 and all Standard Provisions attached to this agreement are applicable to the recipient and to subrecipients which meet the definition of "Recipient" in part 226, unless a section specifically excludes a subrecipient from coverage. The recipient must assure that subrecipients have copies of all the attached standard provisions.

b. For any subawards made with Non-U.S. subrecipients the recipient must include the applicable "Standard Provisions for Non-US Nongovernmental Organizations." Recipients are required to ensure compliance with monitoring procedures in accordance with OMB Circular A-133.

[END OF PROVISION]

### M2. INELIGIBLE COUNTRIES (MAY 1986)

Unless otherwise approved by the USAID Agreement Officer, funds will only be expended for assistance to countries eligible for assistance under the Foreign Assistance Act of 1961, as amended, or under acts appropriating funds for foreign assistance.

[END OF PROVISION]

### M3. NONDISCRIMINATION (JUNE 2012)

No U.S. citizen or legal resident shall be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination on the basis of race, color, national origin, age, disability, or sex under any program or activity funded by this award when work under the grant is performed in the U.S. or when employees are recruited from the U.S.

Additionally, USAID is committed to achieving and maintaining a diverse and representative workforce and a workplace free of discrimination. Based on law, Executive Order, and Agency policy, USAID prohibits discrimination, including harassment, in its own workplace on the basis of race, color, religion, sex (including pregnancy and gender identity), national origin, disability, age, veteran's status, sexual orientation, genetic information, marital status, parental status,

political affiliation, and any other conduct that does not adversely affect the performance of the employee.
In addition, the Agency strongly encourages its recipients and their subrecipients and vendors (at all tiers), performing both in the U.S. and overseas, to develop and enforce comprehensive nondiscrimination policies for their workplaces that include protection for all their employees on these expanded bases, subject to applicable law.

[END OF PROVISION]

**M4. AMENDMENT OF AWARD (JUNE 2012)**

This award may only be amended in writing, by formal amendment or letter, signed by the Agreement Officer (AO), and in the case of a bilateral amendment, by the AO and an authorized official of the recipient.

[END OF PROVISION]

**M5. NOTICES (JUNE 2012)**

Any notice given by USAID or the recipient is sufficient only if in writing and delivered in person, mailed or e-mailed as follows:

(1) To the USAID Agreement Officer, at the address specified in this award; or

(2) To the recipient, at the recipient's address shown in this award, or to such other address specified in this award.

[END OF PROVISION]

**M6. SUBAGREEMENTS (JUNE 2012)**

a. Subawardees and contractors have no relationship with USAID under the terms of this award. All required USAID approvals must be directed through the recipient to USAID.

b. Notwithstanding any other term of this award, subawardees and contractors have no right to submit claims directly to USAID and USAID assumes no liability for any third party claims against the recipient.

[END OF PROVISION]

M7. OMB APPROVAL UNDER THE PAPERWORK REDUCTION ACT (DECEMBER 2003)

Information collection requirements imposed by this award are covered by OMB approval number 0412-0510; the current expiration date is 04/30/2005. The Standard Provisions containing the requirement and an estimate of the public reporting burden (including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information) are

| Standard Provision | Burden Estimate |
|---|---|
| Air Travel and Transportation | 1 (hour) |
| Ocean Shipment of Goods | .5 |
| Patent Rights | .5 |
| Publications | .5 |
| Negotiated Indirect Cost Rates - (Predetermined and Provisional) | 1 |
| Voluntary Population Planning | .5 |
| Protection of the Individual as a Research Subject | 1 |

| 22 CFR 226 | Burden Estimate |
|---|---|
| 22 CFR 226.40-.49, Procurement of Goods and Services | 1 |
| 22 CFR 226.30 -.36, Property Standards | 1.5 |

Comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, may be sent to the Office of Acquisition and Assistance, Policy Division (M/OAA/P), U.S. Agency for International Development, Washington, DC 20523-7801 and to the Office of Management and Budget, Paperwork Reduction Project (0412-0510), Washington, DC 20503.

[END OF PROVISION]

M8. USAID ELIGIBILITY RULES FOR GOODS AND SERVICES (JUNE 2012)

a. This provision is not applicable to commodities or services that the recipient provides with private funds as part of a cost-sharing requirement, or with Program Income generated under this award.

b. Ineligible and Restricted Commodities and Services:

(1) Ineligible Commodities and Services. The recipient must not, under any circumstances, procure any of the following under this award:

(i) Military equipment,
(ii) Surveillance equipment,
(iii) Commodities and services for support of police or other law enforcement activities,
(iv) Abortion equipment and services,
(v) Luxury goods and gambling equipment, or
(vi) Weather modification equipment.

(2) Ineligible Suppliers. Any firms or individuals that do not comply with the requirements in Standard Provision, "Debarment, Suspension and Other Responsibility Matters" and Standard Provision, "Preventing Terrorist Financing" must not be used to provide any commodities or services funded under this award.

(3) Restricted Commodities. The recipient must obtain prior written approval of the Agreement Officer (AO) or comply with required procedures under an applicable waiver, as provided by the AO when procuring any of the following commodities:

(i) Agricultural commodities,
(ii) Motor vehicles,
(iii) Pharmaceuticals,
(iv) Pesticides,
(v) Used equipment,
(vi) U.S. Government-owned excess property, or
(vii) Fertilizer.

c. Source and Nationality:

Except as may be specifically approved in advance by the AO, all commodities and services that will be reimbursed by USAID under this award must be from the authorized geographic code specified in this award and must meet the source and nationality requirements set forth in 22 CFR 228. If the geographic code is not specified, the authorized geographic code is 937. When the total value of procurement for commodities and services during the life of this award is valued at $250,000 or less, the authorized geographic code for procurement of all goods and services to be reimbursed under this award is code 935. For a current list of countries within each geographic code, see: http://www.usaid.gov/ads/policy/300/310.

d. Guidance on the eligibility of specific commodities and services may be obtained from the AO. If USAID determines that the recipient has procured any commodities or services under this award contrary to the requirements of this provision, and has received payment for such purposes, the AO may require the recipient to refund the entire amount of the purchase.

e. This provision must be included in all subagreements, including subawards and contracts, which include procurement of commodities or services.

[END OF PROVISION]

M9. DEBARMENT, SUSPENSION, AND OTHER RESPONSIBILITY MATTERS (JUNE 2012)

a. The recipient agrees to notify the Agreement Officer (AO) immediately upon learning that it or any of its principals:

(1) Are presently excluded or disqualified from covered transactions by any Federal department or agency;

(2) Have been convicted within the preceding three-year period preceding this proposal; been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion, receiving stolen property, making false claims, or obstruction of justice; commission of any other offense indicating a lack of business integrity or business honesty that seriously and directly affects your present responsibility;

(3) Are presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State, or local) with commission of any of the offenses enumerated in paragraph a.(2); and

(4) Have had one or more public transactions (Federal, State, or local) terminated for cause or default within the preceding three years.

b. The recipient agrees that, unless authorized by the AO, it will not knowingly enter into any subagreements or contracts under this award with a person or entity that has an active exclusion on the System for Award Management (SAM) (www.sam.gov). The recipient further agrees to include the following provision in any subagreements or contracts entered into under this award:

DEBARMENT, SUSPENSION, INELIGIBILITY, AND VOLUNTARY EXCLUSION (JUNE 2012)

The recipient/contractor certifies that neither it nor its principals is presently excluded or disqualified from participation in this transaction by any Federal department or agency.

c. The policies and procedures applicable to debarment, suspension, and ineligibility under USAID-financed transactions are set forth in Subpart C of 2 CFR Section 180, as supplemented by 2 CFR 780.

[END OF PROVISION]

M10. DRUG-FREE WORKPLACE (JUNE 2012)

a. The recipient must comply with drug-free workplace requirements in subpart B (or subpart C, if the recipient is an individual) of 2 CFR 782, which adopts the Government-wide implementation (2 CFR part 182) of sec. 5152–5158 of the Drug-Free Workplace Act of 1988 (Pub. L. 100–690, Title V, Subtitle D; 41 U.S.C. 701–707).

[END OF PROVISION]

**M11. EQUAL PARTICIPATION BY FAITH-BASED ORGANIZATIONS (JUNE 2012)**

a. Faith-Based Organizations Encouraged.

Faith-based organizations are eligible to compete on an equal basis as any other organization to participate in USAID programs. Neither USAID nor entities that make and administer subawards of USAID funds will discriminate for or against an organization on the basis of the organization's religious character or affiliation. A faith-based organization may continue to carry out its mission, including the definition, practice, and expression of its religious beliefs, within the limits contained in this provision. More information can be found at the USAID Faith-Based and Community Initiatives Web site: http://www.usaid.gov and 22 CFR 205.1.

b. Inherently Religious Activities Prohibited.

(1) Inherently religious activities include, among other things, worship, religious instruction, prayer, or proselytization.

(2) The recipient must not engage in inherently religious activities as part of the programs or services directly funded with financial assistance from USAID. If the recipient engages in inherently religious activities, it must offer those services at a different time or location from any programs or services directly funded by this award, and participation by beneficiaries in any such inherently religious activities must be voluntary.

(3) These restrictions apply equally to religious and secular organizations. All organizations that participate in USAID programs, including religious ones, must carry out eligible activities in accordance with all program requirements and other applicable requirements governing USAID-funded activities.

(4) These restrictions do not apply to USAID-funded programs where chaplains work with inmates in prisons, detention facilities, or community correction centers, or where USAID funds are provided to religious or other organizations for programs

in prisons, detention facilities, or community correction centers, in which such organizations assist chaplains in carrying out their duties.

(5) Notwithstanding the restrictions of b.(1) and (2), a religious organization that participates in USAID-funded programs or services

(i) Retains its independence and may continue to carry out its mission, including the definition, practice, and expression of its religious beliefs, provided that it does not use direct financial assistance from USAID to support any inherently religious activities,

(ii) May use space in its facilities, without removing religious art, icons, scriptures, or other religious symbols, and

(iii) Retains its authority over its internal governance, and it may retain religious terms in its organization's name, select its board members on a religious basis, and include religious references in its organization's mission statements and other governing documents.

c. Construction of Structures Used for Inherently Religious Activities Prohibited. The recipient must not use USAID funds for the acquisition, construction, or rehabilitation of structures to the extent that those structures are used for inherently religious activities, such as sanctuaries, chapels, or other rooms that the recipient uses as its principal place of worship. Except for a structure used as its principal place of worship, where a structure is used for both eligible and inherently religious activities, USAID funds may not exceed the cost of those portions of the acquisition, construction, or rehabilitation that are attributable to eligible activities.

d. Discrimination Based on Religion Prohibited. The recipient must not discriminate against any beneficiary or potential beneficiary on the basis of religion or religious belief as part of the programs or services directly funded with financial assistance from USAID.

e. A religious organization's exemption from the Federal prohibition on employment discrimination on the basis of religion, set forth in Sec. 702(a) of the Civil Rights Act of 1964, 42 U.S.C. 2000e–1 is not forfeited when the organization receives financial assistance from USAID.

f. The Secretary of State may waive the requirements of this section in whole or in part, on a case-by-case basis, where the Secretary determines that such waiver is necessary to further the national security or foreign policy interests of the United States.

[END OF PROVISION]

**M12. PREVENTING TERRORIST FINANCING – IMPLEMENTATION OF E.O. 13224 (AUGUST 2013)**

a. The recipient must not engage in transactions with, or provide resources or support to, individuals and organizations associated with terrorism, including those individuals or entities that appear on the Specially Designated Nationals and Blocked Persons List maintained by the U.S. Treasury (online at: **http://www.treasury.gov/resource-center/sanctions/SDN-List/Pages/default.aspx**) or the United Nations Security designation list (online at: **http://www.un.org/sc/committees/1267/aq_sanctions_list.shtml**).

b. This provision must be included in all subagreements, including subawards and contracts issued under this award.

[END OF PROVISION]

**M13. MARKING AND PUBLIC COMMUNICATIONS UNDER USAID-FUNDED ASSISTANCE (AUGUST 2013)**

a. The USAID Identity is the official marking for USAID, comprised of the USAID logo and brandmark with the tagline "from the American people." The USAID Identity is on the USAID Web site at **www.usaid.gov/branding**. Recipients must use the USAID Identity, of a size and prominence equivalent to or greater than any other identity or logo displayed, to mark the following:

(1) Programs, projects, activities, public communications, and commodities partially or fully funded by USAID;

(2) Program, project, or activity sites funded by USAID, including visible infrastructure projects or other physical sites;

(3) Technical assistance, studies, reports, papers, publications, audio-visual productions, public service announcements, Web sites/Internet activities, promotional, informational, media, or communications products funded by USAID;

(4) Commodities, equipment, supplies, and other materials funded by USAID, including commodities or equipment provided under humanitarian assistance or disaster relief programs; and

(5) Events financed by USAID, such as training courses, conferences, seminars, exhibitions, fairs, workshops, press conferences and other public activities. If the USAID Identity cannot be displayed, the recipient is encouraged to otherwise acknowledge USAID and the support of the American people.

h. The recipient must implement the requirements of this provision following the approved Marking Plan in the award.

c. The AO may require a preproduction review of program materials and "public communications" (documents and messages intended for external distribution, including but not limited to correspondence; publications; studies; reports; audio visual productions; applications; forms; press; and promotional materials) used in connection with USAID-funded programs, projects or activities, for compliance with an approved Marking Plan.

d. The recipient is encouraged to give public notice of the receipt of this award and announce progress and accomplishments. The recipient must provide copies of notices or announcements to the Agreement Officer's Representative (AOR) and to USAID's Office of Legislative and Public Affairs in advance of release, as practicable. Press releases or other public notices must include a statement substantially as follows:

*"The U.S. Agency for International Development administers the U.S. foreign assistance program providing economic and humanitarian assistance in more than 80 countries worldwide."*

e. Any "public communication" in which the content has not been approved by USAID must contain the following disclaimer:

*"This study/report/audio/visual/other information/media product (specify) is made possible by the generous support of the American people through the United States Agency for International Development (USAID). The contents are the responsibility of [insert recipient name] and do not necessarily reflect the views of USAID or the United States Government."*

f. The recipient must provide the USAID AOR with two copies of all program and communications materials produced under this award.

g. The recipient may request an exception from USAID marking requirements when USAID marking requirements would:

(1) Compromise the intrinsic independence or neutrality of a program or materials where independence or neutrality is an inherent aspect of the program and materials;

(2) Diminish the credibility of audits, reports, analyses, studies, or policy recommendations whose data or findings must be seen as independent;

(3) Undercut host-country government "ownership" of constitutions, laws, regulations, policies, studies, assessments, reports, publications, surveys or audits, public service announcements, or other communications;

(4) Impair the functionality of an item;

(5) Incur substantial costs or be impractical;

(6) Offend local cultural or social norms, or be considered inappropriate; or

(7) Conflict with international law.

h. The recipient may submit a waiver request of the marking requirements of this provision or the Marking Plan, through the AOR, when USAID-required marking would pose compelling political, safety, or security concerns, or have an adverse impact in the cooperating country.

(1) Approved waivers "flow down" to subagreements, including subawards and contracts, unless specified otherwise. The waiver may also include the removal of USAID markings already affixed, if circumstances warrant.

(2) USAID determinations regarding waiver requests are subject to appeal by the recipient, by submitting a written request to reconsider the determination to the cognizant Assistant Administrator.

i. The recipient must include the following marking provision in any subagreements entered into under this award:

*"As a condition of receipt of this subaward, marking with the USAID Identity of a size and prominence equivalent to or greater than the recipient's, subrecipient's, other donor's, or third party's is required. In the event the recipient chooses not to require marking with its own identity or logo by the subrecipient, USAID may, at its discretion, require marking by the subrecipient with the USAID Identity."*

[END OF PROVISION]

## M14. REGULATIONS GOVERNING EMPLOYEES (AUGUST 1992)

(The following applies to the recipient's employees working in the cooperating country under the agreement who are not citizens of the cooperating country.)

a. The recipient's employees must maintain private status and may not rely on local U.S. Government offices or facilities for support while under this grant.

b. The sale of personal property or automobiles by recipient employees and their dependents in the foreign country to which they are assigned are subject to the same limitations and prohibitions which apply to direct-hire USAID personnel employed by the Mission, including the rules contained in 22 CFR 136, except as this may conflict with host government regulations.

c. Other than work to be performed under this award for which an employee is assigned by the recipient, employees of the recipient must not engage directly or indirectly, either in the individual's own name or in the name or through an agency of another person, in any business, profession, or occupation in the foreign countries to which the individual is assigned. In addition, the individual must not make loans or investments to or in any business, profession, or occupation in the foreign countries to which the individual is assigned.

d. The recipient's employees, while in a foreign country, are expected to show respect for its conventions, customs, and institutions, to abide by its applicable laws and regulations, and not to interfere in its internal political affairs.

e. In the event the conduct of any recipient employee is not in accordance with the preceding paragraphs, the recipient's chief of party must consult with the USAID Mission Director and the employee involved, and must recommend to the recipient a course of action with regard to such employee.

f. The parties recognize the rights of the U.S. Ambassador to direct the removal from a country of any U.S. citizen or the discharge from this grant award of any third country national when, in the discretion of the Ambassador, the interests of the United States so require.

g. If it is determined, either under e. or f. above, that the services of such employee should be terminated, the recipient must use its best efforts to cause the return of such employee to the United States, or point of origin, as appropriate.

[END OF PROVISION]

**M15. CONVERSION OF UNITED STATES DOLLARS TO LOCAL CURRENCY (NOVEMBER 1985)**

(This provision applies when activities are undertaken outside the United States.)

Upon arrival in the cooperating country, and from time to time as appropriate, the recipient's chief of party must consult with the Mission Director who must provide, in writing, the procedure the recipient and its employees must follow in the conversion of United States dollars to local currency. This may include, but is not limited to, the conversion of currency through the cognizant United States Disbursing Officer or Mission Controller, as appropriate.

[END OF PROVISION]

**M16. USE OF POUCH FACILITIES (AUGUST 1992)**

(This provision applies when activities are undertaken outside the United States.)

a. Use of diplomatic pouch is controlled by the Department of State. The Department of State has authorized the use of pouch facilities for USAID recipients and their employees as a general policy, as detailed in items (1) through (6) below. However, the final decision regarding use of pouch facilities rest with the Embassy or USAID Mission. In consideration of the use of pouch facilities, the recipient and its employees agree to indemnify and hold harmless, the Department of State and USAID for loss or damage occurring in pouch transmission:

(1) Recipients and their employees are authorized use of the pouch for transmission and receipt of up to a maximum of .9 kgs per shipment of correspondence and documents needed in the administration of assistance programs.

(2) U.S. citizen employees are authorized use of the pouch for personal mail up to a maximum of .45 kgs per shipment (but see a.(3) below).

(3) Merchandise, parcels, magazines, or newspapers are not considered to be personal mail for purposes of this standard provision and are not authorized to be sent or received by pouch.

(4) Official and personal mail pursuant to a.(1) and (2) above sent by pouch should be addressed as follows:

Name of individual or organization (followed by
letter symbol "G")
City Name of post (USAID/_____)
Agency for International Development
Washington, DC 20523-0001

(5) Mail sent via the diplomatic pouch may not be in violation of U.S. Postal laws and may not contain material ineligible for pouch transmission.

(6) Recipient personnel are NOT authorized use of military postal facilities (APO/FPO). This is an Adjutant General's decision based on existing laws and regulations governing military postal facilities and is being enforced worldwide.

b. The recipient is responsible for advising its employees of this authorization, these guidelines, and limitations on use of pouch facilities.

c. Specific additional guidance on grantee use of pouch facilities in accordance with this standard provision is available from the Post Communication Center at the Embassy or USAID Mission.

[END OF PROVISION]

## M17. TRAVEL AND INTERNATIONAL AIR TRANSPORTATION (AUGUST 2013)

### a. PRIOR BUDGET APPROVAL

Direct charges for travel costs for international air travel by individuals are allowable only when each international trip has received prior budget approval. Such approval is met when all of the following are met:

(1) The trip is identified by providing the following information: the number of trips, the number of individuals per trip, and the origin and destination countries or regions;

(2) All of the information noted at a.(1) above is incorporated is the Schedule of this award or amendments to this award; and

(3) The costs related to the travel are incorporated in the budget of this award.

The Agreement Officer (AO) may approve, in writing, international travel costs that have not been incorporated in this award. To obtain AO approval, the recipient must request approval at least three weeks before the international travel, or as far in advance as possible. The recipient must keep a copy of the AO's approval in its files. No other clearance (including country clearance) is required for employees of the recipient, its subrecipients or contractors. International travel by employees who are not on official business of the recipient, such as rest and recuperation (R&R) travel offered as part of an employee's benefits package, must be consistent with the recipient's personnel and travel policies and procedures and does not require approval.

### b. TRAVEL COSTS

All travel costs must comply with the applicable cost principles and must be consistent with those normally allowed in like circumstances in the recipient's non-USAID-funded activities. Costs incurred by employees and officers for travel, including air fare, costs of lodging, other subsistence, and incidental expenses, may be considered reasonable and allowable only to the extent such costs do not exceed reasonable charges normally allowed by the recipient in its regular operations as the result of the recipient organization's written travel policy and are within the limits established by the applicable cost principles.

In the absence of a reasonable written policy regarding international travel costs, the standard for determining the reasonableness of reimbursement for international travel costs will be the Standardized Regulations (Government Civilians, Foreign Areas), published by the U.S. Department of State, as from time to time amended. The most current Standardized Regulations on international travel costs may be obtained from the AO. In the event that the cost for air fare exceeds the customary standard commercial airfare (coach or equivalent) or the lowest commercial discount airfare, the recipient must document one of the allowable exceptions from the applicable cost principles.

e. FLY AMERICA ACT RESTRICTIONS

(1) The recipient must use U.S. Flag Air Carriers for all international air transportation (including personal effects) funded by this award pursuant to the Fly America Act and its implementing regulations to the extent service by such carriers is available.

(2) In the event that the recipient selects a carrier other than a U.S. Flag Air Carrier for international air transportation, in order for the costs of such international air transportation to be allowable, the recipient must document such transportation in accordance with this provision and maintain such documentation pursuant to the Standard Provision, "Accounting, Audit and Records." The documentation must use one of the following reasons or other exception under the Fly America Act:

(i) The recipient uses a European Union (EU) flag air carrier, which is an airline operating from an EU country that has signed the US-EU "Open Skies" agreement (http://www.state.gov/e/eb/rls/othr/ata/ic/170684.htm).

(ii) Travel to or from one of the following countries on an airline of that country when no city pair fare is in effect for that leg (see http://apps.fas.gsa.gov/citypairs/search/):

a. Australia on an Australian airline,
b. Switzerland on a Swiss airline, or
c. Japan on a Japanese airline;

(iii) Only for a particular leg of a route on which no US Flag Air Carrier provides service on that route;

(iv) For a trip of 3 hours or less, the use of a US Flag Air Carrier at least doubles the travel time;

(v) If the US Flag Air Carrier offers direct service, use of the US Flag Air Carrier would increase the travel time by more than 24 hours; or

(vi) If the US Flag Air Carrier does not offer direct service,

a. Use of the US Flag Air Carrier increases the number of aircraft changes by 2 or more,

b. Use of the US Flag Air Carrier extends travel time by 6 hours or more, or

c. Use of the US Flag Air Carrier requires a layover at an overseas interchange of 4 hours or more.

d. DEFINITIONS

The terms used in this provision have the following meanings:

(1) "Travel costs" means expenses for transportation, lodging, subsistence (meals and incidentals), and related expenses incurred by employees who are on travel status on official business of the recipient for any travel outside the country in which the organization is located. "Travel costs" do not include expenses incurred by employees who are not on official business of the recipient, such as rest and recuperation (R&R) travel offered as part of an employee's benefits package that are consistent with the recipient's personnel and travel policies and procedures.

(2) "International air transportation" means international air travel by individuals (and their personal effects) or transportation of cargo by air between a place in the United States and a place outside thereof, or between two places both of which are outside the United States.

(3) "U.S. Flag Air Carrier" means an air carrier on the list issued by the U.S. Department of Transportation at http://ostpxweb.dot.gov/aviation/certific/certlist.htm. U.S. Flag Air Carrier service also includes service provided under a code share agreement with another air carrier when the ticket, or documentation for an electronic ticket, identifies the U.S. flag air carrier's designator code and flight number.

(4) For this provision, the term "United States" includes the fifty states, Commonwealth of Puerto Rico, possessions of the United States, and the District of Columbia.

e. SUBAGREEMENTS

This provision must be included in all subagreements, including all subawards and contracts, under which this award will finance international air transportation.

[END OF PROVISION]

**M18. OCEAN SHIPMENT OF GOODS (JUNE 2012)**

***APPLICABILITY:*** *This provision is applicable for awards and subawards for which the recipient contracts for ocean transportation for goods purchased or financed with USAID funds. In accordance with 22 CFR 228.21, ocean transportation shipments are subject to the provisions of 46 CFR Part 381.*

**OCEAN SHIPMENT OF GOODS (JUNE 2012)**

a. Prior to contracting for ocean transportation to ship goods purchased or financed with USAID funds under this award, the recipient must contact the office below to determine the flag and class of vessel to be used for shipment:

U.S. Agency for International Development,
Office of Acquisition and Assistance, Transportation Division
1300 Pennsylvania Avenue, NW
Washington, DC 20523-7900
Email: oceantransportation@usaid.gov

b. This provision must be included in all subagreements, including subwards and contracts.

[END OF PROVISION]

**M19. VOLUNTARY POPULATION PLANNING ACTIVITIES – MANDATORY REQUIREMENTS (MAY 2006)**

Requirements for Voluntary Sterilization Programs

(1) Funds made available under this award must not be used to pay for the performance of involuntary sterilization as a method of family planning or to coerce or provide any financial incentive to any individual to practice sterilization.

Prohibition on Abortion-Related Activities:

(1) No funds made available under this award will be used to finance, support, or be attributed to the following activities: (i) procurement or distribution of equipment intended to be used for the purpose of inducing abortions as a method of family planning; (ii) special fees or incentives to any person to coerce or motivate them to have abortions; (iii) payments to persons to perform abortions or to solicit persons to undergo abortions; (iv) information, education, training, or communication programs that seek to promote abortion as a method of family planning; and (v) lobbying for or against abortion. The term "motivate," as it relates to family planning assistance, must not be construed to prohibit the provision, consistent with local law, of information or counseling about all pregnancy options.

(2) No funds made available under this award will be used to pay for any biomedical research which relates, in whole or in part, to methods of, or the performance of, abortions or involuntary sterilizations as a means of family planning. Epidemiologic or descriptive research to assess the incidence, extent or consequences of abortions is not precluded.

[END OF PROVISION]

M20. TRAFFICKING IN PERSONS (JUNE 2012)

a. USAID is authorized to terminate this award, without penalty, if the recipient or its employees, or any subrecipient or its employees, engage in any of the following conduct:

(1) Trafficking in persons (as defined in the Protocol to Prevent, Suppress, and Punish Trafficking in Persons, especially Women and Children, supplementing the UN Convention against Transnational Organized Crime) during the period of this award;

(2) Procurement of a commercial sex act during the period of this award, or

(3) Use of forced labor in the performance of this award.

b. For purposes of this provision, "employee" means an individual who is engaged in the performance of this award as a direct employee, consultant, or volunteer of the recipient or any subrecipient.

c. The recipient must include in all subagreements, including subawards and contracts, a provision prohibiting the conduct described in a(1)-(3) by the subrecipient, contractor or any of their employees.

[END OF PROVISION]

M21. SUBMISSIONS TO THE DEVELOPMENT EXPERIENCE CLEARINGHOUSE AND PUBLICATIONS (JUNE 2012)

a. Submissions to the Development Experience Clearinghouse (DEC).

1) The recipient must provide the Agreement Officer's Representative one copy of any Intellectual Work that is published, and a list of any Intellectual Work that is not published.

2) In addition, the recipient must submit Intellectual Work, whether published or not, to the DEC, either on-line (preferred) or by mail. The recipient must review the DEC Web site for submission instructions, including document formatting and the types of documents to submit. Submission instructions can be found at: http://dec.usaid.gov.

3) For purposes of submissions to the DEC, Intellectual Work includes all works that document the implementation, evaluation, and results of international development assistance activities developed or acquired under this award, which may include program and communications materials, evaluations and assessments, information products, research and technical reports, progress and performance reports required under this award (excluding administrative financial

information), and other reports, articles and papers prepared by the recipient under the award, whether published or not. The term does not include the recipient's information that is incidental to award administration, such as financial, administrative, cost or pricing, or management information.

4) Each document submitted should contain essential bibliographic information, such as 1) descriptive title; 2) author(s) name; 3) award number; 4) sponsoring USAID office; 5) development objective; and 6) date of publication.

5) The recipient must not submit to the DEC any financially sensitive information or personally identifiable information, such as social security numbers, home addresses and dates of birth. Such information must be removed prior to submission. The recipient must not submit classified documents to the DEC.

b. In the event award funds are used to underwrite the cost of publishing, in lieu of the publisher assuming this cost as is the normal practice, any profits or royalties up to the amount of such cost must be credited to the award unless the schedule of the award has identified the profits or royalties as program income.

[END OF PROVISION]

## M. 22 LIMITING CONSTRUCTION ACTIVITIES (AUGUST 2013)

***APPLICABILITY:*** *In accordance with the policy at ADS 303.3.30, AOs must include this provision in all solicitations and awards. When no construction activities are contemplated under the award, the AO must insert "*Construction is not eligible for reimbursement under this award*" in section d) of this provision. If the award permits construction activities based on the policy above (or as authorized by waiver), the AO must insert the description and location(s) of the specific construction activities in section d) of this provision. The AO must not make a general reference to the Program Description. The AO must also ensure that there is a specific line item for construction activities in the award budget.*

### LIMITING CONSTRUCTION ACTIVITIES (AUGUST 2013)

a) Construction is not eligible for reimbursement under this award unless specifically identified in paragraph d) below.

b) Construction means —construction, alteration, or repair (including dredging and excavation) of buildings, structures, or other real property and includes, without limitation, improvements, renovation, alteration and refurbishment. The term includes, without limitation, roads, power plants, buildings, bridges, water treatment facilities, and vertical structures.

c) Agreement Officers will not approve any subawards or procurements by recipients for construction activities that are not listed in paragraph d) below. USAID will reimburse allowable costs for only the construction activities listed in this provision not to exceed the amount specified in the construction line item of the award budget. The recipient must receive prior written approval from the AO to transfer funds allotted for construction activities to other cost categories, or vice versa.

d) Description
*[Type of construction and location(s)]*

e) The recipient must include this provision in all subawards and procurements and make vendors providing services under this award and subrecipients aware of the restrictions of this provision.

[END OF PROVISION]

**M. 23 USAID Implementing Partner Notices (IPN) Portal for Assistance (July 2014)**

**USAID IMPLEMENTING PARTNER NOTICES (IPN) PORTAL FOR ASSISTANCE**

For use in all solicitations and resulting awards. Please refer to **ADS 303, Section 303.3.31, "USAID Implementing Partner Notices (IPN) Portal For Assistance"** for additional guidance.

(a) Definitions

"USAID Implementing Partner Notices (IPN) Portal for Assistance ("IPN Portal)" means the single point where USAID posts proposed universal bilateral amendments for USAID awards, which can be accessed electronically by registered USAID recipients. The IPN Portal is located at **https://sites.google.com/site/usaidipnforassistance/**. Universal amendments are those which affect all assistance awards or a designated class of awards as specified in each amendment by the IPN Portal Administrator.

"IPN Portal Administrator" means the USAID official designated by the Director, M/OAA, who has overall responsibility for managing the USAID Implementing Partner Notices Portal for Assistance.

"Universal bilateral amendment" means those amendments with revisions or new requirements or provisions that affect all awards or a designated class of awards, as specified in the Agency notification of such revisions or new requirements.

(b) By submission of an application and execution of an award, the Applicant/Recipient acknowledges the requirement to:

(1) Register with the IPN Portal if awarded an assistance award resulting from this solicitation, and

(2) Receive universal bilateral amendments to this award and general notices via the IPN Portal.

(c) Procedure to register for notifications.

Go to **https://sites.google.com/site/usaidignforassistance/** and click the "Register" button at the top of the page. Recipient representatives must use their official organization email address when subscribing, not personal email addresses.

(d) Processing of IPN Portal Amendments

The Recipient may access the IPN Portal at any time to review all IPN Portal amendments; however, the system will also notify the Recipient by email when the USAID IPN Portal Administrator posts a universal bilateral amendment for Recipient's review and signature. Proposed USAID IPN Portal amendments distributed via the IPN Portal are applicable to all awards, unless otherwise noted in the proposed amendment.

Within 15 calendar days from receipt of the notification email from the IPN Portal, the Recipient must do one of the following:

(1) (a) verify applicability of the proposed amendment for their award(s) per the instructions provided with each amendment; (b) download the amendment and incorporate the following information on the amendment form: award number, organization name, and organization mailing address as it appears in the basic award; (c) sign the hardcopy version; and (d) send the signed amendment (by email or hardcopy) to the AO for signature. The Recipient must not incorporate any other changes to the IPN Portal amendment. Bilateral amendments provided through the IPN Portal are not effective until the both the Recipient and the AO sign the amendment;

(2) Notify the AO in writing if the amendment requires negotiation of additional changes to terms and conditions of the award; or

(3) Notify the AO that the Recipient declines to sign the amendment.

Within 30 calendar days of receipt of a signed amendment from the Recipient, the AO must provide the fully executed amendment to the Recipient or initiate discussions with the Recipient.

[End of Provision]

[END OF MANDATORY PROVISIONS]

## II. REQUIRED AS APPLICABLE STANDARD PROVISIONS FOR U.S. NONGOVERNMENTAL ORGANIZATIONS

### RAA1. NEGOTIATED INDIRECT COST RATES - PREDETERMINED (APRIL 1998)

***APPLICABILITY:*** *This provision is applicable to educational or nonprofit institutions whose indirect cost rates under this award are on a predetermined basis.*

**NEGOTIATED INDIRECT COST RATES - PREDETERMINED (APRIL 1998)**

a. The allowable indirect costs must be determined by applying the predetermined indirect cost rates to the bases specified in the schedule of this award.

b. Within the earlier of 30 days after receipt of the A-133 audit report or nine months after the end of the audit period, the recipient must submit to the cognizant agency for audit the required OMB Circular A-133 audit report, proposed predetermined indirect cost rates, and supporting cost data. If USAID is the cognizant agency or no cognizant agency has been designated, the recipient must submit four copies of the audit report, the proposed predetermined indirect cost rates, and supporting cost data to the Overhead, Special Costs, and Closeout Branch, Office of Acquisition and Assistance, USAID, Washington, DC 20523-7802. The proposed rates must be based on the recipient's actual cost experience during that fiscal year. Negotiations of predetermined indirect cost rates must begin soon after receipt of the recipient's proposal.

c. Allowability of costs and acceptability of cost allocation methods must be determined in accordance with the applicable cost principles.

d. The results of each negotiation must be set forth in an indirect cost rate agreement signed by both parties. Such agreement is automatically incorporated into this award and must specify (1) the agreed upon predetermined rates, (2) the bases to which the rates apply, (3) the fiscal year for which the rates apply, and (4) the specific items treated as direct costs. The indirect cost rate agreement must not change any monetary ceiling, award obligation, or specific cost allowance or disallowance provided for in this award.

e. Pending establishment of predetermined indirect costs rates for any fiscal year, the recipient must be reimbursed either at the rates fixed for the previous fiscal year or at billing rates acceptable to the USAID Agreement Officer, subject to appropriate adjustment when the final rates for the fiscal year or other period are established.

[END OF PROVISION]

RAA2. NEGOTIATED INDIRECT COST RATES - PROVISIONAL (Nonprofit) (APRIL 1998)

*APPLICABILITY: This provision is applicable to any nonprofit organizations whose indirect cost rates under this award are on a provisional basis.*

**NEGOTIATED INDIRECT COST RATES - PROVISIONAL (Nonprofit) (APRIL 1998)**

a. Provisional indirect cost rates must be established for each of the recipient's accounting periods during the term of this award. Pending establishment of revised provisional or final rates, allowable indirect costs must be reimbursed at the rates, on the bases, and for the periods shown in the schedule of the award.

b. Within the earlier of 30 days after receipt of the A-133 audit report or nine months after the end of the audit period, the recipient must submit to the cognizant agency for audit the required OMB Circular A-133 audit report, proposed final indirect cost rates, and supporting cost data. If USAID is the cognizant agency or no cognizant agency has been designated, the recipient must submit four copies of the audit report, along with the proposed final indirect cost rates and supporting cost data, to the Overhead, Special Costs, and Closeout Branch, Office of Acquisition and Assistance, USAID, Washington, DC 20523-7802. The proposed rates must be based on the recipient's actual cost experience during that fiscal year. Negotiations of final indirect cost rates must begin soon after receipt of the recipient's proposal.

c. Allowability of costs and acceptability of cost allocation methods must be determined in accordance with the applicable cost principles.

d. The results of each negotiation must be set forth in a written indirect cost rate agreement signed by both parties. Such agreement is automatically incorporated into this award and must specify (1) the agreed upon final rates, (2) the bases to which the rates apply, (3) the fiscal year for which the rates apply, and (4) the items treated as direct costs. The agreement must not change any monetary ceiling, award obligation, or specific cost allowance or disallowance provided for in this award.

e. Pending establishment of final indirect cost rate(s) for any fiscal year, the recipient must be reimbursed either at negotiated provisional rates or at billing rates acceptable to the Agreement Officer, subject to appropriate adjustment when the final rates for the fiscal year are established. To prevent substantial overpayment or underpayment, the provisional or billing rates may be prospectively or retroactively revised by mutual agreement.

f. Failure by the parties to agree on final rates is a 22 CFR 226.90 dispute.

[END OF PROVISION]

RAA4. EXCHANGE VISITORS AND PARTICIPANT TRAINING (JUNE 2012)

*APPLICABILITY: This provision applies to awards that contain funding for any exchange visitor activities or participant training, as defined in ADS 252 and 253, respectively, conducted or paid for by the recipient with USAID funds under this award.*

**EXCHANGE VISITORS AND PARTICIPANT TRAINING (JUNE 2012)**

For any Exchange Visitor, Participant Training or Invitational Travel activities, the recipient must comply with this provision.

a. **Definitions:**

(1) An **Exchange Visitor** is any host-country or third-country national traveling to the U.S., for any purpose, including Participant Training and Invitational Travel, funded by USAID in whole or in part, directly or indirectly.

(2) A **Participant** is a host-country or third-country national sponsored by USAID for a Participant Training activity taking place in the U.S., a third country, or in the host country.

(3) **Participant Training** is a learning activity conducted within the U.S., a third country, or in the host country for the purpose of furthering USAID development objectives. A learning activity takes place in a setting in which an individual (the Participant) interacts with a knowledgeable professional, predominantly for the purpose of acquiring knowledge or skills for the professional or technical enhancement of the individual. Learning activities may be formally structured, such as an academic program or a technical course, or they may be more informal, such as an observational study tour.

(4) **Invitational Travel** is a type of travel that USAID funds for non-U.S. Government employees. This type of travel may be approved for both U.S. and foreign citizens who are not employed by the U.S. Government (USG), not receiving any type of compensation from the USG for such travel, and only when it is determined that the functions to be performed are essential to the interests of USAID.

b. **Program Monitoring and Data Reporting:** The recipient must monitor Exchange Visitors' and Participants' progress during their program and ensure that problems are identified and resolved quickly.

(1) For U.S.-based activities, the recipient must use USAID's official Exchange Visitor and Participant Training information system, currently called "Training Results and Information Network – TraiNet" (see http://trainethelp.usaid.gov/), to report and manage Exchange Visitor and Participant Training data. The

recipient must also use the USAID Visa Compliance System – VCS (see http://traisethelp.usaid.gov/) to transfer required data for USAID Exchange Visitors to the Department of Homeland Security's Student and Exchange Visitor Information System (SEVIS).

(2) For all third-country activities, and for host-country activities of two consecutive days or 16 contact hours or more in duration, the recipient must use USAID's official Exchange Visitor and Participant Training information system, currently called "Training Results and Information Network – TraiNet" (see http://traisethelp.usaid.gov/), to report and manage Participant Training data.

c. **Health and Accident Insurance:**

(1) For Exchange Visitors traveling to the United States, the recipient must enroll Exchange Visitors in health and accident insurance coverage that meets or exceeds Department of State and USAID minimum coverage requirements as set forth in 22 CFR 62.14 and ADS 253.3.6.2. The requirements may be obtained from the Agreement Officer's Representative.

(2) For Participants traveling to a third country, the recipient must obtain health and accident insurance coverage for all Participants.

(3) For Participants traveling within the host country, the recipient must determine whether specific in-country participant training activities subject them to any risk of health and accident liability for medical costs. Participants may incur, and if so, take appropriate steps according to the local situation, including obtaining health and accident insurance coverage for Participants.

d. **Immigration Requirements:**

(1) For Exchange Visitors traveling to the United States, the recipient must ensure that all USAID-sponsored Exchange Visitors obtain, use, and comply with the terms of the J-1 visa, issued in conjunction with a USAID-issued Certificate of Eligibility for J-1 Visa Status (DS-2019).

(2) For Participants traveling to a third country or within the host country, the recipient must ensure that all Participants obtain, use, and comply with the terms of all applicable immigration, visa and other similar requirements.

e. **Language Proficiency:** The recipient must verify language proficiency. Exchange Visitors must possess sufficient English language proficiency to participate in a U.S.-based activity. Participants of third-country or host-country training must be proficient in the language of training at a sufficient level for participation, unless an interpreter has been arranged. Language competency can be verified through a variety of means including proficiency assessments of interviews, publications, presentations, education conducted in English, and formal testing.

f. **Pre-departure Orientation:** The recipient must conduct pre-departure orientation for U.S-bound Exchange Visitors and Participants of third-country training programs. Pre-departure orientation covers: program objectives; administrative and policy review; cultural aspects; and training/learning methods (see http://pdf.usaid.gov/pdf_docs/PNADT444.pdf).

g. **Conditions of Sponsorship:** The recipient must ensure that all Exchange Visitors read and sign the Conditions of Sponsorship for U.S.-Based Activities form (AID 1381-6). The recipient must also ensure that all Participants of long-term (six months or longer) third-country training read and sign the form Conditions of Sponsorship for Third-Country Training form (AID 1381-7). The recipient must report to the Agreement Officer any known violations by Exchange Visitors of visa or other immigration requirements or conditions.

h. **Exchange Visitor Security Risk and Fraud Inquiry:** Each USAID Mission has an established process for conducting a Security Risk and Fraud Inquiry (SRFI) for Exchange Visitors. The recipient must be prepared to assist Missions in conducting the SRFI, if requested. However, the recipient's role is contributive, and the Mission is ultimately responsible for conducting the SRFI.

i. **Fly America:** To the extent that participants travel by international air travel, the recipient must comply with the Standard Provision, "International Air Travel and Air Transportation of Property."

j. **Use of Minority Serving Institutions:** For U.S.-based Participant Training, the recipient must, to the maximum extent possible, maintain their use of Historically Black Colleges and Universities (HBCUs) and other Minority Serving Institutions (MSIs), including Hispanic Serving Institutions and Tribal Colleges and Universities, as training or education providers.

[END OF PROVISION]

**RAA6. PROTECTION OF THE INDIVIDUAL AS A RESEARCH SUBJECT (APRIL 1998)**

*APPLICABILITY: This provision is applicable when human subjects are involved in research financed by the award.*

**PROTECTION OF THE INDIVIDUAL AS A RESEARCH SUBJECT (APRIL 1998)**

a. Safeguarding the rights and welfare of human subjects involved in research supported by USAID is the responsibility of the organization to which support is awarded. USAID has adopted the Common Federal Policy for the Protection of Human Subjects, Part 225 of Title 22 of the Code of Federal Regulations (the "Policy"). Additional interpretation,

procedures, and implementation guidance of the Policy are found in USAID General Notice entitled "Procedures for the Protection of Human Subjects in Research Supported by USAID," issued April 19, 1995, as amended. USAID's Cognizant Human Subjects Officer (CHSO) in USAID/W has oversight, guidance, and interpretation responsibility for the Policy.

b. Recipient organizations must comply with USAID policy when humans are the subject of research, as defined in 22 CFR 225.102(d), funded by the grant and recipients must provide "assurance," as required by 22 CFR 225.103, that they follow and abide by the procedures in the Policy. See also Section 5 of the April 19, 1995, USAID General Notice which sets forth activities to which the Policy is applicable. The existence of a bona fide, applicable assurance approved by the Department of Health and Human Services (HHS) such as the "multiple project assurance" (MPA) will satisfy this requirement. Alternatively, organizations can provide an acceptable written assurance to USAID as described in 22 CFR 225.103. Such assurances must be determined by the CHSO to be acceptable prior to any applicable research being initiated or conducted under the award. In some limited instances outside the U.S., alternative systems for the protection of human subjects may be used provided they are deemed "at least equivalent" to those outlined in Part 225 (See 22 CFR 225.101[h]). Criteria and procedures for making this determination are described in the General Notice cited in the preceding paragraph.

c. Since the welfare of the research subject is a matter of concern to USAID as well as to the organization, USAID staff consultants and advisory groups may independently review and inspect research and research processes and procedures involving human subjects, and based on such findings, the CHSO may prohibit research which presents unacceptable hazards or otherwise fails to comply with USAID procedures. Informed consent documents must include the stipulation that the subject's records may be subject to such review.

[END OF PROVISION]

**RAA7. CARE OF LABORATORY ANIMALS (MARCH 2004)**

***APPLICABILITY:*** *This provision is applicable when laboratory animals are involved in research performed in the U.S. and financed by the award.*

**CARE OF LABORATORY ANIMALS (MARCH 2004)**

a. Before undertaking performance of any grant involving the use of laboratory animals, the recipient must register with the Secretary of Agriculture of the United States in accordance with Section 6, Public Law 89-544, Laboratory Animal Welfare Act, August 24, 1966, as amended by Public Law 91-579, Animal Welfare Act of 1970, December 24, 1970. The recipient must furnish evidence of such registration to the Agreement Officer.

b. The recipient must acquire animals used in research under this award only from dealers licensed by the Secretary of Agriculture, or from exempted sources in accordance with the Public Laws enumerated in a. above.

c. In the care of any live animals used or intended for use in the performance of this grant, the recipient must adhere to the principles enunciated in the Guide for Care and Use of Laboratory Animals prepared by the Institute of Laboratory Animals Resources, National Academy of Sciences - National Research Council (NAS-NRC), and in the United States Department of Agriculture's (USDA) regulations and standards issued under the Public Laws enumerated in a. above. In case of conflict between standards, the higher standard must be used. The recipient's reports on portions of the award in which animals were used must contain a certificate stating that the animals were cared for in accordance with the principles enunciated in the Guide for Care and Use of Laboratory Animals prepared by the Institute of Laboratory Animal Resources, NAS-NRC, and/or in the regulations and standards as promulgated by the Agricultural Research Service, USDA, pursuant to the Laboratory Animal Welfare Act of 24 August 1966, as amended (P.L. 89-544 and P.L. 91-579). NOTE: The recipient may request registration of the recipient's facility and a current listing of licensed dealers from the Regional Office of the Animal and Plant Health Inspection Service (APHIS), USDA, for the region in which the recipient's research facility is located. The location of the appropriate APHIS Regional Office as well as information concerning this program may be obtained by contacting the Senior Staff Office, Animal Care Staff, USDA/APHIS, 4700 River Road, Unit 84, Riverdale, MD 20737-1234 and at **www.aphis.usda.gov/animal_welfare/index.shtml**.

[END OF PROVISION]

**RAA9. COST SHARING (MATCHING) (FEBRUARY 2012)**

***APPLICABILITY:*** *This provision, along with 22 CFR 226, is applicable when the recipient has agreed or is required to cost share or provide a matching share.*

**COST SHARING (MATCHING) (FEBRUARY 2012)**

a. If at the end of any funding period, the recipient has expended an amount of non-Federal funds less than the agreed upon amount or percentage of total expenditures, the Agreement Officer may apply the difference to reduce the amount of USAID incremental funding in the following funding period. If the award has expired or has been terminated, the Agreement Officer may require the recipient to refund the difference to USAID.

b. The source and nationality requirements and the restricted goods provision established in the Standard Provision entitled "USAID Eligibility Rules for Goods and Services" do not apply to cost sharing (matching) expenditures.

[END OF PROVISION]

RAA10. PROHIBITION OF ASSISTANCE TO DRUG TRAFFICKERS (JUNE 1999)

*APPLICABILITY: This provision is applicable where performance of the award will take place in "Covered" Countries, as described in AIDS 206.*

PROHIBITION OF ASSISTANCE TO DRUG TRAFFICKERS (JUNE 1999)

a. USAID reserves the right to terminate assistance to, or take other appropriate measures with respect to, any participant approved by USAID who is found to have been convicted of a narcotics offense or to have been engaged in drug trafficking as defined in 22 CFR 140.

b.

(1) For any loan over $1,000 made under this agreement, the recipient must insert a clause in the loan agreement stating that the loan is subject to immediate cancellation, acceleration, recall, or refund by the recipient if the borrower or a key individual of a borrower is found to have been convicted of a narcotics offense or to have been engaged in drug trafficking as defined in 22 CFR 140.

(2) Upon notice by USAID of a determination under section (1) and at USAID's option, the recipient agrees to immediately cancel, accelerate, or recall the loan, including refund in full of the outstanding balance. USAID reserves the right to have the loan refund returned to USAID.

c.

(1) The recipient agrees not to disburse, or sign documents committing the recipient to disburse, funds to a subrecipient designated by USAID ("Designated Subrecipient") until advised by USAID that: (i) any United States Government review of the Designated Subrecipient and its key individuals has been completed; (ii) any related certifications have been obtained; and (iii) the assistance to the Designated Subrecipient has been approved. Designation means that the subrecipient has been unilaterally selected by USAID as the subrecipient. USAID approval of a subrecipient, selected by another party, or joint selection by USAID and another party is not designation.

(2) The recipient must insert the following clause, or its substance, in its agreement with the Designated Subrecipient:

*"The recipient reserves the right to terminate this [Agreement/Contract] or take other appropriate measures if the [Subrecipient] or a key individual of the [Subrecipient] is found to have been convicted of a narcotic offense or to have been engaged in drug trafficking as defined in 22 CFR 140."*

[END OF PROVISION]

RAA11. INVESTMENT PROMOTION (NOVEMBER 2003)

*APPLICABILITY: The following clause is required for grants and cooperative agreements when the program includes gray-area activities or investment-related activities where specific activities are not identified at the time of obligation but could be for investment-related activities, as described in ADS 225 (see 225.3.1.8).*

**INVESTMENT PROMOTION (NOVEMBER 2003)**

a. Except as specifically set forth in this award or otherwise authorized by USAID in writing, no funds or other support provided hereunder may be used for any activity that involves investment promotion in a foreign country.

b. In the event the recipient is requested or wishes to provide assistance in the above area or requires clarification from USAID as to whether the activity would be consistent with the limitation set forth above, the recipient must notify the Agreement Officer and provide a detailed description of the proposed activity. The recipient must not proceed with the activity until advised by USAID that it may do so.

c. The recipient must ensure that its employees and subrecipients and contractors providing investment promotion services hereunder are made aware of the restrictions set forth in this clause and must include this clause in all contracts and other subagreements entered into hereunder.

[END OF PROVISION]

RAA12. REPORTING HOST GOVERNMENT TAXES (JUNE 2012)

***APPLICABILITY**: This provision is applicable to all USAID agreements that obligate or suboblgate FY 2003 or later funds except for agreements funded with Operating Expense, Pub. L. 480 funds, or trust funds, or agreements where there will be no commodity transactions in a foreign country over the amount of $500. Please insert address and point of contact at the Embassy, Mission, or M/CFO/CMP as appropriate under section (b) of this provision.*

**REPORTING HOST GOVERNMENT TAXES (JUNE 2012)**

a. By April 16 of each year, the recipient must submit a report containing:

(1) Contractor/recipient name.

(2) Contact name with phone, fax and e-mail.

(3) Agreement number(s).

(4) The total amount of value-added taxes and customs duties (but not sales taxes)

assessed by the host government (or any entity thereof) on purchases in excess of $500 per transaction of supplies, materials, goods or equipment, during the 12 months ending on the preceding September 30, using funds provided under this contract/agreement.

(5) Any reimbursements received by April 1 of the current year on value-added taxes and customs duties reported in (iv).

(6) Reports are required even if the recipient did not pay any taxes or receive any reimbursements during the reporting period.

(7) Cumulative reports may be provided if the recipient is implementing more than one program in a foreign country.

b. Submit the reports to: [insert address and point of contact at the Embassy, Mission, or M/CFO/CMP as appropriate, may include an optional "with a copy to"].

c. Host government taxes are not allowable where the Agreement Officer provides the necessary means to the recipient to obtain an exemption or refund of such taxes, and the recipient fails to take reasonable steps to obtain such exemption or refund. Otherwise, taxes are allowable in accordance with the Standard Provision, "Allowable Costs," and must be reported as required in this provision.

d. The recipient must include this reporting requirement in all applicable subagreements, including subawards and contracts.

[END OF PROVISION]

**RAA13. FOREIGN GOVERNMENT DELEGATIONS TO INTERNATIONAL CONFERENCES (JUNE 2012)**

*APPLICABILITY: Include this provision in agreements funded from the following accounts:*

- *Development Assistance, including assistance for sub-Saharan Africa,*
- *Global Health Programs, and*
- *Micro and Small Enterprise Development Program Account.*

*Further information found in the Mandatory Reference for ADS 303, "Guidance on Funding Foreign Government Delegations to International Conferences,"* (http://www.usaid.gov/ads/policy/300/350www)

FOREIGN GOVERNMENT DELEGATIONS TO INTERNATIONAL CONFERENCES (JUNE 2012)

a. U.S. Government funds under this award must not be used to finance the travel, per diem, hotel expenses, meals, conference fees or other conference costs for any member of a

foreign government's delegation to an international conference sponsored by a multilateral organization, as defined below, unless approved by the Agreement Officer in writing.

b. Definitions:

(1) A foreign government delegation is appointed by the national government (including ministries and agencies but excluding local, state and provincial entities) to act on behalf of the appointing authority at the international conference. A conference participant is a delegate for the purposes of this provision, only when there is an appointment or designation that the individual is authorized to officially represent the government or agency. A delegate may be a private citizen.

(2) An international conference is a meeting where there is an agenda, an organizational structure, and delegations from countries other than the conference location, in which country delegations participate through discussion, votes, etc.

(3) A multilateral organization is an organization established by international agreement and whose governing body is composed principally of foreign governments or other multilateral organizations.

[END OF PROVISION]

**RAA17. STANDARDS FOR ACCESSIBILITY FOR THE DISABLED IN USAID ASSISTANCE AWARDS INVOLVING CONSTRUCTION (SEPTEMBER 2004)**

***APPLICABILITY:*** *This provision must be included in solicitations (e.g., Requests for Applications (RFAs) or Annual Program Statements), and in awards involving construction.*

**STANDARDS FOR ACCESSIBILITY FOR THE DISABLED IN USAID ASSISTANCE AWARDS INVOLVING CONSTRUCTION (SEPTEMBER 2004)**

a. One of the objectives of the USAID Disability Policy is to engage other U.S. Government agencies, host country counterparts, governments, implementing organizations, and other donors in fostering a climate of nondiscrimination against people with disabilities. As part of this policy USAID has established standards for any new or renovation construction project funded by USAID to allow access by people with disabilities (PWDs). The full text of the policy paper can be found at the following Web site: pdf.usaid.gov/pdf_docs/PDABQ631.pdf.

b. USAID requires the recipient to comply with standards of accessibility for people with disabilities in all structures, buildings or facilities resulting from new or renovation construction or alterations of an existing structure.

c. The recipient will comply with the host country or regional standards for accessibility in

construction when such standards result in at least substantially equivalent accessibility and usability as the standard provided in the Americans with Disabilities Act (ADA) of 1990 and the Architectural Barriers Act (ABA) Accessibility Guidelines of July 2004. Where there are no host country or regional standards for universal access or where the host country or regional standards fail to meet the ADA/ABA threshold, the standard prescribed in the ADA and the ABA will be used.

d. New Construction. All new construction will comply with the above standards for accessibility.

e. Alterations. Changes to an existing structure that affect, the usability of the structure will comply with the above standards for accessibility unless the recipient obtains the Agreement Officer's advance approval that compliance is technically infeasible or constitutes an undue burden or both. Compliance is technically infeasible where structural conditions would require removing or altering a load-bearing member that is an essential part of the structural frame or because other existing physical or site constraints prohibit modification or addition of elements, spaces, or features that are in full and strict compliance with the minimum requirements of the standard. Compliance is an undue burden where it entails either a significant difficulty or expense or both.

f. Exceptions. The following construction related activities are excepted from the requirements of paragraphs a. through d. above:

(1) Normal maintenance, reroofing, painting or wall papering, or changes to mechanical or electrical systems are not alterations and the above standards do not apply unless they affect the accessibility of the building or facility; and

(2) Emergency construction (which may entail the provision of plastic sheeting or tents, minor repair and upgrading of existing structures, rebuilding of part of existing structures, or provision of temporary structures) intended to be temporary in nature. A portion of emergency construction assistance may be provided to people with disabilities as part of the process of identifying disaster- and crisis-affected people as "most vulnerable."

[END OF PROVISION]

## RAA21. CENTRAL CONTRACTOR REGISTRATION AND UNIVERSAL IDENTIFIER (OCTOBER 2010)

*APPLICABILITY: This provision is required in accordance with 2 CFR 25, Award Term for Central Contractor Registration and Universal Identifier. Agreement Officers (AOs) must include this provision in all assistance solicitations and all awards, unless the AO exempts an organization from compliance with the provision under one of the following exceptions, from paragraph d. below:*

*Exceptions. The requirements of this provision to obtain a Data Universal Numbering System (DUNS) number and maintain a current registration to the Central Contractor Registration (CCR) do not apply, at the prime award or subaward level, to:*

*(1) Awards to individuals*

*(2) Awards less than $25,000 to foreign recipients to be performed outside the United States (based on a USAID determination)*

*(3) Awards where the AO determines, in writing, that these requirements would cause personal safety concerns.*

**CENTRAL CONTRACTOR REGISTRATION AND UNIVERSAL IDENTIFIER (OCTOBER 2010)**

a. **Requirement for Central Contractor Registration (CCR).** Unless you are exempted from this requirement under 2 CFR 25.110, you as the recipient must maintain the currency of your information in the CCR until you submit the final financial report required under this award or receive the final payment, whichever is later. This requires that you review and update the information at least annually after the initial registration, and more frequently, if required by changes in your information or another award term.

b. **Requirement for Data Universal Numbering System (DUNS) numbers.** If you are authorized to make subawards under this award, you:

(1) Must notify potential subrecipients that no entity (see definition in paragraph c. of this award term) may receive a subaward from you unless the entity has provided its DUNS number to you.

(2) May not make a subaward to an entity unless the entity has provided its DUNS number to you.

c. **Definitions.** For purposes of this award term:

(1) Central Contractor Registration (CCR) means the Federal repository into which an entity must provide information required for the conduct of business as a recipient. Additional information about registration procedures may be found at the CCR Internet site (currently at www.ccr.gov).

(2) Data Universal Numbering System (DUNS) number means the nine-digit number established and assigned by Dun and Bradstreet, Inc. (D&B) to uniquely identify business entities. A DUNS number may be obtained from D&B by telephone (currently 866-705-5711) or the Internet (currently at fedgov.dnb.com/webform).

(3) Entity, as it is used in this award term, means all of the following, as defined at 2 CFR 25, subpart C:

(i) A governmental organization, which is a State, local government, or Indian tribe;

(ii) A foreign public entity;

(iii) A domestic or foreign nonprofit organization;

(iv) A domestic or foreign for-profit organization; and

(v) A Federal agency, but only as a subrecipient under an award or subaward to a non-Federal entity.

(4) Subaward:

(i) This term means a legal instrument to provide support for the performance of any portion of the substantive project or program for which you received this award and that you as the recipient award to an eligible subrecipient.

(ii) The term does not include your procurement of property and services needed to carry out the project or program (for further explanation, see Sec. --.210 of the attachment to OMB Circular A-133, "Audits of States, Local Governments, and Non-Profit Organizations").

(iii) A subaward may be provided through any legal agreement, including an agreement that you consider a contract.

(5) Subrecipient means an entity that:

(i) Receives a subaward from you under this award; and

(ii) Is accountable to you for the use of the Federal funds provided by the subaward.

ADDENDUM (JUNE 2012):

a. **Exceptions.** The requirements of this provision to obtain a Data Universal Numbering System (DUNS) number and maintain a current registration in the Central Contractor Registration (CCR) do not apply, at the prime award or subaward level, to:

(1) Awards to individuals

(2) Awards less than $25,000 to foreign recipients to be performed outside the United States (based on a USAID determination)

(3) Awards where the Agreement Officer determines, in writing, that these requirements would cause personal safety concerns.

b. This provision does not need to be included in subawards.

[END OF PROVISION]

**RAA22. REPORTING SUBAWARDS AND EXECUTIVE COMPENSATION (OCTOBER 2010)**

***APPLICABILITY:*** *This provision is required in accordance with 2 CFR 170, Award Term for Reporting Subawards and Executive Compensation. AOs must include this provision in all assistance solicitations and all awards expected to exceed $25,000, unless an exemption applies under paragraph d. of the provision or the exemptions listed below in this applicability statement. If the AO determines that an exemption applies, the AO must provide guidance to the recipient on reporting with generic information.*

***Exemptions.***

*(1) The requirements to report under this provision do not apply to:*

*(i) Awards to individuals*

*(ii) Awards less than $25,000*

*(2) When the AO determines, in writing, that these requirements would cause personal safety concerns, reporting under this provision can be accomplished using generic information.*

**REPORTING SUBAWARDS AND EXECUTIVE COMPENSATION (OCTOBER 2010)**

a. **Reporting of first-tier subawards.**

(1) Applicability. Unless you are exempt as provided in paragraph d. of this award term, you must report each action that obligates $25,000 or more in Federal funds that does not include Recovery funds (as defined in section 1512(a)(2) of the American Recovery and Reinvestment Act of 2009, Pub. L. 111-5) for a subaward to an entity (see definitions in paragraph e. of this award term).

(2) Where and when to report.

(i) You must report each obligating action described in paragraph a.(1) of this award term to www.fsrs.gov.

(ii) For subaward information, report no later than the end of the month

following the month in which the obligation was made. (For example, if the obligation was made on November 7, 2010, the obligation must be reported by no later than December 31, 2010.)

(3) What to report. You must report the information about each obligating action that the submission instructions posted at www.fsrs.gov specify.

**b. Reporting Total Compensation of Recipient Executives.**

(1) Applicability and what to report. You must report total compensation for each of your five most highly compensated executives for the preceding completed fiscal year, if –

(i) The total Federal funding authorized to date under this award is $25,000 or more;

(ii) In the preceding fiscal year, you received—

(A) 80 percent or more of your annual gross revenues from Federal procurement contracts (and subcontracts) and Federal financial assistance subject to the Transparency Act, as defined at 2 CFR 170.320 (and subawards); and

(B) $25,000,000 or more in annual gross revenues from Federal procurement contracts (and subcontracts) and Federal financial assistance subject to the Transparency Act, as defined at 2 CFR 170.320 (and subawards); and

(iii) The public does not have access to information about the compensation of the executives through periodic reports filed under section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78m(a), 78o(d)) or section 6104 of the Internal Revenue Code of 1986. (To determine if the public has access to the compensation information, see the U.S. Security and Exchange Commission total compensation filings at www.sec.gov/answers/execomp.htm.)

(2) Where and when to report. You must report executive total compensation described in paragraph b.(1) of this award term:

(i) As part of your registration profile at www.bpn.gov/ccr.

(ii) By the end of the month following the month in which this award is made, and annually thereafter.

**c. Reporting of Total Compensation of Subrecipient Executives.**

(1) Applicability and what to report. Unless you are exempt as provided in paragraph d. of this award term, for each first-tier subrecipient under this award, you must report the names and total compensation of each of the subrecipient's five most highly compensated executives for the subrecipient's preceding completed fiscal year, if–

(i) In the subrecipient's preceding fiscal year, the subrecipient received—

(A) 80 percent or more of its annual gross revenues from Federal procurement contracts (and subcontracts) and Federal financial assistance subject to the Transparency Act, as defined at 2 CFR 170.320 (and subawards); and

(B) $25,000,000 or more in annual gross revenues from Federal procurement contracts (and subcontracts), and Federal financial assistance subject to the Transparency Act (and subawards); and

(ii) The public does not have access to information about the compensation of the executives through periodic reports filed under section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78m(a), 78o(d)) or section 6104 of the Internal Revenue Code of 1986. (To determine if the public has access to the compensation information, see the U.S. Security and Exchange Commission total compensation filings at www.sec.gov/answers/execomp.htm.)

(2) Where and when to report. You must report subrecipient executive total compensation described in paragraph c.(1) of this award term:

(i) To the recipient.

(ii) By the end of the month following the month during which you make the subaward. For example, if a subaward is obligated on any date during the month of October of a given year (for example, between October 1 and 31), you must report any required compensation information of the subrecipient by November 30 of that year.

d. Exemptions.

If, in the previous tax year, you had gross income, from all sources, under $300,000, you are exempt from the requirements to report:

(1) Subawards, and

(2) The total compensation of the five most highly compensated executives of any subrecipient.

e. **Definitions.**

For purposes of this award term:

(1) Entity means all of the following, as defined in 2 CFR 25:

(i) A governmental organization, which is a State, local government, or Indian tribe;

(ii) A foreign public entity;

(iii) A domestic or foreign nonprofit organization;

(iv) A domestic or foreign for-profit organization; and

(v) A Federal agency, but only as a subrecipient under an award or subaward to a non-Federal entity.

(2) Executive means officers, managing partners, or any other employees in management positions.

(3) Subaward:

(i) This term means a legal instrument to provide support for the performance of any portion of the substantive project or program for which you received this award and that you as the recipient award to an eligible subrecipient.

(ii) The term does not include your procurement of property and services needed to carry out the project or program (for further explanation, see Sec. __.210 of the attachment to OMB Circular A-133, "Audits of States, Local Governments, and Non- Profit Organizations").

(iii) A subaward may be provided through any legal agreement, including an agreement that you or a subrecipient considers a contract.

(4) Subrecipient means an entity that:

(i) Receives a subaward from you (the recipient) under this award; and

(ii) Is accountable to you for the use of the Federal funds provided by the subaward.

(5) Total compensation means the cash and noncash dollar value earned by the executive during the recipient's or subrecipient's preceding fiscal year and

includes the following (for more information see 17 CFR 229.402(c)(2)):

(i) Salary and bonus.

(ii) Awards of stock, stock options, and stock appreciation rights. Use the dollar amount recognized for financial statement reporting purposes with respect to the fiscal year in accordance with the Statement of Financial Accounting Standards No. 123 (Revised 2004) (FAS 123R), Shared Based Payments.

(iii) Earnings for services under nonequity incentive plans. This does not include group life, health, hospitalization, or medical reimbursement plans that do not discriminate in favor of executives, and are available generally to all salaried employees.

(iv) Change in pension value. This is the change in present value of defined benefit and actuarial pension plans.

(v) Above-market earnings on deferred compensation which is not tax-qualified.

(vi) Other compensation, if the aggregate value of all such other compensation (for example, severance, termination payments, value of life insurance paid on behalf of the employee, perquisites or property) for the executive exceeds $10,000.

[END OF PROVISION]

**RAA23. PATENT REPORTING PROCEDURES (JULY 2012)**

*APPLICABILITY: This provision is applicable whenever the agreement finances research activities, or patentable processes or practices.)*

**PATENT REPORTING PROCEDURES (JULY 2012)**

As incorporated by 22 CFR 226.36 and the standard provision "APPLICABILITY OF 22 CFR PART 226," the clause at 37 CFR 401.14 ("Patent Rights (Small Business Firms and Nonprofit Organizations)") is incorporated by reference into this award as if set forth in full text. The recipient must use the National Institutes of Health EDISON Patent Reporting and Tracking system (http://www.iedison.gov) to fulfill its disclosure obligations under 37 CFR 401.14(c)(1). The recipient must also submit reports on utilization of subject inventions annually to the Agreement Officer's Representative under 37 CFR 401.14(h), and the last report must be provided within 90 days of the expiration of the agreement.

[END OF PROVISION]

[END OF STANDARD PROVISIONS]

End of Attachment D

# ATTACHMENT E – INITIAL ENVIRONMENTAL EXAMINATION
# SUMMARY OF PROGRAMMATIC INITIAL ENVIRONMENTAL EXAMINATION (PIEE)
# PREDICT - 2

## PROGRAM/ACTIVITY DATA

| | |
|---|---|
| **IEE Number:** | XXX GHI-13-29 |
| **Program/Project Number:** | AAD 936-4002 |
| **Country:** | Global |
| **Functional Objective:** | Investing in People |
| **Program Area:** | Health |
| **Program Elements:** | Pandemic Influenza and Other Emerging Threats |
| **Funding Period:** | FY14 - FY18 |
| **Life of Activity Funding:** | September 2014 through September 2019 |
| **Life of PIEE:** | Five years from date of signing or at the time of any change/amendment to the Program. |

**PIEE Amendment:** Yes_____ No__X__ If yes, date of original IEE: _____

**PIEE Prepared by:** August Pabst, GH/HIDN/PIOET

**Current date:** May 2013

## ENVIRONMENTAL ACTION RECOMMENDED

Categorical Exclusion: _____
Negative Determination: _____
Negative Determination w/ Conditions: ___X___
Positive Determination: _____

## SUMMARY OF FINDINGS

The purpose of this document is to review the overall activities and the potential environmental impact that will be undertaken by the recipient organization of the PREDICT 2 cooperative agreement. The PREDICT 2 Programmatic Initial Environmental Examination (PIEE) evaluates the potential impacts of the CBP activities and has determined that a **Negative Determination with Conditions** is appropriate for the actions described in the document. Other actions not described in this paper will require supplemental environmental analysis.

## THRESHOLD ENVIRONMENTAL DETERMINATIONS

The overall environmental determination for PREDICT 2 is a **Negative Determination, with conditions**

Pursuant to 22 CFR216.3(a)(2)(iii), a **Negative Determination with Conditions** is recommended for any PREDICT 2 activities that have potential for negative impact on the environment in the following categories, as presented in Table 3b in this document.

1) Procurement, storage, management and disposal of public health commodities, including laboratory supplies and reagents.
2) Actions that directly or indirectly result in the generation and disposal of hazardous or highly hazardous medical waste (e.g., laboratory diagnosis, wildlife surveillance, etc.)
3) Actions associated with establishing a wildlife surveillance capacity in selected countries and regions that target specific microbial agents.
4) Outbreak response planning and implementation.

SUMMARY OF MONITORING AND REPORTING MEASURES

1. **Agreement Officer Responsibilities**: USAID procurement should include consideration of the implementing partner's ability to perform the mandatory environmental compliance requirements as envisioned under the Program/ Project. The Agreements Officer (AO)/Contraction Officer (CO) shall include required environmental compliance and reporting language into each implementation instrument, and ensure that appropriate resources (budget), qualified staff, equipment, and reporting procedures are dedicated to this portion of the project.

2. **AOR Responsibilities:** The AOR and/or on-site manager or their representative of the Program/Project will undertake field visits, as possible, and consultations with implementing partners to jointly assess the environmental impacts of ongoing activities, and associated mitigation and monitoring conditions
    a. The AOR, in consultation with the mission activity managers and implementing partners, Mission Environmental Officers (MEO), Regional Environmental Officers (REO), and/or Bureau Environmental Officers as appropriate, will actively monitor and evaluate whether environmental consequences unforeseen under activities covered by this PIEE arise during implementation, and modify or end activities as appropriate. If additional activities are added at the primary award level that are not described in this document, an amended PIEE must be prepared.

3. **Supplemental Initial Environmental Examinations**: In the event that any new proposed activity differs substantially from the type or nature of activities described here, or requires different or additional mitigation measures beyond those described, an amendment to this PIEE will be prepared and the SIEE will reference the amended PIEE.

4. **Environmental Mitigation and Monitoring Plans**: It is expected that subsequent funds will either be core or field support funds awarded at the bi-lateral or the core level. For each major core and country activity under this program, an Environmental Mitigation and Monitoring Plan (EMMP) will be completed by the implementing partner and submitted to the AOR, the Global Health Bureau Environmental Officer (BEO), and the Mission Environmental Officer or the Regional Environmental Officer for their approval.
    a. The EMMP must be completed prior to the start of activities.
    b. Implementing partners will provide an Environmental Mitigation and Monitoring Plan (EMMP) for each for the primary award and a country specific EMMP.
    c. This EMMP will be a detailed implementation plan for the conditions prescribed in this document.



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d. The EMMP will be reviewed and approved by the GH BEO prior to the commencement of activities. The mitigation measures and monitoring criteria found in the EMMP should be incorporated into pertinent Performance Monitoring Plans and Annual Workplans.
e. The implementing partners' Project Work Plan will identify those activities outlined in this PIEE that have potential impacts to the environment and discuss plans for environmental management, mitigation approaches, and monitoring measures. Implementing partners will be required to include Environmental Compliance Monitoring in their project work plan and monitoring and evaluation plan.
f. An evaluation of the implementation of the EMMP must be part of the mid, and end of project evaluations.
g. Operating Units will ensure that implementing partners have sufficient capacity to implement and to complete mitigation and monitoring measures.
h. The EMMP must be stored in project files.

5. **Environmental Mitigation And Monitoring Report**: Implementing partners under this award will complete an annual environmental mitigation and monitoring report (EMMR) of all activities.
   a. The environmental monitoring report should be submitted to the AOR by November 1 of each year.
   b. The EMMR will record the environmental mitigation and monitoring measures outlined in the EMMP and will indicate the activities used to ensure that those measures were implemented.
   c. Based on the process outlined in the Project Work Plan, the implementing partners' annual reports to USAID will include brief updates on mitigation and monitoring measures being implemented, results of environmental monitoring, and any other major modifications/revisions in the development activities, and mitigation and monitoring procedures. The EMMR will also identify issues and challenges associated with the implementation of the EMMP.
   d. The EMMR must be stored in project files.

6. **Sub-Agreements or Funds Transfers**: Any sub-agreements or fund transfers from the implementing partners to other organizations must incorporate provisions stipulating:
   a. Any sub agreement or funds transfer must include provisions that stipulate the implementation of conditions outlined in the SIEE for country level programs or an IEE for non-country level programs.
   b. The completion of an environmental mitigation and monitoring plan (EMMP) and annual report (EMMR), and submission to the implementing partner.
   c. Any activity to be undertaken will be within the scope of the environmental determinations and recommendations of this PIEE. This includes assurance that any mitigating measures required for those activities be followed.

7. Implementation will in all cases adhere to applicable host country environmental laws and policies.



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APPROVAL OF ENVIRONMENTAL ACTION RECOMMENDED:

**Recommended By:** _____ 6/14/13
Elizabeth Fox — Date
Director, Office of Health Infectious Disease and Nutrition

**Concurrence:** _____ 6/14/13
Teresa Bernhard — Date
Global Health Bureau Environmental Officer

Approved: X
Disapproved: _____

**Filename:** PREDICT 2 PIEE

# PROGRAMMATIC INITIAL ENVIRONMENTAL EXAMINATION (PIEE)

## PREDICT 2

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ACRONYM LIST

| | |
|---|---|
| AIDS | Acquired Immune Deficiency Syndrome |
| AO | Agreement Officer |
| AOTR | Agreement Officer's Technical Representative |
| BEO | Bureau Environmental Officer |
| CO | Contracts/Grants Officer |
| EMMR | Environmental Mitigation and Monitoring Report |
| FAR | Federal Acquisition Regulation |
| FY | Fiscal Year |
| GH | Bureau for Global Health |
| HIV | Human Immunodeficiency Virus |
| HIV/AIDS | Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome |
| HMIS | Health Management Information Systems |
| HRH | Human Resources for Health |
| LOE | Level of Effort |
| MCH | Maternal Child Health |
| M&E | Monitoring and Evaluation |
| MEO | Mission Environmental Officer |
| MNCH | Maternal, Newborn, and Child Health |
| MOH | Ministry of Health |
| NGO | Non governmental Organization |
| OP | Operating Plan |
| OAA | Office of Acquisition and Assistance |
| PIEE | Programmatic Initial Environmental Examination |
| PMI | Presidential Malaria Initiative |
| PR | Program Results |
| PRH | Population, Reproductive Health |
| REO | Regional Environmental Officer |
| RFA | Request for Application |
| SIEE | Supplemental Initial Environmental Examination |
| SLMG | Sustainable Leadership, Management, and Governance |
| TB | Tuberculosis |
| USAID | United States Agency for International Development |
| USG | United States Government |
| WHO | World Health Organization |

# PROGRAMMATIC INITIAL ENVIRONMENTAL EXAMINATION (PIEE)
# PREDICT 2

**PROGRAM/ACTIVITY DATA**

| | |
|---|---|
| **IEE Number** | **XXX** |
| **Program/Project Number:** | AAD 936-4002 |
| **Country:** | Global |
| **Functional Objective:** | Investing in People |
| **Program Area:** | Health |
| **Program Elements:** | Pandemic Influenza and Other Emerging Threats |
| **Funding Period:** | FY 14 – FY18 |
| **Life of Activity Funding:** | September 2014 through September 2019 |

**Purpose and Scope of PIEE**

The purpose of this document is to review the overall activities undertaken by the PREDICT 2 and provide threshold determinations of environmental impact and conditions for mitigation.

Section 1 of this document covers the categories of activities undertaken by the program; Section 2 is background information on the geographical coverage; Section 3 provides an evaluation of the potential environmental impacts of the Program activities; and Section 4 provides the threshold environmental determination for the Program activities and describes mitigation measures required for implementation.

**SECTION 1: Background and Activity/Program Description**

**Overview of the PREDICT 2 Cooperative Agreement**

*Background*

Explosive human population growth and environmental changes have resulted in increased numbers of people living in close contact with animals. Unfortunately, the resulting increased contact, together with changes in land use, have altered the inherent ecological balance between pathogens and their human and animal hosts, which increases the likelihood of zoonotic diseases—diseases that jump from animals to humans. In order to predict, respond to, and prevent the emergence of novel zoonotic diseases in humans, pathogens must be identified at their source. The PREDICT 2 Project is a follow-on cooperative agreement to the PREDICT project (ending September 29, 2014) and will continue to use a risk-based approach to focus efforts on activities that will increase a countries chances of locating pathogens that could potential harm human populations. In addition, PREDICT 2 will include a social science component that will research the different human/animal interfaces to add to global models of risk attribution and aid in the development and study of risk mitigation options.



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Objectives

Objective I: Assess existing capacity and develop plans for the implementation of wildlife surveillance support.

The PREDICT project will assess the capability of each country/region to conduct wildlife surveillance and develop a plan of action that identifies the inputs needed from this project to achieve the other objectives described in the RFA.

This objective should result in a comprehensive understanding of the existing capacity in the countries and regions targeted through this project. It will describe the existing capabilities, their current utility, and any opportunities to use those capabilities for broader surveillance of diseases in wild animals that are of potential public health impact. Close coordination with the organizations that own, support, and/or operate these assets will help to understand the true potential for use in this wild animal surveillance project. Gaps in systems will be identified and options for solutions will be developed and presented. Barriers to implementation of a wild animal surveillance system will be identified and addressed.

Objective II: Develop models of disease occurrence and spread as well as determining specific areas at high risk.

This objective should produce computational models of disease occurrence and spread that will aid in the development of wild animal surveillance systems and risk-based forecasting for early disease events. Using existing data sets, historical information, scientific publications and other credible, relevant information, these models will identify geographic areas and animal species to target for surveillance activities, identify the factors and conditions most likely to influence the spread of disease from wild animals to domestic animals and/or humans, describe the strengths and weaknesses of differing levels of detection and reporting, and assess the potential impacts (e.g. health, social) of disease and disease control measures.

Objective III: Establish a wildlife surveillance capacity in selected countries and regions that targets specific microbial agents

Routine surveillance of disease occurrence and spread in wild animals, with a focus on rodents, bats and nonhuman primates will be developed and/or improved in pre-determined countries/regions.

Objective IV: Introduce new technologies where they are appropriate and sustainable

Technological advances have extended the ability to conduct disease surveillance in developing countries. For example, disease reporting can occur through text messaging or SMS. Also, field diagnostic technology can help reduce logistical issues for specimen transport and laboratory backlogs. This project will capitalize on the practical, sustainable application of technology to support and streamline surveillance of targeted microbial agents among wild animals. It will focus on technologies that are proven effective, adaptable to low-resource countries, sustainable and promising for long-term use.

Objective V: Improve the flow and handling of information, specimens and samples resulting from the surveillance activities.

This objective will develop the policy considerations around notification of emerging diseases and ensure timely, parallel flows of communication through animal and public health sectors so that timely decisions and actions can occur. It will also develop communication and feedback channels to support and strengthen wild animal surveillance systems.

Objective VI: Characterize and identify high risk human practices and populations that contribute to disease spillover and amplification at the human/animal interface.

Objective VII: Develop, validate and implement behavior change activities among high risk human populations that lower the risk of transmission of novel pathogens from animals to humans and between humans.

**SECTION 2: Country and Environmental Information**

**Locations Affected and Local Environmental Regulations**
USAID's PREDICT 2 programs are worldwide and may take place in any of the USAID mission countries or in countries covered by USAID Regional missions. The status of country level policies on environmental reviews varies. Procedures for disposal of waste are often detailed in national policies for injection safety and in Standard Operating Procedures of laboratories, and are typically based on the WHO Manuals "Laboratory Biosafety Manual, 2nd edition, 2004" and the WHO Manual "Safe Management of Wastes from Health Care Settings."

Location conditions: TBD

**SECTION 3: Evaluation of Project/Program Issues**

The activities under the Program/Project are numerous and complex. Many Program activities do not have direct adverse environmental impacts such as information, education, communication, community mobilization, planning, management, leadership, sustainable, and outreach activities. However, in the course of implementation of these activities, implementing partners should take advantage of opportunities to incorporate and improve means of addressing environmental health issues (like hazardous and infectious waste management) into health service delivery systems.

Certain activities supported by the program will directly or indirectly affect the environment, or have the potential to do so. Based on the analysis conducted by the AOR these activities could affect the environment in four ways:

1) Procurement, storage, management and disposal of public health commodities, including laboratory supplies and reagents.
2) Actions that directly or indirectly result in the generation and disposal of hazardous or highly hazardous medical waste (e.g., laboratory diagnosis and wildlife surveillance, etc.)



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3) Actions associated with establishing a wildlife surveillance capacity in selected countries and regions that targets specific microbial agents.
4) Outbreak response planning and implementation.

The potential impact is discussed in detail below, and summarized in Table 3a towards the end of this section.

**1) Procurement, Storage, Management and Disposal of Public Health Commodities**

This activity includes procurement of laboratory supplies and wildlife surveillance equipment, such as personal protective gear.

Improper management of those public health commodities mentioned above, either during use or disposal, can have adverse effects on the environment by contributing to solid waste and/or contaminating soil and groundwater. Many countries do not have facilities to manage solid wastes other than uncontrolled burns. Plastics and other inorganic materials pose solid waste management issues for some countries. Those commodities that can contribute to hazardous waste will be addressed in the next section.

Information on solid waste management can be found in the Sphere Handbook at: http://www.spherehandbook.org/en/solid-waste-management/

**2) Activities that directly or indirectly result in the generation and disposal of hazardous or highly hazardous medical waste or in techniques that have a direct or indirect environmental impact.**

Small-Scale "one health" initiatives, such as laboratory and wildlife surveillance training provide important and often critical services to countries that would otherwise have little or no access to such services.

However, improper training, handling, storage and disposal of the waste generated in these facilities or activities can spread disease through several mechanisms. Transmission of disease through infectious waste is the greatest and most immediate threat from healthcare waste. If waste is not treated in a way that destroys the pathogenic organisms, dangerous quantities of microscopic disease-causing agents—viruses, bacteria, parasites or fungi—will be present in the waste. These agents can enter the body through punctures and other breaks in the skin, mucous membranes in the mouth, by being inhaled into the lungs, being swallowed, or being transmitted by a vector organism. Those who come in direct contact with the waste are at greatest risk. Examples include healthcare workers, cleaning staff, patients, visitors, waste collectors, disposal site staff, waste pickers, substance abusers and those who knowingly or unknowingly use "recycled" contaminated syringes and needles. Although sharps pose an inherent physical hazard of cuts and punctures, the much greater threat comes from sharps that are also infectious waste. Healthcare workers, waste handlers, waste-pickers, substance abusers and others who handle sharps have become infected with HIV and/or hepatitis B and C viruses through pricks or reuse of syringes/needles.



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Contamination of water supply from untreated healthcare waste can also have devastating effects. If infectious stools or bodily fluids are not treated before being disposed of, they can create and extend epidemics. The absence of proper sterilization procedures is believed to have increased the severity and size of cholera epidemics in Africa during the last decade.

Healthcare wastes generally fall into three categories in terms of public health risk and recommended methods of disposal:

- *General* healthcare waste, similar or identical to domestic waste, including materials such as packaging or unwanted paper. This waste is generally harmless and needs no special handling; 75–90% of waste generated by healthcare facilities falls into this category, and it can be burned or taken to the landfill without any additional treatment.
- *Hazardous* healthcare wastes including infectious waste (except sharps and waste from patients with highly infectious diseases), small quantities of chemicals and pharmaceuticals, and non-recyclable pressurized containers. All blood and body fluids are potentially infectious.
- *Highly hazardous* healthcare wastes, which should be given special attention, includes sharps (especially hypodermic needles), highly infectious non-sharp waste such as laboratory supplies, highly infectious physiological fluids, pathological and anatomical waste, stools from cholera patients, and sputum and blood of patients with highly infectious diseases such as TB and HIV. They also include large quantities of expired or unwanted pharmaceuticals and hazardous chemicals, as well as all radioactive or genotoxic wastes.

If a project's training activities for professional health workers or community health workers involve techniques that would generate and require disposal of hazardous or highly hazardous waste, the Implementing Partners shall be required to include training in or ensure that the training curriculum covers best management practices concerning the proper handling, use, and disposal of medical waste, including blood, sputum, and sharps.

As appropriate, the implementing partners will work with facility, local, regional and/or national officials, to implement and apply appropriate best management practices which incorporate appropriate health and safety measures and environmental safeguards, including proper disposal of medical waste in accordance with international norms as spelled out by the WHO in "WHO's Safe Management of Wastes from Healthcare Activities." National policies and laws should also be considered, though most countries follow WHO Guidelines.

References for this section include:
http://www.who.int/water_sanitation_health/medicalwaste/167to180.pdf
http://www.behealthguide.org/healthfiles/bfile29.htm
*Safe management of wastes from health-care activities*, edited by A. Prüss, E. Giroult and P. Rushbrook. Geneva, WHO, 1999,
http://www.who.int/water_sanitation_health/Environmental_sanit/MHCWHanbook.htm, English

EGSSAA Chapter 8, "Healthcare Waste: Generation, Handling, Treatment and Disposal" (http://www.encapafrica.org/EGSSAA/Word_English/medwaste.doc) for additional guidance on proper handling and disposal of medical waste.

**3) Actions associated with establishing a wildlife surveillance capacity in selected countries and regions that targets specific microbial agents.**

A key objective under the PREDICT 2 project is establishing a wildlife surveillance capacity in select countries were risk of disease spillover is high. In addition to informing global models on disease emergence, the information collected will help determine mitigation approaches and help countries develop policies to control human/animal interfaces in highest risk areas. To accomplish this objective, wildlife sampling is essential. Wildlife sampling includes taking blood, fecal matter, and sputum samples, from a range of species, with a particular focus on rodents, bats and nonhuman primates. Live animal specimens will be sampled and in certain situations, such as interactions with bushmeat hunters, samples will be taken from dead animals. Given that sampling requires direct contact between humans and animals, besides the generation of solid waste, some potential environmental impacts include:

- Removing an animal specimen from its native habitat
- Infecting a healthy animal specimen with a disease
- Harm or death to the animal specimen
- Damaging an ecosystem by impacting the distribution or population of a particular species

Further information can be found in the Guidelines On: The Care and Use of Wildlife by The Canadian Council on Animal Care, at:
http://www.ccac.ca/Documents/Standards/Guidelines/Wildlife.pdf

**4) Outbreak response planning and implementation.**

Response support and technical assistance should be conducted with consideration to potential impacts to the environment. Simple measures to manage the potential impacts can be built into the design of any response program and can be planned and implemented regardless of the response activity.

Some potential impacts include:

- Spread of infectious agents from persons or properties used during response efforts
- Destruction of sensitive habitats, short and long term impacts to threatened and endangered species due to untimely or invasive response actions
- Contamination of soil, sediment or groundwater due to the presence of infectious agents, chemicals etc at the response site
- Contamination of persons, property and environment due to inadequate containment planning and implementation.



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Table 3a: PREDICT 2 Activities with Potential Negative Environmental Impacts

| Investing in People: Health Program Areas | Procurement, Storage, Management and Disposal of Public Health Commodities | Direct or Indirect generation, and need for disposal of hazardous and highly hazardous medical waste (as defined in Section 3 of this IEE) | Actions associated with establishing a wildlife surveillance capacity in selected countries and regions that targets specific microbial agents | Outbreak response planning and implementation |
|---|---|---|---|---|
| | Laboratory reagents and supplies<br><br>Wildlife surveillance equipment<br><br>Personal Protective Gear | Generation of sharps<br><br>Generation of hazardous and highly hazardous medical waste, including blood<br><br>Generation of sputum and other waste | Harm or death to animals being sampled<br><br>Negative impacts to the ecology of the area being sampled | Spread of infectious disease<br><br>Contamination of soil<br><br>Destruction of sensitive habitats/species |





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| Table 3b: CONDITIONS FOR IMPLEMENTATION OF CATEGORIES OF PREDICT 2 ACTIVITIES | |
|---|---|
| **Key Elements of Program/Activities** | **Mitigation Conditions and/or Proactive Interventions** |
| PREDICT 2 activities that involve:<br><br>Procurement, Storage, Management and Disposal of Public Health Commodities | Conditions:<br><br>Consignees for all public health commodities procured under this funding will be advised to store the product according to the information provided on the manufacturer's Materials Safety Data Sheet (MSDS). These are supplied by the manufacturer, and can also be found on the internet by using the active ingredient and MSDS as search terms. If disposal of any of these commodities is required, due to expiration date or any other reason, the consignee will be advised that the preferred method of disposal is to return to the manufacturer. If this is not possible (for example if the expired or spoiled pharmaceuticals are considered hazardous and as such, if transferred across frontiers, become regulated and subject to the Basel Convention on the transfrontier shipment of hazardous waste) then follow the guidelines in the WHO document *Guidelines for Safe Disposal of Unwanted Pharmaceuticals During and After Emergencies*, found at www.who.int/water_sanitation_health/medicalwaste/unwantpharm.pdf. At the request of the Mission, subject to available funding, the implementing partner will make all reasonable attempts to facilitate the disposal of expired commodities under this activity to mitigate the impact of medical waste.<br><br>Implementing partners will work with the host country as appropriate on aspects of essential medicine supply chain management, including estimating demand, distribution, and storage issues of time and temperature.<br><br>Commodities that, during use, become hazardous or highly hazardous waste are managed under the conditions in the following section "Activities that involve the collection, safe handling and disposal of hazardous and highly hazardous medical waste"<br><br>Packaging and disposal of all other public health commodities will be treated using the guidelines provided in Environmental Guidelines for Small-Scale Activities in Africa (EGSSAA)<br>2nd Edition, Chapter 15: Solid Waste (http://www.encapafrica.org/EGSSAA/Word_English/solidwaste.doc)<br><br>In addition, the following guidelines should be followed where appropriate:<br>• USAID/PREDICT, Biosafety and PPE Use (English, French, Spanish)<br>• USAID/PREDICT, Implementing a Cold Chain for Safe Sample Transport and Storage (English, Spanish) |



Exhibit A-1

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| PREDICT 2 activities that involve:<br><br>Generation, storage, handling and disposal of hazardous or highly hazardous medical waste (as defined in Section 3 of this PEE) | Conditions:<br><br>For activities entailing training of professionals in methods that result in the generation and disposal of hazardous or highly hazardous medical waste, including blood or sputum testing, basic and emergency obstetric care techniques, and laboratory support, the implementing partner will include training in or ensure the training curriculum covers procedures to properly handle, label, treat, store, transport and properly dispose of blood, sharps and other medical waste, as applicable, and follows either WHO guidelines, in Environmental Guidelines for Small Scale Activities in Africa Chapter 8, "Healthcare Waste: Generation, Handling, Treatment and Disposal," and is consistent with national policy and procedure for medical waste.<br><br>For all USAID-supported activities entailing service delivery, including blood testing and laboratory support, AORs will work with its implementing partners to assure, to the extent possible, that the medical facilities and operations involved have adequate procedures and capacities in place to properly handle, label, treat, store, transport and properly dispose of blood, sharps and other medical waste. This includes **annual completion of the Healthcare Waste Management Minimum Program Checklist and Action Plan (Annex 1)** for all facilities where implementing partners are directly providing services. Completion of this checklist should be included in the annual workplan.<br><br>Healthcare waste is most appropriately identified by color-coding bags and containers. In addition, the following are well-established practices in the safe handling, storage, and transportation of health-care waste:<br>• Sharps should be collected together (regardless of whether or not they are contaminated), and stored in puncture-proof, impermeable, and tamper-proof containers with fitted covers. If plastic or metal containers are unavailable, then containers made of dense cardboard are recommended.<br>• Highly infectious waste should be immediately sterilized by autoclaving.<br>• On-site collection of waste should be handled at frequent intervals to avoid accumulation, and an adequate supply of fresh collection bags/containers should be available for replacement.<br>• Waste should be stored in an accessible room with adequate space and protection from sunlight.<br>• In any area that produces hazardous waste - hospital wards, treatment rooms, operating theatres, laboratories, etc., three bins plus a separate sharps container will be needed to separate these types of waste. (If hazardous and highly hazardous waste will be disposed of in the same manner, they should not be collected separately.)<br>• For hazardous waste and highly hazardous waste the use of double packaging, e.g. a plastic bag inside a holder or container is recommended for ease of cleaning.<br>• To make separate collection possible, hospital personnel at all levels, especially nurses, support staff, and |



Exhibit A-1

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| | cleaners, should be trained to sort the waste they produce.<br><br>See EGSSAA Chapter 8, "Healthcare Waste: Generation, Handling, Treatment and Disposal" (http://www.encapafrica.org/EGSSAA/Word_English/medwaste.doc) for additional conditions on proper handling and disposal of medical waste. Other important references to consult are "WHO's Safe Management of Wastes from Healthcare Activities" http://www.who.int/water_sanitation_health/medicalwaste/wastemanag/en/<br><br>In addition, the following guidelines should be followed where appropriate:<br>• USAID/PREDICT, Safety Guide: Laboratory Operations (English, French, Spanish) |
| PREDICT 2 activities that involve:<br><br>Activities associated with establishing a wildlife surveillance capacity in selected countries and regions that targets specific microbial agents | For activities under PREDICT 2, implementing partners shall conduct wildlife sampling in a humane and ethical manner, including practicing a "no kill policy" when possible. Proper training and management of wildlife sampling activities is essential and implementing partners will follow the existing USAID/PREDICT generated protocols and guidelines where appropriate (made available to implementing partner upon award of cooperative agreement):<br>• Guide: For Safe Animal Capture and Sampling (English, French, Spanish)<br>• Protocol: Small Carnivore Sampling Methods (English)<br>• Protocol: Bushmeat Sampling Methods (English, French, Spanish)<br>• Protocol: Bat and Rodent Sampling Methods (English, French, Spanish)<br>• Protocol: Primates Sampling Methods (English)<br>• Guide: Packing and Shipping Biological Samples (English, Spanish)<br><br>In addition, PREDICT 2 implementing partners will follow all country specific laws and regulations with regards to wildlife capture, handling, and sample acquisition.<br><br>Further information on wildlife handling can be found in the Guidelines On: The Care and Use of Wildlife by The Canadian Council on Animal Care, at: http://www.ccac.ca/Documents/Standards/Guidelines/Wildlife.pdf |
| PREDICT 2 activities that involve: | Response support and technical assistance should be conducted with consideration to the potential environment. Simple measures to manage the potential impacts can be built into the design of any response program and can be planned and implemented regardless of the response activity. |



Exhibit A-1

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|---|---|
| Outbreak response planning and implementation | The implementing partner will coordinate with local environmental experts, officials, NGOs and the MEO to understand the sensitive species and habitats in the region and to design procedures that ensure the protection of those habitats and species.<br><br>The implementing partner will ensure that all USAID employees or USAID contractors or USAID trained personnel can visually identify any important habitat or species from the target species. This may include using identification cards, have a specialist on site or on call during the response etc.<br><br>Some helpful information about solid waste management in response situations may be found in the Sphere Handbook at: http://www.spherehandbook.org/en/solid-waste-management-standard-1-collection-and-disposal/ |





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## SECTION 4: Recommended Determinations and Conditions for Implementation

### 4a. Determination

Based on the analysis presented in Section 3, this PIEE recommends threshold decisions and conditions for implementation of PREDICT 2 activities. USAID/GH acknowledges that the environmental screening and review procedures described here do not substitute for the recipient country's own environmental laws and policies.

The overall threshold determination for PREDICT 2 is a **Negative Determination, with conditions**. However, various classes of activities have been grouped into two different determinations. The conditions for implementation of the activities follow in Table 4a. If program activities are similar to the activities in Section 3, the conditions established must be implemented as part of the program design and implementation.

**Activities presented in Section 4. Table 4 of this document**

Pursuant to 22 CFR216.3(a)(2)(iii), a **Negative Determination with Conditions** is recommended for any Program activities that have potential for negative impact on the environment in the following categories, as presented in Table 2 in Section 3 of this document.

1) Procurement, storage, management and disposal of public health commodities, including laboratory supplies and reagents.
2) Actions that directly or indirectly result in the generation and disposal of hazardous or highly hazardous medical waste (e.g., laboratory diagnosis and wildlife surveillance, etc.)
3) Actions associated with establishing a wildlife surveillance capacity in selected countries and regions that targets specific microbial agents.
4) Outbreak response planning and implementation.

Table 4: Determinations for Activities Executed Under This Program

| Activities | Recommended Threshold Determination and 22 CFR Part 216 citation |
|---|---|
| Activities not involving any biophysical interventions:<br>○ Document and information transfers e.g. dissemination of PREDICT 2 best practices materials<br>○ Controlled experimentation exclusively for the purpose of research and field evaluation and carefully monitored;<br>○ Analyses, studies, academic or research workshops and meetings<br>○ Studies, projects or programs intended to develop the capability of recipient countries and organizations to engage in development planning<br>○ Develop models of disease occurrence and spread as well as determining specific areas at high risk.<br>○ Improve the flow and handling of information, specimens and samples resulting from the surveillance activities.<br>○ Characterize and identify high risk practices and populations that contribute to disease spillover and amplification at the human/animal interface.<br>○ Develop, validate and implement behavior change activities among high risk populations that lowers the risk of transmission of novel pathogens from animals to humans and between humans | Categorical Exclusion, per<br>○ 22 CFR 216.2 (c)(1)(i-ii), for research activities which may have an effect on the physical and natural environment but will not have a significant effect as a result of limited scope, carefully controlled nature and effective monitoring;<br>○ 216.2 (c)(2)(i), for all activities consisting of education, technical assistance or training programs, except to the extent such programs include activities directly affecting the environment (such as construction of facilities, etc.);<br>○ 216.2 (c)(2)(ii), for controlled experimentation exclusively for the purpose of research and field evaluation which are confined to small areas and carefully monitored;<br>○ 216.2 (c)(2)(iii), for analyses, studies, academic or research workshops and meetings;<br>○ 216.2 (c)(2)(v), for document and information transfers;<br>○ 216.2(c)(2)(xiv), for studies, projects or programs intended to develop the capability of recipient countries to engage in development planning, expect to the extent designed to result in activities directly affecting the environment (such as construction of facilities, etc.) |
| Procurement, storage, management and disposal of public health commodities, including pharmaceutical drugs, immunizations and nutritional supplements, laboratory supplies and reagents. | Negative Determination with Conditions, 22 CFR 216.3 (a) (2) (iii) for activities involving procurement, storage, management and disposal of public health commodities |
| Actions that directly or indirectly result in the generation and | Negative Determination with Conditions, 22 CFR 216.3 (a) (2) (iii) for all |



Exhibit A-1 to Base Agreement

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| | |
|---|---|
| disposal of hazardous or highly hazardous medical waste (e.g., basic and emergency obstetric care techniques, administration of injectables, HIV or TB testing, disease diagnosis and treatment, etc.) | the health activities directly or indirectly result in the generation and disposal of hazardous or highly hazardous medical waste |
| Actions associated with establishing a wildlife surveillance capacity in selected countries and regions that targets specific microbial agents | Negative Determination with Conditions, 22 CFR 216.3 (a) (2) (iii) for activities involving direct interaction with wildlife |
| Outbreak response planning and implementation. | Negative Determination with Conditions, 22 CFR 216.3 (a) (2) (iii) for activities involving outbreak response planning and implementation |

4b. Monitoring Conditions

1. **Agreement Officer Responsibilities**: USAID procurement should include consideration of the implementing partner's ability to perform the mandatory environmental compliance requirements as envisioned under the Program/ Project. The Agreements Officer (AO) shall include required environmental compliance and reporting language into each implementation instrument, and ensure that appropriate resources (budget), qualified staff, equipment, and reporting procedures are dedicated to this portion of the project.

2. **AOR Responsibilities**: The AOR and/or on-site manager or their representative of the Program/Project will undertake field visits, as possible, and consultations with implementing partners to jointly assess the environmental impacts of ongoing activities, and associated mitigation and monitoring conditions.
   a. The AOR, in consultation with the mission activity managers and implementing partners, Mission Environmental Officers (MEO), Regional Environmental Officers (REO), and/or Bureau Environmental Officers as appropriate, will actively monitor and evaluate whether environmental consequences unforeseen under activities covered by this PIEE arise during implementation, and modify or end activities as appropriate. If additional activities are added at the primary award level that are not described in this document, an amended PIEE must be prepared.

3. **Supplemental Initial Environmental Examinations**: In the event that any new proposed activity differs substantially from the type or nature of activities described here, or requires different or additional mitigation measures beyond those described, an amendment to this PIEE will be prepared and the SIEE will reference the amended PIEE.

4. **Environmental Mitigation and Monitoring Plans**: It is expected that subsequent funds will either be core or field support funds awarded at the bi-lateral or the core level. For each major core and country activity under this program, an Environmental Mitigation and Monitoring Plan (EMMP) will be completed by the implementing partner and submitted to the AOR, the Global Health Bureau Environmental Officer (BEO), and the Mission Environmental Officer or the Regional Environmental Officer for their approval.
   a. The EMMP must be completed prior to the start of activities.
   b. Implementing partners will provide an Environmental Mitigation and Monitoring Plan (EMMP) for each for the primary award and a country specific EMMP.
   c. This EMMP will be a detailed implementation plan for the conditions prescribed in this document.
   d. The EMMP will be reviewed and approved by the GH BEO prior to the commencement of activities. The mitigation measures and monitoring criteria found in the EMMP should be incorporated into pertinent Performance Monitoring Plans and Annual Workplans.
   e. The implementing partners' Project Work Plan will identify those activities outlined in this PIEE that have potential impacts to the environment and discuss plans for environmental management, mitigation approaches, and monitoring measures. Implementing partners will be required to include Environmental



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Compliance Monitoring in their project work plan and monitoring and evaluation plan

f. An evaluation of the implementation of the EMMP must be part of the mid, and end of project evaluations.
g. Operating Units will ensure that implementing partners have sufficient capacity to complete to implement mitigation and monitoring measures
h. The EMMP must be stored in project files

5. **Environmental Mitigation And Monitoring Report**: Implementing partners under this award will complete an annual environmental mitigation and monitoring report (EMMR) of all activities.
   a. The environmental monitoring report should be submitted to the AOR by November 1 of each year.
   b. The EMMR will record the environmental mitigation and monitoring measures outlined in the EMMP and will indicate the activities used to ensure that these measures were implemented.
   c. Based on the process outlined in the Project Work Plan, the implementing partners' annual reports to USAID will include brief updates on mitigation and monitoring measures being implemented, results of environmental monitoring, and any other major modifications/revisions in the development activities, and mitigation and monitoring procedures. The EMMR will also identify issues and challenges associated with the implementation of the EMMP.
   d. The EMMR must be stored in project files

6. **Sub-Agreements or Funds Transfers**: Any sub-agreements or fund transfers from the implementing partners to other organizations must incorporate provisions stipulating:
   a. Any sub agreement or funds transfer must include provisions that stipulate the implementation of an EMMP
   b. the completion of an annual environmental monitoring plan and report, and
   c. Any activity to be undertaken will be within the scope of the environmental determinations and recommendations of this PIEE. This includes assurance that any mitigating measures required for those activities be followed.

7. Implementation will in all cases adhere to applicable host country environmental laws and policies.

**4c. The Environmental Mitigation And Monitoring Plan And Report (EMMP/R)**

Operating Units for Associate Awards will use an annual Environmental Mitigation and Monitoring Plan (EMMP) to ensure programmatic compliance with 22 CFR 216. An EMMR will be completed annually so that the conditions specified and met in this PIEE and subsequent SIEE are shown to have been carried out under OEPA. The EMMPs and EMMRs are reviewed and approved by the mission activity manager and the Mission Environmental Officer.



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The EMMP is described in the table below and should be filled out in detail in the prior to the start of activities. The specific mitigation measures identified in the EMMP must be integrated into the annual work-plan for the project and activities.

The Reporting Form, labeled EMMR is below. It should be submitted in the annual performance report.

**PREDICT 2 Cooperative Agreement**
**Environmental Mitigation and Monitoring Plan (EMMP)**

| Category of Activity from Section 4 of PREDICT 2 IEE | Describe specific environmental threats of your organization's activities (based on analysis in Section 3 of PREDICT 2 IEE) | Description of Specific Mitigation Measures for these activities as required in Section 4 of PREDICT 2 IEE | Who is responsible for monitoring | Monitoring Indicator | Monitoring Method | Frequency of Monitoring |
|---|---|---|---|---|---|---|
| For instance 1. Education, technical assistance, training etc. | No environmental impacts anticipated as a result of these activities | Education, technical assistance and training about activities that inherently affect the environment include discussion prevention and mitigation of potential negative environmental effects | | Discussion of environmental impact included in education, technical assistance, training and other materials | Review of materials | Annual |
| 2. Public Health Commodities | | | | | | |
| | | | | | | |

PREDICT 2
Environmental Mitigation and Monitoring Report (EMMR)

| List each Mitigation Measure from column 3 in the EMMR Mitigation Plan (EMMR Part 1 of 2) | Status of Mitigative Measures | List any outstanding issues relating to required conditions | Remarks |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Exhibit A Exhibit Agreement

Exhibit A-1

UCDUS8002724

## Certification

I certify the completeness and the accuracy of the Environmental Monitoring and Mitigation Report (EMMR) compliance monitoring plan for PREDICT 2 COOPERATIVE AGREEMENT above (and covered by the PREDICT 2 PIEE) for which I am responsible:

_____ _____

Signature Date

_____

Print Name

_____

Organization

_____

BELOW THIS LINE FOR USAID USE ONLY

**USAID Mission or Central Bureau Clearance of EMMR:**

Agreement Officer's Representative:_____ Date:_____

Mission Environmental Officer:_____ Date:_____

Regional Environmental Advisor:_____ Date:_____

Bureau Environmental Officer:_____ Date:_____

Note: If clearance is denied, comments must be provided to applicant.

Annex 1. Healthcare Waste Management Minimal Program Checklist and Action Plan to be Included in Training Materials/Programs

| *Elements/Actions* | *In Place?* | *Next Steps to be done* | | |
|---|---|---|---|---|
| | | *What* | *By Whom* | *By When* |
| ***Written plans and procedures*** | | | | |
| 1. *A written waste management plan*<br>Describing all the practices for handling, storing, treating, and disposing of hazardous and non-hazardous waste, as well as types of worker training required. | | | | |
| 2. *Internal rules for generation, handling, storage, treatment, and disposal of healthcare waste* | | | | |
| 3. *Clearly assigned staff responsibilities that cover all steps in the waste management process.* | | | | |
| 4. *Staff waste handling training curricula or a list of topics covered.* | | | | |
| 5. *Waste minimization, reuse, and recycling procedures.* | | | | |
| ***Staff Training, Practices, and Protection*** | | | | |
| 6. *Staff trained in safe handling, storage, treatment, and disposal.*<br>Does staff exhibit good hygiene, safe sharps handling, proper use of protective clothing, proper packaging and labeling of waste, and safe storage of waste?<br>Does staff know the correct responses for spills, injury, and exposure? | | | | |
| 7. *Protective clothing available for workers who move and treat collected infectious waste* such as surgical masks and gloves, aprons, and boots. | | | | |
| 8. *Good hygiene provision.* Are soap and, ideally, warm water readily available workers to | | | | |

Exhibit A- Exhibit Agreement

Exhibit A-1

UCDUS0002726

| | | | | |
|---|---|---|---|---|
| use and can workers be observed regularly washing. | | | | |
| 9. *Workers vaccinated* for against viral hepatitis B, tetanus infections, and other endemic infections for which vaccines are available. | | | | |
| ***Handling and Storage Practices*** | | | | |
| 10. *Temporary storage containers and designated storage locations.*<br>11. Are there labeled, covered, leak-proof, puncture-resistant temporary storage containers for hazardous healthcare wastes? | | | | |
| 12. *Minimization, reuse, and recycling procedures.*<br>• Does the facility have good inventory practices for chemicals and pharmaceuticals, i.e.:<br>o use the oldest batch first;<br>o open new containers only after the last one is empty; procedures to prevent products from being thrown out during routine cleaning; and | | | | |
| 13. *A waste segregation system.*<br>• Is general waste separated from infectious/hazardous waste?<br>• Is sharp waste (needles, broken glass, etc.) collected in separate puncture-proof containers?<br>• Are other levels of segregation being applied e.g. hazardous liquids, chemicals and pharmaceuticals, PVC plastic, and materials containing heavy metals (these are valuable, but less essential)? | | | | |
| 14. *Temporary storage containers and designated storage locations.*<br>• Are there labeled, covered, leak-proof, puncture-resistant temporary storage containers for hazardous healthcare wastes?<br>• Is the location distant from patients or food? | | | | |
| ***Treatment Practices*** | | | | |
| 15. *Frequent removal and treatment of waste* | | | | |

| | | | | |
|---|---|---|---|---|
| • Are wastes collected daily?<br>• Are wastes treated with a frequency appropriate to the climate and season?<br>○ Warm season in warm climates within **24 hrs**<br>○ In the cool season in warm climates within **48 hrs**<br>○ In the warm season in temperate climates within **48 hrs** | | | | |
| 16. *Treatment mechanisms for hazardous and highly hazardous waste.* (The most important function of treatment is disinfection).<br>• Are wastes being burned in the open air, in a drum or brick incinerator, or a single-chamber incinerator?<br>• If not are they being buried safely (in a pit with an impermeable plastic or clay lining)?<br>• Is the final disposal site (usually a pit) surrounded by fencing or other materials and in view of the facility to prevent accidental injury or scavenging of syringes and other medical supplies? | | | | |
| 17. If the waste is transported off-site, are precautions taken to ensure that it is transported and disposed of safely? | | | | |

*** Training should be conducted before starting activity implementation**

**For more detailed checklists and guidance consult**: *Safe management of wastes from health-care activities*, edited by A. Prüss, E. Giroult and P. Rushbrook, Geneva, WHO, 1999, http://www.who.int/water_sanitation_health/Environmental_sanit/MHCWHanbook.htm, English

**Annex 2. Disposal and Treatment Methods Suitable for Different Categories of Healthcare Waste to be Included in Training Materials/Programs (EXAMPLE)**

| Method | Infectious Waste (laboratory cultures, excreta) | Sharps (needles, blades, broken glass) | Pharmaceutical Waste (expired pharmaceuticals, boxes contaminated by pharmaceuticals) | Chemical Waste (laboratory reagents, solvents) | Radioactive Waste (unused liquids from laboratory research) |
|---|---|---|---|---|---|
| Rotary kiln | ✓ | ✓ | ✓ | ✓ | ✓[2] |
| Pyrolytic incinerator | ✓ | ✓ | ✓[1] | ✓[1] | ✓[2] |
| Single-chamber incinerator | ✓ | ✓ | | | ✓[2] |
| Drum or brick incinerator | ✓ | ✓ | | | |
| Chemical disinfection | ✓ | ✓ | | | |
| Wet thermal treatment | ✓ | ✓ | | | |
| Microwave irradiation | ✓ | ✓ | | | |
| Encapsulation | | ✓ | ✓ | ✓[1] | |
| Safe burial on hospital premises | ✓ | ✓ | ✓[1] | ✓[1] | |
| Sanitary landfill | ✓ | | ✓[1] | | |
| Discharge to sewer | | | ✓[1] | | Low-level liquid waste |
| Inertization | | | ✓ | | |
| Other | | | Return to supplier | Return to supplier | Decay by storage |

1: Small quantities only
2: Low-level infectious waste

Exhibit A-1

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# ATTACHMENT F – TABLE OF ACRONYMS

| | |
|---|---|
| BSL | Biohazard Safety Level |
| CDC | United States Centers for Disease Control and Prevention |
| cPCR | Consensus Polymerase Chain Reaction |
| DALYs | Disability Adjusted Life Years |
| DOD | United States Department of Defense |
| DTRA | U.S. DOD/Defense Threat Reduction Agency |
| DUO | Diseases of Unknown Origin |
| EAP | External Advisory Panel |
| EHA | EcoHealth Alliance |
| EID | Emerging Infectious Disease |
| ELISA | Enzyme-linked Immunosorbent Assay |
| EPT | Emerging Pandemic Threats Program of |
| USAID FAO | The Food and Agriculture Organization |
| FUO | Fever of Unknown Origin |
| GAINS | Global Animal Information System |
| GHSA | Global Health Security Agenda |
| GIS | Geographic Information Systems |
| GISRS | WHO Global Influenza Surveillance and Response System |
| HTS | High Through-put Sequencing |
| IHR | International Health Regulations |
| ILI | Influenza-like Illness |
| INSERM | Institut National de la Sánte et de la Recherche Médicale |
| MB | Metabiota, Inc. |
| M&E | Monitoring and Evaluation |
| MERS | Middle Eastern Respiratory Syndrome |
| OFFLU | OIE-FAO Network of Expertise on Animal Influenza |
| OHCEA | One Health Central and East Africa University Network |
| OHI | One Health Institute |
| OHW | USAID One Health Workforce project |
| OIE | Organization for Animal Health |
| PIOET | USAID's Pandemic Influenza and Other Emerging Threats Program |
| PPE | Personal Protective Equipment |
| P&R | USAID Preparedness and Response project |
| SARI | Severe Acute Respiratory Infection |
| SARS-CoV | Severe Acute Respiratory Syndrome Coronavirus |
| SEAOHUN | Southeast Asia One Health University Network |
| SI | Smithsonian Institution |
| SOP | Standard Operating Procedure |
| SVM | School of Veterinary Medicine |
| USAID | United States Agency for International Development |
| UCD | University of California, Davis |
| UCG | United States Government |
| WAHIS | World Animal Health Information System |
| WCS | Wildlife Conservation Society |

| | |
|---|---|
| WHO | The World Health Organization |
| ZIPI | Zoonotic Infections Prevention Integration committee |

**End of Attachment F**

# MODIFICATION OF ASSISTANCE AWARD

Page 1 of 3

| 1. MODIFICATION NUMBER: | 2. EFFECTIVE DATE OF MODIFICATION: | 3. AWARD NUMBER: | 4. EFFECTIVE DATE OF AWARD: |
|---|---|---|---|
| 04 | See Block 16 | AID-OAA-A-14-00102 | 10/01/2014 |

**5. RECIPIENT:**

University of California, Davis
School of Veterinary Medicine,
1850 Research Park Dr.
Davis, CA 95618

DUNS No.: 04-712-0084
TIN No.: 94-6036404 LOC: 2999P

**6. ADMINISTERED BY:**

U.S. Agency for International Development
Office of Acquisition and Assistance
M/OAA/GH/HIDN
1300 Pennsylvania Ave., NW
SA-44, 549
Washington, DC 20532-7900

**7. FISCAL DATA:**

**Amount Obligated: $13,600,000.00**
**Detail: See page 2**

**8. TECHNICAL OFFICE:**
USAID/GH/HIDN

**9. PAYMENT OFFICE:**

U.S. Agency for International Development
M/FM/CMP/LOC
loc@usaid.gov

**10. FUNDING SUMMARY:**

| | Obligated Amount | Total Est. Amount |
|---|---|---|
| **Amount Obligated prior to this Modification:** | $ 62,800,000.00 | $100,000,000.00 |
| **Change made by this Modification:** | $ 13,600,000.00 | $ 0.00 |
| **New/Current Total:** | $ 76,400,000.00 | $100,000,000.00 |

**11. DESCRIPTION OF MODIFICATION:**
PROJECT II

The purpose of this modification is to:

1. Provide incremental funding in the amount of $13,600,000.00 changing the obligated amount from $62,800,000 to $76,400,000.00;
2. Update the references to 22 CFR 226 and replace with the applicable 2 CFR 200 references in ATTACHMENT A – SCHEDULE;
3. Incorporate updates to the mandatory standard provisions (Attachment D)
4. Incorporate additional reporting requirements/guidance for Ebola/Global Health and Security Agenda (GHSA) funding.
5. All other terms and conditions of this award remain unchanged and in full effect. See page 2-3 for specific changes.

**12. THIS MODIFICATION IS ENTERED INTO PURSUANT TO THE AUTHORITY OF THE FOREIGN ASSISTANCE ACT OF 1961, AS AMENDED. EXCEPT AS SPECIFICALLY ABSENCED HEREIN, ALL TERMS AND CONDITIONS OF THE AWARD REFERENCED ON BLOCK #3 ABOVE, AS IT MAY HAVE HERETOFORE BEEN AMENDED, REMAIN UNCHANGED AND IN FULL FORCE AND EFFECT.**

| 13. RECIPIENT | X | IS | IS NOT REQUIRED TO SIGN THIS DOCUMENT TO CONFIRM ITS AGREEMENT WITH THE CHANGES EFFECTED HEREIN. |
|---|---|---|---|

**14. RECIPIENT**

BY: Ahmed Hakim-Elahi, Ph.D., J.D.

Executive Director, Research Administration
(Name Typed or Printed)

TITLE:

DATE: 9/29/2015

**15. THE UNITED STATES OF AMERICA**
**U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT**

BY: Hillary A. Marshall

Hillary A. Marshall
(Name Typed or Printed)

TITLE: Agreement Officer

DATE: 9/30/15

The Cooperative Agreement is modified as follows:

To update the CFR referenced, the Cooperative Agreement is modified as follows:

1) In ATTACHMENT A – SCHEDULE, A.3.3. AMOUNT OF AWARD AND PAYMENT, **REPLACE** "22 CFR 226" with "2 CFR 200".

2) In ATTACHMENT A – SCHEDULE, A.4. AWARD BUDGET, **REPLACE** "22 CFR 226" with "2 CFR 200".

3) In ATTACHMENT A – SCHEDULE, A.8. COST SHARING, **REPLACE** with the following: "The Recipient agrees to expend cost share in an amount not less than $3,697,810 under this agreement. All cost sharing contributions shall be in accordance with 2 CFR 200.306, 2 CFR 700.10, and Standard Provisions on Cost Sharing or Matching and are subject to audit."

4) In ATTACHMENT A – SCHEDULE, A.9. PROGRAM INCOME, **REPLACE** "22 CFR 226.24" with "2 CFR 200.307".

5) In ATTACHMENT A – SCHEDULE, A.10. SUBSTANTIAL INVOLVEMENT, **REPLACE** "22 CFR 226" with "2 CFR 200".

6) In ATTACHMENT A – SCHEDULE, A.11.b Semi-annual reports, **REPLACE** "22 CFR 226.51(b)" with "2 CFR 200.328".

7) In ATTACHMENT A – SCHEDULE, A.11.c Final Report, **REPLACE** "22 CFR 226.51(b)" with "2 CFR 200.328".

8) In ATTACHMENT A – SCHEDULE, A.11.d Financial Reporting, **REPLACE** "22 CFR 226.52" with "2 CFR 200.327".

9) In **ATTACHMENT A – SCHEDULE, A.11 REPORTING AND EVALUATION**, add the following subsections to the agreement:

**A.11.1 Financial and Programmatic Reporting Requirements and Guidance for Ebola /Global Health Security Agenda (GHSA) Funding**

(a) The recipient shall submit a country-specific, monthly report containing financial and programmatic information as to be determined by the AOR for all countries receiving Ebola/GHSA funds. The reporting format will be determined in advance by the AOR.

(b) As new priorities are set by the Global Health Security Agency, the recipient may be requested to report as required in subsection (a) above on additional countries other than those listed in the agreement.

**A.11.2 Ebola/GHSA Funding Guidance**



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(a) Ebola/GHSA funding shall only be used to fund activities in African countries or for implementation of programs in Africa

10) In ATTACHMENT D – STANDARD PROVISIONS, MANDATORY STANDARD PROVISIONS FOR U.S. NONGOVERNMENTAL ORGANIZATIONS, **REMOVE** and **REPLACE** with the attached. Changes are highlighted in yellow.

11) In ATTACHMENT D – STANDARD PROVISIONS, REQUIRED AS APPLICABLE STANDARD PROVISIONS FOR U.S. NONGOVERNMENTAL ORGANIZATIONS, **REMOVE** and **REPLACE** with the attached. Changes are highlighted in yellow.

ATTACHMENTS:
ATTACHMENT D – MANDATORY STANDARD PROVISIONS FOR US NGO'S (38 pages)

12) On the **COVER PAGE – A. GENERAL**:

- On Line 1., "Amount Obligated this Action", DELETE the amount of "$15,200,000.00" and REPLACE with "$13,600,000.00".
- On Line 3., "Total Obligated USAID Amount", DELETE the amount of "$62,800,000.00" and REPLACE with "76,400,000.00".

13) On the **COVER PAGE – B. SPECIFIC**, add the following accounting and appropriation data:

| Account ID | Accounting Template | BBFY | EBFY | Fund | OP | Prog Area | Dist Code | Prog Elem | BGA | OP Def | SOC | Funded Amount | Requisition Number |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | GH-EN Program Funds | 2015 | 2016 | GH-C-AI | GHEEDN | A11 | 936-4062 | A050 | 997 | (None) | 410021 | 13600000 | REQM4GH-15-000487 Item# 0001 |

Amount Obligated this Action: $ 13,600,000.00
Total Estimated USAID Amount: $100,000,000.00
Total Obligated USAID Amount: $ 76,400,000.00
Amount Remaining to be Obligated: $ 23,600,000.00

14) In **ATTACHMENT A – SCHEDULE, A.3 AMOUNT OF COOPERATIVE AGREEMENT AND PAYMENT**, paragraph 2., DELETE "$62,800,000.00" and REPLACE with "$76,400,000.00"

All other terms and conditions remain the same.

**--- END OF MODIFICATION NO. 4 ---**



UCDUSR0002734

# ATTACHMENT D – STANDARD PROVISIONS

## MANDATORY STANDARD PROVISIONS FOR U.S. NONGOVERNMENTAL ORGANIZATIONS

### M1. APPLICABILITY OF 2 CFR 200 and 2 CFR 700 (DECEMBER 2014)

a. All provisions of 2 CFR 200, 2 CFR 700, and all Standard Provisions attached to this agreement are applicable to the recipient and to subrecipients which meet the definition of "Recipient" in part 2 CFR 200.86, unless a section specifically excludes a subrecipient from coverage. The recipient must assure that subrecipients have copies of all the attached standard provisions.

b. For any subawards made with Non-U.S. subrecipients the recipient must include the applicable "Standard Provisions for Non-US Nongovernmental Organizations." Recipients are required to ensure compliance with monitoring procedures in accordance with 2 CFR 200 and 2 CFR 700.

[END OF PROVISION]

### M2. INELIGIBLE COUNTRIES (MAY 1986)

Unless otherwise approved by the USAID Agreement Officer, funds will only be expended for assistance to countries eligible for assistance under the Foreign Assistance Act of 1961, as amended, or under acts appropriating funds for foreign assistance.

[END OF PROVISION]

### M3. NONDISCRIMINATION (JUNE 2012)

No U.S. citizen or legal resident shall be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination on the basis of race, color, national origin, age, disability, or sex under any program or activity funded by this award when work under the grant is performed in the U.S. or when employees are recruited from the U.S.

Additionally, USAID is committed to achieving and maintaining a diverse and representative workforce and a workplace free of discrimination. Based on law, Executive Order, and Agency policy, USAID prohibits discrimination, including harassment, in its own workplace on the basis of race, color, religion, sex (including pregnancy and gender identity), national origin, disability, age, veteran's status, sexual orientation, genetic information, marital status, parental status, political affiliation, and any other conduct that does not adversely affect the performance of the employee.



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In addition, the Agency strongly encourages its recipients and their subrecipients and vendors (at all tiers), performing both in the U.S. and overseas, to develop and enforce comprehensive nondiscrimination policies for their workplaces that include protection for all their employees on these expanded bases, subject to applicable law.

[END OF PROVISION]

## M4. AMENDMENT OF AWARD (JUNE 2012)

This award may only be amended in writing, by formal amendment or letter, signed by the Agreement Officer (AO), and in the case of a bilateral amendment, by the AO and an authorized official of the recipient.

[END OF PROVISION]

## M5. NOTICES (JUNE 2012)

Any notice given by USAID or the recipient is sufficient only if in writing and delivered in person, mailed or e-mailed as follows.

(1) To the USAID Agreement Officer, at the address specified in this award; or

(2) To the recipient, at the recipient's address shown in this award, or to such other address specified in this award.

a. Notices to the University should be sent to the below address and/or email address and a courtesy copy sent to the Financial Deputy Director.
Jason Jacobs
Principal Grant and Contract Administrator
200 Oak Street, SW
Minneapolis, MN 55455
jaco@umn.edu

Financial Deputy Director: Chris Dillion, cdillon@umn.edu

[END OF PROVISION]

## M6. SUBAWARDS AND CONTRACTS (DECEMBER 2014)

a. Subawardees and contractors have no relationship with USAID under the terms of this award. All required USAID approvals must be directed through the recipient to USAID.



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b. Notwithstanding any other term of this award, subawardees and contractors have no right to submit claims directly to USAID and USAID assumes no liability for any third party claims against the recipient.

[END OF PROVISION]

## M7. OMB APPROVAL UNDER THE PAPERWORK REDUCTION ACT (DECEMBER 2014)

Information collection requirements imposed by this award are covered by OMB approval number 0412-0510; the current expiration date is 04/30/2005. The Standard Provisions containing the requirement and an estimate of the public reporting burden (including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information) are:

| Standard Provision | Burden Estimate |
|---|---|
| Air Travel and Transportation | 1 (hour) |
| Ocean Shipment of Goods | .5 |
| Patent Rights | .5 |
| Publications | .5 |
| Negotiated Indirect Cost Rates - (Predetermined and Provisional) | 1 |
| Voluntary Population Planning | .5 |
| Protection of the Individual as a Research Subject | 1 |

| 22 CFR 226 | Burden Estimate |
|---|---|
| 2 CFR 200.318-326, Procurement Standards | 1 |
| 2 CFR 200.310-315, Property Standards | 1.5 |

Comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, may be sent to the Bureau for Management, Office of Acquisition and Assistance, Policy Division (M/OAA/P), U.S. Agency for International Development, Washington, DC 20523 and to the Office of Management and Budget, Paperwork Reduction Project (0412-0510), Washington, DC 20503.

[END OF PROVISION]

## M8. USAID ELIGIBILITY RULES FOR GOODS AND SERVICES (JUNE 2012)



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a. This provision is not applicable to commodities or services that the recipient provides with private funds as part of a cost-sharing requirement, or with Program Income generated under this award.

b. Ineligible and Restricted Commodities and Services:

(1) Ineligible Commodities and Services. The recipient must not, under any circumstances, procure any of the following under this award:

(i) Military equipment,
(ii) Surveillance equipment,
(iii) Commodities and services for support of police or other law enforcement activities,
(iv) Abortion equipment and services,
(v) Luxury goods and gambling equipment, or
(vi) Weather modification equipment.

(2) Ineligible Suppliers. Any firms or individuals that do not comply with the requirements in Standard Provision, "Debarment, Suspension and Other Responsibility Matters" and Standard Provision, "Preventing Terrorist Financing" must not be used to provide any commodities or services funded under this award.

(3) Restricted Commodities. The recipient must obtain prior written approval of the Agreement Officer (AO) or comply with required procedures under an applicable waiver, as provided by the AO when procuring any of the following commodities:

(i) Agricultural commodities,
(ii) Motor vehicles,
(iii) Pharmaceuticals,
(iv) Pesticides,
(v) Used equipment,
(vi) U.S. Government-owned excess property, or
(vii) Fertilizer.

c. Source and Nationality:

Except as may be specifically approved in advance by the AO, all commodities and services that will be reimbursed by USAID under this award must be from the authorized geographic code specified in this award and must meet the source and nationality requirements set forth in 22 CFR 228. If the geographic code is not specified, the authorized geographic code is 937. When the total value of procurement for commodities and services during the life of this award is valued at $250,000 or less, the authorized geographic code for procurement of all goods and services to be reimbursed under this award is code 935. For a current list of countries within each geographic code, see: http://www.usaid.gov/ads/policy/300/310



UCDUSR0002738

d. Guidance on the eligibility of specific commodities and services may be obtained from the AO. If USAID determines that the recipient has procured any commodities or services under this award contrary to the requirements of this provision, and has received payment for such purposes, the AO may require the recipient to refund the entire amount of the purchase.

e. This provision must be included in all subawards and contracts which include procurement of commodities or services.

[END OF PROVISION]

## M9. DEBARMENT, SUSPENSION, AND OTHER RESPONSIBILITY MATTERS (JUNE 2012)

a. The recipient agrees to notify the Agreement Officer (AO) immediately upon learning that it or any of its principals:

(1) Are presently excluded or disqualified from covered transactions by any Federal department or agency;

(2) Have been convicted within the preceding three-year period preceding this proposal; been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion, receiving stolen property, making false claims, or obstruction of justice, commission of any other offense indicating a lack of business integrity or business honesty that seriously and directly affects your present responsibility;

(3) Are presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State, or local) with commission of any of the offenses enumerated in paragraph a.(2); and

(4) Have had one or more public transactions (Federal, State, or local) terminated for cause or default within the preceding three years.

b. The recipient agrees that, unless authorized by the AO, it will not knowingly enter into any subawards or contracts under this award with a person or entity that has an active exclusion on the System for Award Management (SAM) (www.sam.gov). The recipient further agrees to include the following provision in any subawards or contracts entered into under this award.

DEBARMENT, SUSPENSION, INELIGIBILITY, AND VOLUNTARY EXCLUSION (JUNE 2012)



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The recipient/contractor certifies that neither it nor its principals is presently excluded or disqualified from participation in this transaction by any Federal department or agency.

c. The policies and procedures applicable to debarment, suspension, and ineligibility under USAID-financed transactions are set forth in Subpart C of 2 CFR Section 180, as supplemented by 2 CFR 780.

[END OF PROVISION]

## M10. DRUG-FREE WORKPLACE (JUNE 2012)

a. The recipient must comply with drug-free workplace requirements in subpart B (or subpart C, if the recipient is an individual) of 2 CFR 782, which adopts the Government-wide implementation (2 CFR part 182) of sec. 5152–5158 of the Drug-Free Workplace Act of 1988 (Pub. L. 100–690, Title V, Subtitle D; 41 U.S.C. 701–707).

[END OF PROVISION]

## M11. EQUAL PARTICIPATION BY FAITH-BASED ORGANIZATIONS (JUNE 2012)

a. Faith-Based Organizations Encouraged.

Faith-based organizations are eligible to compete on an equal basis as any other organization to participate in USAID programs. Neither USAID nor entities that make and administer subawards of USAID funds will discriminate for or against an organization on the basis of the organization's religious character or affiliation. A faith-based organization may continue to carry out its mission, including the definition, practice, and expression of its religious beliefs, within the limits contained in this provision. More information can be found at the USAID Faith-Based and Community Initiatives Web site: http://www.usaid.gov and 22 CFR 205.1.

b. Inherently Religious Activities Prohibited.

(1) Inherently religious activities include, among other things, worship, religious instruction, prayer, or proselytization.

(2) The recipient must not engage in inherently religious activities as part of the programs or services directly funded with financial assistance from USAID. If the recipient engages in inherently religious activities, it must offer those services at a different time or location from any programs or services directly funded by this award, and participation by beneficiaries in any such inherently religious activities must be voluntary.



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(3) These restrictions apply equally to religious and secular organizations. All organizations that participate in USAID programs, including religious ones, must carry out eligible activities in accordance with all program requirements and other applicable requirements governing USAID-funded activities.

(4) These restrictions do not apply to USAID-funded programs where chaplains work with inmates in prisons, detention facilities, or community correction centers, or where USAID funds are provided to religious or other organizations for programs in prisons, detention facilities, or community correction centers, in which such organizations assist chaplains in carrying out their duties.

(5) Notwithstanding the restrictions of b.(1) and (2), a religious organization that participates in USAID-funded programs or services

(i) Retains its independence and may continue to carry out its mission, including the definition, practice, and expression of its religious beliefs, provided that it does not use direct financial assistance from USAID to support any inherently religious activities,

(ii) May use space in its facilities, without removing religious art, icons, scriptures, or other religious symbols, and

(iii) Retains its authority over its internal governance, and it may retain religious terms in its organization's name, select its board members on a religious basis, and include religious references in its organization's mission statements and other governing documents.

c. Construction of Structures Used for Inherently Religious Activities Prohibited. The recipient must not use USAID funds for the acquisition, construction, or rehabilitation of structures to the extent that those structures are used for inherently religious activities, such as sanctuaries, chapels, or other rooms that the recipient uses as its principal place of worship. Except for a structure used as its principal place of worship, where a structure is used for both eligible and inherently religious activities, USAID funds may not exceed the cost of those portions of the acquisition, construction, or rehabilitation that are attributable to eligible activities.

d. Discrimination Based on Religion Prohibited. The recipient must not discriminate against any beneficiary or potential beneficiary on the basis of religion or religious belief as part of the programs or services directly funded with financial assistance from USAID.

e. A religious organization's exemption from the Federal prohibition on employment discrimination on the basis of religion, set forth in Sec. 702(a) of the Civil Rights Act of 1964, 42 U.S.C. 2000e–1 is not forfeited when the organization receives financial assistance from USAID.



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f. The Secretary of State may waive the requirements of this section in whole or in part, on a case-by-case basis, where the Secretary determines that such waiver is necessary to further the national security or foreign policy interests of the United States.

[END OF PROVISION]

## M12. PREVENTING TERRORIST FINANCING -- IMPLEMENTATION OF E.O. 13224 (AUGUST 2013)

a. The recipient must not engage in transactions with, or provide resources or support to, individuals and organizations associated with terrorism, including those individuals or entities that appear on the Specially Designated Nationals and Blocked Persons List maintained by the U.S. Treasury (online at: http://www.treasury.gov/resource-center/sanctions/SDN-List/Pages/default.aspx) or the United Nations Security designation list (online at: http://www.un.org/sc/committees/1267/aq_sanctions_list.shtml).

b. This provision must be included in all subawards and contracts issued under this award.

[END OF PROVISION]

## M13. MARKING AND PUBLIC COMMUNICATIONS UNDER USAID-FUNDED ASSISTANCE (DECEMBER 2014)

a. The USAID Identity is the official marking for USAID, comprised of the USAID logo and brandmark with the tagline "from the American people," unless amended by USAID to include additional or substitute use of a logo or seal and tagline representing a presidential initiative or other high level interagency initiative. The USAID Identity (including any required presidential initiative or related identity) is on the USAID Web site at www.usaid.gov/branding. Recipients must use the USAID Identity, of a size and prominence equivalent to or greater than any other identity or logo displayed, to mark the following:

(1) Programs, projects, activities, public communications, and commodities partially or fully funded by USAID;

(2) Program, project, or activity sites funded by USAID, including visible infrastructure projects or other physical sites;

(3) Technical assistance, studies, reports, papers, publications, audio-visual productions, public service announcements, Web sites/Internet activities, promotional, informational, media, or communications products funded by USAID;



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(4) Commodities, equipment, supplies, and other materials funded by USAID, including commodities or equipment provided under humanitarian assistance or disaster relief programs; and

(5) Events financed by USAID, such as training courses, conferences, seminars, exhibitions, fairs, workshops, press conferences and other public activities. If the USAID Identity cannot be displayed, the recipient is encouraged to otherwise acknowledge USAID and the support of the American people.

b. The recipient must implement the requirements of this provision following the approved Marking Plan in the award.

c. The AO may require a preproduction review of program materials and "public communications" (documents and messages intended for external distribution, including but not limited to correspondence; publications, studies, reports; audio visual productions; applications, forms; press, and promotional materials) used in connection with USAID-funded programs, projects or activities, for compliance with an approved Marking Plan.

d. The recipient is encouraged to give public notice of the receipt of this award and announce progress and accomplishments. The recipient must provide copies of notices or announcements to the Agreement Officer's Representative (AOR) and to USAID's Office of Legislative and Public Affairs in advance of release, as practicable. Press releases or other public notices must include a statement substantially as follows:

*"The U.S. Agency for International Development administers the U.S. foreign assistance program providing economic and humanitarian assistance in more than 80 countries worldwide."*

e. Any "public communication" in which the content has not been approved by USAID must contain the following disclaimer:

*"This study/report/audio/visual/other information media product (specify) is made possible by the generous support of the American people through the United States Agency for International Development (USAID). The contents are the responsibility of [insert recipient name] and do not necessarily reflect the views of USAID or the United States Government."*

f. The recipient must provide the USAID AOR with two copies of all program and communications materials produced under this award.

g. The recipient may request an exception from USAID marking requirements when USAID marking requirements would:

(1) Compromise the intrinsic independence or neutrality of a program or materials where independence or neutrality is an inherent aspect of the program and



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materials;

(2) Diminish the credibility of audits, reports, analyses, studies, or policy recommendations whose data or findings must be seen as independent;

(3) Undercut host-country government "ownership" of constitutions, laws, regulations, policies, studies, assessments, reports, publications, surveys or audits, public service announcements, or other communications;

(4) Impair the functionality of an item;

(5) Incur substantial costs or be impractical;

(6) Offend local cultural or social norms, or be considered inappropriate; or

(7) Conflict with international law.

h. The recipient may submit a waiver request of the marking requirements of this provision or the Marking Plan, through the AOR, when USAID-required marking would pose compelling political, safety, or security concerns, or have an adverse impact in the cooperating country.

(1) Approved waivers "flow down" to subawards and contracts unless specified otherwise. The waiver may also include the removal of USAID markings already affixed, if circumstances warrant.

(2) USAID determinations regarding waiver requests are subject to appeal by the recipient, by submitting a written request to reconsider the determination to the cognizant Assistant Administrator.

i. The recipient must include the following marking provision in any subawards entered into under this award:

*"As a condition of receipt of this subaward, marking with the USAID Identity of a size and prominence equivalent to or greater than the recipient's, subrecipient's, other donor's, or third party's is required. In the event the recipient chooses not to require marking with its own identity or logo by the subrecipient, USAID may, at its discretion, require marking by the subrecipient with the USAID Identity."*

[END OF PROVISION]

## M14. REGULATIONS GOVERNING EMPLOYEES (AUGUST 1992)

(The following applies to the recipient's employees working in the cooperating country under the agreement who are not citizens of the cooperating country.)



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a. The recipient's employees must maintain private status and may not rely on local U.S. Government offices or facilities for support while under this grant.

b. The sale of personal property or automobiles by recipient employees and their dependents in the foreign country to which they are assigned are subject to the same limitations and prohibitions which apply to direct-hire USAID personnel employed by the Mission, including the rules contained in 22 CFR 136, except as this may conflict with host government regulations.

c. Other than work to be performed under this award for which an employee is assigned by the recipient, employees of the recipient must not engage directly or indirectly, either in the individual's own name or in the name or through an agency of another person, in any business, profession, or occupation in the foreign countries to which the individual is assigned. In addition, the individual must not make loans or investments to or in any business, profession, or occupation in the foreign countries to which the individual is assigned.

d. The recipient's employees, while in a foreign country, are expected to show respect for its conventions, customs, and institutions, to abide by its applicable laws and regulations, and not to interfere in its internal political affairs.

e. In the event the conduct of any recipient employee is not in accordance with the preceding paragraphs, the recipient's chief of party must consult with the USAID Mission Director and the employee involved, and must recommend to the recipient a course of action with regard to such employee.

f. The parties recognize the rights of the U.S. Ambassador to direct the removal from a country of any U.S. citizen or the discharge from this grant award of any third country national when, in the discretion of the Ambassador, the interests of the United States so require.

g. If it is determined, either under e. or f. above, that the services of such employee should be terminated, the recipient must use its best efforts to cause the return of such employee to the United States, or point of origin, as appropriate.

[END OF PROVISION]

## M15. CONVERSION OF UNITED STATES DOLLARS TO LOCAL CURRENCY (NOVEMBER 1985)

(This provision applies when activities are undertaken outside the United States.)

Upon arrival in the cooperating country, and from time to time as appropriate, the recipient's



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chief of party must consult with the Mission Director who must provide, in writing, the procedure the recipient and its employees must follow in the conversion of United States dollars to local currency. This may include, but is not limited to, the conversion of currency through the cognizant United States Disbursing Officer or Mission Controller, as appropriate.

[END OF PROVISION]

## M16. USE OF POUCH FACILITIES (AUGUST 1992)

(This provision applies when activities are undertaken outside the United States.)

a. Use of diplomatic pouch is controlled by the Department of State. The Department of State has authorized the use of pouch facilities for USAID recipients and their employees as a general policy, as detailed in items (1) through (6) below. However, the final decision regarding use of pouch facilities rest with the Embassy or USAID Mission. In consideration of the use of pouch facilities, the recipient and its employees agree to indemnify and hold harmless, the Department of State and USAID for loss or damage occurring in pouch transmission.

(1) Recipients and their employees are authorized use of the pouch for transmission and receipt of up to a maximum of .9 kgs per shipment of correspondence and documents needed in the administration of assistance programs.

(2) U.S. citizen employees are authorized use of the pouch for personal mail up to a maximum of .45 kgs per shipment (but see a.(3) below).

(3) Merchandise, parcels, magazines, or newspapers are not considered to be personal mail for purposes of this standard provision and are not authorized to be sent or received by pouch.

(4) Official and personal mail pursuant to a.(1) and (2) above sent by pouch should be addressed as follows:

Name of individual or organization (followed by
letter symbol "G")
City Name of post (USAID/_____)
Agency for International Development
Washington, DC 20523-0001

(5) Mail sent via the diplomatic pouch may not be in violation of U.S. Postal laws and may not contain material ineligible for pouch transmission.

(6) Recipient personnel are NOT authorized use of military postal facilities (APO/FPO). This is an Adjutant General's decision based on existing laws and regulations governing military postal facilities and is being enforced worldwide.



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b. The recipient is responsible for advising its employees of this authorization, these guidelines, and limitations on use of pouch facilities.

c. Specific additional guidance on grantee use of pouch facilities in accordance with this standard provision is available from the Post Communication Center at the Embassy or USAID Mission.

[END OF PROVISION]

## M17. TRAVEL AND INTERNATIONAL AIR TRANSPORTATION (DECEMBER 2014)

### a. TRAVEL COSTS

All travel costs must comply with the applicable cost principles and must be consistent with those normally allowed in like circumstances in the recipient's non-USAID-funded activities. Costs incurred by employees and officers for travel, including air fare, costs of lodging, other subsistence, and incidental expenses, may be considered reasonable and allowable only to the extent such costs do not exceed reasonable charges normally allowed by the recipient in its regular operations as the result of the recipient organization's written travel policy and are within the limits established by the applicable cost principles.

In the absence of a reasonable written policy regarding international travel costs, the standard for determining the reasonableness of reimbursement for international travel costs will be the Standardized Regulations (Government Civilians, Foreign Areas), published by the U.S. Department of State, as from time to time amended. The most current Standardized Regulations on international travel costs may be obtained from the AO. In the event that the cost for air fare exceeds the customary standard commercial airfare (coach or equivalent) or the lowest commercial discount airfare, the recipient must document one of the allowable exceptions from the applicable cost principles.

### b. FLY AMERICA ACT RESTRICTIONS

(1) The recipient must use U.S. Flag Air Carriers for all international air transportation (including personal effects) funded by this award pursuant to the Fly America Act and its implementing regulations to the extent service by such carriers is available.

(2) In the event that the recipient selects a carrier other than a U.S. Flag Air Carrier for international air transportation, in order for the costs of such international air transportation to be allowable, the recipient must document such transportation in accordance with this provision and maintain such documentation pursuant to the Standard Provision, "Accounting, Audit and Records." The documentation must use one of the following reasons or other exception under the Fly America Act:



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(i) The recipient uses a European Union (EU) flag air carrier, which is an airline operating from an EU country that has signed the US-EU "Open Skies" agreement (http://www.state.gov/e/eb/rls/othr/ata/ic/170684.htm)

(ii) Travel to or from one of the following countries on an airline of that country when no city pair fare is in effect for that leg (see http://apps.fas.gsa.gov/citypairs/search/):

a. Australia on an Australian airline,
b. Switzerland on a Swiss airline, or
c. Japan on a Japanese airline;

(iii) Only for a particular leg of a route on which no US Flag Air Carrier provides service on that route;

(iv) For a trip of 3 hours or less, the use of a US Flag Air Carrier at least doubles the travel time;

(v) If the US Flag Air Carrier offers direct service, use of the US Flag Air Carrier would increase the travel time by more than 24 hours, or

(vi) If the US Flag Air Carrier does not offer direct service,

a. Use of the US Flag Air Carrier increases the number of aircraft changes by 2 or more,

b. Use of the US Flag Air Carrier extends travel time by 6 hours or more, or

c. Use of the US Flag Air Carrier requires a layover at an overseas interchange of 4 hours or more.

**e. DEFINITIONS**

The terms used in this provision have the following meanings:

(1) "Travel costs" means expenses for transportation, lodging, subsistence (meals and incidentals), and related expenses incurred by employees who are on travel status on official business of the recipient for any travel outside the country in which the organization is located. "Travel costs" do not include expenses incurred by employees who are not on official business of the recipient, such as rest and recuperation (R&R) travel offered as part of an employee's benefits package that are consistent with the recipient's personnel and travel policies and procedures.



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(2) "International air transportation" means international air travel by individuals (and their personal effects) or transportation of cargo by air between a place in the United States and a place outside thereof, or between two places both of which are outside the United States.

(3) "U.S. Flag Air Carrier" means an air carrier on the list issued by the U.S. Department of Transportation at http://ostpxweb.dot.gov/aviation/certific/certlist.htm. U.S. Flag Air Carrier service also includes service provided under a code share agreement with another air carrier when the ticket, or documentation for an electronic ticket, identifies the U.S. flag air carrier's designator code and flight number.

(4) For this provision, the term "United States" includes the fifty states, Commonwealth of Puerto Rico, possessions of the United States, and the District of Columbia.

**d. SUBAWARDS AND CONTRACTS**

This provision must be included in all subawards and contracts under which this award will finance international air transportation.

[END OF PROVISION]

## M18. OCEAN SHIPMENT OF GOODS (JUNE 2012)

a. Prior to contracting for ocean transportation to ship goods purchased or financed with USAID funds under this award, the recipient must contact the office below to determine the flag and class of vessel to be used for shipment:

U.S. Agency for International Development,
Bureau for Management
Office of Acquisition and Assistance, Transportation Division
1300 Pennsylvania Avenue, NW
Washington, DC 20523
Email: **oceantransportation@usaid.gov**

b. This provision must be included in all subawards and contracts.

[END OF PROVISION]

## M19. VOLUNTARY POPULATION PLANNING ACTIVITIES – MANDATORY REQUIREMENTS (MAY 2006)

Requirements for Voluntary Sterilization Programs



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(1) Funds made available under this award must not be used to pay for the performance of involuntary sterilization as a method of family planning or to coerce or provide any financial incentive to any individual to practice sterilization.

Prohibition on Abortion-Related Activities:

(1) No funds made available under this award will be used to finance, support, or be attributed to the following activities: (i) procurement or distribution of equipment intended to be used for the purpose of inducing abortions as a method of family planning; (ii) special fees or incentives to any person to coerce or motivate them to have abortions; (iii) payments to persons to perform abortions or to solicit persons to undergo abortions; (iv) information, education, training, or communication programs that seek to promote abortion as a method of family planning; and (v) lobbying for or against abortion. The term "motivate," as it relates to family planning assistance, must not be construed to prohibit the provision, consistent with local law, of information or counseling about all pregnancy options.

(2) No funds made available under this award will be used to pay for any biomedical research which relates, in whole or in part, to methods of, or the performance of, abortions or involuntary sterilizations as a means of family planning. Epidemiologic or descriptive research to assess the incidence, extent or consequences of abortions is not precluded.

[END OF PROVISION]

## M20. TRAFFICKING IN PERSONS (JULY 2015)

a. The recipient, subawardee, or contractor, at any tier, or their employees, labor recruiters, brokers or other agents, must not engage in:

(1) Trafficking in persons (as defined in the Protocol to Prevent, Suppress, and Punish Trafficking in Persons, especially Women and Children, supplementing the UN Convention against Transnational Organized Crime) during the period of this award;

(2) Procurement of a commercial sex act during the period of this award; or

(3) Use of forced labor in the performance of this award.

(4) Acts that directly support or advance trafficking in persons, including the following acts:



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i. Destroying, concealing, confiscating, or otherwise denying an employee access to that employee's identity or immigration documents;

ii. Failing to provide return transportation or pay for return transportation costs to an employee from a country outside the United States to the country from which the employee was recruited upon the end of employment if requested by the employee, unless:

a) exempted from the requirement to provide or pay for such return transportation by USAID under this award; or

b) the employee is a victim of human trafficking seeking victim services or legal redress in the country of employment or a witness in a human trafficking enforcement action;

iii. Soliciting a person for the purpose of employment, or offering employment, by means of materially false or fraudulent pretenses, representations, or promises regarding that employment;

iv. Charging employees recruitment fees ; or

v. Providing or arranging housing that fails to meet the host country housing and safety standards.

b. In the event of a violation of section (a) of this provision, USAID is authorized to terminate this award, without penalty, and is also authorized to pursue any other remedial actions authorized as stated in section 1704(c) of the National Defense Authorization Act for Fiscal Year 2013 (Pub. L. 112-239, enacted January 2, 2013).

c. For awards that exceed an estimated value of $500,000, the recipient must submit to the Agreement Officer, the annual "Certification regarding Trafficking in Persons, Implementing Title XVII of the National Defense Authorization Act for Fiscal Year 2013" as required prior to this award, and must implement a compliance plan to prevent the activities described above in section (a) of this provision. The recipient must provide a copy of the compliance plan to the Agreement Officer upon request and must post the useful and relevant contents of the plan or related materials on its website (if one is maintained) and at the workplace.

d. The recipient's compliance plan must be appropriate to the size and complexity of the award and to the nature and scope of the activities to be performed. The plan must include, at a minimum, the following:

(1) An awareness program to inform employees about the trafficking related prohibitions included in this provision, the activities prohibited and the action that will be taken against the employee for violations.

(2) A reporting process for employees to report, without fear of retaliation, activity inconsistent with the policy prohibiting trafficking, including a means to make



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available to all employees the Global Human Trafficking Hotline at 1-844-888-FREE and its e-mail address at **help@befree.org**.

(3) A recruitment and wage plan that only permits the use of recruitment companies with trained employees, prohibits charging of recruitment fees to the employee, and ensures that wages meet applicable host-country legal requirements or explains any variance.

(4) A housing plan, if the recipient or any subawardee intends to provide or arrange housing. The housing plan is required to meet any host-country housing and safety standards.

(5) Procedures for the recipient to prevent any agents or subawardee at any tier and at any dollar value from engaging in trafficking in persons activities described in section a of this provision. The recipient must also have procedures to monitor, detect, and terminate any agents or subawardee or subawardee employees that have engaged in such activities.

e. If the Recipient receives any credible information from any source that alleges that the recipient, contractor, subawardee, or agent has engaged in any of the prohibited activities identified in this provision, the recipient must immediately notify the cognizant Agreement Officer and the USAID Office of the Inspector General; and must fully cooperate with any Federal agencies responsible for audits, investigations, or corrective actions relating to trafficking in persons.

f. The Agreement Officer may direct the Recipient to take specific steps to abate an alleged violation or enforce the requirements of a compliance plan.

g. For purposes of this provision, "employee" means an individual who is engaged in the performance of this award as a direct employee, consultant, or volunteer of the recipient or any subrecipient.

h. The recipient must include in all subawards and contracts a provision prohibiting the conduct described in a(1)-(9) by the subrecipient, contractor or any of their employees.

[END OF PROVISION]

## M21. SUBMISSIONS TO THE DEVELOPMENT EXPERIENCE CLEARINGHOUSE AND PUBLICATIONS (JUNE 2012)

a. Submissions to the Development Experience Clearinghouse (DEC)

1) The recipient must provide the Agreement Officer's Representative one copy of any Intellectual Work that is published, and a list of any Intellectual Work that is not published.



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2) In addition, the recipient must submit Intellectual Work, whether published or not, to the DEC, either on-line (preferred) or by mail. The recipient must review the DEC Web site for submission instructions, including document formatting and the types of documents to submit. Submission instructions can be found at: http://dec.usaid.gov.

3) For purposes of submissions to the DEC, Intellectual Work includes all works that document the implementation, evaluation, and results of international development assistance activities developed or acquired under this award, which may include program and communications materials, evaluations and assessments, information products, research and technical reports, progress and performance reports required under this award (excluding administrative financial information), and other reports, articles and papers prepared by the recipient under the award, whether published or not. The term does not include the recipient's information that is incidental to award administration, such as financial, administrative, cost or pricing, or management information.

4) Each document submitted should contain essential bibliographic information, such as 1) descriptive title; 2) author(s) name; 3) award number; 4) sponsoring USAID office; 5) development objective; and 6) date of publication.

5) The recipient must not submit to the DEC any financially sensitive information or personally identifiable information, such as social security numbers, home addresses and dates of birth. Such information must be removed prior to submission. The recipient must not submit classified documents to the DEC.

b. In the event award funds are used to underwrite the cost of publishing, in lieu of the publisher assuming this cost as is the normal practice, any profits or royalties up to the amount of such cost must be credited to the award unless the schedule of the award has identified the profits or royalties as program income.

[END OF PROVISION]

## M22. LIMITING CONSTRUCTION ACTIVITIES (AUGUST 2013)

a) Construction is not eligible for reimbursement under this award unless specifically identified in paragraph d) below.

b) Construction means —construction, alteration, or repair (including dredging and excavation) of buildings, structures, or other real property and includes, without limitation, improvements, renovation, alteration and refurbishment. The term includes, without limitation, roads, power plants, buildings, bridges, water treatment facilities, and vertical structures.

c) Agreement Officers will not approve any subawards or procurements by recipients for construction activities that are not listed in paragraph d) below. USAID will reimburse



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allowable costs for only the construction activities listed in this provision not to exceed the amount specified in the construction line item of the award budget. The recipient must receive prior written approval from the AO to transfer funds allotted for construction activities to other cost categories, or vice versa.

d) Description
Construction is not eligible for reimbursement under this award.

e) The recipient must include this provision in all subawards and procurements and make vendors providing services under this award and subrecipients aware of the restrictions of this provision.

[END OF PROVISION]

## M23. USAID IMPLEMENTING PARTNER NOTICES (IPN) PORTAL FOR ASSISTANCE (JULY 2014)

**(a)** Definitions

"USAID Implementing Partner Notices (IPN) Portal for Assistance ("IPN Portal)" means the single point where USAID posts proposed universal bilateral amendments for USAID awards, which can be accessed electronically by registered USAID recipients. The IPN Portal is located at https://sites.google.com/site/usaidipnforassistance/ . Universal amendments are those which affect all assistance awards or a designated class of awards as specified in each amendment by the IPN Portal Administrator.

"IPN Portal Administrator" means the USAID official designated by the Director, M/OAA, who has overall responsibility for managing the USAID Implementing Partner Notices Portal for Assistance.

"Universal bilateral amendment" means those amendments with revisions or new requirements or provisions that affect all awards or a designated class of awards, as specified in the Agency notification of such revisions or new requirements.

**(b)** By submission of an application and execution of an award, the Applicant/Recipient acknowledges the requirement to:

**(1)** Register with the IPN Portal if awarded an assistance award resulting from this solicitation, and

**(2)** Receive universal bilateral amendments to this award and general notices via the IPN Portal.

**(c)** Procedure to register for notifications.



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Go to https://sites.google.com/site/usaidipnforassistance/ and click the "Register" button at the top of the page. Recipient representatives must use their official organization email address when subscribing, not personal email addresses.

**(d)** Processing of IPN Portal Amendments

The Recipient may access the IPN Portal at any time to review all IPN Portal amendments; however, the system will also notify the Recipient by email when the USAID IPN Portal Administrator posts a universal bilateral amendment for Recipient's review and signature. Proposed USAID IPN Portal amendments distributed via the IPN Portal are applicable to all awards, unless otherwise noted in the proposed amendment.

Within 15 calendar days from receipt of the notification email from the IPN Portal, the Recipient must do one of the following:

**(1)** (a) verify applicability of the proposed amendment for their award(s) per the instructions provided with each amendment; (b) download the amendment and incorporate the following information on the amendment form: award number, organization name, and organization mailing address as it appears in the basic award; (c) sign the hardcopy version; and (d) send the signed amendment (by email or hardcopy) to the AO for signature. The Recipient must not incorporate any other changes to the IPN Portal amendment. Bilateral amendments provided through the IPN Portal are not effective until the both the Recipient and the AO sign the amendment;

**(2)** Notify the AO in writing if the amendment requires negotiation of additional changes to terms and conditions of the award; or

**(3)** Notify the AO that the Recipient declines to sign the amendment.

Within 30 calendar days of receipt of a signed amendment from the Recipient, the AO must provide the fully executed amendment to the Recipient or initiate discussions with the Recipient.

[END OF PROVISION]

## M24. PILOT PROGRAM FOR ENHANCEMENT OF GRANTEE EMPLOYEE WHISTLEBLOWER PROTECTIONS (SEPTEMBER 2014)

The requirement to comply with and inform all employees of the "Pilot Program for Enhancement of Contractor Employee Whistleblower Protections" is retroactively effective for all assistance awards and subawards (including subcontracts) issued beginning July 1, 2013.

The Grantee must:

1. Inform its employees working under this award in the predominant native language of the workforce that they are afforded the employee whistleblower rights and protections



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provided under 41 U.S.C. § 4712; and

2. Include such requirement in any subaward or subcontract made under this award.

41 U.S.C. § 4712 states that an employee of a Grantee may not be discharged, demoted, or otherwise discriminated against as a reprisal for "whistleblowing." In addition, whistleblower protections cannot be waived by any agreement, policy, form, or condition of employment.

Whistleblowing is defined as making a disclosure "that the employee reasonably believes" is evidence of any of the following:

- Gross mismanagement of a Federal contract or grant;
- A gross waste of Federal funds;
- An abuse of authority relating to a Federal contract or grant;
- A substantial and specific danger to public health or safety; or
- A violation of law, rule, or regulation related to a Federal contract or grant (including the competition for, or negotiation of, a contract or grant).

To qualify under the statute, the employee's disclosure must be made to:

- A Member of the U.S. Congress, or a representative of a U.S. Congressional Committee;
- A cognizant U.S. Inspector General;
- The U.S. Government Accountability Office;
- A Federal employee responsible for contract or grant oversight or management at the relevant agency;
- A U.S. court or grand jury; or,
- A management official or other employee of the Grantee who has the responsibility to investigate, discover, or address misconduct.

[End of Provision]

## M25. SUBMISSION OF DATASETS TO THE DEVELOPMENT DATA LIBRARY (OCTOBER 2014)

a. Definitions. For the purpose of submissions to the DDL:

(1) "Dataset" is an organized collection of structured data, including data contained in spreadsheets, whether presented in tabular or non-tabular form. For example, a Dataset may represent a single spreadsheet, an extensible mark-up language (XML) file, a geospatial data file, or an organized collection of these. This requirement does not apply to aggregated performance reporting data that the recipient submits directly to a USAID portfolio management system or to unstructured data, such as email messages, PDF files, PowerPoint presentations, word processing documents, photos and graphic images, audio files, collaboration software, and instant messages. Neither does the requirement apply to the recipient's information that is incidental to award administration, such as



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financial, administrative, cost or pricing, or management information. Datasets submitted to the DDL will generally be those generated with USAID resources and created in support of Intellectual Work that is uploaded to the Development Experience Clearinghouse (DEC) (See M21. SUBMISSIONS TO THE DEVELOPMENT EXPERIENCE CLEARINGHOUSE AND PUBLICATIONS (JUNE 2012).

(2) "Intellectual Work" includes all works that document the implementation, monitoring, evaluation, and results of international development assistance activities developed or acquired under this award, which may include program and communications materials, evaluations and assessments, information products, research and technical reports, progress and performance reports required under this award (excluding administrative financial information), and other reports, articles and papers prepared by the recipient under the award, whether published or not. The term does not include the recipient's information that is incidental to award administration, such as financial, administrative, cost or pricing, or management information.

b. Submissions to the Development Data Library (DDL)

**(1)** The recipient must submit to the Development Data Library (DDL) at **www.usaid.gov/data**, in a machine-readable, non-proprietary format, a copy of any Dataset created or obtained in performance of this award, including Datasets produced by a subawardee or a contractor at any tier. The submission must include supporting documentation describing the Dataset, such as code books, data dictionaries, data gathering tools, notes on data quality, and explanations of redactions.

**(2)** Unless otherwise directed by the Agreement Officer (AO) or the Agreement Officer Representative (AOR), the recipient must submit the Dataset and supporting documentation to the DDL within thirty (30) calendar days after the Dataset is first used to produce an Intellectual Work or is of sufficient quality to produce an Intellectual Work. Within thirty (30) calendar days after award completion, the recipient must submit to the DDL any Datasets and supporting documentation that have not previously been submitted to the DDL, along with an index of all Datasets and Intellectual Work created or obtained under the award. The recipient must also provide to the AOR an itemized list of any and all DDL submissions.

The recipient is not required to submit the data to the DDL, when, in accordance with the terms and conditions of this award, Datasets containing results of federally funded scientific research are submitted to a publicly accessible research database. However, the recipient must submit a notice to the DDL by following the instructions at **www.usaid.gov/data**, with a copy to the agreement officer representative, providing details on where and how to access the data. The direct results of federally funded scientific research must be reported no later than when



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the data are ready to be submitted to a peer-reviewed journal for publication, or no later than five calendar days prior to the conclusion of the award, whichever occurs earlier.

**(3)** The recipient must submit the Datasets following the submission instructions and acceptable formats found at **www.usaid.gov/data**.

**(4)** The recipient must ensure that any Dataset submitted to the DDL does not contain any proprietary or personally identifiable information, such as social security numbers, home addresses, and dates of birth. Such information must be removed prior to submission.

**(5)** The recipient must not submit classified data to the DDL.

[End of Provision]

## M26. PROHIBITION ON PROVIDING FEDERAL ASSISTANCE TO ENTITIES THAT REQUIRE CERTAIN INTERNAL CONFIDENTIALITY AGREEMENTS (APRIL 2015)

(a) The recipient must not require employees, subawardees, or contractors seeking to report fraud, waste, or abuse to sign or comply with internal confidentiality agreements or statements prohibiting or otherwise restricting such employees, subawardees, or contractor from lawfully reporting such waste, fraud, or abuse to a designated investigative or law enforcement representative of a Federal department or agency authorized to receive such information.

(b) The recipient must notify employees that the prohibitions and restrictions of any internal confidentiality agreements covered by this provision are no longer in effect.

(c) The prohibition in paragraph (a) of this clause does not contravene requirements applicable to Standard Form 312, Form 4414, or any other form issued by a Federal department or agency governing the nondisclosure of classified information.

(d) (1) In accordance with section 7 43 of Division E, Title VI I, of the Consolidated and Further Continuing Resolution Appropriations Act, 2015 (Pub. L. 113-235), use of funds appropriated (or otherwise made available) under that or any other Act may be prohibited, if the Government determines that the recipient is not in compliance with the requirements of this provision.

(3) The Government may seek any available remedies in the event the recipient fails to comply with the requirements of this provision.

[End of Provision]

## M27. CHILD SAFEGUARDING (June 2015)



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(a) Because the activities to be funded under this award may involve children, or personnel engaged in the implementation of the award may come into contact with children, these activities could raise the risk of child abuse, exploitation, or neglect within USAID-funded programs. The organization agrees to abide by the following child safeguarding core principles:

(1) Ensure compliance with host country and local child welfare and protection legislation or international standards, whichever gives greater protection, and with U.S. law where applicable;

(2) Prohibit all personnel from engaging in child abuse, exploitation, or neglect;

(3) Consider child safeguarding in project planning and implementation to determine potential risks to children that are associated with project activities and operations;

(4) Apply measures to reduce the risk of child abuse, exploitation, or neglect, including, but not limited to, limiting unsupervised interactions with children; prohibiting exposure to pornography; and complying with applicable laws, regulations, or customs regarding the photographing, filming, or other image-generating activities of children;

(5) Promote child-safe screening procedures for personnel, particularly personnel whose work brings them in direct contact with children; and

(6) Have a procedure for ensuring that personnel and others recognize child abuse, exploitation, or neglect; mandating that personnel and others report allegations; investigating and managing allegations; and taking appropriate action in response to such allegations, including, but not limited to, dismissal of personnel.

(b) The organization must also include in their code of conduct for all personnel implementing USAID-funded activities the child safeguarding principles in (a) (1) through (6).

(c) The following definitions apply for purposes of this provision:

(1) Child: A child or children are defined as persons who have not attained 18 years of age.

(2) Child abuse, exploitation, or neglect: Constitutes any form of physical abuse; emotional ill-treatment; sexual abuse; neglect or insufficient supervision; trafficking; or commercial, transactional, labor, or other exploitation resulting in actual or potential harm to the child's health, well-being, survival, development, or dignity. It includes, but is not limited to: any act or failure to act which results in death, serious physical or emotional harm to a child, or an act or failure to act which presents an imminent risk of serious harm to a child.



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(3) Physical abuse: Constitutes acts or failures to act resulting in injury (not necessarily visible), unnecessary or unjustified pain or suffering without causing injury, harm or risk of harm to a child's health or welfare, or death. Such acts may include, but are not limited to: punching, beating, kicking, biting, shaking, throwing, stabbing, choking, or hitting (regardless of object used), or burning. These acts are considered abuse regardless of whether they were intended to hurt the child.

(4) Sexual Abuse: Constitutes fondling a child's genitals, penetration, incest, rape, sodomy, indecent exposure, and exploitation through prostitution or the production of pornographic materials.

(5) Emotional abuse or ill treatment: Constitutes injury to the psychological capacity or emotional stability of the child caused by acts, threats of acts, or coercive tactics. Emotional abuse may include, but is not limited to: humiliation, control, isolation, withholding of information, or any other deliberate activity that makes the child feel diminished or embarrassed.

(6) Exploitation: Constitutes the abuse of a child where some form of remuneration is involved or whereby the perpetrators benefit in some manner. Exploitation represents a form of coercion and violence that is detrimental to the child's physical or mental health, development, education, or well-being.

(7) Neglect: Constitutes failure to provide for a child's basic needs within USAID-funded activities that are responsible for the care of a child in the absence of the child's parent or guardian.

(d) The recipient must insert the provisions in (a) and (b) in all sub-awards under this award.

[End of Provision]

## M28. MANDATORY DISCLOSURES (July 2015)

Consistent with 2 CFR §200 113, applicants and recipients must disclose, in a timely manner, in writing to the USAID Office of the Inspector General, with a copy to the cognizant Agreement Officer, all violations of Federal criminal law involving fraud, bribery, or gratuity violations potentially affecting the Federal award. Subrecipients must disclose, in a timely manner, in writing to the USAID Office of the Inspector General and to the prime recipient (pass through entity) all violations of Federal criminal law involving fraud, bribery, or gratuity violations potentially affecting the Federal award.

Disclosures must be sent to:
U.S. Agency for International Development
Office of the Inspector General
P.O. Box 657 Washington, DC 20044-0657
Phone: 1-800-230-6539 or 202-712-1023
Email: ig.hotline@usaid.gov
URL: https://oig.usaid.gov/content/usaid-contractor-reporting-form.



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Failure to make required disclosures can result in any of the remedies described in 2 CFR §200 338 Remedies for noncompliance, including suspension or debarment (See 2 CFR 180, 2 CFR 780 and 31 U.S.C. 3321).

The recipient must include this mandatory disclosure requirement in all subawards and contracts under this award.

[End of Provision]

## [END OF MANDATORY PROVISIONS]

## REQUIRED AS APPLICABLE STANDARD PROVISIONS FOR U.S. NONGOVERNMENTAL ORGANIZATIONS

### RAA1. NEGOTIATED INDIRECT COST RATES - PREDETERMINED (DECEMBER 2014)

a. The allowable indirect costs must be determined by applying the predetermined indirect cost rates to the bases specified in the schedule of this award.

b. Except as otherwise provided in 2 CFR 200.414 Indirect (F&A) costs paragraph (e), a nonprofit organization which has not previously established an indirect cost rate with a Federal agency must submit its initial indirect cost proposal immediately after the organization is advised that a Federal award will be made and, in no event, later than three months after the effective date of the Federal award.

Organizations that have previously established indirect cost rates must submit a new indirect cost proposal to the cognizant agency for indirect costs within six months after the close of each fiscal year.

If USAID is the cognizant agency or no cognizant agency has been designated, the recipient must submit four copies of the audit report, the proposed predetermined indirect cost rates, and supporting cost data to the Overhead, Special Costs, and Closeout Branch, Management Bureau, Office of Acquisition and Assistance, USAID, Washington, DC 20523-7802. The proposed rates must be based on the recipient's actual cost experience during that fiscal year. Negotiations of predetermined indirect cost rates must begin soon after receipt of the recipient's proposal.

c. Allowability of costs and acceptability of cost allocation methods must be determined in accordance with the applicable cost principles.

i. The results of each negotiation must be set forth in an indirect cost rate agreement signed by both parties. Such agreement is automatically incorporated into this award and must specify (1) the agreed upon predetermined rates, (2) the bases to which the rates apply, and (3) the fiscal year for which the rates apply. The indirect cost rate agreement must not



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change any monetary ceiling, award obligation, or specific cost allowance or disallowance provided for in this award.

j. Predetermined rate means an indirect cost rate, applicable to a specified current or future period, usually the organization's fiscal year. The rate is based on an estimate of the costs to be incurred during the period. **A predetermined rate is not subject to adjustment.**

k. If a dispute arises in a negotiation of an indirect cost rate between the cognizant agency for indirect costs and the nonprofit organization, the dispute must be resolved in accordance with the appeals procedures of the cognizant agency for indirect costs.

[END OF PROVISION]

## RAA2. NEGOTIATED INDIRECT COST RATES - PROVISIONAL (Nonprofit) (DECEMBER 2014)

a. Provisional indirect cost rates must be established for each of the recipient's accounting periods during the term of this award. Pending establishment of revised provisional or final rates, allowable indirect costs must be reimbursed at the rates, on the bases, and for the periods shown in the schedule of the award.

b. Organizations that have previously established indirect cost rates must submit a new indirect cost proposal to the cognizant agency for indirect costs within six months after the close of each fiscal year. Except as otherwise provided in §200.414 Indirect (F&A) costs paragraph (e) of this Part, a nonprofit organization which has not previously established an indirect cost rate with a Federal agency must submit its initial indirect cost proposal immediately after the organization is advised that a Federal award will be made and, in no event, later than three months after the effective date of the Federal award.

If USAID is the cognizant agency or no cognizant agency has been designated, the recipient must submit four copies of the audit report, along with the proposed final indirect cost rates and supporting cost data, to the Overhead, Special Costs, and Closeout Branch, Office of Acquisition and Assistance, USAID, Washington, DC 20523-7802. The proposed rates must be based on the recipient's actual cost experience during that fiscal year. Negotiations of final indirect cost rates must begin soon after receipt of the recipient's proposal. No proposal to establish indirect (F&A) cost rates will be acceptable unless such costs have been certified by the non-profit organization using the Certificate of Indirect (F&A) Costs set
2 CFR 200, Appendix IV, Section j. The certificate must be signed on behalf of the organization by an individual at a level no lower than vice president or chief financial officer for the organization.



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d. Allowability of costs and acceptability of cost allocation methods must be determined in accordance with the applicable cost principles.

e. The results of each negotiation must be set forth in a written indirect cost rate agreement signed by both parties. Such agreement is automatically incorporated into this award and must specify (1) the agreed upon final rates, (2) the bases to which the rates apply, and (3) the fiscal year for which the rates apply. The agreement must not change any monetary ceiling, award obligation, or specific cost allowance or disallowance provided for in this award.

f. Pending establishment of final indirect cost rate(s) for any fiscal year, the recipient must be reimbursed either at negotiated provisional rates or at billing rates acceptable to the Agreement Officer, subject to appropriate adjustment when the final rates for the fiscal year are established. To prevent substantial overpayment or underpayment, the provisional rate may be adjusted by the cognizant agency for indirect costs during the institution's fiscal year.

g. If a dispute arises in a negotiation of an indirect cost rate between the cognizant agency for indirect costs and the nonprofit organization, the dispute must be resolved in accordance with the appeals procedures of the cognizant agency for indirect costs.

[END OF PROVISION]

## RAA4. EXCHANGE VISITORS AND PARTICIPANT TRAINING (JUNE 2012)

For any Exchange Visitor, Participant Training or Invitational Travel activities, the recipient must comply with this provision.

a. **Definitions:**

(1) An **Exchange Visitor** is any host-country or third-country national traveling to the U.S., for any purpose, including Participant Training and Invitational Travel, funded by USAID in whole or in part, directly or indirectly.

(2) A **Participant** is a host-country or third-country national sponsored by USAID for a Participant Training activity taking place in the U.S., a third country, or in the host country.

(3) **Participant Training** is a learning activity conducted within the U.S., a third country, or in the host country for the purpose of furthering USAID development objectives. A learning activity takes place in a setting in which an individual (the Participant) interacts with a knowledgeable professional, predominantly for the purpose of acquiring knowledge or skills for the professional or technical enhancement of the individual. Learning activities may be formally structured, such as an academic program or a technical course, or they may be more informal,



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such as an observational study tour.

(4) **Invitational Travel** is a type of travel that USAID funds for non-U.S. Government employees. This type of travel may be approved for both U.S. and foreign citizens who are not employed by the U.S. Government (USG), not receiving any type of compensation from the USG for such travel, and only when it is determined that the functions to be performed are essential to the interests of USAID.

b. **Program Monitoring and Data Reporting:** The recipient must monitor Exchange Visitors' and Participants' progress during their program and ensure that problems are identified and resolved quickly.

(1) For U.S.-based activities, the recipient must use USAID's official Exchange Visitor and Participant Training information system, currently called "Training Results and Information Network – TraiNet" (see http://trainethelp.usaid.gov/), to report and manage Exchange Visitor and Participant Training data. The recipient must also use the USAID Visa Compliance System – VCS (see http://trainethelp.usaid.gov/) to transfer required data for USAID Exchange Visitors to the Department of Homeland Security's Student and Exchange Visitor Information System (SEVIS).

(2) For all third-country activities, and for host-country activities of two consecutive days or 16 contact hours or more in duration, the recipient must use USAID's official Exchange Visitor and Participant Training information system, currently called "Training Results and Information Network – TraiNet" (see http://trainethelp.usaid.gov/), to report and manage Participant Training data.

c. **Health and Accident Insurance:**

(1) For Exchange Visitors traveling to the United States, the recipient must enroll Exchange Visitors in health and accident insurance coverage that meets or exceeds Department of State and USAID minimum coverage requirements as set forth in 22 CFR 62.14 and ADS 253.3.6.2. The requirements may be obtained from the Agreement Officer's Representative.

(2) For Participants traveling to a third country, the recipient must obtain health and accident insurance coverage for all Participants.

(3) For Participants traveling within the host country, the recipient must determine whether specific in-country participant training activities subject them to any risk of health and accident liability for medical costs. Participants may incur, and if so, take appropriate steps according to the local situation, including obtaining health and accident insurance coverage for Participants.

d. **Immigration Requirements:**



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(1) For Exchange Visitors traveling to the United States, the recipient must ensure that all USAID-sponsored Exchange Visitors obtain, use, and comply with the terms of the J-1 visa, issued in conjunction with a USAID-issued Certificate of Eligibility for J-1 Visa Status (DS-2019).

(2) For Participants traveling to a third country or within the host country, the recipient must ensure that all Participants obtain, use, and comply with the terms of all applicable immigration, visa and other similar requirements.

e. **Language Proficiency:** The recipient must verify language proficiency. Exchange Visitors must possess sufficient English language proficiency to participate in a U.S.-based activity. Participants of third-country or host-country training must be proficient in the language of training at a sufficient level for participation, unless an interpreter has been arranged. Language competency can be verified through a variety of means including proficiency assessments of interviews, publications, presentations, education conducted in English, and formal testing.

f. **Pre-departure Orientation:** The recipient must conduct pre-departure orientation for U.S-bound Exchange Visitors and Participants of third-country training programs. Pre-departure orientation covers: program objectives; administrative and policy review; cultural aspects; and training/learning methods.

g. **Conditions of Sponsorship:** The recipient must ensure that all Exchange Visitors read and sign the Conditions of Sponsorship for U.S.-Based Activities form (AID 1381-6). The recipient must also ensure that all Participants of long-term (six months or longer) third-country training read and sign the form Conditions of Sponsorship for Third-Country Training form (AID 1381-7). The recipient must report to the Agreement Officer any known violations by Exchange Visitors of visa or other immigration requirements or conditions.

h. **Exchange Visitor Security Risk and Fraud Inquiry:** Each USAID Mission has an established process for conducting a Security Risk and Fraud Inquiry (SRFI) for Exchange Visitors. The recipient must be prepared to assist Missions in conducting the SRFI, if requested. However, the recipient's role is contributive, and the Mission is ultimately responsible for conducting the SRFI.

i. **Fly America:** To the extent that participants travel by international air travel, the recipient must comply with the Standard Provision, "International Air Travel and Air Transportation of Property."

j. **Use of Minority Serving Institutions:** For U.S.-based Participant Training, the recipient must, to the maximum extent possible, maintain their use of Historically Black Colleges and Universities (HBCUs) and other Minority Serving Institutions (MSIs), including Hispanic Serving Institutions and Tribal Colleges and Universities, as training or education providers.



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[END OF PROVISION]

## RAA6. PROTECTION OF THE INDIVIDUAL AS A RESEARCH SUBJECT (APRIL 1998)

a. Safeguarding the rights and welfare of human subjects involved in research supported by USAID is the responsibility of the organization to which support is awarded. USAID has adopted the Common Federal Policy for the Protection of Human Subjects, Part 225 of Title 22 of the Code of Federal Regulations (the "Policy"). Additional interpretation, procedures, and implementation guidance of the Policy are found in USAID General Notice entitled "Procedures for the Protection of Human Subjects in Research Supported by USAID," issued April 19, 1995, as amended. USAID's Cognizant Human Subjects Officer (CHSO) in USAID/W has oversight, guidance, and interpretation responsibility for the Policy.

b. Recipient organizations must comply with USAID policy when humans are the subject of research, as defined in 22 CFR 225.102(d), funded by the grant and recipients must provide "assurance," as required by 22 CFR 225.103, that they follow and abide by the procedures in the Policy. See also Section 5 of the April 19, 1995, USAID General Notice which sets forth activities to which the Policy is applicable. The existence of a bona fide, applicable assurance approved by the Department of Health and Human Services (HHS) such as the "multiple project assurance" (MPA) will satisfy this requirement. Alternatively, organizations can provide an acceptable written assurance to USAID as described in 22 CFR 225.103. Such assurances must be determined by the CHSO to be acceptable prior to any applicable research being initiated or conducted under the award. In some limited instances outside the U.S., alternative systems for the protection of human subjects may be used provided they are deemed "at least equivalent" to those outlined in Part 225 (See 22 CFR 225.101[h]). Criteria and procedures for making this determination are described in the General Notice cited in the preceding paragraph.

c. Since the welfare of the research subject is a matter of concern to USAID as well as to the organization, USAID staff consultants and advisory groups may independently review and inspect research and research processes and procedures involving human subjects, and based on such findings, the CHSO may prohibit research which presents unacceptable hazards or otherwise fails to comply with USAID procedures. Informed consent documents must include the stipulation that the subject's records may be subject to such review.

[END OF PROVISION]

## RAA7. CARE OF LABORATORY ANIMALS (MARCH 2004)

a. Before undertaking performance of any grant involving the use of laboratory animals, the



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recipient must register with the Secretary of Agriculture of the United States in accordance with Section 6, Public Law 89-544, Laboratory Animal Welfare Act, August 24, 1966, as amended by Public Law 91-579, Animal Welfare Act of 1970, December 24, 1970. The recipient must furnish evidence of such registration to the Agreement Officer.

b. The recipient must acquire animals used in research under this award only from dealers licensed by the Secretary of Agriculture, or from exempted sources in accordance with the Public Laws enumerated in a. above.

c. In the care of any live animals used or intended for use in the performance of this grant, the recipient must adhere to the principles enunciated in the Guide for Care and Use of Laboratory Animals prepared by the Institute of Laboratory Animals Resources, National Academy of Sciences - National Research Council (NAS-NRC), and in the United States Department of Agriculture's (USDA) regulations and standards issued under the Public Laws enumerated in a. above. In case of conflict between standards, the higher standard must be used. The recipient's reports on portions of the award in which animals were used must contain a certificate stating that the animals were cared for in accordance with the principles enunciated in the Guide for Care and Use of Laboratory Animals prepared by the Institute of Laboratory Animal Resources, NAS-NRC, and/or in the regulations and standards as promulgated by the Agricultural Research Service, USDA, pursuant to the Laboratory Animal Welfare Act of 24 August 1966, as amended (P.L. 89-544 and P.L. 91-579). NOTE: The recipient may request registration of the recipient's facility and a current listing of licensed dealers from the Regional Office of the Animal and Plant Health Inspection Service (APHIS), USDA, for the region in which the recipient's research facility is located. The location of the appropriate APHIS Regional Office as well as information concerning this program may be obtained by contacting the Senior Staff Office, Animal Care Staff, USDA/APHIS, 4700 River Road, Unit 84, Riverdale, MD 20737-1234 and at www.aphis.usda.gov/animal_welfare/index.shtml.

[END OF PROVISION]

## RAA9. COST SHARING (MATCHING) (FEBRUARY 2012)

a. If at the end of any funding period, the recipient has expended an amount of non-Federal funds less than the agreed upon amount or percentage of total expenditures, the Agreement Officer may apply the difference to reduce the amount of USAID incremental funding in the following funding period. If the award has expired or has been terminated, the Agreement Officer may require the recipient to refund the difference to USAID.

b. The source and nationality requirements and the restricted goods provision established in the Standard Provision entitled "USAID Eligibility Rules for Goods and Services" do not apply to cost sharing (matching) expenditures.

[END OF PROVISION]



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## RAA10. PROHIBITION OF ASSISTANCE TO DRUG TRAFFICKERS (JUNE 1999)

a. USAID reserves the right to terminate assistance to, or take other appropriate measures with respect to, any participant approved by USAID who is found to have been convicted of a narcotics offense or to have been engaged in drug trafficking as defined in 22 CFR 140.

b.

(1) For any loan over $1,000 made under this agreement, the recipient must insert a clause in the loan agreement stating that the loan is subject to immediate cancellation, acceleration, recall, or refund by the recipient if the borrower or a key individual of a borrower is found to have been convicted of a narcotics offense or to have been engaged in drug trafficking as defined in 22 CFR 140.

(2) Upon notice by USAID of a determination under section (1) and at USAID's option, the recipient agrees to immediately cancel, accelerate, or recall the loan, including refund in full of the outstanding balance. USAID reserves the right to have the loan refund returned to USAID.

c.

(1) The recipient agrees not to disburse, or sign documents committing the recipient to disburse, funds to a subrecipient designated by USAID ("Designated Subrecipient") until advised by USAID that: (i) any United States Government review of the Designated Subrecipient and its key individuals has been completed; (ii) any related certifications have been obtained; and (iii) the assistance to the Designated Subrecipient has been approved. Designation means that the subrecipient has been unilaterally selected by USAID as the subrecipient. USAID approval of a subrecipient, selected by another party, or joint selection by USAID and another party is not designation.

(2) The recipient must insert the following clause, or its substance, in its agreement with the Designated Subrecipient:

*"The recipient reserves the right to terminate this [Agreement Contract] or take other appropriate measures if the [Subrecipient] or a key individual of the [Subrecipient] is found to have been convicted of a narcotic offense or to have been engaged in drug trafficking as defined in 22 CFR 140."*

[END OF PROVISION]

## RAA11. INVESTMENT PROMOTION (NOVEMBER 2003)

a. Except as specifically set forth in this award or otherwise authorized by USAID in writing, no funds or other support provided hereunder may be used for any activity that



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involves investment promotion in a foreign country.

b. In the event the recipient is requested or wishes to provide assistance in the above area or requires clarification from USAID as to whether the activity would be consistent with the limitation set forth above, the recipient must notify the Agreement Officer and provide a detailed description of the proposed activity. The recipient must not proceed with the activity until advised by USAID that it may do so.

c. The recipient must ensure that its employees and subrecipients and contractors providing investment promotion services hereunder are made aware of the restrictions set forth in this clause and must include this clause in all contracts and other subawards and contracts entered into hereunder.

[END OF PROVISION]

## RAA12. REPORTING HOST GOVERNMENT TAXES (DECEMBER 2014)

a. By April 16 of each year, the recipient must submit a report containing:

(1) Contractor/recipient name.

(2) Contact name with phone, fax and e-mail.

(3) Agreement number(s).

(4) The total amount of value-added taxes and customs duties (but not sales taxes) assessed by the host government (or any entity thereof) on purchases in excess of $500 per transaction of supplies, materials, goods or equipment, during the 12 months ending on the preceding September 30, using funds provided under this contract/agreement.

(5) Any reimbursements received by April 1 of the current year on value-added taxes and customs duties reported in (iv).

(6) Reports are required even if the recipient did not pay any taxes or receive any reimbursements during the reporting period.

(7) Cumulative reports may be provided if the recipient is implementing more than one program in a foreign country.

b. Submit the reports to: Harish Ramroop via email at hramroop@usaid.gov or via snail mail at:

Harish Ramroop
USAID



UCDUSR00002769

M/CFO/CMP, Room 435-I, SA-44
1300 Pennsylvania Avenue, N.W.
Washington, DC 20523

c. Host government taxes are not allowable where the Agreement Officer provides the necessary means to the recipient to obtain an exemption or refund of such taxes, and the recipient fails to take reasonable steps to obtain such exemption or refund. Otherwise, taxes are allowable in accordance with the Standard Provision, "Allowable Costs," and must be reported as required in this provision.

d. The recipient must include this reporting requirement in all applicable subawards and contracts.

[END OF PROVISION]

## RAA13. FOREIGN GOVERNMENT DELEGATIONS TO INTERNATIONAL CONFERENCES (JUNE 2012)

a. U.S. Government funds under this award must not be used to finance the travel, per diem, hotel expenses, meals, conference fees or other conference costs for any member of a foreign government's delegation to an international conference sponsored by a multilateral organization, as defined below, unless approved by the Agreement Officer in writing.

b. Definitions:

(1) A foreign government delegation is appointed by the national government (including ministries and agencies but excluding local, state and provincial entities) to act on behalf of the appointing authority at the international conference. A conference participant is a delegate for the purposes of this provision, only when there is an appointment or designation that the individual is authorized to officially represent the government or agency. A delegate may be a private citizen.

(2) An international conference is a meeting where there is an agenda, an organizational structure, and delegations from countries other than the conference location, in which country delegations participate through discussion, votes, etc.

(3) A multilateral organization is an organization established by international agreement and whose governing body is composed principally of foreign governments or other multilateral organizations.

[END OF PROVISION]



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## RAA17. USAID DISABILITY POLICY - ASSISTANCE (DECEMBER 2004)

a. The objectives of the USAID Disability Policy are (1) to enhance the attainment of United States foreign assistance program goals by promoting the participation and equalization of opportunities of individuals with disabilities in USAID policy, country and sector strategies, activity designs and implementation; (2) to increase awareness of issues of people with disabilities both within USAID programs and in host countries; (3) to engage other U.S. Government agencies, host country counterparts, governments, implementing organizations and other donors in fostering a climate of nondiscrimination against people with disabilities, and (4) to support international advocacy for people with disabilities.

b. USAID therefore requires that the recipient not discriminate against people with disabilities in the implementation of USAID funded programs and that it make every effort to comply with the objectives of the USAID Disability Policy in performing the program under this grant or cooperative agreement. To that end and to the extent it can accomplish this goal within the scope of the program objectives, the recipient should demonstrate a comprehensive and consistent approach for including men, women, and children with disabilities.

[END OF PROVISION]

## RAA18. STANDARDS FOR ACCESSIBILITY FOR THE DISABLED IN USAID ASSISTANCE AWARDS INVOLVING CONSTRUCTION (SEPTEMBER 2004)

a. One of the objectives of the USAID Disability Policy is to engage other U.S. Government agencies, host country counterparts, governments, implementing organizations, and other donors in fostering a climate of nondiscrimination against people with disabilities. As part of this policy USAID has established standards for any new or renovation construction project funded by USAID to allow access by people with disabilities (PWDs). The full text of the policy paper can be found at the following Web site: pdf.usaid.gov/pdf_docs/PDABQ631.pdf.

b. USAID requires the recipient to comply with standards of accessibility for people with disabilities in all structures, buildings or facilities resulting from new or renovation construction or alterations of an existing structure.

c. The recipient will comply with the host country or regional standards for accessibility in construction when such standards result in at least substantially equivalent accessibility and usability as the standard provided in the Americans with Disabilities Act (ADA) of 1990 and the Architectural Barriers Act (ABA) Accessibility Guidelines of July 2004. Where there are no host country or regional standards for universal access or where the host country or regional standards fail to meet the ADA/ABA threshold, the standard prescribed in the ADA and the ABA will be used.

h. New Construction. All new construction will comply with the above standards for accessibility.



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i. Alterations. Changes to an existing structure that affect, the usability of the structure will comply with the above standards for accessibility unless the recipient obtains the Agreement Officer's advance approval that compliance is technically infeasible or constitutes an undue burden or both. Compliance is technically infeasible where structural conditions would require removing or altering a load-bearing member that is an essential part of the structural frame or because other existing physical or site constraints prohibit modification or addition of elements, spaces, or features that are in full and strict compliance with the minimum requirements of the standard. Compliance is an undue burden where it entails either a significant difficulty or expense or both.

j. Exceptions. The following construction related activities are excepted from the requirements of paragraphs a. through d. above:

- Normal maintenance, reroofing, painting or wall papering, or changes to mechanical or electrical systems are not alterations and the above standards do not apply unless they affect the accessibility of the building or facility; and

- Emergency construction (which may entail the provision of plastic sheeting or tents, minor repair and upgrading of existing structures, rebuilding of part of existing structures, or provision of temporary structures) intended to be temporary in nature. A portion of emergency construction assistance may be provided to people with disabilities as part of the process of identifying disaster- and crisis-affected people as "most vulnerable."

[END OF PROVISION]

## RAA22. UNIVERSAL IDENTIFIER AND SYSTEM OF AWARD MANAGEMENT (July 2015)

k. **Requirement for System of Award Management (SAM).** Unless you are exempted from this requirement under 2 CFR 25.110, you as the recipient must maintain the currency of your information in SAM until you submit the final financial report required under this award or receive the final payment, whichever is later. This requires that you review and update the information at least annually after the initial registration, and more frequently, if required by changes in your information or another award term.

l. **Requirement for Data Universal Numbering System (DUNS) numbers.** If you are authorized to make subawards under this award, you:

- Must notify potential subrecipients that no entity (see definition in paragraph c. of this award term) may receive a subaward from you unless the entity has provided its DUNS number to you.

- May not make a subaward to an entity unless the entity has provided its DUNS number to you.



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m. **Definitions.** For purposes of this award term:

(1) System of Award Management (SAM) means the Federal repository into which an entity must provide information required for the conduct of business as a recipient. Additional information about registration procedures may be found at the SAM Internet site (currently at

(2) Data Universal Numbering System (DUNS) number means the nine-digit number established and assigned by Dun and Bradstreet, Inc. (D&B) to uniquely identify business entities. A DUNS number may be obtained from D&B by telephone (currently 866-705-5711) or the Internet (currently at fedgov.dnb.com/webform).

(3) Entity, as it is used in this award term, means all of the following, as defined at 2 CFR 25, subpart C:

(i) A governmental organization, which is a State, local government, or Indian tribe;

(ii) A foreign public entity;

(iii) A domestic or foreign nonprofit organization;

(iv) A domestic or foreign for-profit organization; and

(v) A Federal agency, but only as a subrecipient under an award or subaward to a non-Federal entity.

**Subaward**.

(4) This term means a legal instrument to provide support for the performance of any portion of the substantive project or program for which you received this award and that you as the recipient award to an eligible subrecipient.

(i) The term does not include your procurement of property and services needed to carry out the project or program (for further explanation, see 2 CFR 200 Subpart F Audit Requirements).

(ii) A subaward may be provided through any legal agreement, including an agreement that you consider a contract.

(5) Subrecipient means an entity that:

(i) Receives a subaward from you under this award; and

(ii) Is accountable to you for the use of the Federal funds provided by the subaward.



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**ADDENDUM (JUNE 2012):**

**a. Exceptions.** The requirements of this provision to obtain a Data Universal Numbering System (DUNS) number and maintain a current registration in the System of Award Management (SAM) do not apply, at the prime award or subaward level, to:

(1) Awards to individuals
(2) Awards less than $25,000 to foreign recipients to be performed outside the United States (based on a USAID determination)
(3) Awards where the Agreement Officer determines, in writing, that these requirements would cause personal safety concerns.

**b.** This provision does not need to be included in subawards.

[END OF PROVISION]

## RAA23. REPORTING SUBAWARDS AND EXECUTIVE COMPENSATION (DECEMBER 2014)

**a. Reporting of first-tier subawards.**

(1) Applicability. Unless you are exempt as provided in paragraph d. of this award term, you must report each action that obligates $25,000 or more in Federal funds that does not include Recovery funds (as defined in section 1512(a)(2) of the American Recovery and Reinvestment Act of 2009, Pub. L. 111-5) for a subaward to an entity (see definitions in paragraph e. of this award term).

(2) Where and when to report.

(i) You must report each obligating action described in paragraph a.(1) of this award term to www.fsrs.gov.

(ii) For subaward information, report no later than the end of the month following the month in which the obligation was made. (For example, if the obligation was made on November 7, 2010, the obligation must be reported by no later than December 31, 2010.)

(3) What to report. You must report the information about each obligating action that the submission instructions posted at www.fsrs.gov specify.

**b. Reporting Total Compensation of Recipient Executives.**

(1) Applicability and what to report. You must report total compensation for each of your five most highly compensated executives for the preceding completed fiscal year, if –



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(i) The total Federal funding authorized to date under this award is $25,000 or more;

(ii) In the preceding fiscal year, you received—

(A) 80 percent or more of your annual gross revenues from Federal procurement contracts (and subcontracts) and Federal financial assistance subject to the Transparency Act, as defined at 2 CFR 170.320 (and subawards); and

(B) $25,000,000 or more in annual gross revenues from Federal procurement contracts (and subcontracts) and Federal financial assistance subject to the Transparency Act, as defined at 2 CFR 170.320 (and subawards); and

(iii) The public does not have access to information about the compensation of the executives through periodic reports filed under section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78m(a), 78o(d)) or section 6104 of the Internal Revenue Code of 1986. (To determine if the public has access to the compensation information, see the U.S. Security and Exchange Commission total compensation filings at www.sec.gov/answers/execomp.htm.)

(2) Where and when to report. You must report executive total compensation described in paragraph b.(1) of this award term:

(i) As part of your registration profile at www.bpn.gov/ccr.

(ii) By the end of the month following the month in which this award is made, and annually thereafter.

**c. Reporting of Total Compensation of Subrecipient Executives.**

(1) Applicability and what to report. Unless you are exempt as provided in paragraph d. of this award term, for each first-tier subrecipient under this award, you must report the names and total compensation of each of the subrecipient's five most highly compensated executives for the subrecipient's preceding completed fiscal year, if–

(i) In the subrecipient's preceding fiscal year, the subrecipient received—

(A) 80 percent or more of its annual gross revenues from Federal procurement contracts (and subcontracts) and Federal financial assistance subject to the Transparency Act, as defined at 2 CFR 170.320 (and subawards); and



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(B) $25,000,000 or more in annual gross revenues from Federal procurement contracts (and subcontracts), and Federal financial assistance subject to the Transparency Act (and subawards); and

(ii) The public does not have access to information about the compensation of the executives through periodic reports filed under section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78m(a), 78o(d)) or section 6104 of the Internal Revenue Code of 1986. (To determine if the public has access to the compensation information, see the U.S. Security and Exchange Commission total compensation filings at www.sec.gov/answers/execomp.htm.)

(2) Where and when to report. You must report subrecipient executive total compensation described in paragraph c.(1) of this award term:

(i) To the recipient.

(ii) By the end of the month following the month during which you make the subaward. For example, if a subaward is obligated on any date during the month of October of a given year (for example, between October 1 and 31), you must report any required compensation information of the subrecipient by November 30 of that year.

**d. Exemptions.**

If, in the previous tax year, you had gross income, from all sources, under $300,000, you are exempt from the requirements to report:

(1) Subawards, and

(2) The total compensation of the five most highly compensated executives of any subrecipient.

**e. Definitions.**

For purposes of this award term:

(1) Entity means all of the following, as defined in 2 CFR 25:

(i) A governmental organization, which is a State, local government, or Indian tribe;

(ii) A foreign public entity;

(iii) A domestic or foreign nonprofit organization;



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(iv) A domestic or foreign for-profit organization; and

(v) A Federal agency, but only as a subrecipient under an award or subaward to a non-Federal entity.

(2) Executive means officers, managing partners, or any other employees in management positions.

(3) Subaward:

(i) This term means a legal instrument to provide support for the performance of any portion of the substantive project or program for which you received this award and that you as the recipient award to an eligible subrecipient.

(ii) The term does not include your procurement of property and services needed to carry out the project or program (for further explanation, see2 CFR 200 Subpart F Audit Requirements).

(iii) A subaward may be provided through any legal agreement, including an agreement that you or a subrecipient considers a contract.

(4) Subrecipient means an entity that:

(i) Receives a subaward from you (the recipient) under this award; and

(ii) Is accountable to you for the use of the Federal funds provided by the subaward.

(5) Total compensation means the cash and noncash dollar value earned by the executive during the recipient's or subrecipient's preceding fiscal year and includes the following (for more information see 17 CFR 229.402(c)(2)):

(i) Salary and bonus.

(ii) Awards of stock, stock options, and stock appreciation rights. Use the dollar amount recognized for financial statement reporting purposes with respect to the fiscal year in accordance with the Statement of Financial Accounting Standards No. 123 (Revised 2004) (FAS 123R), Shared Based Payments.

(iii) Earnings for services under nonequity incentive plans. This does not include group life, health, hospitalization, or medical reimbursement plans that do not discriminate in favor of executives, and are available generally to all salaried employees.



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(iv) Change in pension value. This is the change in present value of defined benefit and actuarial pension plans.

(v) Above-market earnings on deferred compensation which is not tax-qualified.

(vi) Other compensation, if the aggregate value of all such other compensation (for example, severance, termination payments, value of life insurance paid on behalf of the employee, perquisites or property) for the executive exceeds $10,000.

[END OF PROVISION]

## RAA24. PATENT REPORTING PROCEDURES (DECEMBER 2014)

Nonprofit Organizations)") is incorporated by reference into this award as if set forth in full text. The recipient must use the National Institutes of Health EDISON Patent Reporting and Tracking system (http://www.iedison.gov) to fulfill its disclosure obligations under 37 CFR 401.14(c)(1). The recipient must also submit reports on utilization of subject inventions annually to the Agreement Officer's Representative under 37 CFR 401.14(h), and the last report must be provided within 90 days of the expiration of the agreement.

**[END OF PROVISION]**
**[END OF REQUIRED AS APPLICABLE STANDARD PROVISIONS]**

**END OF ATTACHMENT D**



UCDUSR0002778

EXHIBIT A

# MODIFICATION OF ASSISTANCE AWARD



| 1. MODIFICATION NUMBER: | 2. EFFECTIVE DATE OF MODIFICATION: | 3. AWARD NUMBER: | 4. EFFECTIVE DATE OF AWARD: |
|---|---|---|---|
| 09 | See Block 16 | AID-OAA-A-14-00102 | 10/01/2014 |

**5. RECIPIENT:**

University of California, Davis
School of Veterinary Medicine,
1850 Research Park Dr.
Davis, CA 95618

DUNS No.: 04-712-0084
TIN No.: 94-6035494 LOC: 2986P

**6. ADMINISTERED BY:**

U.S. Agency for International Development
Office of Acquisition and Assistance
M/OAA/GH/HIDN
1300 Pennsylvania Ave., NW
SA-44, 549
Washington, DC 20532-7900

**7. FISCAL DATA:**

**Amount Obligated: $2,582,500.00**
**Detail: See page 2**

**8. TECHNICAL OFFICE:**
USAID/GH/HIDN

**9. PAYMENT OFFICE:**

U.S. Agency for International Development
M/FM/CMP/LOC
loc@usaid.gov

**10. FUNDING SUMMARY:**

| | Obligated Amount | Total Est. Amount |
|---|---|---|
| Amount Obligated prior to this Modification: | $ 96,000,000.00 | $100,000,000.00 |
| Change made by this Modification: | $ 2,582,500.00 | $ 0.00 |
| New/Current Total: | $ 99,582,500.00 | $100,000,000.00 |

**11. DESCRIPTION OF MODIFICATION:**

The purpose of this modification is to:

1. to provide incremental funding in the amount of $2,582,500.00 increasing the total obligated amount from $97,000,000.00 to $99,582,500.00 with $417,500.00 remaining to be obligated against the total estimated cost of $100,000,000.00.
2. to insert the Protecting Life in Global Health Assistance provision into Attachment D section RAA24..

(See continuation pages)

12. THIS MODIFICATION IS ENTERED INTO PURSUANT TO THE AUTHORITY OF THE FOREIGN ASSISTANCE ACT OF 1961, AS AMENDED. EXCEPT AS SPECIFICALLY AMENDED HEREIN, ALL TERMS AND CONDITIONS OF THE AWARD REFERENCED ON BLOCK 03 ABOVE, AS IT MAY HAVE HERE TO FORE BEEN AMENDED, REMAIN UNCHANGED AND IN FULL FORCE AND EFFECT.

13. RECIPIENT [X] IS [ ] IS NOT REQUIRED TO SIGN THIS DOCUMENT TO RECONFIRM ITS AGREEMENT WITH THE CHANGES EFFECTED HEREIN.

**14. RECIPIENT:**

BY: [signature]

TITLE: Ahmad [illegible], Ph.D., J.D.
Executive Director, Research Administration

DATE: 11/30/2017

**15. THE UNITED STATES OF AMERICA**
**U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT**

BY: [signature]

Roland C. Markey
(Name Typed or Printed)

TITLE: Agreement Officer

DATE: 11/30/2017

The Cooperative Agreement is modified as follows:

1) On the **COVER PAGE – A. GENERAL:**

- On Line 1., "Amount Obligated this Action", DELETE the amount of "$100,000.00" and REPLACE with "$2,582,500.00".
- On Line 3., "Total Obligated USAID Amount", DELETE the amount of "$97,000,000.00" and REPLACE with "$97,000,000.00".

2) On the **COVER PAGE – B. SPECIFIC**, add the following:

| Account ID | Accounting Template | BBFY | EBFY | Fund | OP | Prog Area | Dist Code | Prog Elem | BGA | OP Def | SOC | Funded Amount |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 35 | GH-HN Program Funds | 2017 | 2018 | GH-C-AI | GHJD | HL.4 | 936-4002 | (none) | 997 | (None) | 4100201 | $2,582,500.00 |

Amount Obligated this Action: $ 2,582,500.00
Total Estimated USAID Amount: $100,000,000.00
Total Obligated USAID Amount: $ 99,582,500.00
Amount Remaining to be Obligated: $ 417,500.00

3) In **ATTACHMENT A – SCHEDULE, A.3 AMOUNT OF AWARD AND PAYMENT**, paragraph 2., DELETE "USAID hereby obligates the amount of $97,000,000.00 for program expenditures during the period set forth in A.2 above." and REPLACE with "USAID hereby obligates the amount of $99,582,500.00 for program expenditures during the period set forth in A.2 above."

Add Protecting Life in Global Health Assistance provision to section D as follows.

**RAA24. PROTECTING LIFE IN GLOBAL HEALTH ASSISTANCE (MAY 2017)**

I. Ineligibility of Foreign Non-governmental Organizations that Perform or Actively Promote Abortion as a Method of Family Planning.

This provision is in two parts: I, applicable to foreign non-governmental organizations; and II, applicable to U.S. non-governmental organizations. Both part I and part II should be included in awards.

I. Grants and Cooperative Agreements with Foreign Non-governmental Organizations

(1) The recipient agrees that it will not, during the term of this award, perform or actively promote abortion as a method of family planning in foreign countries or provide financial support to any other foreign non-governmental organization that conducts such activities. For purposes of this paragraph (a), a foreign nongovernmental organization is a for-profit or not-for-profit non-governmental organization that is not organized under the laws of the United States, any State of the United States, the District of Columbia, or the Commonwealth of Puerto Rico, or any other territory or possession of the United States.



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(2) The recipient agrees that authorized representatives of USAID may, at any reasonable time, announced or unannounced, consistent with 2 CFR Part 200: (i) inspect the documents and materials maintained or prepared by the recipient in the usual course of its operations that describe the health activities of the recipient, including reports, brochures, and service statistics; (ii) observe the health activities conducted by the recipient, (iii) consult with healthcare personnel of the recipient; and (iv) obtain a copy of audited financial statements or reports of the recipient, as applicable.

(3) In the event USAID has reasonable cause to believe that the recipient may have violated its undertaking not to perform or actively promote abortion as a method of family planning, the recipient must make available to USAID such books and records and other information as USAID may reasonably request to determine whether a violation of that undertaking has occurred, consistent with 2 CFR Part 200.

(4) Health assistance furnished to the recipient under this award must be terminated if the recipient violates any undertaking required by this paragraph (a), and the recipient must refund to USAID any unexpended amounts furnished to the recipient under this award, plus an amount equivalent to that used by the recipient to perform or actively promote abortion as a method of family planning while receiving funding under this award. The amount to be refunded to USAID under this subparagraph (4) may not exceed the total amount of health assistance furnished under this award.

(5) The recipient may not furnish health assistance under this award to another foreign non-governmental organization (the subrecipient) unless: (i) subrecipient agrees, by entering into such subaward, that it does not perform or actively promote abortion as a method of family planning in foreign countries and will not provide financial support to any other foreign non-governmental organization that conducts such activities; and (ii) such foreign non-governmental organization's agreement contains the same terms and conditions as described in subparagraph (6) below.

(6) Prior to entering into an agreement to furnish health assistance to a foreign non-governmental organization under this award, the recipient must ensure that such agreement with the subrecipient includes the following terms:

(i) The subrecipient will not, while receiving assistance under this award, perform or actively promote abortion as a method of family planning in foreign countries or provide financial support to other foreign non-governmental organizations that conduct such activities;

(ii) The recipient and authorized representatives of USAID may, at any reasonable time, announced or unannounced, consistent with 2 CFR Part 200: (A) inspect the documents and materials maintained or prepared by the subrecipient in the usual course of its operations that describe the health activities of the subrecipient, including reports, brochures, and service statistics; (B) observe health activities conducted by the subrecipient; (C) consult with healthcare personnel of the subrecipient; and (D) obtain a copy of audited financial statements or reports of the subrecipient, as applicable;



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(iii) In the event that the recipient or USAID has reasonable cause to believe that a subrecipient may have violated its undertaking not to perform or actively promote abortion as a method of family planning, the recipient will review the health program of the subrecipient to determine whether a violation of such undertaking has occurred. The subrecipient must make available to the recipient such books and records and other information as may be reasonably requested to conduct the review. USAID may review the health program of the subrecipient under these circumstances, and the subrecipient must provide access on a timely basis to USAID to such books and records and other information upon request, consistent with 2 CFR Part 200;

(iv) Health assistance provided to the subrecipient under this award must be terminated if the subrecipient violates any award terms under subparagraphs (6)(i)-(iii), above, and the subrecipient must refund to the recipient any unexpended amounts furnished to the subrecipient under this award, plus an amount equivalent to that used by the subrecipient to perform or actively promote abortion as a method of family planning while receiving funding under this award, up to the total amount of health assistance furnished to the subrecipient under this award; and

(v) The subrecipient may furnish health assistance under this award to another foreign non-governmental organization only if: (A) such foreign nongovernmental organization agrees, by entering into such agreement, that it will not perform or actively promote abortion as a method of family planning in foreign countries and will not provide financial support to any other foreign non-governmental organization that conducts such activities, and (B) such foreign non-governmental organization's agreement contains the same terms and conditions as those provided by the subrecipient to the recipient as described in subparagraphs (6)(i)-(iv), above.

(7) Where the terms and conditions of the award require USAID approval of subawards, the recipient must include a description of the due diligence performed by the recipient on the subrecipient before furnishing health assistance under this award.

(8) The recipient is liable to USAID for a refund for a violation by the subrecipient of any requirement of this paragraph (a) only if: (i) the recipient knowingly furnishes health assistance under this award to a subrecipient that performs or actively promotes abortion as a method of family planning, or (ii) the subrecipient did not abide by its award terms required by subparagraphs (6)(i)-(iii), above, and the recipient failed to make reasonable due diligence efforts prior to furnishing health assistance to the subrecipient, or (iii) the recipient knows or has reason to know, by virtue of the monitoring that the recipient is required to perform under the terms of this award, that a subrecipient has violated any of the award terms required by subparagraphs (6)(i)-(iii), above, and the recipient fails to terminate health assistance to the subrecipient, or fails to require the subrecipient to terminate assistance furnished under a subaward that violates any award terms required by subparagraphs (6)(i)-(iii), above.

(9) The recipient acknowledges that USAID may make independent inquiries in the community served by the recipient or a subrecipient under this award regarding whether it performs or actively promotes abortion as a method of family planning.



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(10) The following definitions apply for purposes of paragraph (n):

(i) Abortion is a method of family planning when it is for the purpose of spacing births. This includes, but is not limited to, abortions performed for the physical or mental health of the mother and abortions performed for fetal abnormalities, but does not include abortions performed if the life of the mother would be endangered if the fetus were carried to term or abortions performed following rape or incest.

(ii) "To perform abortions" means to operate a facility where abortions are provided as a method of family planning. Excluded from this definition is the treatment of injuries or illnesses caused by legal or illegal abortions, for example, post-abortion care.

(iii) "To actively promote abortion" means for an organization to commit resources, financial or other, in a substantial or continuing effort to increase the availability or use of abortion as a method of family planning.

(A) This includes, but is not limited to, the following activities:

(I) Operating a service-delivery site that provides, as part of its regular program, counseling, including advice and information, regarding the benefits and/or availability of abortion as a method of family planning;

(II) Providing advice that abortion as a method of family planning is an available option or encouraging women to consider abortion (passively responding to a question regarding where a safe, legal abortion may be obtained is not considered active promotion if a woman who is already pregnant specifically asks the question, she clearly states that she has already decided to have a legal abortion, and the healthcare provider reasonably believes that the ethics of the medical profession in the host country requires a response regarding where it may be obtained safely and legally);

(III) Lobbying a foreign government to legalize or make available abortion as a method of family planning or lobbying such a government to continue the legality of abortion as a method of family planning; and

(IV) Conducting a public information campaign in foreign countries regarding the benefits and/or availability of abortion as a method of family planning.

(B) Excluded from the definition of active promotion of abortion as a method of family planning are referrals for abortion as a result of rape or incest, or if the life of the mother would be endangered if she were to carry the fetus to term. Also excluded from this definition is the treatment of injuries or illnesses caused by legal or illegal abortions, for example, postabortion care.



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(C) Action by an individual acting in the individual's capacity shall not be attributed to an organization with which the individual is associated, provided that the individual is neither on duty nor acting on the organization's premises, and the organization neither endorses nor provides financial support for the action and takes reasonable steps to ensure that the individual does not improperly represent that he or she is acting on behalf of the organization.

(iv) Furnishing health assistance to a foreign non-governmental organization includes the transfer of funds made available under this award or goods or services financed with such funds, but does not include the purchase of goods or services from an organization or the participation of an individual in the general training programs of the recipient or subrecipient.

(v) To "control" an organization means to possess the power to direct, or cause the direction of, the management and policies of an organization.

(11) In determining whether a foreign non-governmental organization is eligible to be a recipient or subrecipient of health assistance under this award, the action of separate non-governmental organizations shall not be imputed to the recipient or subrecipient, unless, in the judgment of USAID, a separate non-governmental organization is being used purposefully to avoid the provisions of this paragraph (a). Separate non-governmental organizations are those that have distinct legal existence in accordance with the laws of the countries in which they are organized. Foreign organizations that are separately organized shall not be considered separate, however, if one is controlled by the other. The recipient may request the USAID Agreement Officer's approval to treat as separate the health activities of two or more organizations, which would not be considered separate under the preceding sentence. The recipient must provide a written justification to USAID that the health activities of the organizations are sufficiently distinct to warrant not imputing the activity of one to the other.

(12) Health assistance may be furnished under this award by a recipient or subrecipient to a foreign government or parastatal even though the government or parastatal includes abortion in its health program, provided that no such assistance may be furnished under this award in support of the abortion activity of the government or parastatal and any funds transferred to the government or parastatal must be placed in a segregated account to ensure that such funds may not be used to support the abortion activity of the government or parastatal.

(13) For the avoidance of doubt, in the event of a conflict between a term of this paragraph (a) and an affirmative duty of a healthcare provider required under local law to provide counseling about and referrals for abortion as a method of family planning, compliance with such law shall not trigger a violation of this paragraph (a).

II. Grants and Cooperative Agreements with U.S. Non-governmental Organizations

(1) The recipient (A) agrees that it will not furnish health assistance under this award to any foreign non-governmental organization that performs or actively promotes abortion as a method of family planning in



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foreign countries; and (B) further agrees to require that such subrecipients do not provide financial support to any other foreign non-governmental organization that conducts such activities. For purposes of this paragraph (a), a foreign non-governmental organization is a for-profit or not-for-profit non-governmental organization that is not organized under the laws of the United States, any State of the United States, the District of Columbia, or the Commonwealth of Puerto Rico, or any other territory or possession of the United States.

(2) Prior to entering into an agreement to furnish health assistance to a foreign non-governmental organization (subrecipient) under this award, the recipient must ensure that such agreement with the subrecipient includes the following terms:

(i) The subrecipient will not, while receiving assistance under this award, perform or actively promote abortion as a method of family planning in foreign countries or provide financial support to other foreign non-governmental organizations that conduct such activities;

(ii) The recipient, and authorized representatives of USAID may, at any reasonable time, announced or unannounced, consistent with 2 CFR Part 200: (A) inspect the documents and materials maintained or prepared by the subrecipient in the usual course of its operations that describe the health activities of the subrecipient, including reports, brochures, and service statistics; (B) observe the health activities conducted by the subrecipient; (C) consult with healthcare personnel of the subrecipient; and (D) obtain a copy of audited financial statements or reports of the subrecipient, as applicable; \

(iii) In the event that the recipient or USAID has reasonable cause to believe that a subrecipient may have violated its undertaking not to perform or actively promote abortion as a method of family planning, the recipient will review the health program of the subrecipient to determine whether a violation of such undertaking has occurred. The subrecipient must make available to the recipient such books and records and other information as may be reasonably requested to conduct the review. USAID may review the health program of the subrecipient under these circumstances, and the subrecipient must provide access on a timely basis to USAID to such books and records and other information upon request, consistent with 2 CFR part 200;

(iv) Health assistance provided to the subrecipient under this award must be terminated if the subrecipient violates any award terms required by subparagraphs (2)(i)-(iii), above, and the subrecipient must refund to the recipient any unexpended amounts furnished to the subrecipient under this award, plus an amount equivalent to that used by the subrecipient to perform or actively promote abortion as a method of family planning while receiving funding under this award, up to the total amount of health assistance furnished to the subrecipient under this award; and

(v) The subrecipient may furnish health assistance under this award to another foreign non-governmental organization only if: (A) such foreign nongovernmental organization agrees, by entering into such agreement, that it will not perform or actively promote abortion as a method



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of family planning in foreign countries and will not provide financial support to any other foreign non-governmental organization that conducts such activities; and (B) such foreign non-governmental organization's agreement contains the same terms and conditions as those provided by the subrecipient to the recipient as described in subparagraphs (2)(i)-(iv), above.

(3) Where the terms and conditions of the award require USAID approval of subawards, the recipient must include a description of the due diligence performed by the recipient on the subrecipient before furnishing health assistance under this award.

(4) The recipient is liable to USAID for a refund for a violation by the subrecipient of any requirement of this paragraph (a) only if: (i) the recipient knowingly furnishes health assistance under this award to a subrecipient that performs or actively promotes abortion as a method of family planning; or (ii) the subrecipient did not abide by its award terms required by subparagraphs (2)(i)-(iii), above, and the recipient failed to make reasonable due diligence efforts prior to furnishing health assistance to the subrecipient; or (iii) the recipient knows or has reason to know, by virtue of the monitoring that the recipient is required to perform under the terms of this award, that a subrecipient has violated any of the award terms required by subparagraphs (2)(i)-(iii), above, and the recipient fails to terminate health assistance to the subrecipient, or fails to require the subrecipient to terminate assistance furnished under a subaward that violates any award terms required by subparagraphs (2)(i)-(iii), above.

(5) The recipient acknowledges that USAID may make independent inquiries in the community served by a subrecipient under this award regarding whether such subrecipient performs or actively promotes abortion as a method of family planning.

(6) The following definitions apply for purposes of this paragraph (a):

(i) Abortion is a method of family planning when it is for the purpose of spacing births. This includes, but is not limited to, abortions performed for the physical or mental health of the mother and abortions performed for fetal abnormalities, but does not include abortions performed if the life of the mother would be endangered if the fetus were carried to term or abortions performed following rape or incest.

(ii) "To perform abortions" means to operate a facility where abortions are provided as a method of family planning. Excluded from this definition is the treatment of injuries or illnesses caused by legal or illegal abortions, for example, post-abortion care.

(iii) "To actively promote abortion" means for an organization to commit resources, financial or other, in a substantial or continuing effort to increase the availability or use of abortion as a method of family planning.

(A) This includes, but is not limited to, the following activities:



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(I) Operating a service-delivery site that provides, as part of its regular program, counseling, including advice and information, regarding the benefits and/or availability of abortion as a method of family planning;

(II) Providing advice that abortion as a method of family planning is an available option or encouraging women to consider abortion (passively responding to a question regarding where a safe, legal abortion may be obtained is not considered active promotion if a woman who is already pregnant specifically asks the question, she clearly states that she has already decided to have a legal abortion, and the healthcare provider reasonably believes that the ethics of the medical profession in the host country requires a response regarding where it may be obtained safely and legally);

(III) Lobbying a foreign government to legalize or make available abortion as a method of family planning or lobbying such a government to continue the legality of abortion as a method of family planning; and

(IV) Conducting a public-information campaign in foreign countries regarding the benefits and/or availability of abortion as a method of family planning.

(B) Excluded from the definition of active promotion of abortion as a method of family planning are referrals for abortion as a result of rape or incest, or if the life of the mother would be endangered if she were to carry the fetus to term. Also excluded from this definition is the treatment of injuries or illnesses caused by legal or illegal abortions, for example, postabortion care.

(C) Action by an individual acting in the individual's capacity shall not be attributed to an organization with which the individual is associated, provided that the individual is neither on duty nor acting on the organization's premises, and the organization neither endorses nor provides financial support for the action and takes reasonable steps to ensure that the individual does not improperly represent that he or she is acting on behalf of the organization.

(iv) Furnishing health assistance to a foreign non-governmental organization includes the transfer of funds made available under this award or goods or services financed with such funds, but does not include the purchase of goods or services from an organization or the participation of an individual in the general training programs of the recipient or subrecipient.

(v) To "control" an organization means to possess the power to direct, or cause the direction of, the management and policies of an organization.

(7) In determining whether a foreign non-governmental organization is eligible to be a subrecipient of health assistance under this award, the action of separate non-governmental organizations shall not be imputed to the subrecipient, unless, in the judgment of USAID, a separate non-governmental organization



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is being used purposefully to avoid the provisions of this paragraph (a). Separate nongovernmental organizations are those that have distinct legal existence in accordance with the laws of the countries in which they are organized. Foreign organizations that are separately organized shall not be considered separate, however, if one is controlled by the other. The recipient may request the USAID Agreement Officer's approval to treat as separate the health activities of two or more organizations, which would not be considered separate under the preceding sentence. The recipient must provide a written justification to USAID that the health activities of the organizations are sufficiently distinct to warrant not imputing the activity of one to the other.

(8) Health assistance may be furnished under this award by a recipient or subrecipient to a foreign government or parastatal even though the government or parastatal includes abortion in its health program, provided that no such assistance may be furnished under this award in support of the abortion activity of the government or parastatal and any funds transferred to the government or parastatal must be placed in a segregated account to ensure that such funds may not be used to support the abortion activity of the government or parastatal.

(9) For the avoidance of doubt, in the event of a conflict between a term of this paragraph (a) and an affirmative duty of a healthcare provider required under local law to provide counseling about and referrals for abortion as a method of family planning, compliance with such law shall not trigger a violation of this paragraph (a). (b) This provision shall be inserted verbatim in subawards in accordance with the terms of paragraph (a).

[END OF PROVISION]

All other terms and conditions of the cooperative agreement remain unchanged and in full force and effect.

**--- END OF MODIFICATION No. 9 ---**



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EXHIBIT B

Scope of Work

Dr. H. Benjamin Larman

The Johns Hopkins University

Project Title: PREDICT Serology

- Perform VirScan analysis on 200 serum samples (including a smaller number of acute/convalescent pairs from acute febrile illness).
- Perform ArboScan analysis on the same set of samples.
- Run the data through our pipeline which generates enrichment scores for each peptide and summary statistics at the protein and organism level. (Note, analysis of ArboScan may take time to optimize - we are just in the process of receiving this library).

The period of performance would span one year.

EXHIBIT C

Program Director/Principal Investigator (Last, First, Middle): Larman, H. Benjamin-Subaward to UCDavis

## DETAILED BUDGET FOR INITIAL BUDGET PERIOD
## DIRECT COSTS ONLY

FROM: 09/01/2019 THROUGH: 08/31/2020

List PERSONNEL (Applicant organization only)
Use Cal, Acad, or Summer to Enter Months Devoted to Project
Enter Dollar Amounts Requested (omit cents) for Salary Requested and Fringe Benefits

| NAME | ROLE ON PROJECT | Cal. Mnths | Acad. Mnths | Summer Mnths | INST.BASE SALARY | SALARY REQUESTED | FRINGE BENEFITS | TOTAL |
|---|---|---|---|---|---|---|---|---|
| Larman, H. Benjamin | PD/PI | 0.12 | | | 98,578 | 986 | 335 | 1,321 |
| Mohan, Divya | Res. Specialist | 1.2. | | | 37,842 | 3,784 | 1,287 | 5,071 |
| Venkataraman, Thiagaraja | Postdoc Fellow | 1.2 | | | 48,804 | 4,880 | 942 | 5,822 |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | **SUBTOTALS** → | | | | | 9,650 | 2,564 | 12,214 |

CONSULTANT COSTS

EQUIPMENT (Itemize)

SUPPLIES (Itemize by category)
General Research Supplies; $ 3,893
Sequencing Supplies, $ 3,893

7,786

TRAVEL

INPATIENT CARE COSTS

OUTPATIENT CARE COSTS

ALTERATIONS AND RENOVATIONS (Itemize by category)

OTHER EXPENSES (Itemize by category)

| | | |
|---|---|---|
| CONSORTIUM/CONTRACTUAL COSTS | DIRECT COSTS | |
| **SUBTOTAL DIRECT COSTS FOR INITIAL BUDGET PERIOD** (Item 7a, Face Page) | | $ 20,000 |
| CONSORTIUM/CONTRACTUAL COSTS | FACILITIES AND ADMINISTRATIVE COSTS | 12,750 |
| **TOTAL DIRECT COSTS FOR INITIAL BUDGET PERIOD** | | $ 32,750 |



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EXHIBIT C

**BUDGET JUSTIFICATION**

**A. Key Personnel** ($986)

Site PD/PI: H. Benjamin Larman, Ph.D., (0.12 calendar months), will serve as site PD/PI for the PREDICT serology subcontract. Dr. Larman is an Assistant Professor in the Immunology Division of the Pathology Department. As a graduate student with Steve Elledge, he developed the PhIP-Seq/VirScan technology. Dr. Larman will oversee the proposed work related to sample screening and data analysis.

**B. Other Personnel** ($8,664)

Research Technologist: Divya Mohan, (1.2 calendar months) has been trained to characterize serum samples and perform automated PhIP-Seq screening in the Larman Lab. She will assist in the expansion of the new ArboScan phage library and sample screening.

Postdoctoral Fellow: Thiagarajan Venkataraman, Ph.D., (1.2 calendar months) has been trained in the Larman Lab to perform library expansion and characterization. Dr. Venkataraman will be responsible for the expansion and QC of the ArboScan library.

**FRINGE BENEFITS** ($2,564)
Fringe benefits are calculated at 34% for all Johns Hopkins University faculty and staff.
Fringe benefits are calculated on 19.3% for all postdoctoral fellows who receive a wage.

**C. Equipment**

None requested.

**D. Travel**

None requested.

**E. Participant/Trainee Support Costs**

None requested.

**OTHER EXPENSES**
None requested.

**F. Other Direct Costs**

**RESEARCH SUPPLIES** ($7,786)
Next generation DNA sequencing costs (including fees for use of liquid handling robotics in the ChemCORE): $3,893
Molecular biology reagents: $3,893 (magnetic Dynabeads for antibody and RNA capture, oligonucleotides, Herculase II DNA polymerase, IgA capture antibodies)

**G. Indirect Costs** ($12,750)
F&A Rates: Facilities and Administrative Costs for Johns Hopkins University are calculated on a Modified Total Direct Cost basis (total direct costs excluding equipment). The Johns Hopkins University federally negotiated rate agreement for organized research conducted on campus is 63.75% based on the latest agreement dated 06/15/2018.

**Section D – Cost Transfers, Indirect Costs, Cost Sharing**

16. How does the organization ensure that all cost transfers are legitimate and appropriate?

17. Does the organization have an indirect cost allocation plan or a negotiated indirect cost rate? ☐Yes ☐No
Explain.

18. Does the organization have procedures which provide assurance that consistent treatment is applied in the distribution of charges to all grants? ☐Yes ☐No

19. How does the organization determine that it has met cost-sharing goals?

**Section E – Compliance**

20. Does your organization engage in any lobbying or partisan political activity which is charged, directly or indirectly, to a federally-assisted program? ☐Yes ☐No

21. Does your organization have a formal policy of nondiscrimination and a formal system for complying with Federal civil rights requirements? ☐Yes ☐No

22. Does your organization have cash forecasting process which will minimize the time elapsed between the drawing down of funds and the disbursement of those funds? ☐Yes ☐No

23. Is your organization familiar with Federal financial reports so that they will be completed in an accurate and timely manner when required? ☐Yes ☒No

24. Under which program(s), if any, does your organization receive Federal Student Financial Assistance Funds?

25. What was the dollar volume of Federal awards to your organization during the last fiscal year?

26. Registered in SAM.gov? ☐ Yes ☐ No

I certify that all necessary human subject, animal subject, and/or environmental health and safety approvals have been obtained prior to conducting work that requires such approvals. I certify to the best of my knowledge and belief that the foregoing statements are true and accurate.

Signature: _____ Title: _____

Name: _____ Date: _____



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**Any references to "this award" in this Appendix shall be understood to refer to the cooperative agreement (AID-OAA-A-14-00102) received by the University of California, Davis from the US Agency for International Development (USAID) for the PREDICT-2 project. Any questions regarding the terms and conditions or information included in the prime agreement should be directed to the Purchaser.*

**M6. SUBAWARDS AND CONTRACTS (DECEMBER 2014)**

a. Subawardees and contractors have no relationship with USAID under the terms of this award. All required USAID approvals must be directed through the recipient to USAID.

b. Notwithstanding any other term of this award, subawardees and contractors have no right to submit claims directly to USAID and USAID assumes no liability for any third party claims against the recipient.

[END OF PROVISION]

**M8. USAID ELIGIBILITY RULES FOR GOODS AND SERVICES (JUNE 2012)**

a. This provision is not applicable to commodities or services that the recipient provides with private funds as part of a cost-sharing requirement, or with Program Income generated under this award.

b. Ineligible and Restricted Commodities and Services:

(1) Ineligible Commodities and Services. The recipient must not, under any circumstances, procure any of the following under this award:

(i) Military equipment,
(ii) Surveillance equipment,
(iii) Commodities and services for support of police or other law enforcement activities,
(iv) Abortion equipment and services,
(v) Luxury goods and gambling equipment, or
(vi) Weather modification equipment.

(2) Ineligible Suppliers. Any firms or individuals that do not comply with the requirements in Standard Provision, "Debarment, Suspension and Other Responsibility Matters" and Standard Provision, "Preventing Terrorist Financing" must not be used to provide any commodities or services funded under this award.

(3) Restricted Commodities. The recipient must obtain prior written approval of the Agreement Officer (AO) or comply with required procedures under an applicable waiver, as provided by the AO when procuring any of the following commodities:

(i) Agricultural commodities,

(ii) Motor vehicles,
(iii) Pharmaceuticals,
(iv) Pesticides,
(v) Used equipment,
(vi) U.S. Government-owned excess property, or
(vii) Fertilizer.

c. Source and Nationality:

Except as may be specifically approved in advance by the AO, all commodities and services that will be reimbursed by USAID under this award must be from the authorized geographic code specified in this award and must meet the source and nationality requirements set forth in 22 CFR 228. If the geographic code is not specified, the authorized geographic code is 937. When the total value of procurement for commodities and services during the life of this award is valued at $250,000 or less, the authorized geographic code for procurement of all goods and services to be reimbursed under this award is code 935. For a current list of countries within each geographic code, see: http://www.usaid.gov/ads/policy/300/310.

d. Guidance on the eligibility of specific commodities and services may be obtained from the AO. If USAID determines that the recipient has procured any commodities or services under this award contrary to the requirements of this provision, and has received payment for such purposes, the AO may require the recipient to refund the entire amount of the purchase.

e. This provision must be included in all subawards and contracts which include procurement of commodities or services.

[END OF PROVISION]

**M12. PREVENTING TERRORIST FINANCING – IMPLEMENTATION OF E.O. 13224 (AUGUST 2013)**

a. The recipient must not engage in transactions with, or provide resources or support to, individuals and organizations associated with terrorism, including those individuals or entities that appear on the Specially Designated Nationals and Blocked Persons List maintained by the U.S. Treasury (online at: http://www.treasury.gov/resource-center/sanctions/SDN-List/Pages/default.aspx) or the United Nations Security designation list (online at: http://www.un.org/sc/committees/1267/aq_sanctions_list.shtml).

b. This provision must be included in all subawards and contracts issued under this award.

[END OF PROVISION]

## M17. TRAVEL AND INTERNATIONAL AIR TRANSPORTATION (DECEMBER 2014)

**a. TRAVEL COSTS**

All travel costs must comply with the applicable cost principles and must be consistent with those normally allowed in like circumstances in the recipient's non-USAID-funded activities. Costs incurred by employees and officers for travel, including air fare, costs of lodging, other subsistence, and incidental expenses, may be considered reasonable and allowable only to the extent such costs do not exceed reasonable charges normally allowed by the recipient in its regular operations as the result of the recipient organization's written travel policy and are within the limits established by the applicable cost principles.

In the absence of a reasonable written policy regarding international travel costs, the standard for determining the reasonableness of reimbursement for international travel costs will be the Standardized Regulations (Government Civilians, Foreign Areas), published by the U.S. Department of State, as from time to time amended. The most current Standardized Regulations on international travel costs may be obtained from the AO. In the event that the cost for air fare exceeds the customary standard commercial airfare (coach or equivalent) or the lowest commercial discount airfare, the recipient must document one of the allowable exceptions from the applicable cost principles.

**b. FLY AMERICA ACT RESTRICTIONS**

(1) The recipient must use U.S. Flag Air Carriers for all international air transportation (including personal effects) funded by this award pursuant to the Fly America Act and its implementing regulations to the extent service by such carriers is available.

(2) In the event that the recipient selects a carrier other than a U.S. Flag Air Carrier for international air transportation, in order for the costs of such international air transportation to be allowable, the recipient must document such transportation in accordance with this provision and maintain such documentation pursuant to the Standard Provision, "Accounting, Audit and Records." The documentation must use one of the following reasons or other exception under the Fly America Act:

(i) The recipient uses a European Union (EU) flag air carrier, which is an airline operating from an EU country that has signed the US-EU "Open Skies" agreement (http://www.state.gov/e/eb/rls/othr/ata/ic/170684.htm).

(ii) Travel to or from one of the following countries on an airline of that country when no city pair fare is in effect for that leg (see http://apps.fas.gsa.gov/citypairs/search/):

a. Australia on an Australian airline,
b. Switzerland on a Swiss airline, or
c. Japan on a Japanese airline;

(iii) Only for a particular leg of a route on which no US Flag Air Carrier provides service on that route;

(iv) For a trip of 3 hours or less, the use of a US Flag Air Carrier at least doubles the travel time;

(v) If the US Flag Air Carrier offers direct service, use of the US Flag Air Carrier would increase the travel time by more than 24 hours, or

(vi) If the US Flag Air Carrier does not offer direct service,

a. Use of the US Flag Air Carrier increases the number of aircraft changes by 2 or more,

b. Use of the US Flag Air Carrier extends travel time by 6 hours or more, or

c. Use of the US Flag Air Carrier requires a layover at an overseas interchange of 4 hours or more.

**c. DEFINITIONS**

The terms used in this provision have the following meanings:

(1) "Travel costs" means expenses for transportation, lodging, subsistence (meals and incidentals), and related expenses incurred by employees who are on travel status on official business of the recipient for any travel outside the country in which the organization is located. "Travel costs" do not include expenses incurred by employees who are not on official business of the recipient, such as rest and recuperation (R&R) travel offered as part of an employee's benefits package that are consistent with the recipient's personnel and travel policies and procedures.

(2) "International air transportation" means international air travel by individuals (and their personal effects) or transportation of cargo by air between a place in the United States and a place outside thereof, or between two places both of which are outside the United States.

(3) "U.S. Flag Air Carrier" means an air carrier on the list issued by the U.S. Department of Transportation at http://ostpxweb.dot.gov/aviation/certific/certlist.htm. U.S. Flag Air Carrier service also includes service provided under a code share agreement with another air carrier when the ticket, or documentation for an electronic ticket, identifies the U.S. flag air carrier's designator code and flight number.

(4) For this provision, the term "United States" includes the fifty states, Commonwealth of Puerto Rico, possessions of the United States, and the District of Columbia.

**d. SUBAWARDS AND CONTRACTS**

This provision must be included in all subawards and contracts under which this award will finance international air transportation.

[END OF PROVISION]

**M18. OCEAN SHIPMENT OF GOODS (JUNE 2012)**

a. Prior to contracting for ocean transportation to ship goods purchased or financed with USAID funds under this award, the recipient must contact the office below to determine the flag and class of vessel to be used for shipment:

U.S. Agency for International Development,
Bureau for Management
Office of Acquisition and Assistance, Transportation Division
1300 Pennsylvania Avenue, NW
Washington, DC 20523
Email: oceantransportation@usaid.gov

b. This provision must be included in all subawards and contracts.

[END OF PROVISION]

**M.20. TRAFFICKING IN PERSONS (JULY 2015)**

a. The recipient, subawardee, or contractor, at any tier, or their employees, labor recruiters, brokers or other agents, must not engage in:

(1) Trafficking in persons (as defined in the Protocol to Prevent, Suppress, and Punish Trafficking in Persons, especially Women and Children, supplementing the UN Convention against Transnational Organized Crime) during the period of this award;

(2) Procurement of a commercial sex act during the period of this award; or

(3) Use of forced labor in the performance of this award.

(4) Acts that directly support or advance trafficking in persons, including the following acts:

i. Destroying, concealing, confiscating, or otherwise denying an employee access to that employee's identity or immigration documents;

ii. Failing to provide return transportation or pay for return transportation costs to an employee from a country outside the United States to the country from which the employee was recruited upon the end of employment if requested by the employee, unless:

a) exempted from the requirement to provide or pay for such return transportation by USAID under this award; or

b) the employee is a victim of human trafficking seeking victim services or legal redress in the country of employment or a witness in a human trafficking enforcement action;

iii. Soliciting a person for the purpose of employment, or offering employment, by means of materially false or fraudulent pretenses, representations, or promises regarding that employment;

iv. Charging employees recruitment fees ; or

v. Providing or arranging housing that fails to meet the host country housing and safety standards.

b. In the event of a violation of section (a) of this provision, USAID is authorized to terminate this award, without penalty, and is also authorized to pursue any other remedial actions authorized as stated in section 1704(c) of the National Defense Authorization Act for Fiscal Year 2013 (Pub. L. 112-239, enacted January 2, 2013).

c. For awards that exceed an estimated value of $500,000, the recipient must submit to the Agreement Officer, the annual "Certification regarding Trafficking in Persons. Implementing Title XVII of the National Defense Authorization Act for Fiscal Year 2013" as required prior to this award, and must implement a compliance plan to prevent the activities described above in section (a) of this provision. The recipient must provide a copy of the compliance plan to the Agreement Officer upon request and must post the useful and relevant contents of the plan or related materials on its website (if one is maintained) and at the workplace.

d. The recipient's compliance plan must be appropriate to the size and complexity of the award and to the nature and scope of the activities to be performed. The plan must include, at a minimum, the following:

(1) An awareness program to inform employees about the trafficking related prohibitions included in this provision, the activities prohibited and the action that will be taken against the employee for violations.

(2) A reporting process for employees to report, without fear of retaliation, activity inconsistent with the policy prohibiting trafficking, including a means to make available to all employees the Global Human Trafficking Hotline at 1-844-888-FREE and its e-mail address at **help@befree.org**.

(3) A recruitment and wage plan that only permits the use of recruitment companies with trained employees, prohibits charging of recruitment fees to the employee, and ensures that wages meet applicable host-country legal requirements or explains any variance.

(4) ) A housing plan, if the recipient or any subawardee intends to provide or arrange housing. The housing plan is required to meet any host-country housing and safety standards.

(5) Procedures for the recipient to prevent any agents or subawardee at any tier and at any dollar value from engaging in trafficking in persons activities described in section a of this provision. The recipient must also have procedures to monitor, detect, and terminate any agents or subawardee or subawardee employees that have engaged in such activities.

e. If the Recipient receives any credible information from any source that alleges that the recipient, contractor, subawardee, or agent has engaged in any of the prohibited activities identified in this provision, the recipient must immediately notify the cognizant Agreement Officer and the USAID Office of the Inspector General, and must fully cooperate with any Federal agencies responsible for audits, investigations, or corrective actions relating to trafficking in persons.

f. The Agreement Officer may direct the Recipient to take specific steps to abate an alleged violation or enforce the requirements of a compliance plan.

g. For purposes of this provision, "employee" means an individual who is engaged in the performance of this award as a direct employee, consultant, or volunteer of the recipient or any subrecipient.

[END OF PROVISION]

**M22. LIMITING CONSTRUCTION ACTIVITIES (AUGUST 2013)**

a) Construction is not eligible for reimbursement under this award unless specifically identified in paragraph d) below.

b) Construction means —construction, alteration, or repair (including dredging and excavation) of buildings, structures, or other real property and includes, without limitation, improvements, renovation, alteration and refurbishment. The term includes, without limitation, roads, power plants, buildings, bridges, water treatment facilities, and vertical structures.

c) Agreement Officers will not approve any subawards or procurements by recipients for construction activities that are not listed in paragraph d) below. USAID will reimburse allowable costs for only the construction activities listed in this provision not to exceed the amount specified in the construction line item of the award budget. The recipient must receive prior written approval from the AO to transfer funds allotted for construction activities to other cost categories, or vice versa.

d) Description
Construction is not eligible for reimbursement under this award.

e) The recipient must include this provision in all subawards and procurements and make vendors providing services under this award and subrecipients aware of the restrictions of this provision.

[END OF PROVISION]

**M24. PILOT PROGRAM FOR ENHANCEMENT OF GRANTEE EMPLOYEE WHISTLEBLOWER PROTECTIONS (SEPTEMBER 2014)**

The requirement to comply with and inform all employees of the "Pilot Program for Enhancement of Contractor Employee Whistleblower Protections" is retroactively effective for all assistance awards and subawards (including subcontracts) issued beginning July 1, 2013.

The Grantee must:

1. Inform its employees working under this award in the predominant native language of the workforce that they are afforded the employee whistleblower rights and protections provided under 41 U.S.C. § 4712; and

2. Include such requirement in any subaward or subcontract made under this award.

41 U.S.C. § 4712 states that an employee of a Grantee may not be discharged, demoted, or otherwise discriminated against as a reprisal for "whistleblowing." In addition, whistleblower protections cannot be waived by any agreement, policy, form, or condition of employment.

Whistleblowing is defined as making a disclosure "that the employee reasonably believes" is evidence of any of the following:

- Gross mismanagement of a Federal contract or grant;
- A gross waste of Federal funds;
- An abuse of authority relating to a Federal contract or grant;
- A substantial and specific danger to public health or safety; or
- A violation of law, rule, or regulation related to a Federal contract or grant (including the competition for, or negotiation of, a contract or grant).

To qualify under the statute, the employee's disclosure must be made to:

- A Member of the U.S. Congress, or a representative of a U.S. Congressional Committee;
- A cognizant U.S. Inspector General;
- The U.S. Government Accountability Office;
- A Federal employee responsible for contract or grant oversight or management at the relevant agency;
- A U.S. court or grand jury; or,
- A management official or other employee of the Grantee who has the responsibility to investigate, discover, or address misconduct.

[End of Provision]

**M.28. MANDATORY DISCLOSURES (July 2015)**

Consistent with 2 CFR §200.113, applicants and recipients must disclose, in a timely manner, in writing to the USAID Office of the Inspector General, with a copy to the cognizant Agreement Officer, all violations of Federal criminal law involving fraud, bribery, or gratuity violations potentially affecting the Federal award. Subrecipients must disclose, in a timely manner, in writing to the USAID Office of the Inspector General and to the prime recipient (pass through entity) all violations of Federal criminal law involving fraud, bribery, or gratuity violations potentially affecting the Federal award.

Disclosures must be sent to:
U.S. Agency for International Development
Office of the Inspector General
P.O. Box 657 Washington, DC 20044-0657
Phone: 1-800-230-6539 or 202-712-1023
Email: ig.hotline@usaid.gov
URL: https://oig.usaid.gov/content/usaid-contractor-reporting-form.

Failure to make required disclosures can result in any of the remedies described in 2 CFR §200.338 Remedies for noncompliance, including suspension or debarment (See 2 CFR 180, 2 CFR 780 and 31 U.S.C. 3321).

The recipient must include this mandatory disclosure requirement in all subawards and contracts under this award.

[End of Provision]

**[END OF MANDATORY PROVISIONS]**

**REQUIRED AS APPLICABLE STANDARD PROVISIONS FOR U.S. NONGOVERNMENTAL ORGANIZATIONS**

**RAA11. INVESTMENT PROMOTION (NOVEMBER 2003)**
a. Except as specifically set forth in this award or otherwise authorized by USAID in writing, no funds or other support provided hereunder may be used for any activity that involves investment promotion in a foreign country.

b. In the event the recipient is requested or wishes to provide assistance in the above area or requires clarification from USAID as to whether the activity would be consistent with the limitation set forth above, the recipient must notify the Agreement Officer and provide a detailed description of the proposed activity. The recipient must not proceed with the activity until advised by USAID that it may do so.

c. The recipient must ensure that its employees and subrecipients and contractors providing investment promotion services hereunder are made aware of the restrictions set forth in this clause and must include this clause in all contracts and other subawards and contracts entered into hereunder.

[END OF PROVISION]

**RAA12. REPORTING HOST GOVERNMENT TAXES (DECEMBER 2014)**

a. By April 16 of each year, the recipient must submit a report containing:

(1) Contractor/recipient name.

(2) Contact name with phone, fax and e-mail.

(3) Agreement number(s).

(4) The total amount of value-added taxes and customs duties (but not sales taxes) assessed by the host government (or any entity thereof) on purchases in excess of
$500 per transaction of supplies, materials, goods or equipment, during the 12 months ending on the preceding September 30, using funds provided under this contract/agreement.

(5) Any reimbursements received by April 1 of the current year on value-added taxes and customs duties reported in (iv).

(6) Reports are required even if the recipient did not pay any taxes or receive any reimbursements during the reporting period.

(7) Cumulative reports may be provided if the recipient is implementing more than one program in a foreign country.

b. Submit the reports to: Harish Ramroop via email at hramroop@usaid.gov or via snail mail at:

Harish Ramroom
USAID
M/CFO/CMP, Room 435-I, SA-44
1300 Pennsylvania Avenue, N.W.
Washington, DC 20523

c. Host government taxes are not allowable where the Agreement Officer provides the necessary means to the recipient to obtain an exemption or refund of such taxes, and the recipient fails to take reasonable steps to obtain such exemption or refund. Otherwise, taxes are allowable in accordance with the Standard Provision, "Allowable Costs," and must be reported as required in this provision.

d. The recipient must include this reporting requirement in all applicable subawards and contracts.

[END OF PROVISION]

*"Any references to "this award" in this Appendix shall be understood to refer to the cooperative agreement (AID-OAA-A-14-00102) received by the University of California, Davis from the US Agency for International Development (USAID) for the PREDICT-2 project. Any questions regarding the terms and conditions or information included in the prime agreement should be directed to the Purchaser.*

## M6. SUBAWARDS AND CONTRACTS (DECEMBER 2014)

a. Subawardees and contractors have no relationship with USAID under the terms of this award. All required USAID approvals must be directed through the recipient to USAID.

b. Notwithstanding any other term of this award, subawardees and contractors have no right to submit claims directly to USAID and USAID assumes no liability for any third party claims against the recipient.

[END OF PROVISION]

## M8. USAID ELIGIBILITY RULES FOR GOODS AND SERVICES (JUNE 2012)

a. This provision is not applicable to commodities or services that the recipient provides with private funds as part of a cost-sharing requirement, or with Program Income generated under this award.

b. Ineligible and Restricted Commodities and Services:

(1) Ineligible Commodities and Services. The recipient must not, under any circumstances, procure any of the following under this award:

(i) Military equipment,
(ii) Surveillance equipment,
(iii) Commodities and services for support of police or other law enforcement activities,
(iv) Abortion equipment and services,
(v) Luxury goods and gambling equipment, or
(vi) Weather modification equipment.

(2) Ineligible Suppliers. Any firms or individuals that do not comply with the requirements in Standard Provision, "Debarment, Suspension and Other Responsibility Matters" and Standard Provision, "Preventing Terrorist Financing" must not be used to provide any commodities or services funded under this award.

(3) Restricted Commodities. The recipient must obtain prior written approval



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of the Agreement Officer (AO) or comply with required procedures under an applicable waiver, as provided by the AO when procuring any of the following commodities:

(i) Agricultural commodities,
(ii) Motor vehicles,
(iii) Pharmaceuticals,
(iv) Pesticides,
(v) Used equipment,
(vi) U.S. Government-owned excess property, or
(vii) Fertilizer.

c. Source and Nationality:
Except as may be specifically approved in advance by the AO, all commodities and services that will be reimbursed by USAID under this award must be from the authorized geographic code specified in this award and must meet the source and nationality requirements set forth in 22 CFR 228. If the geographic code is not specified, the authorized geographic code is 937. When the total value of procurement for commodities and services during the life of this award is valued at $250,000 or less, the authorized geographic code for procurement of all goods and services to be reimbursed under this award is code 935. For a current list of countries within each geographic code, see: http://www.usaid.gov/ads/policy/300/310

d. Guidance on the eligibility of specific commodities and services may be obtained from the AO. If USAID determines that the recipient has procured any commodities or services under this award contrary to the requirements of this provision, and has received payment for such purposes, the AO may require the recipient to refund the entire amount of the purchase.

e. This provision must be included in all subawards and contracts which include procurement of commodities or services.

[END OF PROVISION]

## M12. PREVENTING TERRORIST FINANCING -- IMPLEMENTATION OF E.O. 13224 (AUGUST 2013)

a. The recipient must not engage in transactions with, or provide resources or support to, individuals and organizations associated with terrorism, including those individuals or entities that appear on the Specially Designated Nationals and Blocked Persons List maintained by the U.S. Treasury (online at: http://www.treasury.gov/resource-center/sanctions/SDN-List/Pages/default.aspx) or the United Nations Security designation list (online at: http://www.un.org/sc/committees/1267/aq_sanctions_list.shtml)

b. This provision must be included in all subawards and contracts issued under this



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award.

[END OF PROVISION]

## M17. TRAVEL AND INTERNATIONAL AIR TRANSPORTATION (DECEMBER 2014)

### a. TRAVEL COSTS

All travel costs must comply with the applicable cost principles and must be consistent with those normally allowed in like circumstances in the recipient's non-USAID-funded activities. Costs incurred by employees and officers for travel, including air fare, costs of lodging, other subsistence, and incidental expenses, may be considered reasonable and allowable only to the extent such costs do not exceed reasonable charges normally allowed by the recipient in its regular operations as the result of the recipient organization's written travel policy and are within the limits established by the applicable cost principles.

In the absence of a reasonable written policy regarding international travel costs, the standard for determining the reasonableness of reimbursement for international travel costs will be the Standardized Regulations (Government Civilians, Foreign Areas), published by the U.S. Department of State, as from time to time amended. The most current Standardized Regulations on international travel costs may be obtained from the AO. In the event that the cost for air fare exceeds the customary standard commercial airfare (coach or equivalent) or the lowest commercial discount airfare, the recipient must document one of the allowable exceptions from the applicable cost principles.

### b. FLY AMERICA ACT RESTRICTIONS

(1) The recipient must use U.S. Flag Air Carriers for all international air transportation (including personal effects) funded by this award pursuant to the Fly America Act and its implementing regulations to the extent service by such carriers is available.

(2) In the event that the recipient selects a carrier other than a U.S. Flag Air Carrier for international air transportation, in order for the costs of such international air transportation to be allowable, the recipient must document such transportation in accordance with this provision and maintain such documentation pursuant to the Standard Provision, "Accounting, Audit and Records." The documentation must use one of the following reasons or other exception under the Fly America Act:

(i) The recipient uses a European Union (EU) flag air carrier, which is an airline operating from an EU country that has signed the US-EU "Open Skies" agreement (http://www.state.gov/e/eb/rls/othr/ata/vic/170684.htm).

(ii) Travel to or from one of the following countries on an airline of that



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country when no city pair fare is in effect for that leg (see http://apps.fas.gsa.gov/citypairs/search/):

a. Australia on an Australian airline,
b. Switzerland on a Swiss airline, or
c. Japan on a Japanese airline;

(iii) Only for a particular leg of a route on which no US Flag Air Carrier provides service on that route;

(iv) For a trip of 3 hours or less, the use of a US Flag Air Carrier at least doubles the travel time;

(v) If the US Flag Air Carrier offers direct service, use of the US Flag Air Carrier would increase the travel time by more than 24 hours; or

(vi) If the US Flag Air Carrier does not offer direct service,

a. Use of the US Flag Air Carrier increases the number of aircraft changes by 2 or more,

b. Use of the US Flag Air Carrier extends travel time by 6 hours or more, or

c. Use of the US Flag Air Carrier requires a layover at an overseas interchange of 4 hours or more.

**c. DEFINITIONS**

The terms used in this provision have the following meanings:

(1) "Travel costs" means expenses for transportation, lodging, subsistence (meals and incidentals), and related expenses incurred by employees who are on travel status on official business of the recipient for any travel outside the country in which the organization is located. "Travel costs" do not include expenses incurred by employees who are not on official business of the recipient, such as rest and recuperation (R&R) travel offered as part of an employee's benefits package that are consistent with the recipient's personnel and travel policies and procedures.

(2) "International air transportation" means international air travel by individuals (and their personal effects) or transportation of cargo by air between a place in the United States and a place outside thereof, or between two places both of which are outside the United States.

(3) "U.S. Flag Air Carrier" means an air carrier on the list issued by the U.S. Department of Transportation at http://ostpxweb.dot.gov/aviation/certific/certlist.htm. U.S. Flag Air Carrier



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service also includes service provided under a code share agreement with another air carrier when the ticket, or documentation for an electronic ticket, identifies the U.S. flag air carrier's designator code and flight number.

(4) For this provision, the term "United States" includes the fifty states, Commonwealth of Puerto Rico, possessions of the United States, and the District of Columbia.

**d. SUBAWARDS AND CONTRACTS**

This provision must be included in all subawards and contracts under which this award will finance international air transportation.

[END OF PROVISION]

## M18. OCEAN SHIPMENT OF GOODS (JUNE 2012)

***APPLICABILITY:*** *This provision is applicable for awards and subawards for which the recipient contracts for ocean transportation for goods purchased or financed with USAID funds. In accordance with 22 CFR 228.21, ocean transportation shipments are subject to the provisions of 46 CFR Part 381.*

**OCEAN SHIPMENT OF GOODS (JUNE 2012)**

a. Prior to contracting for ocean transportation to ship goods purchased or financed with USAID funds under this award, the recipient must contact the office below to determine the flag and class of vessel to be used for shipment:

U.S. Agency for International Development,
Bureau for Management
Office of Acquisition and Assistance, Transportation Division
1300 Pennsylvania Avenue, NW
Washington, DC 20523
Email: **oceantransportation@usaid.gov**

b. This provision must be included in all subawards and contracts.

[END OF PROVISION]

## M20. TRAFFICKING IN PERSONS (April 2016)

a. The recipient, subawardee, or contractor, at any tier, or their employees, labor recruiters, brokers or other agents, must not engage in:

(1) Trafficking in persons (as defined in the Protocol to Prevent, Suppress,



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and Punish Trafficking in Persons, especially Women and Children, supplementing the UN Convention against Transnational Organized Crime) during the period of this award;

(2) Procurement of a commercial sex act during the period of this award;

(3) Use of forced labor in the performance of this award;

(4) Acts that directly support or advance trafficking in persons, including the following acts:

i. Destroying, concealing, confiscating, or otherwise denying an employee access to that employee's identity or immigration documents;

ii. Failing to provide return transportation or pay for return transportation costs to an employee from a country outside the United States to the country from which the employee was recruited upon the end of employment if requested by the employee, unless:

a) exempted from the requirement to provide or pay for such return transportation by USAID under this award; or

b) the employee is a victim of human trafficking seeking victim services or legal redress in the country of employment or a witness in a human trafficking enforcement action;

iii. Soliciting a person for the purpose of employment, or offering employment, by means of materially false or fraudulent pretenses, representations, or promises regarding that employment;

iv. Charging employees recruitment fees; or

v. Providing or arranging housing that fails to meet the host country housing and safety standards.

b. In the event of a violation of section (a) of this provision, USAID is authorized to terminate this award, without penalty, and is also authorized to pursue any other remedial actions authorized as stated in section 1704(c) of the National Defense Authorization Act for Fiscal Year 2013 (Pub. L. 112-239, enacted January 2, 2013).

c. If the estimated value of services required to be performed under the award outside the United States exceeds $500,000, the recipient must submit to the Agreement Officer, the annual "Certification regarding Trafficking in Persons, Implementing Title XVII of the National Defense Authorization Act for Fiscal Year 2013" as required prior to this award, and must implement a compliance plan to prevent the activities described above in section (a) of this provision. The recipient must provide a copy of the compliance plan to the Agreement Officer upon request and must post the useful and relevant contents of the plan or related materials on its website



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(if one is maintained) and at the workplace.

d. The recipient's compliance plan must be appropriate to the size and complexity of the award and to the nature and scope of the activities, including the number of non-United States citizens expected to be employed. The plan must include, at a minimum, the following:

(1) An awareness program to inform employees about the trafficking related prohibitions included in this provision, the activities prohibited and the action that will be taken against the employee for violations.

(2) A reporting process for employees to report, without fear of retaliation, activity inconsistent with the policy prohibiting trafficking, including a means to make available to all employees the Global Human Trafficking Hotline at 1-844-888-FREE and its e-mail address at help@befree.org.

(3) A recruitment and wage plan that only permits the use of recruitment companies with trained employees, prohibits charging of recruitment fees to the employee, and ensures that wages meet applicable host-country legal requirements or explains any variance.

(4) A housing plan, if the recipient or any subawardee intends to provide or arrange housing. The housing plan is required to meet any host-country housing and safety standards.

(5) Procedures for the recipient to prevent any agents or subawardee at any tier and at any dollar value from engaging in trafficking in persons activities described in section a of this provision. The recipient must also have procedures to monitor, detect, and terminate any agents or subawardee or subawardee employees that have engaged in such activities.

e. If the Recipient receives any credible information regarding a violation listed in section a(1)-(4) of this provision, the recipient must immediately notify the cognizant Agreement Officer and the USAID Office of the Inspector General; and must fully cooperate with any Federal agencies responsible for audits, investigations, or corrective actions relating to trafficking in persons.

f. The Agreement Officer may direct the Recipient to take specific steps to abate an alleged violation or enforce the requirements of a compliance plan.

g. For purposes of this provision, "employee" means an individual who is engaged in the performance of this award as a direct employee, consultant, or volunteer of the recipient or any subrecipient.

h. The recipient must include in all subawards and contracts a provision prohibiting the conduct described in section a(1)-(4) by the subrecipient, contractor, or any of their employees, or any agents. The recipient must also include a provision authorizing the recipient to terminate the award as described in section b of this



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provision.

[END OF PROVISION]

## M22. LIMITING CONSTRUCTION ACTIVITIES (AUGUST 2013)

***APPLICABILITY:*** *In accordance with the policy at ADS 303.3.30, AOs must include this provision in all solicitations and awards. When no construction activities are contemplated under the award, the AO must insert "*Construction is not eligible for reimbursement under this award*" in section d) of this provision. If the award permits construction activities based on the policy above (or as authorized by waiver), the AO must insert the description and location(s) of the specific construction activities in section d) of this provision. The AO must not make a general reference to the Program Description. The AO must also ensure that there is a specific line item for construction activities in the award budget.*

**LIMITING CONSTRUCTION ACTIVITIES (AUGUST 2013)**

a) Construction is not eligible for reimbursement under this award unless specifically identified in paragraph d) below.

b) Construction means —construction, alteration, or repair (including dredging and excavation) of buildings, structures, or other real property and includes, without limitation, improvements, renovation, alteration and refurbishment. The term includes, without limitation, roads, power plants, buildings, bridges, water treatment facilities, and vertical structures.

c) Agreement Officers will not approve any subawards or procurements by recipients for construction activities that are not listed in paragraph d) below. USAID will reimburse allowable costs for only the construction activities listed in this provision not to exceed the amount specified in the construction line item of the award budget. The recipient must receive prior written approval from the AO to transfer funds allotted for construction activities to other cost categories, or vice versa.

d) Description
Construction is not eligible under this award.

e) The recipient must include this provision in all subawards and procurements and make vendors providing services under this award and subrecipients aware of the restrictions of this provision.

[END OF PROVISION]

## M24. PILOT PROGRAM FOR ENHANCEMENT OF GRANTEE EMPLOYEE WHISTLEBLOWER PROTECTIONS (SEPTEMBER



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**2014)**

The requirement to comply with and inform all employees of the "Pilot Program for Enhancement of Contractor Employee Whistleblower Protections" is retroactively effective for all assistance awards and subawards (including subcontracts) issued beginning July 1, 2013.

The Grantee must:

1. Inform its employees working under this award in the predominant native language of the workforce that they are afforded the employee whistleblower rights and protections provided under 41 U.S.C. § 4712; and

2. Include such requirement in any subaward or subcontract made under this award.

41 U.S.C. § 4712 states that an employee of a Grantee may not be discharged, demoted, or otherwise discriminated against as a reprisal for "whistleblowing." In addition, whistleblower protections cannot be waived by any agreement, policy, form, or condition of employment.

Whistleblowing is defined as making a disclosure "that the employee reasonably believes" is evidence of any of the following:

- Gross mismanagement of a Federal contract or grant;
- A gross waste of Federal funds;
- An abuse of authority relating to a Federal contract or grant;
- A substantial and specific danger to public health or safety; or
- A violation of law, rule, or regulation related to a Federal contract or grant (including the competition for, or negotiation of, a contract or grant).

To qualify under the statute, the employee's disclosure must be made to:

- A Member of the U.S. Congress, or a representative of a U.S. Congressional Committee;
- A cognizant U.S. Inspector General;
- The U.S. Government Accountability Office;
- A Federal employee responsible for contract or grant oversight or management at the relevant agency;
- A U.S. court or grand jury; or,
- A management official or other employee of the Grantee who has the responsibility to investigate, discover, or address misconduct.

[End of Provision]

## M26. PROHIBITION ON PROVIDING FEDERAL ASSISTANCE TO ENTITIES THAT REQUIRE CERTAIN INTERNAL



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## CONFIDENTIALITY AGREEMENTS (APRIL 2015)

(a) The recipient must not require employees, subawardees, or contractors seeking to report fraud, waste, or abuse to sign or comply with internal confidentiality agreements or statements prohibiting or otherwise restricting such employees, subawardees, or contractor from lawfully reporting such waste, fraud, or abuse to a designated investigative or law enforcement representative of a Federal department or agency authorized to receive such information.

(b) The recipient must notify employees that the prohibitions and restrictions of any internal confidentiality agreements covered by this provision are no longer in effect.

(c) The prohibition in paragraph (a) of this clause does not contravene requirements applicable to Standard Form 312, Form 4414, or any other form issued by a Federal department or agency governing the nondisclosure of classified information.

(d) (1) In accordance with section 7 43 of Division E, Title VI I, of the Consolidated and Further Continuing Resolution Appropriations Act, 2015 (Pub. L. 113-235), use of funds appropriated (or otherwise made available) under that or any other Act may be prohibited, if the Government determines that the recipient is not in compliance with the requirements of this provision.

(2) The Government may seek any available remedies in the event the recipient fails to comply with the requirements of this provision.

[End of Provision]

## M28. MANDATORY DISCLOSURES (July 2015)

Consistent with 2 CFR §200.113, applicants and recipients must disclose, in a timely manner, in writing to the USAID Office of the Inspector General, with a copy to the cognizant Agreement Officer, all violations of Federal criminal law involving fraud, bribery, or gratuity violations potentially affecting the Federal award. Subrecipients must disclose, in a timely manner, in writing to the USAID Office of the Inspector General and to the prime recipient (pass through entity) all violations of Federal criminal law involving fraud, bribery, or gratuity violations potentially affecting the Federal award.

Disclosures must be sent to:

U.S. Agency for International Development
Office of the Inspector General
P.O. Box 657
Washington, DC 20044-0657
Phone: 1-800-230-6539 or 202-712-1023
Email: ig.hotline@usaid.gov



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URL: https://oig.usaid.gov/content/usaid-contractor-reporting-form

Failure to make required disclosures can result in any of the remedies described in 2 CFR §200.338 Remedies for noncompliance, including suspension or debarment (See 2 CFR 180, 2 CFR 780 and 31 U.S.C. 3321).

The recipient must include this mandatory disclosure requirement in all subawards and contracts under this award.

[End of Provision]

## M27. NONDISCRIMINATION AGAINST BENEFICIARIES (November 2016).

(a) USAID policy requires that the recipient not discriminate against any beneficiaries in implementation of this award, such as, but not limited to, by withholding, adversely impacting, or denying equitable access to the benefits provided through this award on the basis of any factor not expressly stated in the award. This includes, for example, race, color, religion, sex (including gender identity, sexual orientation, and pregnancy), national origin, disability, age, genetic information, marital status, parental status, political affiliation, or veteran's status. Nothing in this provision is intended to limit the ability of the recipient to target activities toward the assistance needs of certain populations as defined in the award.

(b) The recipient must insert this provision, including this paragraph, in all subawards and contracts under this award.

[End of Provision]

## [END OF MANDATORY PROVISIONS]



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## RAA12. REPORTING HOST GOVERNMENT TAXES (DECEMBER 2014)

***APPLICABILITY**: This provision is applicable to all USAID agreements that obligate or subobligate FY 2003 or later funds except for agreements funded with Operating Expense, Pub. L. 480 funds, or trust funds, or agreements where there will be no commodity transactions in a foreign country over the amount of $500. Please insert address and point of contact at the Embassy, Mission, or M/CFO/CMP as appropriate under section (b) of this provision.*

### REPORTING HOST GOVERNMENT TAXES (JUNE 2012)

a. By April 16 of each year, the recipient must submit a report containing:

(1) Contractor/recipient name.

(2) Contact name with phone, fax and e-mail.

(3) Agreement number(s).

(4) The total amount of value-added taxes and customs duties (but not sales taxes) assessed by the host government (or any entity thereof) on purchases in excess of $500 per transaction of supplies, materials, goods or equipment, during the 12 months ending on the preceding September 30, using funds provided under this contract/agreement.

(5) Any reimbursements received by April 1 of the current year on value-added taxes and customs duties reported in (iv).

(6) Reports are required even if the recipient did not pay any taxes or receive any reimbursements during the reporting period.

(7) Cumulative reports may be provided if the recipient is implementing more than one program in a foreign country.

b. Submit the reports to: [insert address and point of contact at the Embassy, Mission, or M/CFO/CMP as appropriate, may include an optional "with a copy to"]

c. Host government taxes are not allowable where the Agreement Officer provides the necessary means to the recipient to obtain an exemption or refund of such taxes, and the recipient fails to take reasonable steps to obtain such exemption or refund. Otherwise, taxes are allowable in accordance with the Standard Provision, "Allowable Costs," and must be reported as required in this provision.

d. The recipient must include this reporting requirement in all applicable subawards and contracts.

[END OF PROVISION]



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## RAA26. CONTRACT PROVISION FOR DBA INSURANCE UNDER RECIPIENT PROCUREMENTS (DECEMBER 2014)

**APPLICABILITY:** *The following provision is required when the recipient is expected to procure services to be performed overseas.*

### DEFENSE BASE ACT (DBA) WORKERS' COMPENSATION INSURANCE FOR PROCUREMENT CONTRACT (DECEMBER 2014)

All contracts made by the recipient under this award for services to be performed overseas must contain the following provision, as applicable.

Workers' Compensation Insurance (Defense Base Act)

(a) The Contractor must--

(1) Before commencing performance under this contract, establish provisions to provide for the payment of disability compensation and medical benefits to covered employees and death benefits to their eligible survivors, by purchasing Defense Base Act (DBA) insurance pursuant to the terms of the contract between USAID and USAID's DBA insurance carrier unless the Contractor qualifies as a self-insurer under the Longshore and Harbor Workers' Compensation Act (33 U.S.C. 932) as extended by the Defense Base Act (42 U.S.C. 1651, et seq.), or has an approved retrospective rating agreement for DBA. The Contractor must continue to maintain these provisions to provide such Defense Base Act benefits until contract performance is completed.

(2) If USAID or the Contractor has secured a waiver of DBA coverage in accordance with AIDAR 728.305-70(a) for contractor's employees who are not citizens of, residents of, or hired in the United States, the contractor agrees to provide such employees with worker's compensation benefits as required by the laws of the country in which the employees are working, or by the laws of the employee's native country, whichever offers greater benefits. The Department of Labor has granted partial blanket waivers of DBA coverage applicable to USAID-financed contracts performed in countries listed in the DEFENSE BASE ACT (DBA) WAIVER LIST.

(3) Within ten days of an employee's injury or death or from the date the Contractor has knowledge of the injury or death, submit Form LS-202 (Employee's First Report of Injury or Occupational Illness) to the Department of Labor in accordance with the Longshore and Harbor Workers' Compensation Act (33 U.S.C. 930(a), 20 CFR 702.201 to 702.203).

(4) Pay all compensation due for disability or death within the timeframes required by



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the Longshore and Harbor Workers' Compensation Act (33 U.S.C. 914, 20 CFR 702.231 and 703.232).

(5) Provide for medical care as required by the Longshore and Harbor Workers' Compensation Act (33 U.S.C. 907, 20 CFR 702.402 and 702.419).

(6) If controverting the right to compensation, submit Form LS-207 (Notice of Controversion of Right to Compensation) to the Department of Labor in accordance with the Longshore and Harbor Workers' Compensation Act (33 U.S.C. 914(d), 20 CFR 702.251).

(7) Immediately upon making the first payment of compensation in any case, submit Form LS-206 (Payment of Compensation Without Award) to the Department of Labor in accordance with the Longshore and Harbor Workers' Compensation Act (33 U.S.C. 914(c), 20 CFR 702.234).

(8) When payments are suspended or when making the final payment, submit Form LS-208 (Notice of Final Payment or Suspension of Compensation Payments) to the Department of Labor in accordance with the Longshore and Harbor Workers' Compensation Act (33 U.S.C. 914 (c) and (g), 20 CFR 702.234 and 702.235).

(9) Adhere to all other provisions of the Longshore and Harbor Workers' Compensation Act as extended by the Defense Base Act, and Department of Labor regulations at 20 CFR Parts 701 to 704.

For additional information on the Longshore and Harbor Workers' Compensation Act requirements see http://www.dol.gov/owcp/dlhwc/lsdba.htm.

The Contractor must insert the substance of this clause including this paragraph (c), in all subcontracts to which the Defense Base Act applies.

[END OF PROVISION]

**[END OF REQUIRED AS APPLICABLE PROVISIONS]**

**EXHIBIT G**

**PROHIBITION OF SALARY SUPPLEMENTS WITH PREDICT-2 FUNDS**

Though a commonly-accepted practice in many countries, salary supplements or "top ups" for staff of foreign governmental entities or parastatals are NOT ALLOWED. Supplementing or "topping up" existing salaries by paying a salary rate above the individual's pre-project pay rate or by receiving compensation from the project above and beyond their established 100% level of effort (LOE) compensation is prohibited. If governmental/parastatal employees are to be engaged in PREDICT activities, the Consortium partner managing the in-country activities must secure written permission from the supervising ministry acknowledging that their employee(s) is participating in the project and that the ministry or department is supportive of the employee spending time on the project. If payment for government/parastatal employees is to be provided by PREDICT, a subaward or subcontract detailing the financial relationship with the ministry should be put in place to facilitate payment and document that written permission was obtained. **Government/parastatal employees should not be paid through individual contracts or agreements.**

**From:** David J Wolking <djwolking@ucdavis.edu>
**Sent:** Tue, 20 Aug 2019 15:10:35 -0700
**Subject:** Re: [Reminder] PREDICT EB Aug 21
**To:** [redacted]
**Cc:** Elizabeth Leasure <ealeasure@ucdavis.edu>, David John Wolking <djwolking@ucdavis.edu>, Amanda Fine <afine@wcs.org>, Brian H Bird <bhbird@ucdavis.edu>, Corina Grigorescu Monagin <cgmonagin@ucdavis.edu>, Christine Kreuder Johnson <ckjohnson@ucdavis.edu>, Jon Epstein <epstein@ecohealthalliance.org>, Karen Saylors [redacted], Peter Daszak <daszak@ecohealthalliance.org>, Simon Anthony <sja2127@columbia.edu>, "Murray, Suzan" <murrays@si.edu>, "Tammie O'Rourke" <torourke@metabiota.com>, Jonna Mazet <jkmazet@ucdavis.edu>, Woutrina A Smith <wasmith@ucdavis.edu>, Kevin Olival <olival@ecohealthalliance.org>, William Karesh <karesh@ecohealthalliance.org>, Tracey Goldstein <tgoldstein@ucdavis.edu>, "Valitutto, Marc" <valituttom@si.edu>, "Churchill, Carolina" <cchurchill@wcs.org>, Dawn Zimmerman <zimmermand@si.edu>, Evelyn Luciano <luciano@ecohealthalliance.org>, Sarah Olson <solson@wcs.org>, Alison Andre <andre@ecohealthalliance.org>, Amanda Andre <amanda.andre@ecohealthalliance.org>, Ava Sullivan <sullivan@ecohealthalliance.org>, Molly Turner <turner@ecohealthalliance.org>, Brooke Genovese <bgenovese@ucdavis.edu>, predict Sympa List <predict@ucdavis.edu>
Wildlife Regulation and Border Trade Abstract_CM.docx

Hi there,

Below is the agenda for tomorrow's EB call along with one attachment (an early abstract from the behavior team on a cross partner publication idea).

Talk soon,

David

**PREDICT Executive Board Meeting**
Wednesday, August 21, 2019
9:00-11:00am PST/12:00-2:00pm EST
Zoom link: https://onehealth.zoom.us [redacted]
*Additional Zoom info below agenda*

**1. Administrative items**
- Y5 and extension updates
- Bali updates

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**9. AOB**

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**Or iPhone one-tap :**
US: +16468769923, REDACTED or +16699006833, REDACTED
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US: +1 646 876 9923 or +1 669 900 6833
**Meeting ID:** REDACTED
International numbers available: https://zoom.us/u/depX2cn5i

On Thu, Aug 15, 2019 at 3:58 PM REDACTED wrote:

Hi PREDICT EB,

This is a reminder for your next PREDICT EB call, scheduled Wednesday August 21 at 9am PT/12pm ET. Call-in details and agenda will follow. Please let us know if there are any agenda items you would like to discuss.

Best,

—

Perceptions of Wildlife Regulation and Border Trade through Qualitative PREDICT Data

Wildlife trade is well established as a driver of emerging infectious disease spillover to humans.[1] Globally, the scale and scope of the legal and illegal wildlife trade is extensive; just the illegal arm is estimated at 29 million individual animals traded annually comprising over 1,600 reptile, bird and mammal species with a value of $7-$23 billion.[2] Purpose and motivation for wildlife trade vary between countries – from nutritional subsistence hunting to profitable sale for pet trade or meat, luxury goods, trophy hunting, or medicinal use – and from start to finish there are multiple players in the value chain (e.g. hunters, transporters, sellers, food preparers, pet owners). In addition to possible infectious disease risks, overexploitation of wildlife presents potential risks to ecosystems that are often complex and species-specific.[3]

This multi-country analysis focuses on wildlife trafficking, bushmeat trade across borders, people's reactions to wildlife hunting regulations/confiscation of hunted meat, and awareness of wildlife restrictions and regulations, as seen through qualitative interviews conducted in Laos, Indonesia, Cameroon, Democratic Republic of Congo, China, Vietnam, Nepal, Republic of Congo, Sierra Leone, and Tanzania. We consider the following aspects:

- Cross-border trade dynamics
- Regulatory/policy perspectives
- Taxa-specific observations in trade and trafficking
- Perceptions of disease risk

This multi-country analysis will bring together qualitative information to add critical information on the context of wildlife trade and potential disease implications. The findings will provide a foundation for international, country, and trade-specific policy recommendations anticipated for the health and conservation communities that can promote One Health research, policy and practice to reduce risks and impacts.

---

[1] Travis, D. A., Watson, R. P. & Tauer, A. The spread of pathogens through trade in wildlife. Rev Sci Tech30, 219-239 (2011).

[2] Karesh, W. B., Smith, K. M. & Asmussen, M. in Compendium of the OIE Global Conference on Wildlife (World Organisation for Animal Health (OIE)).

[3] LeBreton et al., Patterns of bushmeat hunting and perceptions of disease risk among central African communities. Anim Conserv 9, 357-363.

**From:** "Tammie O'Rourke" <torourke@metabiota.com>
**Sent:** Wed, 21 Aug 2019 09:27:35 -0700
**Subject:** Re: [Reminder] PREDICT EB Aug 21
**To:** David J Wolking <djwolking@ucdavis.edu>
**Cc:** [redacted], Elizabeth Leasure <ealeasure@ucdavis.edu>, Amanda Fine <afine@wcs.org>, Brian H Bird <bhbird@ucdavis.edu>, Corina Grigorescu Monagin <cgmonagin@ucdavis.edu>, Christine Kreuder Johnson <ckjohnson@ucdavis.edu>, Jon Epstein <epstein@ecohealthalliance.org>, Karen Saylors [redacted], Peter Daszak <daszak@ecohealthalliance.org>, Simon Anthony <sja2127@columbia.edu>, "Murray, Suzan" <murrays@si.edu>, Jonna Mazet <jkmazet@ucdavis.edu>, Woutrina A Smith <wasmith@ucdavis.edu>, Kevin Olival <olival@ecohealthalliance.org>, William Karesh <karesh@ecohealthalliance.org>, Tracey Goldstein <tgoldstein@ucdavis.edu>, "Valitutto, Marc" <valituttom@si.edu>, "Churchill, Carolina" <cchurchill@wcs.org>, Dawn Zimmerman <zimmermand@si.edu>, Evelyn Luciano <luciano@ecohealthalliance.org>, Sarah Olson <solson@wcs.org>, Alison Andre <andre@ecohealthalliance.org>, Amanda Andre <amanda.andre@ecohealthalliance.org>, Ava Sullivan <sullivan@ecohealthalliance.org>, Molly Turner <turner@ecohealthalliance.org>, Brooke Genovese <bgenovese@ucdavis.edu>, predict Sympa List <predict@ucdavis.edu>
outstanding gov reports.xlsx

Hi everyone,
Attached is the outstanding government report list and below is the indicator report for this week.
Tammie

| Indicator |
|---|
| # countries with data |
| # countries with tests approved by government |
| # animals sampled |
| # humans sampled |
| # human questionnaires |
| # specimens |
| # tests |
| # animals tested |
| # humans tested |
| # animal specimens tested |
| # human specimens tested |
| # tests approved by government |
| # tests active testing ongoing |
| # sequences interpreted |
| # sequences waiting interpretation |
| # individuals barcoded |
| average days between event and data submission |
| average days between event and data submission for data submitted in last 2 weeks |
| number of events/test batches waiting for country input |
| number of events waiting for IH review |
| number of test batches waiting for IH review |
| number of barcode test batches waiting for IH review |

On Tue, Aug 20, 2019 at 3:10 PM David J Wolking <djwolking@ucdavis.edu> wrote:

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Talk soon,

David

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On Thu, Aug 15, 2019 at 3:58 PM REDACTED wrote:

Hi PREDICT EB,

This is a reminder for your next PREDICT EB call, scheduled Wednesday August 21 at 9am PT/12pm ET. Call-in details and agenda will follow. Please let us know if there are any agenda items you would like to discuss.

Best,

[redacted]

--
Tammie O'Rourke
Metabiota
Senior Information Management Developer
Emerging Pandemic Threats - PREDICT Program
tel +1-250-618-2460

PRODUCED IN NATIVE FORMAT

**From:** "Tammie O'Rourke" <torourke@metabiota.com>
**Sent:** Wed, 21 Aug 2019 09:36:57 -0700
**Subject:** Re: [Reminder] PREDICT EB Aug 21
**To:** David J Wolking <djwolking@ucdavis.edu>
**Cc:** [redacted] Elizabeth Leasure <ealeasure@ucdavis.edu>, Amanda Fine <[redacted]>, Brian H Bird <bhbird@ucdavis.edu>, Corina Grigorescu Monagin <cgmonagin@ucdavis.edu>, Christine Kreuder Johnson <ckjohnson@ucdavis.edu>, Jon Epstein <epstein@ecohealthalliance.org>, Karen Saylors [redacted], Peter Daszak <daszak@ecohealthalliance.org>, Simon Anthony <sja2127@columbia.edu>, "Murray, Suzan" <murrays@si.edu>, Jonna Mazet <jkmazet@ucdavis.edu>, Woutrina A Smith <wasmith@ucdavis.edu>, Kevin Olival <olival@ecohealthalliance.org>, William Karesh <karesh@ecohealthalliance.org>, Tracey Goldstein <tgoldstein@ucdavis.edu>, "Valitutto, Marc" <valituttom@si.edu>, "Churchill, Carolina" [redacted] Dawn Zimmerman <zimmermand@si.edu>, Evelyn Luciano <luciano@ecohealthalliance.org>, Sarah Olson <solson@wcs.org>, Alison Andre <andre@ecohealthalliance.org>, Amanda Andre <amanda.andre@ecohealthalliance.org>, Ava Sullivan <sullivan@ecohealthalliance.org>, Molly Turner <turner@ecohealthalliance.org>, Brooke Genovese <bgenovese@ucdavis.edu>, predict Sympa List <predict@ucdavis.edu>

Additionally, below is the list of countries that have active tests.

| | |
|---|---|
| Bangladesh | 464 |
| China | 12 |
| DR Congo | 3 |
| Egypt | 6 |
| Ethiopia | 24 |
| Jordan | 522 |
| Nepal | 50 |
| Rwanda | 9 |
| Tanzania | 449 |
| Uganda | 1 |
| Vietnam | 779 |

On Tue, Aug 20, 2019 at 3:10 PM David J Wolking <djwolking@ucdavis.edu> wrote:

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David

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On Thu, Aug 15, 2019 at 3:58 PM REDACTED wrote:

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Best,

REDACTED

--
Tammie O'Rourke
Metabiota
Senior Information Management Developer
Emerging Pandemic Threats - PREDICT Program
tel: +1-250-618-2460

**From:** "William B. Karesh" <karesh@ecohealthalliance.org>
**To:** Katherine Leasure <kaleasure@ucdavis.edu>
**Cc:** Jonna Mazet <jkmazet@ucdavis.edu>, Elizabeth Leasure <ealeasure@ucdavis.edu>, Ava Sullivan <sullivan@ecohealthalliance.org>
**Subject:** Re: Bali meeting and Subhash
**Sent:** Thu, 29 Aug 2019 17:16:52 +0000

Thanks Katie.
BK

**William B. Karesh, D.V.M**
*Executive Vice President for Health and Policy*

EcoHealth Alliance
460 West 34th Street - 17th Floor
New York, NY 10001 USA

+1.212.380.4463 (direct)
+1.212.380.4465 (fax)
www.ecohealthalliance.org

President, OIE Working Group on Wildlife

Co-chair, IUCN Species Survival Commission - Wildlife Health Specialist Group

EPT Partners Liaison, USAID Emerging Pandemic Threats - PREDICT-2 Program

*EcoHealth Alliance leads cutting-edge research into the critical connections between human and wildlife health and delicate ecosystems. With this science we develop solutions that promote conservation and prevent pandemics.*

On Aug 29, 2019, at 12:18 PM, Katherine Leasure <kaleasure@ucdavis.edu> wrote:

Hi Billy,

I will need to submit an amendment to add Subhash to the Bali ITA. I can coordinate with him on his airfare and hotel booking. In order to book his flight in business class, we will first need him to complete an airfare upgrade exception form and provide a doctor's note. I will submit the ITA amendment today, then follow-up with Subhash regarding his travel arrangements.

Thank you,
Katie

On Wed, Aug 28, 2019 at 3:08 PM William B. Karesh <karesh@ecohealthalliance.org> wrote:

Subhash would now like to attend the Bali meeting.
REDACTED needs to fly business class. He can get a letter from REDACTED

How should we proceed? tickets? hotel booking?

Billy

**William B. Karesh, D.V.M**
*Executive Vice President for Health and Policy*

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--
**Katherine Leasure**
HR/Payroll/Financial Assistant
One Health Institute
530-752-7526

**Sent:** Tue, 3 Sep 2019 15:49:21 -0700
**Subject:** Fwd: PREDICT update: Bangladesh
**From:** Jonna Mazet <jkmazet@ucdavis.edu>
**To:** Alice Latinne <latinne@ecohealthalliance.org>, Evelyn Luciano <luciano@ecohealthalliance.org>, Annette Roug <aroug@ucdavis.edu>, Jon Epstein <epstein@ecohealthalliance.org>
**Cc:** Peter Daszak <daszak@ecohealthalliance.org>, Billy Karesh <karesh@ecohealthalliance.org>, Predict inbox <predict@ucdavis.edu>

FYI on communications with Mission & GoB below, as well as my trying to understand Andrew's guidance,
Jonna

---------- Forwarded message ---------
From: **Jonna Mazet** <jkmazet@ucdavis.edu>
Date: Tue, Sep 3, 2019 at 3:47 PM
Subject: Re: PREDICT update: Bangladesh
To: Andrew Clements <aclements@usaid.gov>
Cc: David J Wolking <djwolking@ucdavis.edu>, PREDICTMGT <predictmgt@usaid.gov>, Billy Karesh <karesh@ecohealthalliance.org>, Peter Daszak <daszak@ecohealthalliance.org>, Jon Epstein <epstein@ecohealthalliance.org>

Hi Andrew,
Received., thanks. Based on your email, I am still a bit confused, as we hadn't made a distinction between Aug-Sept activities and the economic analyses. I do not believe that I have FY18 money left at EHA to pay Aug-October invoices for anything in Bangladesh, including the closeout, as well as the economic analyses unless we move money from other countries. Perhaps you were planning for that in this communication, but I just want to make sure that you are aware that all work has stopped in Bangladesh pending movement of funds or your advice otherwise.
Just clarifying,
Jonna

On Tue, Sep 3, 2019 at 5:46 AM Andrew Clements <aclements@usaid.gov> wrote:

> See request below on notifying GOB.
>
> *Andrew P. Clements, Ph.D.*
> *Senior Scientific Advisor*
> *Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
> *U.S. Agency for International Development*
> *Mobile phone: 1-571-345-4253*
> *Email: aclements@usaid.gov*
>
> Begin forwarded message:
>
> **From:** Ariella Camera <acamera@usaid.gov>
> **Date:** September 3, 2019 at 2:02:15 PM GMT+2
> **To:** Andrew Clements <aclements@usaid.gov>
> **Cc:** Angela Wang <awang@usaid.gov>, PREDICTMGT <predictmgt@usaid.gov>, "Md. Abul Kalam" <mdkalam@usaid.gov>
> **Subject: Re: PREDICT update: Bangladesh**
>
> Ok, I would prefer for us to do it together. Thank you.
>
> Sent from my iPhone
>
> On Sep 3, 2019, at 5:58 PM, Andrew Clements <aclements@usaid.gov> wrote:

My assumption is that the PREDICT country team will discuss with the GOB. This is very recent news so they may not have done it yet. Please don't raise with GOB until PREDICT has had a chance to do it first.

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

On Sep 3, 2019, at 11:26 AM, Ariella Camera <acamera@usaid.gov> wrote:

Hi Andrew,
Thank you for the update. It is unfortunate since the economic analysis would have been informative for policy discussions and thinking about self-reliance. Regarding these updates will you and the PREDICT team be communicating this to our key government counterparts? I think it will be a tough discussion and we are happy to be present for it if needed.

If there is anything you need from us on this end let me know.

Have a good day,

**Ariella Camera**
Deputy Director
Health Systems Strengthening Pillar
Office of Population, Health, Nutrition, and Education
USAID/Bangladesh

Tel: REDACTED
Cell:
Email: acamera@usaid.gov

*Bangladesh is 10 hours ahead of Washington, D.C., and +6 GMT. Our work week is Sunday through Thursday.*

On Tue, Sep 3, 2019 at 2:08 PM Andrew Clements <aclements@usaid.gov> wrote:

Hi Ariella,

I will be sending out an update on PREDICT later today, but wanted to give you a heads up, specifically on Bangladesh issues.

Regarding completion of **year 5 activities** (final year of PREDICT), which were supposed to be finished by 9/30/19 but were delayed because of funding arriving late and not being the full amount (including $1.1 million less for Bangladesh). I have had to instruct PREDICT to stop all activities in Bangladesh because of insufficient funds. I've had to pull funding from somewhere else in the project just to cover bills from Bangladesh that will arrive in August and September. I've been told by PREDICT that the close-out of the project and sharing of initial results will still take place. However, the GH economic analysis will not be possible (at this point, in-country data has been collected, but PREDICT can't move forward without additional funds). I will try again in a couple of weeks to see if additional year 5 money can be obligated for Bangladesh, but I have no idea whether it will happen or not since, unfortunately, others in GH are making that decision.

In addition to the year 5 budget shortfall, we haven't been allowed to obligate funds for the PREDICT **year 6 extension** and I'm skeptical that it can be done after FY19 closes on 9/30/19. As a result, we will not be pursuing these additional activities in any of the countries we had originally proposed, including Bangladesh.

Sorry that I don't have better news. Please know that the PREDICT staff and I feel terrible that the project is not being permitted to complete the work in Bangladesh.

Andrew

Andrew Cunsolo, Ph.D.
Senior Scientific Advisor
Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health
U.S. Agency for International Development
Mobile phone: 1-571-345-4253
E-mail: acunsolo@usaid.gov

*For more information on USAID's Emerging Pandemic Threats program, see:* http://www.usaid.gov/ept2

**Sent:** Wed, 4 Sep 2019 22:29:06 -0700
**Subject:** Re: PREDICT update: Bangladesh
**From:** Jonna Mazet <jkmazet@ucdavis.edu>
**To:** "William B. Karesh" <karesh@ecohealthalliance.org>

Yeah -- he sent a new template. I'll just redo the country caps and then we'll go from there. What we can do, we will do.
J

On Wed, Sep 4, 2019 at 10:29 AM William B. Karesh <karesh@ecohealthalliance.org> wrote:

I don't understand his answer. Does it mean that he WAS planning that but now it's not possible? Or, he is still planning to do it? Or, he hopes you will do something to make that happen?
Clearly there are some communication issues at the root of all of this.

BK

On Sep 4, 2019, at 1:24 PM, Jonna Mazet <jkmazet@ucdavis.edu> wrote:

Okay -- thanks for confirming.
Jonna

On Wed, Sep 4, 2019 at 4:02 AM Andrew Clements <aclements@usaid.gov> wrote:

Yes, was planning for the funding switch in order to cover Aug-Oct invoices.

Andrew Clements, Ph.D.
Senior Scientific Advisor
Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health
U.S. Agency for International Development
Mobile phone: 1-571-345-4253
E-mail: aclements@usaid.gov

*For more information on USAID's Emerging Pandemic Threats program, see:* http://www.usaid.gov/ept2

On Wed, Sep 4, 2019 at 12:48 AM Jonna Mazet <jkmazet@ucdavis.edu> wrote:

Hi Andrew,
Received., thanks. Based on your email, I am still a bit confused, as we hadn't made a distinction between Aug-Sept activities and the economic analyses. I do not believe that I have FY18 money left at EHA to pay Aug-October invoices for anything in Bangladesh, including the closeout, as well as the economic analyses unless we move money from other countries. Perhaps you were planning for that in this communication, but I just want to make sure that you are aware that all work has stopped in Bangladesh pending movement of funds or your advice otherwise.
Just clarifying,
Jonna

On Tue, Sep 3, 2019 at 5:46 AM Andrew Clements <aclements@usaid.gov> wrote:

See request below on notifying GOB.

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*

*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

Begin forwarded message:

**From:** Ariella Camera <acamera@usaid.gov>
**Date:** September 3, 2019 at 2:02:15 PM GMT+2
**To:** Andrew Clements <aclements@usaid.gov>
**Cc:** Angela Wang <awang@usaid.gov>, PREDICTMGT <predictmgt@usaid.gov>, "Md. Abul Kalam" <mdkalam@usaid.gov>
**Subject: Re: PREDICT update: Bangladesh**

Ok, I would prefer for us to do it together. Thank you.

Sent from my iPhone

On Sep 3, 2019, at 5:58 PM, Andrew Clements <aclements@usaid.gov> wrote:

> My assumption is that the PREDICT country team will discuss with the GOB. This is very recent news so they may not have done it yet. Please don't raise with GOB until PREDICT has had a chance to do it first.
>
> *Andrew P. Clements, Ph.D.*
> *Senior Scientific Advisor*
> *Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
> *U.S. Agency for International Development*
> *Mobile phone: 1-571-345-4253*
> *Email: aclements@usaid.gov*
>
> On Sep 3, 2019, at 11:26 AM, Ariella Camera <acamera@usaid.gov> wrote:
>
> > Hi Andrew,
> > Thank you for the update. It is unfortunate since the economic analysis would have been informative for policy discussions and thinking about self-reliance. Regarding these updates will you and the PREDICT team be communicating this to our key government counterparts? I think it will be a tough discussion and we are happy to be present for it if needed.
>
> If there is anything you need from us on this end let me know.
>
> Have a good day,

**Ariella Camera**
Deputy Director
Health Systems Strengthening Pillar
Office of Population, Health, Nutrition, and Education
USAID/Bangladesh

Tel: REDACTED
Cell:
Email: acamera@usaid.gov

**Bangladesh is 10 hours ahead of Washington, D.C., and +6 GMT. Our work week is Sunday through Thursday.*

On Tue, Sep 3, 2019 at 2:08 PM Andrew Clements <aclements@usaid.gov> wrote:

Hi Ariella,

I will be sending out an update on PREDICT later today, but wanted to give you a heads up, specifically on Bangladesh issues.

Regarding completion of **year 5 activities** (final year of PREDICT), which were supposed to be finished by 9/30/19 but were delayed because of funding arriving late and not being the full amount (including $1.1 million less for Bangladesh), I have had to instruct PREDICT to stop all activities in Bangladesh because of insufficient funds. I've had to pull funding from somewhere *else* in the project just to cover bills from Bangladesh that will arrive in August and September. I've been told by PREDICT that the close-out of the project and sharing of initial results will still take place. However, the OH economic analysis will not be possible (at this point, in-country data has been collected, but PREDICT can't move forward without additional funds). I will try again in a couple of weeks to see if additional year 5 money can be obligated for Bangladesh, but I have no idea whether it will happen or not since, unfortunately, others in GH are making that decision.

In addition to the year 5 budget shortfall, we haven't been allowed to obligate funds for the PREDICT **year 6 extension** and I'm skeptical that it can be done after FY19 closes on 9/30/19. As a result, we will not be pursuing these additional activities in any of the countries we had originally proposed, including Bangladesh.

Sorry that I don't have better news. Please know that the PREDICT staff and I feel terrible that the project is not being permitted to complete the work in Bangladesh.

Andrew

Andrew Clements, Ph.D.
Senior Scientific Adviser
Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health
U.S. Agency for International Development
Mobile phone: 1-571-345-4253
E-mail: aclements@usaid.gov

*For more information on USAID's Emerging Pandemic Threats program, see:* http://www.usaid.gov/ept2

**Sent:** Tue, 24 Sep 2019 22:10:52 -0700
**Subject:** Re: Urgent: Reliance Question 967747 (Bangladesh econ study)
**From:** Jonna Mazet <jkmazet@ucdavis.edu>
**To:** Catherine Machalaba <machalaba@ecohealthalliance.org>, Peter Daszak <daszak@ecohealthalliance.org>, Emily Hagan <hagan@ecohealthalliance.org>
**Cc:** "William B. Karesh" <karesh@ecohealthalliance.org>, David J Wolking <djwolking@ucdavis.edu>, Elizabeth Leasure <ealeasure@ucdavis.edu>, Evelyn Luciano <luciano@ecohealthalliance.org>

Hi All,
Looking forward to your feedback in response to David's comments. In addition, I think you should consult with your admin team, as I believe you are dangerously low on funds for Bangladesh and overall.
Thanks,
Jonna

On Mon, Sep 23, 2019 at 10:05 AM David J Wolking <djwolking@ucdavis.edu> wrote:

> Hi Catherine,
> I'm including the PIs here as well so we are all in the loop. I wasn't part of the Bangladesh discussions last week in Bali so not sure what was discussed but I know Peter, Billy, and the Bangladesh team did talk with Andrew about the situation.
>
> For this IRB, we do need to make decisions on the reliance. The annual renewal is not due until October 21, 2019 but the EHA reliance agreement with the UCD IRB ends on Sept 30, 2019, hence the push from our administration on status.
>
> If you don't perceive any additional enrollments given funding status at this time, it's likely OK to let the reliance agreement end as the team would only be working with de-identitifed data from this point onwards. If through other funding you plan to proceed as described below, we'll need to keep it open and discuss what is most appropriate (e.g., shifting it from UCD to another IRB or retaining it with Jonna as PI until study closure). The latter bears risk for her as PI if no longer linked to the P2 award but we have not discussed this yet so both options are on the table.
>
> Please let me know ASAP where we stand so I can work on this reliance piece this week.
>
> Best,
>
> David

On Thu, Sep 19, 2019 at 10:12 AM Catherine Machalaba <machalaba@ecohealthalliance.org> wrote:

> Hi David,
> Thanks!! This is what Peter and Billy advised before Bali (but the situation may have since changed re: work and funding situation in Bangladesh):
>
> "We think we should try to extend the IRB in the hope that we will be able to complete the study. The main rationale would be so that we could finish inputting surveys not yet entered into the database, potentially enroll additional Nipah cases, and collect the public institution data. We had been planning to hold a stakeholder meeting to source the government institution data and this is high priority to include in the study. Obviously this all got put on hold with the stop work but since the team has been working directly with government partners throughout - including in obtaining the lists of case households and businesses - we would like to see it through if possible if the situation improves. We obviously hope to

push through funding so if there is any opportunity of extending the IRB (to September 2020?) we would like to try since this study is of such high interest to government institutions in the country."

If this full scope is not possible, from a practical standpoint, the main concern I have at this point is that the team wont be able to add the remaining survey data (collected on paper before the stop work) to our database if the IRB ends on September 30th. Is there any way we could extend it to allow for this specifically, or any other route that you and Emily see for entering this data? From there on it would all be de-identified data, so fine to continue to work with, I assume?

Thanks David!!!

Kind regards,
Catherine

**Catherine Machalaba, MPH**
*Policy Advisor and Research Scientist*

EcoHealth Alliance
460 West 34th Street – 17th floor
New York, NY 10001

1.212.380.4472 (direct)
REDACTED (mobile)
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www.ecohealthalliance.org

Chair, Veterinary Public Health Special Primary Interest Group, American Public Health Association

Program Officer, IUCN SSC Wildlife Health Specialist Group

Science Officer, Future Earth oneHEALTH Project

*EcoHealth Alliance leads cutting-edge scientific research into the critical connections between human and wildlife health and delicate ecosystems. With this science, we develop solutions that prevent pandemics and promote conservation.*

On Sep 19, 2019, at 12:45 PM, David J Wolking <djwolking@ucdavis.edu> wrote:

Catherine and Emily,
This statent below is accurate correct? If so I'm going to end the reliance on this one.

David

---------- Forwarded message ---------
From: **Jenee Evans** <no-reply@irbnet.org>
Date: Tue, Sep 17, 2019, 1:33 PM
Subject: Reliance Question 967747
To: David Wolking <djwolking@ucdavis.edu>, Jenee Evans <jemevans@ucdavis.edu>

DO NOT REPLY directly to this message. Please use IRBNet Project Mail to respond.

Message from Jenee Evans:

Re: [1287043-3] Economic analysis of four zoonotic diseases in Bangladesh

Hi David,

I'm following up on the project mail below.

Best regards,
Jenée

---

Date: 09/03/2019 02:00 PM

To: "David Wolking" <djwolking@ucdavis.edu>, "Jenee Evans" <jcmevans@ucdavis.edu>
From: "Jenee Evans" <no-reply@irbnet.org>
Reply To: "Jenee Evans" <jcmevans@ucdavis.edu>
Subject: Reliance Question 1287043-3

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Message from Jenee Evans:

Re: [1287043-3] Economic analysis of four zoonotic diseases in Bangladesh

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I think this is the last study I need to bother you about. Please confirm that EcoHealth Alliance is no longer interacting with subjects or working with identifiable data for this study and we can let the reliance agreement for this study expire.

Thanks,

Jenée Evans | IRB Reliance Analyst
University of California, Davis

Work days | T, W, & F

For IRBNet demonstration videos and training resources visit the UCD IRB website at http://research.ucdavis.edu/irbadmin

**From:** "William B. Karesh" <karesh@ecohealthalliance.org>
**To:** Catherine Machalaba <machalaba@ecohealthalliance.org>, David Wolking <djwolking@ucdavis.edu>
**Cc:** Jonna Mazet <jkmazet@ucdavis.edu>, Peter Daszak <daszak@ecohealthalliance.org>, Emily Hagan <hagan@ecohealthalliance.org>, Elizabeth Leasure <ealeasure@ucdavis.edu>, Evelyn Luciano <luciano@ecohealthalliance.org>
**Subject:** Re: Urgent: Reliance Question 967747 (Bangladesh econ study)
**Sent:** Wed, 25 Sep 2019 14:54:30 +0000

I concur.
BK

**William B. Karesh, D.V.M**
*Executive Vice President for Health and Policy*

EcoHealth Alliance
460 West 34th Street - 17th Floor
New York, NY 10001 USA

+1.212.380.4463 (direct)
+1.212.380.4465 (fax)
www.ecohealthalliance.org

President, OIE Working Group on Wildlife

Co-chair, IUCN Species Survival Commission - Wildlife Health Specialist Group

EPT Partners Liaison, USAID Emerging Pandemic Threats - PREDICT-2 Program

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On Sep 25, 2019, at 5:49 AM, Catherine Machalaba <machalaba@ecohealthalliance.org> wrote:

Thank you Jonna and David!

Emily and I just spoke and this approach sounds perfect if Billy and Peter agree - we are ok to close the IRB for the economics study. Emily reminded me that the survey data is already de-identified so it is be OK to enter it into the database at a later stage since the consent forms are already filed away separate from the data.

Thank you guys again and hello from Liberia!

Kind regards,
Catherine

On Sep 25, 2019, at 5:11 AM, Jonna Mazet <jkmazet@ucdavis.edu> wrote:

> Hi All,
> Looking forward to your feedback in response to David's comments. In addition, I think you should consult with your admin team, as I believe you are dangerously low on funds for Bangladesh and overall.
> Thanks,
> Jonna

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Please let me know ASAP where we stand so I can work on this reliance piece this week.

Best,

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Thanks David!!!

Kind regards,
Catherine

**Catherine Machalaba, MPH**
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Thanks,

Jenée Evans | IRB Reliance Analyst
University of California, Davis

Work days | T, W, & F

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**From:** Peter Daszak <daszak@ecohealthalliance.org>
**To:** [redacted] Tracey Goldstein <tgoldstein@ucdavis.edu>, Christine Kreuder Johnson <ckjohnson@UCDAVIS.EDU>, "sja2127@cumc.columbia.edu" <sja2127@cumc.columbia.edu>, Kirsten Gilardi <kvgilardi@ucdavis.edu>, Kevin Olival <olival@ecohealthalliance.org>, "MurrayS@si.edu" <MurrayS@si.edu>
**Cc:** Jonna Mazet <jkmazet@ucdavis.edu>
**Subject:** RE: SpillOver manuscript draft for review
**Sent:** Thu, 26 Sep 2019 15:30:29 +0000

That's very much appreciated – I'll have comments back with you by then.

Cheers,

Peter

**Peter Daszak**
*President*

EcoHealth Alliance
460 West 34th Street – 17th Floor
New York, NY 10001

Tel. +1 212-380-4474
Website: www.ecohealthalliance.org
Twitter: @PeterDaszak

*EcoHealth Alliance leads cutting-edge research into the critical connections between human and wildlife health and delicate ecosystems. With this science we develop solutions that prevent pandemics and promote conservation.*

---

**From:** [redacted]
**Sent:** Thursday, September 26, 2019 6:11 AM
**To:** Tracey Goldstein; Christine Kreuder Johnson; sja2127@cumc.columbia.edu; Kirsten Gilardi; Peter Daszak; Kevin Olival; MurrayS@si.edu
**Cc:** Jonna Mazet
**Subject:** Re: SpillOver manuscript draft for review

Hi Everyone,

The deadline for comments on the manuscript was yesterday. I have heard from some of you that you would like a little more time due to work travel etc, so I'll extend the deadline until **COB Monday September 30th** , at which point I will then integrate all comments and circulate a final version. If I do not hear from you by the deadline, I will assume you are happy with the manuscript as it stands.

Cheers,

[redacted]

---

**From:** [redacted]
**Date:** Friday, September 6, 2019 at 1:02 PM
**To:** Tracey Goldstein <tgoldstein@ucdavis.edu>, Christine Kreuder Johnson <ckjohnson@UCDAVIS.EDU>, "Anthony, Simon J." <sja2127@cumc.columbia.edu>, Kirsten Gilardi <kvgilardi@ucdavis.edu>, Peter Daszak <daszak@ecohealthalliance.org>, Kevin Olival <olival@ecohealthalliance.org>, Tammie O'Rourke <torourke@metabiota.com>, "solson@wcs.org" <solson@wcs.org>, [redacted] Gemma Vidal

Fabuel <gvidal@ucdavis.edu>, "Murray, Suzan" <MurrayS@si.edu>
**Cc:** Jonna Mazet <jkmazet@ucdavis.edu>
**Subject:** Re: SpillOver manuscript draft for review

Hi everyone,

I just was informed that the website link I provided did not work, please use this one https://stage.spillover.global/

Feel free to explore the rank your virus function with fake data but please do not submit a new record or login to the website.

Many thanks,

[redacted]

**From:** REDACTED
**Date:** Friday, September 6, 2019 at 10:35 AM
**To:** Tracey Goldstein <tgoldstein@ucdavis.edu>, Christine Kreuder Johnson <ckjohnson@UCDAVIS.EDU>, "Anthony, Simon J." <sja2127@cumc.columbia.edu>, Kirsten Gilardi <kvgilardi@ucdavis.edu>, Peter Daszak <daszak@ecohealthalliance.org>, Kevin Olival <olival@ecohealthalliance.org>, Tammie O'Rourke <torourke@metabiota.com>, "Murray, Suzan" <MurrayS@si.edu>, "solsen@wcs.org" <solsen@wcs.org>, REDACTED REDACTED >, Gemma Vidal Fabuel <gvidal@ucdavis.edu>
**Cc:** Jonna Mazet <jkmazet@ucdavis.edu>
**Subject:** SpillOver manuscript draft for review

Hi Everyone,

Jonna and I are very happy to invite you to be a co-author of the manuscript on the SpillOver: Virus Risk Ranking analysis and website. Please contact me if you would not like to be included as a co-author.

I have attached a draft copy of the manuscript and supplementary text for your review (please track changes). We are planning to submit to the New England Journal of Medicine as soon as possible, therefore I am hoping for a quick turnaround and invite comments/edits to be sent to me and Jonna by **COB Wednesday September 25th** . If I do not hear from you by the deadline, I will assume you are happy with the manuscript as it stands.

If you would like to view the website please go to www.stage.spillover.global but please keep this website confidential. We will officially launch the website at the time of publication. Also note, we are still in the process of making minor tweaks to the website but feel free to provide feedback if you notice anything that is incorrect.

Kind regards,

[redacted]


REDACTED

Project Scientist, PREDICT Project of USAID
Postdoctoral Researcher in Disease Ecology
One Health Institute
School of Veterinary Medicine
University of California Davis
1089 Veterinary Medicine Drive
Davis, CA 95616, USA

Mobile REDACTED

**From:** Kevin Olival <colival@ecohealthalliance.org>
**Subject:** Re: SpillOver manuscript draft for review
**Sent:** Mon, 30 Sep 2019 15:59:31 -0400
**Cc:** Tracey Goldstein <tgoldstein@ucdavis.edu>, Christine Kreuder Johnson <ckjohnson@UCDAVIS.EDU>, "Anthony, Simon J." <sja2127@cumc.columbia.edu>, Kirsten Gilardi <kvgilardi@ucdavis.edu>, Peter Daszak <daszak@ecohealthalliance.org>, Suzan Murray <MurrayS@si.edu>, Jonna Mazet <jkmazet@ucdavis.edu>
**To:** REDACTED
Spillover_DRAFT_06_09_2019_KJO.docx
Supplementary_05_09_19_DRAFT_KJO.docx

REDACTED

Well done! Attached are my edits and comments on the main ms and supplement. Please let me know if you have any follow up questions.

Cheers,
Kevin

Kevin J. Olival, PhD
Vice President for Research

EcoHealth Alliance
460 West 34th Street – 17th floor
New York, NY 10001

1.212.380.4478 (direct)
REDACTED (mobile)
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> [redacted]
>
>
> [redacted]
>
> Project Scientist, PREDICT Project of USAID
> Postdoctoral Researcher in Disease Ecology
> One Health Institute

> School of Veterinary Medicine
> University of California Davis
> 1089 Veterinary Medicine Drive
> Davis, CA 95616, USA>
> Mobile: REDACTED

---

[redacted]

Well done! Attached are my edits and comments on the main ms and supplement. Please let me know if you have any follow up questions.

Cheers,
Kevin

---

---

**Title**

Spillover: A New Tool for Viral Risk Ranking

**Authors**

Zoë J. Grange[1], Tracey Goldstein[1,2], Chris. K. Johnson[1,3], Simon Anthony[2,3,4], Kirsten Gilardi[1], Peter Daszak[5], Kevin J. Olival[5], Tamarnie O'Rouke[1], Suzan Murray[6], Sarah Olson[7], Eri Togami[1], Gema Vidal[1], PREDICT Consortium[8], and Jonna A.K. Mazet[1*]

**Affiliations**

[1]One Health Institute and Karen C. Drayer Wildlife Health Center, School of Veterinary Medicine, University of California, Davis, California, USA
[2]EcoHealth Alliance, New York, New York, USA
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## Abstract

Background

Emerging infectious diseases have major societal and economic impacts, with the last 5 epidemics of animal-origin costing 122-163 billion US dollars. We are unprepared for future disease outbreaks; an estimated 500,000 animal viruses capable of spillover into people remain undiscovered. We need to shift our epidemic approach from reactive response to proactive prevention, and a tool for ranking the risk from newly-discovered viruses is needed.

Methods:

We compiled a database of more than 270,000 records of known zoonotic viruses and viruses detected during the largest viral discovery effort on record. Using a combination of literature reviews and expert opinion we identify and rank 42 host, viral, and environmental factors that contribute to viral spillover. We then developed a quantitative risk ranking framework and an interactive tool called SpillOver that uses a weighting system and external data to estimate the relative risk of a viruses' potential to infect people.

Results:

We ranked 687 viruses in order of concern to human health. The top 45 were known zoonotic viruses, with *Influenza A virus* in first position. Several newly discovered wildlife viruses were assigned higher spillover risk values than known zoonotic viruses.

Conclusions:

Using a scientifically-informed process, we capitalized on the wealth of global virus data being generated to identify targets for further investigation and prioritization for pandemic preparedness. As viral discovery efforts continue to reduce the burden of the unknown and our understanding of zoonotic processes increases, SpillOver provides an adaptive platform to collate and rank new and existing viruses, improve our planning to reduce risk, and inform public health interventions for prevention and rapid control of zoonotic disease outbreaks.



**Keywords**: Emerging infectious disease, Wildlife, Disease ecology, Environment, Zoonoses


## Main Text

The cross-species transmission of viruses has caused significant health and economic impacts to human and animal populations[1], with viruses of animal origin (zoonotic) predicted to cause the next pandemic[2]. Since 2002, five major human epidemics have cost the economy $122-$163 USD billion[3]. Despite a growing investment in global health security, our ongoing lack of epidemic preparedness and adequate prevention strategies was evident during the 2013-2016 outbreak of Zaire ebolavirus in West Africa which caused 11,323 known deaths[4] and major societal disruption[5].

Approximately 1.67 million undescribed viral species are thought to exist in mammals and birds, with up to half of these estimated to have zoonotic potential[6]. Even more conservative calculations, accounting for viral sharing among hosts, estimate there are ~10,000 potential zoonotic viruses in wildlife (Carlson et al.). With just over 260 zoonotic viruses known to infect humans[1,7], the vast majority of viruses still remain undiscovered. The PREDICT project of the U.S. Agency for International Development (USAID) Emerging Pandemic Threats Program (PREDICT), was established in 2009 to build capacity to detect wildlife viruses at high-risk human disease transmission interfaces in over 30 countries. Since its inception, PREDICT has discovered hundreds of viruses in animal hosts around the world[8], with the largest impact of any viral discovery project on our knowledge of global virus threats. For example, PREDICT identified a new ebolavirus, *Bombali ebolavirus* in bats (*Chaerephon pumilus* and *Mops condylurus*) roosting inside houses in Sierra Leone[9], leading to virus' surveillance and detection by other groups in Kenya[10] and Guinea[11].



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Identifying pathogen threats in advance of epidemics facilitates a shift from reactive response to a proactive approach to pandemic prevention, with significant life and money saving outcomes[6]. However, virus detection in an animal at a high-risk disease transmission interface does not necessarily mean a virus will spillover into humans. The risk these viruses pose to human health is not equal, and it is impractical to investigate or even surveil for every virus. A number of ecological and behavioral characteristics may influence zoonotic transmission potential and virulence of a virus in humans. A tool is needed to systematically evaluate and quantify virus spillover risk to inform decisions on the prioritization and allocation of resources and initiatives for prevention of viral outbreaks in human populations.

Previous attempts at virus risk assessments have been insightful but limited in their scope by focusing on specific groups of viruses or a small number of risk factors[4,7,12,13]. The holistic approach used by PREDICT has resulted in a vast virus database (data.predict.global). Our innovative risk assessment compares newly-discovered viruses to known zoonotic viruses by evaluating a large number of virologic factors alongside environmental and host factors that influence cross-species transmission and utilizing a broad scope of expert opinion. Taking it one step further, we have created an outreach tool, SpillOver: Viral Risk Ranking (www.spillover.global) to house and communicate the risk ranking output to scientists, policy makers and the public while also providing a scientifically responsible crowd-sourcing platform for future evolution.

**Creating a Database of Viruses of Animal Origin**

A total of 270,843 records of virus detections in 1,171 species were collated from multiple sources, including a dataset of viruses detected during PREDICT surveillance, NCBI virus nucleotide records, and a literature review of previously identified zoonotic viruses (Supplementary appendix).

Between 2009 and 2014, PREDICT collected samples from XXX wildlife species in 5 mammalian orders (*Primates, Chiroptera, Rodentia, Carnivora, Eulipotyphla, Lagomorpha, Pholidota, Cetartiodactyla*) at high-risk pathogen transmission interfaces in 20 countries. Consensus PCR protocols and Sanger/Next-Generation sequencing were used to test samples for up to 27 viral families[14]. A total of 614 unique viruses, 475 of which were novel, were detected from 210 host species (plus 27 hosts identified to genus).

We conducted a review of literature cited in a zoonotic virus database[15] to extract supplementary virus detection data for 79 ITCV-recognized known zoonotic viruses. Records of *Bombali ebolavirus* were taken from published reports[9,10].

For each virus species, nucleotide records including host species, sample type, and country of detection were extracted from the NCBI virus database (ftp://ftp.ncbi.nlm.nih.gov/pub/taxonomy/) for further evaluation, analysis, and cleaning.

The paucity of collated, accurate public viral detection information, including global data sources on competent vectors, is a significant limitation of risk estimations. Although this analysis takes a major step forward, there remain complexities for which our estimates may not have fully accounted. By grouping viruses at the species level, our approach does not separate strain type variation, and when combined with the current lack of clear guidelines on viral species definitions by the International Committee on Taxonomy of Viruses [16], we are limited in our ability to determine whether a novel virus is a member of a known zoonotic species with major public health and political implications.

**Identification of Risk Factors**

We identified 42 risk factors thought to contribute to the risk of viral spillover from animals to humans via an extensive literature review and by soliciting input from emerging infectious disease experts. Risk factors were categorized as either belonging to the host (animal infected by the virus), the virus (the infective agent), or the environment (location in which the host animal was found).

External data resources were used when risk factor data were unavailable for a virus detection record (Supplementary appendix). Data was derived from 19 publicly available resources on: the environment



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131 (LADA land-use systems[17], NASA Sedac Gridded population of the World UN Adjusted population
132 density v4 2015[18], Global Grid of Probabilities of Urban Expansion to 2030[19], adapted HYDE land
133 conversion 2005[20,21], Global Forest Change 2017 [22]), hosts (IUCN Red List[23], Birdlife International [24],
134 Catalogue of Life[25], TimeTree[26], diet database[27]), and viruses (International Committee on Taxonomy of
135 Viruses (ICTV)[28], ViralZone database[29], reference virology textbooks [30-32], published human/zoonotic
136 virus databases[7,11,28,33], the NCBI nucleotide database (ftp://ftp.ncbi.nlm.nih.gov/refseq/release/).

137 **Solicitation of Expert Opinion**

138 We conducted a survey of international experts in the field of virology, epidemiology, ecology, molecular
139 biology, public health, veterinary and human medicine, and One Health (Supplementary appendix).
140 Invitations, instructions, and a worksheet were sent to 150 experts from 20 countries. Participants were
141 asked to review risk factors and assign a Level of Risk to each factor (high, medium, low, or not relevant
142 for spillover), alongside their self-identified Level of Expertise for each risk factor subject (novice to
143 master).

144 The response rate for completion of the risk ranking assessment was 66/150 (44%). All risk factors were
145 assessed by experts within the respective field. Participant opinion varied within most categories, and
146 given the lack of consensus, results were further analyzed by weighting categorical risk with the level of
147 expertise of the participant.

148 Risk Factor Contribution (0-3) = $\frac{\sum(\text{Risk Factor Score (0-3)} \times \text{Expertise Score (1-16)})}{\sum \text{Expertise Score (1-16)}}$

149 For each completed expert opinion survey, scaler values were assigned to the Level of Risk (Risk Factor
150 Score) and Level of Expertise (Expertise Score) for each risk factor. If a participant did not declare a
151 Level of Risk or Expertise, a score of 0 and 8 were assigned respectively. The contribution each risk
152 factor has towards the total risk that any virus will spillover from animals to humans was calculated as a
153 weighted average risk score from all expert responses (Risk Factor Contribution) using the above
154 formula.

155 A gradient of weighted average expert risk scores was observed among the risk factors. The top four
156 spillover risk factors were: documented animal to human transmission, known viral infectivity in humans,
157 intimacy of interaction between wild animals and humans in the host ecosystem, and potential for human
158 to human transmission (Fig. 1).

159 Forty-two risk factors were selected for inclusion in the analysis. Host mass, viral phylogenetics, and the
160 impact of protected areas were assessed by experts as worthy of consideration but were eliminated due to
161 insufficient data, leaving 39 risk factors included in our virus ranking calculations.

162 **Viral Risk Ranking Framework**

163 A viral risk ranking framework was created to calculate a relative Risk Score and produce a risk report for
164 each virus. Each virus' relative Risk Score was calculated by combining the *Risk Factor Contribution*, an
165 average ranking of the most important risk factors from the expert survey, and *Virus Data Risk* scores
166 calculated from quantitative data obtained from published records for each virus detection and external
167 data sources (Fig. 2&3).

168 There are multiple levels within each risk factor, and each level may contribute a different level of
169 spillover risk. For example, … Therefore, risk scores were assigned to risk levels on a 0 to 5 scale (Risk
170 Level Scores). For categorical factors, each risk factor level was assigned a score using the authors expert
171 opinion. A central score of 2.5 was assigned to risk levels categorized as Unknown. For summation risk
172 factors, the Risk Level Score was adjusted to a 0-5 scale based on the number of level options as follows:

173 Risk Level Score (0-5) = $\sum \frac{5}{\text{Risk Level}^{th}}$



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Using the principle of the worst-case scenario, for each virus, Virus Data Risk scores were calculated using the highest Risk Level Score contained in the database, accounting for the Risk Factor Contribution to the overall virus spillover risk.

$$\text{Virus Data Risk (0-5)} = \frac{\text{MAX(Risk Level Score)} \times \text{Risk Factor Contribution}}{1}$$

The Risk Score for a given virus is the sum of all Virus Data Risk scores. Contribution of Risk Categories for the Virus, Host, and Environment were calculated as the sum of all Virus Data Risk scores within each category. Virus ranking positions were allocated in ascending order of virus Risk Scores, with 1 being the riskiest.

**Development of the SpillOver: Viral Risk Ranking Tool**

SpillOver: Viral Risk Ranking (www.spillover.global) is browser-based tool to designed to increase accessibility to evidence-based risk ranking of viruses. It can be used to communicate the viral risk ranking output to policy makers and communities, especially in areas with higher risk of emerging infectious diseases. SpillOver produces a detailed spillover risk report for each virus (Fig. 3), and the Risk Comparison tool allows users to compare and contrast ranked viruses and the opportunity to filter viruses on a selection of key attributes, including virus specific factors and the host species and locations where viruses have been found. Together, the tools facilitate the identification of risk factors in areas not yet known to have specific viruses.

SpillOver is a crowd sourcing platform in which users can choose to privately rank a new virus or add to existing virus records using the Rank Your Virus tool. Currently, the application is restricted to host species in the classes *Mammalia, Reptilia, Amphibia,* and *Aves,* vector species in class *Insecta* and *Arachnida*, and 24 viral families of concern to human health[5]. SpillOver does not include records of viruses detected only in humans. However, the ability of a virus to infect humans and associated traits are encompassed within the risk factors. Users are encouraged to submit their data, which is then reviewed by the website administrators prior to integration into the central database. The minimal set of data required for ranking a virus include: virus species and taxonomy, virus sequence or reference number, host species and sample type, the estimated timeline of host species divergence from humans, host location, and the primary disease transmission interface where the host was sampled. Variables for other host, virus, and environmental factors are auto-populated using data sources detailed above. Users can further edit answers to improve accuracy of information, for example if additional host species are later found positive for the virus. The innovative design is fully customizable for future developments, including updating new risk factors and datasets as they become available, as well as incorporating evolving scientific information to adjust the weighting of factors already included in the tool.

Data used for this analysis was restricted to genetic evidence of viral infection (excludes antibody response). However, SpillOver is not reliant on a particular detection protocol, instead we place the responsibility of robust virus speciation on the submitter. This approach facilitates future integration of all data sources, especially in high-risk countries where access to advanced technologies may be limited but where surveillance most vital.

**Creating order out of chaos**

The goal of this risk ranking is to begin to bring some rationality to risk perception and management when identifying new viral threats or identifying known viruses in new locations. Out of 687 ranked viruses, the top 45 viruses were all known zoonotics (Table 1). Unsurprisingly and reassuringly, Influenza A virus, a known, ubiquitous, and high-risk zoonotic virus, was the highest ranked virus. Viruses responsible for the most recent epidemics of international concern and inspiring public fear, *Zaire ebolavirus* and *Zika virus* were outside the top 10 but within the top 50. Before this ranking tool, it could have been argued that Ebolavirus occupied a place of overestimated fear in the public's mindset, while Zika had been underestimated from a risk perspective, resulting in dire consequences. For both of these



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viruses, recent events remind us of the ramifications of not having such a risk list for consideration when attempting to diagnose and control diseases presenting with unusual symptoms in new areas. Having a list of at least the top 100 viruses of concern that can be expected in specific geographic areas will likely help those preparing for and controlling unusual mortality events deploy resources where they are most needed in a timely fashion. The tool not only provides locations where viruses have been found, but also helps users to identify where risks can be expected based on host ranges and other factors. Our assessment has highlighted that although not listed as zoonotic by our strict definition[10], some human viruses, such as Enterovirus B and Middle East respiratory syndrome-related coronavirus (MERS), are likely to be of zoonotic origin and rank amongst some of the most well-known zoonotic viruses.

Of the viruses detected during PREDICT, 35 were assigned higher spillover risk values than some known zoonotics (Table 1). The identification of highly ranked novel PREDICT coronaviruses in bats at high-risk disease transmission interfaces, including hunting and human dwellings in Africa and Asia, suggests that these viruses should be put on watch lists, much like the warning system for emerging pathogens proposed by Han and Drake [34]. Coronaviruses were not known to cause severe disease in humans until the outbreak of severe acute respiratory syndrome (SARS) and MERS[35-37]. Although these novel coronaviruses have not yet been detected in humans, spillover events may be going unrecognized due to lack of diagnostic facilities, underreporting, and misdiagnosis[38], as recently supported by evidence of SARS related CoV spillover to humans in rural China (Wang et al. 2018).

Our test case, *Bombali ebolavirus*, did not rank highly in terms of spillover risk (Table 1), yet based on its relatedness to Ebola Zaire and *perceived* risk, had the potential for inciting community concern and even panic. Detecting a new ebolavirus has societal implications, including stigmatization, and thus interpretation and communication of findings requires careful consideration. SpillOver has the potential to help scientists and governments assess and communicate risk from an evidence-based perspective, including in situations when viruses are first discovered and scant information may be available. As additional information becomes available, e.g. additional host species or locations for *Bombali ebolavirus*[8,19], then risk estimations may change and can be updated in real-time. Therefore, accentuating the need for further investment in pandemic prevention efforts at high-risk transmission interfaces, particularly in countries with low Epidemic Preparedness Index scores[39].

**A global resource for zoonotic threats**

SpillOver is the first comprehensive risk assessment tool to systematically evaluate novel viruses in terms of their zoonotic and pandemic potential. Existing tools to rank influenza virus strains are increasingly being used by public health communities and researchers, e.g. CDC's IRAT and WHO's TIPRA [REFS], but are limited to ranking pandemic risk for a single virus. By soliciting expert opinion, we identified the top perceived contributors to spillover risk across viral threats more broadly (Fig. 1). Combining multiple sources and analytics, the simple design of SpillOver requires only a few pieces of readily available information to produce a comparative risk report and addresses calls for an infrastructure to interpret global infectious disease data[34]. We encourage all future viral detections of animal origin to be collaboratively reported on the system.

While SpillOver includes a wide-range of potential risk factors, it is likely that a complex interaction among these and other undocumented risk factors determine virus emergence in humans. [COULD LIST SOME OF THE OTHER CAVEATS FROM INTRO HERE] ~~It has been suggested as that predicting the next pandemic is impossible~~[40]. However, human behavior is unpredictable, and yet motor insurance companies have created algorithms to predict the likelihood that a client will make a claim based on demographics and other risk factors. Although, viral characteristics are beyond our control, human behavior is adaptable. Public health interventions including community education on safe hygiene and animal husbandry practices when interacting with host animals and biocontainment of high-risk viruses would significantly reduce the likelihood of virus transmission. Increased viral surveillance in human



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populations most at risk would contribute to our knowledge of viral infectivity in humans[40], one of the most important risk factors for viral spillover.

**Collaboration is Key to Success**

At this stage, SpillOver is not intended to predict the next pandemic. By creating a starting point, we attempt to address the burden of uncertainty created by viral discoveries using a scientifically-informed process, while identifying targets for further investigation that could lead to public health interventions prior to a zoonotic outbreak, instead of the costly, in both the economic and societal sense, reactionary response we have used to date.

The impact of SpillOver will be dependent on collaborative participation across disciplines. Once high-risk viruses have been identified, mitigation of risk requires a combination of computing technologies, synthetic biology, sociology, and politics to improve data sourcing, develop preventive and controlling countermeasures, and design and implement public health interventions. New initiatives, such as the Coalition for Epidemic Preparedness Innovations (CEPI) [41] and SoNar-Global are making strides forward by building vaccine technology and social science networks for viral threats. Integrating data obtained from viral discovery efforts, including the second phase of PREDICT and GVP[6], into SpillOver will complement CEPI and SoNar-Global by identifying priorities for countermeasure research and development. Given the expected number of annual pandemic deaths from influenza alone is 720,000 with an estimated cost of US$490 billion[42], the estimate of US$3.4 billion to characterize approximately 99% of the world's viruses is a relatively small cost that, when combined with epidemiological analysis such as SpillOver, could have big impacts on pandemic preparedness[6].

**Accession numbers**

The Genbank accession numbers used in this study are listed in Supplementary appendix.

**Author contributions**

ZG designed, analyzed, and developed the tool; wrote the manuscript. JM conceived of the project, developed and oversaw the program that collected the data; guided the design, analysis, and development of the tool and manuscript; revised the manuscript. KJO helped conceive of and design the tool; and edited the manuscript.

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## Tables and Figures




**Figure 1** A list of host, virus and environmental risk factors included in the virus spillover risk analysis, scaled color (red-orange-yellow) according to weighted expert opinion of risk contribution (high to no risk) to viral spillover from animals to humans.



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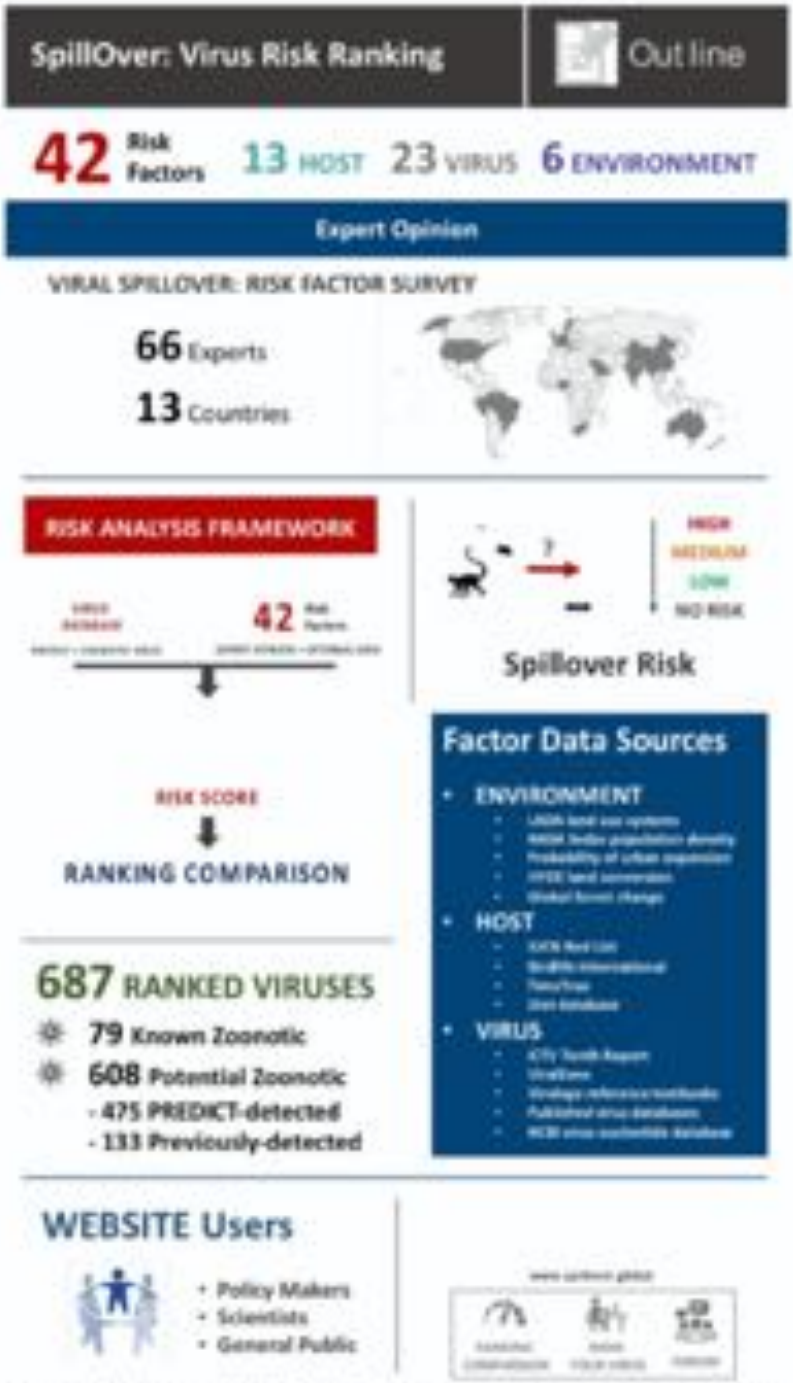


**Figure 2** Schematic outline of the SpillOver risk ranking analysis, framework and website (www.spillover.global)



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**Figure 3** Virus ranking profile for Rabies lyssavirus, including the contribution of a selection of risk factors and its associated data has towards the overall spillover risk assessment. For full details see spillover global website.



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| RISK RANKING | | VIRUS | | | | | | HOST | |
|---|---|---|---|---|---|---|---|---|---|
| POSITION | SCORE | SPECIES | GENUS | FAMILY | Novel | Zoonotic | Human | Distribution | Plasticity | Distribution |
| 1 | 119.86 | Influenza A virus | Influenzavirus A | Orthomyxoviridae | Yes | Yes | Yes | Global | > 10 Species / > 10 Orders | Global |
| 2 | 118.71 | Orthohepevirus A | Orthohepevirus | Hepeviridae | Yes | Yes | Yes | Global | > 10 Species / > 10 Orders | Global |
| 3 | 117.80 | Rotavirus A | Rotavirus | Reoviridae | Yes | Yes | Yes | Global | > 10 Species / > 10 Orders | Global |
| 4 | 116.45 | West Nile Virus | Flavivirus | Flaviviridae | Yes | Yes | Yes | Global | > 10 Species / > 10 Orders | Global |
| 5 | 114.62 | Rabies lyssavirus | Lyssavirus | Rhabdoviridae | Yes | Yes | Yes | Global | > 10 Species / > 10 Orders | Global |
| 6 | 114.50 | Chikungunya virus | Alphavirus | Togaviridae | Yes | Yes | Yes | Global | > 10 Species / 3 Orders | Global |
| 7 | 112.84 | Rift Valley fever phlebovirus | Phlebovirus | Bunyaviridae | Yes | Yes | Yes | Sporadic Global | > 10 Species / 3-5 Orders | Global |
| 8 | 112.21 | Japanese encephalitis virus | Flavivirus | Flaviviridae | Yes | Yes | Yes | Sporadic Global | > 10 Species / 5-10 Orders | Global |
| 9 | 111.41 | Crimean-Congo hemorrhagic fever orthonairovirus | Nairovirus | Bunyaviridae | Yes | Yes | Yes | Global | > 10 Species / 5-10 Orders | Global |
| 10 | 108.36 | Sindbis virus | Alphavirus | Togaviridae | Yes | Yes | Yes | Global | > 10 Species / 5-10 Orders | Global |
| 27 | 102.58 | Zaire ebolavirus | Ebolavirus | Filoviridae | Yes | Yes | Yes | Regional | 3-5 Species / 1 Orders | Global |
| 30 | 101.87 | Zika virus | Flavivirus | Flaviviridae | Yes | Yes | Yes | Sporo-Global | > 10 Species / 3 Orders | Global |
| 33 | 101.29 | SARS [a] | Betacoronavirus | Coronaviridae | Yes | Yes | Yes | Sporo-Global | > 10 Species / 3 Orders | Global |
| 46 | 99.70 | Enterovirus B | Enterovirus | Picornaviridae | Yes | Yes | Yes | Sporo-Global | 2 Species / 1 Orders | Global |
| 47 | 95.17 | MERS [b] | Betacoronavirus | Coronaviridae | Yes | Yes | Yes | Sporo-Global | 2 Species / 2 Orders | Global |
| 56 | 92.16 | Murine coronavirus | Betacoronavirus | Coronaviridae | Yes | Yes | Yes | Sporo-Global | 3-5 Species / 2 Orders | Global |
| 86 | 85.44 | PREDICT_CoV-23 | Alphacoronavirus | Coronaviridae | Yes | Yes | Yes | Sporo-Global | 3-5 Species / 1 Order | Sporo-Global |
| 87 | 85.26 | PREDICT_CoV-22 | Betacoronavirus | Coronaviridae | Yes | Yes | Yes | Sporo-Global | 2 Species / 1 Order | Sporo-Global |
| 237 | 70.24 | Bombali ebolavirus | Ebolavirus | Filoviridae | Yes | Yes | Yes | Regional | 2 Species / 1 Order | Sporo-Global |
| 687 | 47.79 | PREDICT_PyV-39 | Unassigned | Polyomaviridae | Yes | Yes | Yes | Restricted Small | 1 Species / 1 Order | Sporo-Global |

[a] SARS = Severe acute respiratory syndrome-related coronavirus
[b] MERS = Middle East respiratory syndrome-related coronavirus

**Table 1** A virus spillover risk ranking comparison including; the Top 10 viruses, a selection of key zoonotic viruses, the top and bottom ranked novel viruses found during PREDICT wildlife surveillance effort.



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# Supplementary Appendix

# Spillover: A New Tool for Viral Risk Ranking

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## Data availability statement

All datasets along with the R code and R package dependencies needed to fully replicate and evaluate these analyses are provided at …….. The top-level README.txt file in the directory details the file structure and metadata provided.

## Supplementary Methods

### Risk Ranking Survey

*Survey Design*

Risk ranking assessment worksheets comprised of two components, one section for collection demographics of the participants, and the other assessing factors thought to contribute to the risk of viral spillover and/or epidemic events of animal-origin (Appendix 1). Demographics collected included: age range, gender, country of residence and primary / secondary area of expertise. Participants were asked to rank each category as High, Medium, Low or Not relevant for spillover, in terms of its 'Contribution to the risk of a new human viral spillover or epidemic event of animal-origin'. In addition, participants were asked to assess their 'Level of Expertise' for each category, with the following options in ascending level of competence: Novice, Competent, Proficient, Expert, Master.

*Elicitation of Expert Participants*

Invitations to participate in the risk ranking assessment, including instructions and worksheet (Appendix 1) were sent to the email addresses of 150 experts from 20 countries / nations (Fig. S1). Experts were selected from relevant literature, google searches, and conferences / meetings attendance lists. The majority of experts were affiliated with academic institutions (66%), the remainder (33%) comprising of

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government, private or international organizations / foundations (Table S1). Experts were sent two email reminders, with the total timeframe of recruitment at approximately 6 weeks.

*Summary of Participant Responses*

Participant responses to the risk ranking assessment were analyzed and plotted in R software[1] using sqldf[2], dplyr[3] and ggplot2[4]. If the participant did not provide an answer, it was categorized as Not Declared for participant demographics, or Unassigned for the risk assessment.

*Expert Adjusted Risk Factor Contribution*

Values were assigned to Level of Risk and Level of Expertise (Table S2). Responses were analyzed in R software[1] using sqldf[2], dplyr[3] and ggplot2[4].

$$\text{Risk Factor Contribution (0-3)} = \frac{\sum(\text{Risk Factor Score (0 - 3)} \times \text{Expertise Score (1 - 16)})}{\sum \text{Expertise Score (1 - 16)}}$$

For each completed expert opinion survey, scaler values were assigned to the Level of Risk (Risk Factor Score) and Level of Expertise (Expertise Score) for each risk factor. If a participant did not declare a Level of Risk or Expertise, a score of 0 and 8 were assigned respectively. The contribution each risk factor has towards the total risk that any virus will spillover from animals to humans was calculated as a weighted average risk score from all expert responses (Risk Factor Contribution) using the above formula.

## Viral Risk Ranking Framework

*Risk Level Scores*

There are multiple levels within each risk factor, and each level may contribute a different level of spillover risk. Therefore, risk scores were assigned to risk levels on a 0 to 5 scale (Risk Level Scores). For categorical factors, each risk factor level was assigned a score using the authors expert opinion. A central score of 2.5 was assigned to risk levels categorized as Unknown. For summation risk factors, the Risk Level Score was adjusted to a 0-5 scale based on the number of level options as follows:

$$\text{Risk Level Score (0-5)} = \sum \frac{5}{\text{Risk Level}^{th}}$$

*Virus Data Risk*

Using the principle of the worst-case scenario, for each virus, Virus Data Risk scores were calculated using the highest Risk Level Score contained in the database, accounting for the Risk Factor Contribution to the overall virus spillover risk.

$$\text{Virus Data Risk (0-5)} = \frac{\text{MAX(Risk Level Score)} \times \text{Risk Factor Contribution}}{3}$$

Virus Data Risk scores were grouped into categories: Low (0-1), Low-Medium (1-2), Medium (2-3), Medium-High (3-4), High (4-5).

*Risk Score*

The Risk Score for a given virus is the sum of Virus Data Risk scores for each factor. Contribution of Risk Categories for the Virus, Host, and Environment were calculated as the sum of all Virus Data Risk scores within each category. Virus ranking positions were allocated in ascending order of virus Risk Scores, with 1 being the riskiest.

*Selection of Risk Factors*

Following evaluation of data resources available, 42 environmental, host and viral risk factors (listed below) were selected for inclusion in the viral risk ranking analysis. Host mass, viral phylogenetics, and

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the impact of protected areas were assessed by experts as worthy of consideration but were eliminated due to insufficient data. Below, we detail the methods and data analysis behind each risk factor included in the risk assessment.

*Host Risk Factors*

Host plasticity - No. of species / No. of orders

Hosts plasticity is a measure of the diversity (number of species) and breadth (number of orders) of hosts the virus is known to infect. In cases where a host species was unidentified at either the species level, records of virus detection were not included in calculations of host diversity, unless the virus has only been recorded in an unidentified host species. Host species were limited to the classes *Mammalia* (excluding humans (*Homo sapiens*)), *Aves*, *Reptilia*, *Amphibia*, *Insecta* and *Arachnida*. Host taxonomy was formatted in the first instance using accepted scientific names in the IUCN Red List[3], and when not available, the Catalogue of life[4]. Using the NCBI nucleotide database extraction for viruses in the ICTV virus list, the distribution of number of host species and orders per virus (Fig. S6) was used to inform categorization of the two variables into the following groups: 1 species, 2 species, 3-5 species, 6-10 species, and more than 10 species.

Host sample type diversity

Sample diversity is a calculation of the number of sample types in which a virus has been detected. Samples were grouped into the following broad categories according to the body systems: Cardiovascular system, Digestive system, Endocrine system, Integumentary system, Urogenital system, Lymphatic system, Muscular Skeletal System, Nervous system, Respiratory system. Fecal samples were assigned their own category. Samples of unknown origin were only counted when no other sample type was recorded for the virus.

Conservation status of the host species

A custom function "HostTaxonomy" was created within R software[1] using rredlist[5] and sqldf[6] (Supplementary Information). For IUCN redlist recognized host species, conservation measures (Least Concern, Near Threatened, Vulnerable, Endangered, Critically Endangered, Extinct in the Wild, Extinct, Data Deficient, Unknown) were extracted from the IUCN Redlist database using a personal API token [3]. Species not assessed by the IUCN, were defaulted as 'Unknown' conservation status, with the exception of domesticated species, which were assigned as 'Least Concern'.

Habitat breadth of the host(s)

A custom function "HostHabitat" was created within R software[1] using rredlist[5] and sqldf[6]. Habitat is the place or environment where a plant or animal naturally or normally lives and grows, and was extracted from the IUCN Redlist database using a personal API token [3]. For IUCN Redlist recognized host species, habitat breadth of the host(s) was calculated from the total number of habitats the host(s) occupies, as recognized by the IUCN, i.e. Forest, Savanna, Shrubland. Species not assessed by the IUCN, were defaulted as 'Unknown' habitat breadth, with the exception of domesticated species, which were assigned the same habitat diversity as their wild counterparts. Due to lack of a comprehensive data resource for habitat diversity of members belonging to the taxonomic class *Insecta* and *Arachnida*, European CDC vector fact sheets (https://ecdc.europa.eu/en/disease-vectors/facts) were used to calculate the average number of habitats a vector species occupies. This number (5) was then used for all species within *Insecta* and *Arachnida*.

Diet breadth of the host species

Diet breadth for mammals and birds was calculated from the total number of dietary categories outlined in the reference dataset produced by Wilman, Belmaker [7]. For the purposes of this analysis, we defined a species to eat a food category if it's estimated percent use was $\geq 1\%$. Scientific names were corrected to align with IUCN designations, and where duplicate records occurred, the record with the highest

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confidence was taken. Due to lack of a comprehensive data resource for diet diversity of members belonging to the taxonomic class Insecta and Arachnida, European CDC vector fact sheets (https://ecdc.europa.eu/en/disease-vectors/facts) were used to calculate the average number of dietary categories. This number (1) was then used for all species within *Insecta* and *Arachnida*. Species not assessed by Wilman, Belmaker [8], were defaulted as 'Unknown' diet breadth, with the exception of domesticated species, which were assigned the same diet categories as their wild counterparts.

Geography of the host(s)

Species range files for *Mammalia*, *Amphibia* and *Reptilia* were downloaded from the IUCN Redlist database[1] on October 25th 2017. Shapefiles for bird ranges were provided by Birdlife International [9] (downloaded October 27th 2017). Spatial polygon datasets were uploaded into QGIS (version 3.0.3-Girona)[10] for processing. The fix geometry function was conducted on all files to overcome geometry errors. IUCN range files were filtered to remove uncertain range files ('Not Mapped', 'Origin uncertain', 'Possibly Extant (resident)', 'Possibly Extinct', 'Presence Uncertain', 'Probably Extant (resident)'). Species range size was calculated using the lets.rangesize function in the R package letsR[1,11]. Bird range files were filtered to remove areas of passage, and undetermined or sporadic occurrence, thus reducing uncertainty contained in the dataset. Range size attributes were extracted from spatial files for bird species range. The sum of all range areas for a given species was calculated in R software[1]. Country land mass was collected from the World Bank 2016 records[12], unless unavailable, in which case, data was extracted from the United Nations 2007 land mass data[13] followed by the CIA World Factbook[14].

A custom function "HostGeog" was created within R software[1] in order to calculate the geographic range of the host species. Country of occurrence for each host species was extracted from the IUCN Redlist database using sqldf[5] and rredlist[7] with a personal API token.

For species belonging to the taxonomic class *Insecta* and *Arachnida*, geographical distribution was extracted from the Catalogue of life[6] database.

Country names/designations were defined as per the IUCN Redlist database[2] based on ISO 3166 list of countries. Global distribution of the host species was classified according the following descriptions of species occurrence: 1) Isolated endemic – one country with a range size <10,000 sq. Km, 2) National (small) - a single country with a land mass < 2.5 million sq. Km, 3) National (large) – a single country with a land mass > 2.5 million sq. Km 4) Regional - more than 1 country in 1 WHO region, 5) Semi-global - more than 1 country and 2-3 WHO regions, 6) Global - more than 1 country and > 3 WHO regions[15], or 7) Unknown - data not available. In this study, the Arctic region and Antarctica are considered a country and their own respective WHO region.

Genetic relatedness between host species and humans

The timescale of evolutionary divergence was used as an indicator of genetic relatedness between host species and humans (*Homo sapiens*). A list of species in the IUCN Red List database was downloaded within R software[1] using rredlist[7] with a personal API token on the 31st October 2017. A list of up to 2 (if available) randomly chosen species per order in the IUCN list was used to evaluate the distribution of divergence times across species in the classes *Amphibia*, *Reptilia*, *Aves* and *Mammalia*. For each species, the estimated time of divergence (in Million Years Ago, MYA) from humans (*Homo sapiens*) was calculated using TimeTree[16] (http://www.timetree.org/), and based on the their distribution (Fig. S7), the following categories were created: None (0 MYA), Very Recent (0-50 MYA), Recent (50-100 MYA), Far (100-200 MYA) and Very Far (>200 MYA). Following this, a function "MYAgroup" was created in R software[1] using sqldf[5] to group the estimated time of divergence for each host species accordingly.

*Environmental Risk Factors*

The longitude and latitude of the host species sampling location was used to extract environmental information from global datasets.

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Land use and livestock density in the host ecosystem

Two custom functions "LandUse" and "Livestock" were created to extract land use categories and livestock density respectively. Data was extracted from the LADA land-use systems maps[17] using raster[18], plyr[19] and sqldf[20] packages in R[1]. Land use was re-categorized to the broader LADA descriptors (Forest, Grasslands, Shrubs, Crops, Agriculture, Urban land, Wetlands, Sparse vegetation, Bare areas, Open water, and Unknown for undefined or data deficient areas). Livestock density was recorded as either High, Medium, Low, None, or Unknown for undefined or data deficient areas.

Human population density

The density of human populations within the host ecosystem was calculated using a custom function "PopDensity2015". The function uses raster[18], rgdal[20], plyr[19] and sqldf[20] packages in R[1] to extract attributes from the NASA Sedac Gridded population of the World UN Adjusted population density v4 2015[21]. Population density was grouped into the following categories: Unknown, <1, 1-5, 5-25, 25-250, 250-1000 and >1000 people/sqKm.

Urbanization in the host ecosystem

Probability of urban expansion was used as an indicator of land conversion and urbanization processes. A custom function "Urbanization" was created to extract probability values from the Global Grid of Probabilities of Urban Expansion to 2030[22]. To account for data source recommendations, a 20km radius buffer was applied to data points, and probability of urban extraction attributes were extracted from all 5 km$^2$ grids within the buffer zone using raster[18]. Urbanization in the host ecosystem was defined as presence of a high probability (>75%) of urbanization within the 20km radius buffer of the sampling location.

Agricultural intensification in the host ecosystem

Using previously described methods, global maps of cropland, pasture, and urban layers were adapted from the publicly available HYDE 2005 dataset [23,24], which assigns a percentage score for each land use category (e.g. 14% Urban, 29% Crops, 41% Pasture) to each raster cell. Cells within the layers were re-categorized as only one land use type: urban cells were defined as those containing greater than 25% urban land, while cells with at least 50% human land-use were assigned either pasture or crops, depending on which is greater. Areas with less than 50% human land-use and less than 25% urban land were not assigned a land-use type. The cells in resulting rasters have one of three values: 1 = urban, 3 = crops, 5 = pasture. For the purposes of this analysis, a map of land use change over time was created by assigning human land-use categories as above for both HYDE datasets for 1970 and 2005, and then highlighting only cells with novel Urban, Pasture or Crop development since 1970. A 20km radius buffer was applied to the sampling event geographic coordinates using the raster[18] package. Land use change attributes were extracted from all cells within the buffer zone. Agricultural intensification was defined as presence of novel pasture or cropland within a 20km radius buffer of the sampling location.

Forest degradation / deforestation in the host ecosystem

Loss in the forest canopy cover, defined as vegetation taller than 5m in height, was used as an indicator of forest degradation / deforestation in the host ecosystem. Using a custom function called "Deforestation" that calls packages gfcanalysis[25], sqldf[20], rgdal[20] and raster[18]. Annual forest cover and forest loss (in hectares) for each area of interest was extracted from the Global Forest Change 2017 dataset[26] using a 20km buffer zone around spatial points and a forest cover threshold set at 30%[27,28]. Percentage loss of tree cover was calculated on an annual time scale between 2000 and 2017 from the difference between annual area cover and loss. Finally, forest degradation for a sampling event location was determined as presence of ≥ 20% forest cover change between 2000 and 2017, as per the FAO 2015 Global Forest Resources Assessment definition forest cover change[29]. Forest cover gain was not analyzed as a separate entity in this study.

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Number of primary high-risk disease transmission interfaces

High-risk disease transmission interfaces are defined and adapted from categories previously described in Johnson, Hitchens [30]. For this study, direct and indirect interface categories were combined into one group, and the category 'Restaurant' replaced 'Consumed' as the interface description. Four extra categories were added including: Extractive Industry, Livestock, Pristine Habitat, and Wild Animal Farm. The total number of interfaces is calculated from the sum of all interfaces contained in host records for a virus. Unknown interfaces are only counted if no other interface was present.

Frequency and intimacy of contact at the transmission interface

The frequency and intimacy of contact between humans and wildlife, and humans and livestock for each primary transmission interface were assessed based on the expert opinion of the authors and risk characterization of interfaces during USAID PREDICT surveillance activities. Levels were categorized as follows: Unknown, Low, Medium, High.

*Virus Risk Factors*

Literature Reviews and Data Sources

The International Committee on Taxonomy of Viruses (ICTV) 2015 Master Species List (MSL30) version 5/24/2016 (referred to as ICTV virus list) was downloaded from the ICTV online database (https://talk.ictvonline.org/) and used as a reference of known viruses within 24 target viral families proposed by the Global Virome Project (GVP) as being of concern to human health (*Arenaviridae*, *Bornaviridae*, *Bunyaviridae*, *Coronaviridae*, *Filoviridae*, *Flaviviridae*, *Hepeviridae*, *Orthomyxoviridae*, *Paramyxoviridae*, *Picornaviridae*, *Reoviridae*, *Retroviridae*, *Rhabdoviridae*, *Togaviridae*, *Astroviridae*, *Caliciviridae*, *Picobirnaviridae*, *Arteriviridae*, *Herpesviridae*, *Poxviridae*, *Parvoviridae*, *Adenoviridae*, *Papillomaviridae*, *Polyomaviridae*)[31]. Known plant viruses were removed from the list and not assessed or included in any analyses, resulting in a master ICTV virus list of 1049 viruses (Supplementary Information). For each virus, the ability to infect a taxonomic group (human, terrestrial mammals, birds, other animals), its virulence and epidemicity were assessed through a literature review of three reference virology textbooks [32-34], four human/zoonotic virus databases[30,35-37], and a literature search of all databases in the Web of Science using the search term: 'Virus Name' AND 'Humans'.

The NCBI nucleotide database for viruses was downloaded from the NCBI ftp (ftp://ftp.ncbi.nlm.nih.gov/ncbi-asn1/) on June 8th, 2018. Attributes including accession number, organism name, host species, sample description and country of detection were extracted from genbank files using a custom python script in Anaconda Jupyter software[38] calling Biopython Entrez and SeqIO[39]. Data cleaning was conducted in R software[7] using rentrez[40], sqldf[5], readlist[7], and taxize[41]. For each virus species in the ICTV virus list, a list of taxon IDs was extracted from the NCBI taxonomy database and used to select all FTP NCBI nucleotide records associated with a given virus species designation and its synonyms. Host species data were cleaned using accepted scientific names and taxonomy in the IUCN Red List[1], and when not available, the Catalogue of life[6]. Isolation source lists were grouped according to the sample type groupings based on body systems described previously. Country names/designations were corrected as per the IUCN Redlist database[1] based on ISO 3166 list of countries. An 'Unknown' status was assigned to ambiguous records. Records of unknown species origin and viral sequences originating from environmental samples, cell lines, cloned sequences, laboratory isolates and/or synthetic constructs were removed from the dataset.

When available, the longitude and latitude of the host species were extracted from the public resources, else the central coordinates of the nearest village or town were used as a reference point. If location was only provided at the state or provincial level, the geographic coordinates were classified as unknown.

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Characteristics of a virus

Three family level viral properties based on the nature of the viral genome were extracted from the Tenth Report of the International Committee on Taxonomy of Viruses (ICTV)[47]. Descriptors include genome type (DNA or RNA), whether a virus has an envelope surrounding its genome, and if the viral genome is broken up into segments. Segmentation was defined as more than one linear or circular genomic (DNA or RNA) segment.

Ability of a virus to infect humans, terrestrial mammals, birds and other animals

Viruses were classified as able to infect humans, terrestrial mammals, birds, other animals based on the host species in which the virus has been detected. A custom function called "speciesTaxonomy" was created to classify host species as either a Human (Species is *Homo sapiens*), Birds (Order belongs to *Aves*), Terrestrial Mammals (mammals that inhabit the land), or Other Animals (all other animal that do not belong in previous classifications) (Table S4). A virus was classified as able to infect a taxonomic group (human, terrestrial mammals, birds, other animals) if they were positive by either the literature review, nucleotide virus records extracted from NCBI (both described above), or detection records contained in the spillover database.

Proportion of viruses known to infect animal taxa in a viral family

The proportion of viruses known to infect humans, terrestrial mammals, birds, and other animals within each of the 24 viral families was calculated using the ICTV list of 1049 viruses. A virus was classified as able to infect a taxonomic group if they were either positive by the literature review, or by nucleotide virus records extracted from NCBI (both described above). The percentage of viruses known to infect humans/terrestrial mammals/birds/other animals within each virus family were calculated and grouped into categories: None (0%), Low (0-25%), Medium (25-50%), High (50-75%) and Very High (75-100%).

Human viruses

Human viruses were assessed to determine the duration of virus infection, severity of disease and its ability to transmit between humans. Duration of infection was defined as acute (up to 4 weeks) and chronic (more than 4 weeks)[36]. The severity of illness in humans, classified according to known symptoms and degree of damage caused by a virus: Deadly (known cause of mortality), Severe Illness (unable to function in a normal manner), Mild Illness (limited disruption to function), Found in a sick human of unknown cause of illness, Not known to cause disease. The proportion of known human pathogens in a viral family was calculated from the number of virulent (known to cause deadly, severe or mild illness) versus avirulent viruses within each family in the ICTV list, and subsequently grouped into categories: None (0%), Low (0-25%), Medium (25-50%), High (50-75%) and Very High (75-100%).

Ability of a virus to transmit between animals and humans

A list of known zoonotic viruses was extracted from the database created by Johnson, Hitchens [39]. Virus names were updated to ICTV standards and where appropriate grouped at the species level, resulting in a list of 85 viruses within the 24 viral families known to transmit between animals and humans.

Ability of the virus to cause an epidemic

The epidemicity of a virus was categorized according to historic records of outbreaks, epidemics or pandemics in humans, animals or both.

Virulence in terrestrial mammals / birds / other animals

Virulence was classified according to known symptoms and degree of damage caused by a virus to its host: Severe Illness (unable to function in a normal manner), Mild Illness (limited disruption to function), Not known to cause disease or Unknown (no records in the literature).

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Proportion of viruses within a viral family that are known to infect more than 1 host species

The total number of distinct host species was calculated using NCBI nucleotide records for the 1049 virus in the ICTV virus list. Unidentified species were not included in calculations. The proportion of viruses that are known to infect more than 1 host species was calculated for each of the 24 viral families in R software[3], and categorized accordingly: None (0%), Very Low (1-10%), Low (10-25%), Medium (25-50%), High (50-75%), Very High (75-100%).

Transmission mode of the viral genus

Due to limitations in knowledge of how individual viruses are transmitted, the transmission mode of the viral genus was used as a proxy for all viral species within that genus. Transmission mode records were extracted from the ViralZone database[37] and grouped into relevant categories as per described in Antonovics, Wilson [43] (Table S3).

Geography of the virus

A custom function called "GeogVirus" was created in R software[3] using sqldf[5] to determine the virus distribution from the number of countries, and WHO regions[35] in which the virus has been detected. Using definitions of international spread adapted from Johnson, Hitchens [36], virus distribution was determined as: 1) National (small) - a single country with a land mass < 2.5 million sq. Km, 2) National (large) - a single country with a land mass > 2.5 million sq. Km, 3) Regional - more than 1 country in 1 WHO region, 4) Semi-global - more than 1 country and 2-3 WHO regions, 5) Global - more than 1 country and > 3 WHO regions. The Arctic region and Antarctica are considered a country and their own respective WHO region. Country names/designations were defined as per the IUCN Redlist database[7] based on ISO 3166 list of countries.

## Creating a Database of Viruses of Animal Origin

A total of 271073 records of virus detection in wildlife were collated from multiple sources, including a dataset of viruses detected during PREDICT surveillance, NCBI virus nucleotide records, and a literature review of previously identified and known zoonotic viruses.

*PREDICT Dataset*

Collection and Testing Animal Samples

Between 2009 and 2014, samples were collected from mammalian orders (*Primates, Chiroptera, Rodentia, Carnivora, Eulipotyphla, Lagomorpha, Pholidota, Cetartiodactyla*) at high risk pathogen transmission interfaces in 20 countries as part of PREDICT surveillance. The research protocol was approved by the University of California Animal Care and Use Committee (IACUC) (permit 17504, 19300).

In the process of sample collection, geographic and demographic data about the host and its environment were recorded. Animals were given a unique identifier and species identified. In cases of uncertainty, animals were identified to the genus level. Fecal samples were either collected as freshly voided specimen, or via rectal / anal swabs. Respiratory samples were obtained via an oral, nasal or oropharyngeal swab during handling. Additional samples included urogenital swabs and urine. Blood was collected via needle / syringe, or a needle prick and blood spot on a collection card. When possible, duplicate samples were stored in up to 1mL of Viral Transport Medium (VTM) and 1mL of Trizol. In cases where the animal was either previously euthanized (for example in restaurants) or an animal died during capture / handling, tissue biopsies were collected and placed into VTM, Trizol and 10% Formalin.

Samples were tested for viral families of concern to human health using PREDICT standardized conventional PCR protocols, cDNA extraction and sequencing as per previously described[44]. Target viral families included members of the *Adenoviridae, Arenaviridae, Astroviridae, Bunyaviridae,*

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*Coronaviridae, Flaviviridae, Herpesviridae, Orthomyxoviridae, Papillomaviridae, Paramyxoviridae, Picobirnaviridae, Picornaviridae, Polyomaviridae, Poxviridae, Reoviridae, Retroviridae Rhabdoviridae, and Togaviridae.*

Viruses that shared between 90% and 95%[77] sequence similarity (depending on viral family) to existing viruses in the NCBI nucleotide database were assigned a name and corresponding NCBI accession number or ICTV classification referencing the virus with the closest identity. For non-ICTV classified viruses, Blastn searches were run on the virus sequences to identify closely related viruses with ≥ 99% identity, ≥ 97% query cover and a low E-value. The Pub Med Central (PMC) database was used to conduct a literature search of all publications citing the matching NCBI accession numbers. When available, host and sample information was extracted from nucleotide records and corresponding publications. Detection records were included in the dataset only if confirmed by PCR and sequencing.

Novel virus sequences that did not match any known virus, were assigned a name starting with PREDICT followed by a number (i.e. PREDICT-1). Upon detection of the first novel sequence, all subsequent viral sequences were aligned with both NCBI nucleotide records using Blastn and a local database of novel sequences held in Geneious (version ...77). Viruses that shared more than 99% sequence identity with a named novel PREDICT virus were assigned the same name.

*ICTV recognized zoonotic viruses*

Viral detection data was collated for 79 ITCV recognized known zoonotic viruses. Viral detection data was collated for 79 ITCV recognized known zoonotic viruses. We conducted a review of literature cited in the zoonotic virus database by Johnson, Hitchens [10] to extract supplementary attributes including host species, location and additional interfaces. For each virus species, including pseudonyms, nucleotide records including host species, sample type, and country of detection were extracted from the NCBI were included from the NCBI nucleotide extraction using methods described previously. Reports with only serological evidence, cloned sequences, and/or synthetic constructs were not included in the final dataset.

*Bombali ebolavirus*

A new ebolavirus, *Bombali ebolavirus* was identified in bats (*Chaerephon pumilus* and *Mops condylurus*) roosting inside houses in Sierra Leone in 2016 as part of PREDICT surveillance efforts [45]. Subsequently, the virus was detected by researchers in *Mops condylurus* in Kenya[46]. Detection records, including details on the host species and location were extracted from published resources [47,48]. These records were then processed using the viral risk ranking framework as a test case for using SpillOver as a tool to evaluate newly discovered viruses with zoonotic potential.

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## Supplementary Tables

**Table S1** Affiliation of experts invited (n = 150) to participate in the risk ranking assessment.

| Affiliation | Number of Invitations |
|---|---|
| Government Department | 2 |
| Government Agency | 19 |
| Government Research Institute | 4 |
| International Organization | 9 |
| Private Foundation | 13 |
| Private Organization | 3 |
| University | 100 |

**Table S2** Values assigned to levels of risk and expertise for each category.

| | Level | Score |
|---|---|---|
| *Risk* | High | 3 |
| | Medium | 2 |
| | Low | 1 |
| | Not Relevant | 0 |
| | Unassigned | 0 |
| *Expertise* | Master | 16 |
| | Expert | 8 |
| | Proficient | 4 |
| | Competent | 2 |
| | Novice | 1 |
| | Unassigned | 8 |

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**Table S3** Categorization of transmission mode for viral genus.

| Mode Categorical Organization | | | | Mode Code | Route (examples) |
|---|---|---|---|---|---|
| Vertical | | | | Vertical | cytoplasmic, transplacental, during vaginal birth or breast feeding |
| Horizontal | Sexual | | | Sexual | mainly genital–genital, but also oro-genital, flower to flower |
| | Non-sexual | Direct contact | | Direct | skin-to-skin (kissing, biting, touching), auto inoculation, blood to blood |
| | | Airborne | | Airborne | respiratory tract–respiratory tract, aerosol, oral droplets |
| | | Indirect | Environmental | Indirect-Env | contaminated food–oral, infected water–oral, faecal–oral, water–skin, urine |
| | | | Fomites | Indirect-Fom | clothing–skin, needle–blood, doorknob–hand |
| | | | Vector-borne | Indirect-Vect | cutaneous penetration, vector fecal deposition, vector identity |
| Unknown | | | | Unknown | unknown transmission |

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**Table S4** Categorization of host families from the Classes: Aves, Mammalia, Reptilia, Amphibia, Arachnida, Insecta

| Class | Order | Family | Category |
|---|---|---|---|
| Mammalia | Afrosoricida | - | Terrestrial mammal |
| Mammalia | Carnivora | - | Terrestrial mammal |
| Mammalia | Cetartiodactyla | Antilocapridae | Terrestrial mammal |
| Mammalia | Cetartiodactyla | Neobalaenidae | Other animals |
| Mammalia | Cetartiodactyla | Eschrichtiidae | Other animals |
| Mammalia | Cetartiodactyla | Platanistidae | Other animals |
| Mammalia | Cetartiodactyla | Moschidae | Terrestrial mammal |
| Mammalia | Cetartiodactyla | Suidae | Terrestrial mammal |
| Mammalia | Cetartiodactyla | Tayassuidae | Terrestrial mammal |
| Mammalia | Cetartiodactyla | Hippopotamidae | Terrestrial mammal |
| Mammalia | Cetartiodactyla | Camelidae | Terrestrial mammal |
| Mammalia | Cetartiodactyla | Tragulidae | Terrestrial mammal |
| Mammalia | Cetartiodactyla | Cervidae | Terrestrial mammal |
| Mammalia | Cetartiodactyla | Giraffidae | Terrestrial mammal |
| Mammalia | Cetartiodactyla | Bovidae | Terrestrial mammal |
| Mammalia | Cetartiodactyla | Lipotidae | Other animals |
| Mammalia | Cetartiodactyla | Iniidae | Other animals |
| Mammalia | Dasyuromorphia | - | Terrestrial mammal |
| Mammalia | Dermoptera | - | Terrestrial mammal |
| Mammalia | Didelphimorphia | - | Terrestrial mammal |
| Mammalia | Diprotodontia | - | Terrestrial mammal |
| Mammalia | Eulipotyphla | - | Terrestrial mammal |
| Mammalia | Hyracoidea | - | Terrestrial mammal |
| Mammalia | Lagomorpha | - | Terrestrial mammal |
| Mammalia | Macroscelidea | - | Terrestrial mammal |
| Mammalia | Microbiotheria | - | Terrestrial mammal |
| Mammalia | Monotremata | - | Terrestrial mammal |
| Mammalia | Notoryctemorphia | - | Terrestrial mammal |
| Mammalia | Paucituberculata | - | Terrestrial mammal |
| Mammalia | Peramelemorphia | - | Terrestrial mammal |
| Mammalia | Perissodactyla | - | Terrestrial mammal |
| Mammalia | Pholidota | - | Terrestrial mammal |
| Mammalia | Pilosa | - | Terrestrial mammal |
| Mammalia | Primates | - | Terrestrial mammal |

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| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Mammalia | Cetartiodactyla | Pontoporiidae | Other animals | Mammalia | Proboscidea | - | Terrestrial mammal |
| Mammalia | Cetartiodactyla | Delphinidae | Other animals | Mammalia | Rodentia | - | Terrestrial mammal |
| Mammalia | Cetartiodactyla | Phocoenidae | Other animals | Mammalia | Scandentia | - | Terrestrial mammal |
| Mammalia | Cetartiodactyla | Monodontidae | Other animals | Mammalia | Sirenia | - | Other animals |
| Mammalia | Cetartiodactyla | Physeteridae | Other animals | Mammalia | Homo sapiens | - | Humans |
| Mammalia | Cetartiodactyla | Ziphiidae | Other animals | Amphibia | - | - | Other animals |
| Mammalia | Cetartiodactyla | Balaenopteridae | Other animals | Arachnida | - | - | Other animals |
| Mammalia | Cetartiodactyla | Balaenidae | Other animals | Aves | - | - | Birds |
| Mammalia | Chiroptera | - | Terrestrial mammal | Insecta | - | - | Other animals |
| Mammalia | Cingulata | - | Terrestrial mammal | | | | |

UCDUSR0002876

## Supplementary Figures

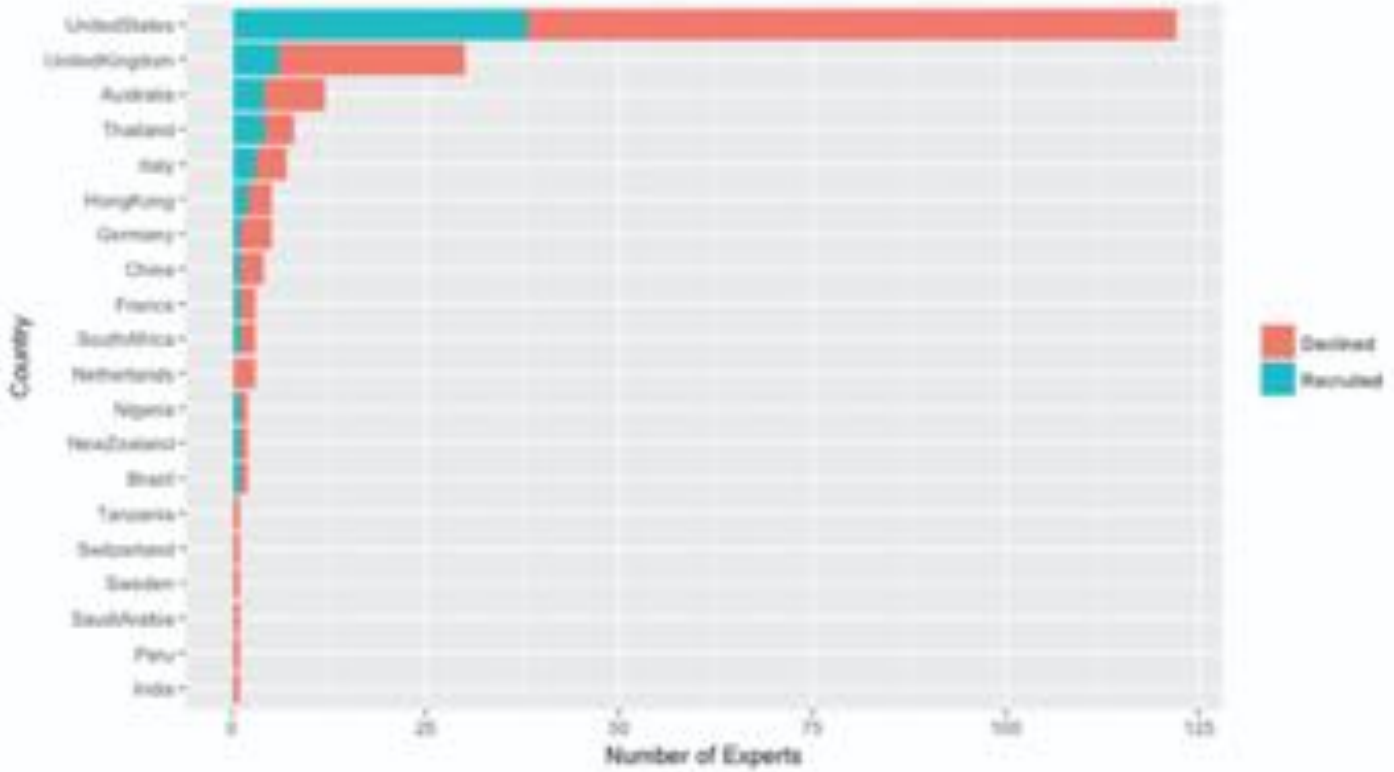


**Fig. S1** Number *of experts* (n = 150) recruited (blue) versus declined (red) to participate in the risk ranking survey by Country *of residence*.

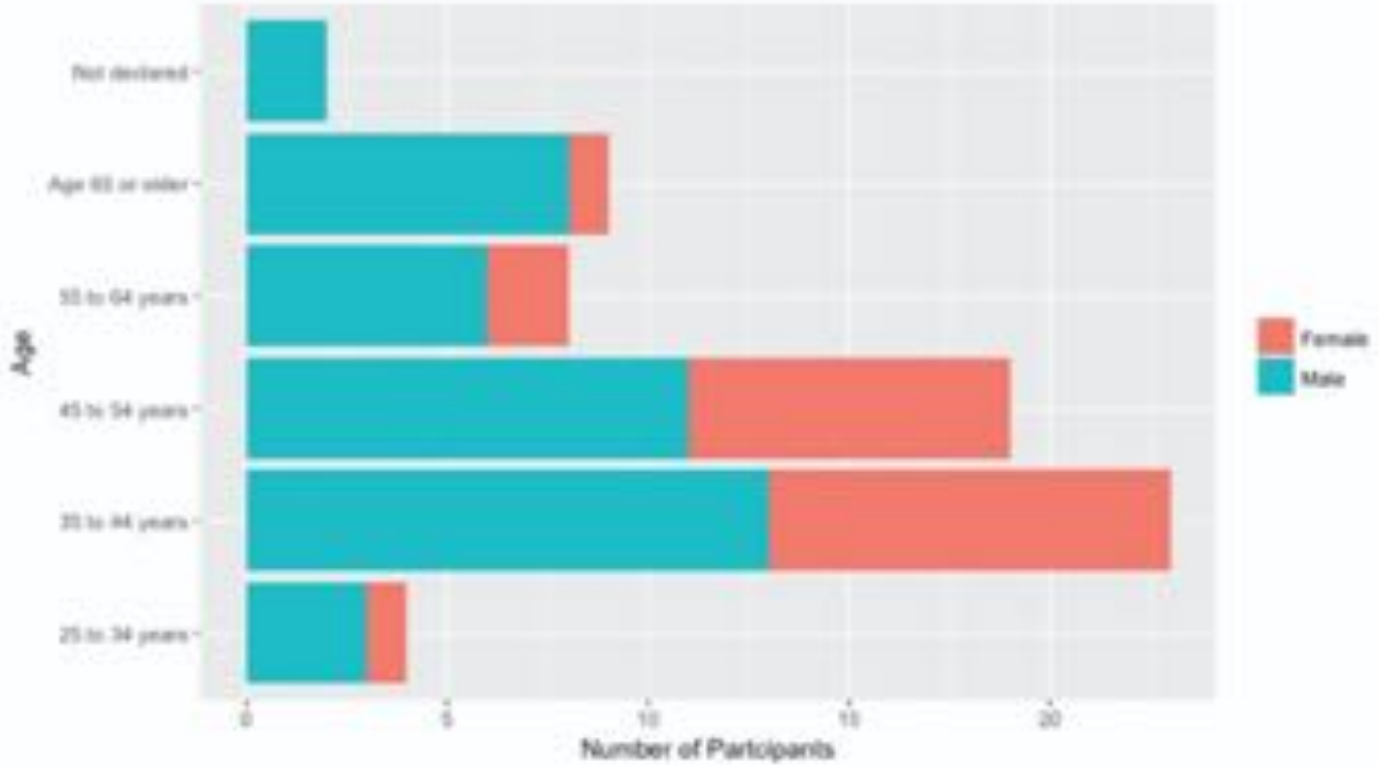


**Fig. S2** Participant (n = 65) reported demographics for age and gender.

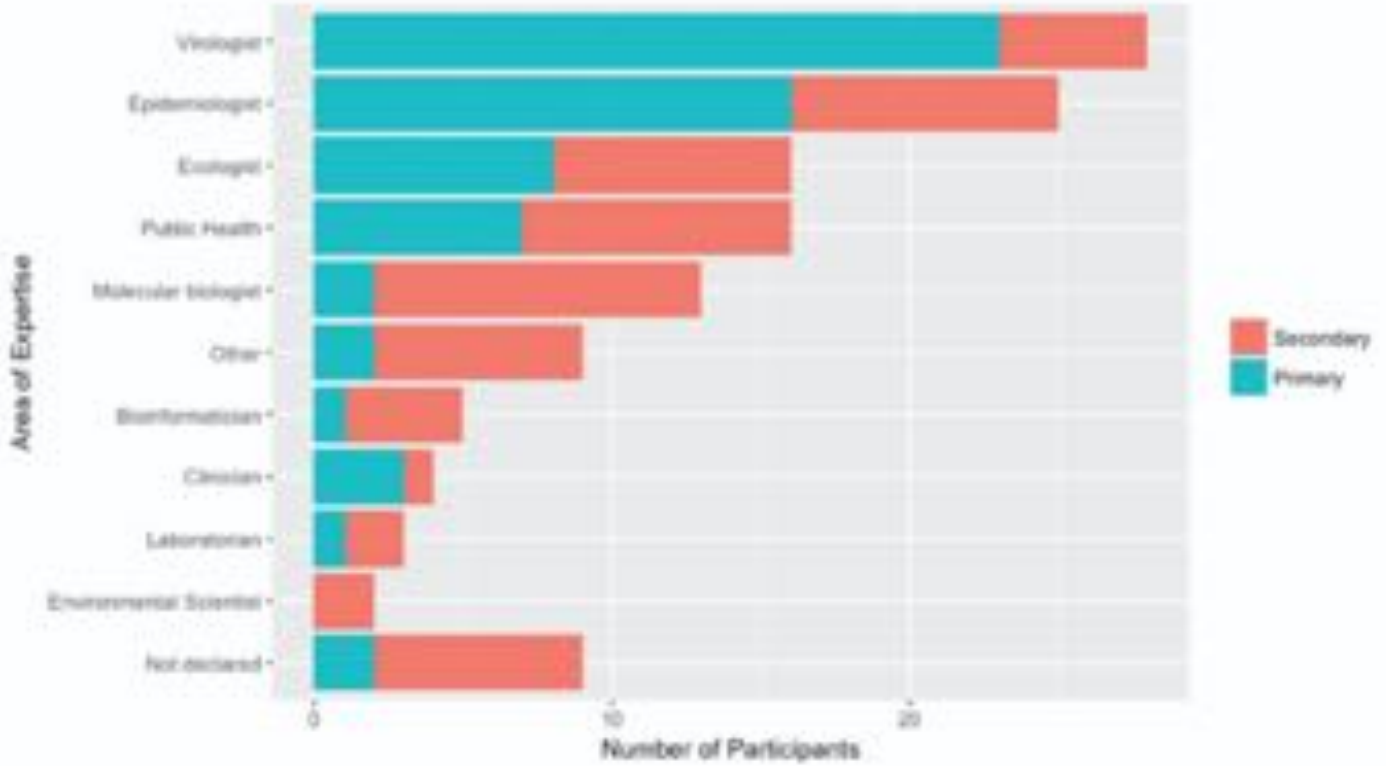


**Fig. S3** Participant (n = 65) reported areas of primary (blue) and secondary (red) expertise.

UCDUSR0002879

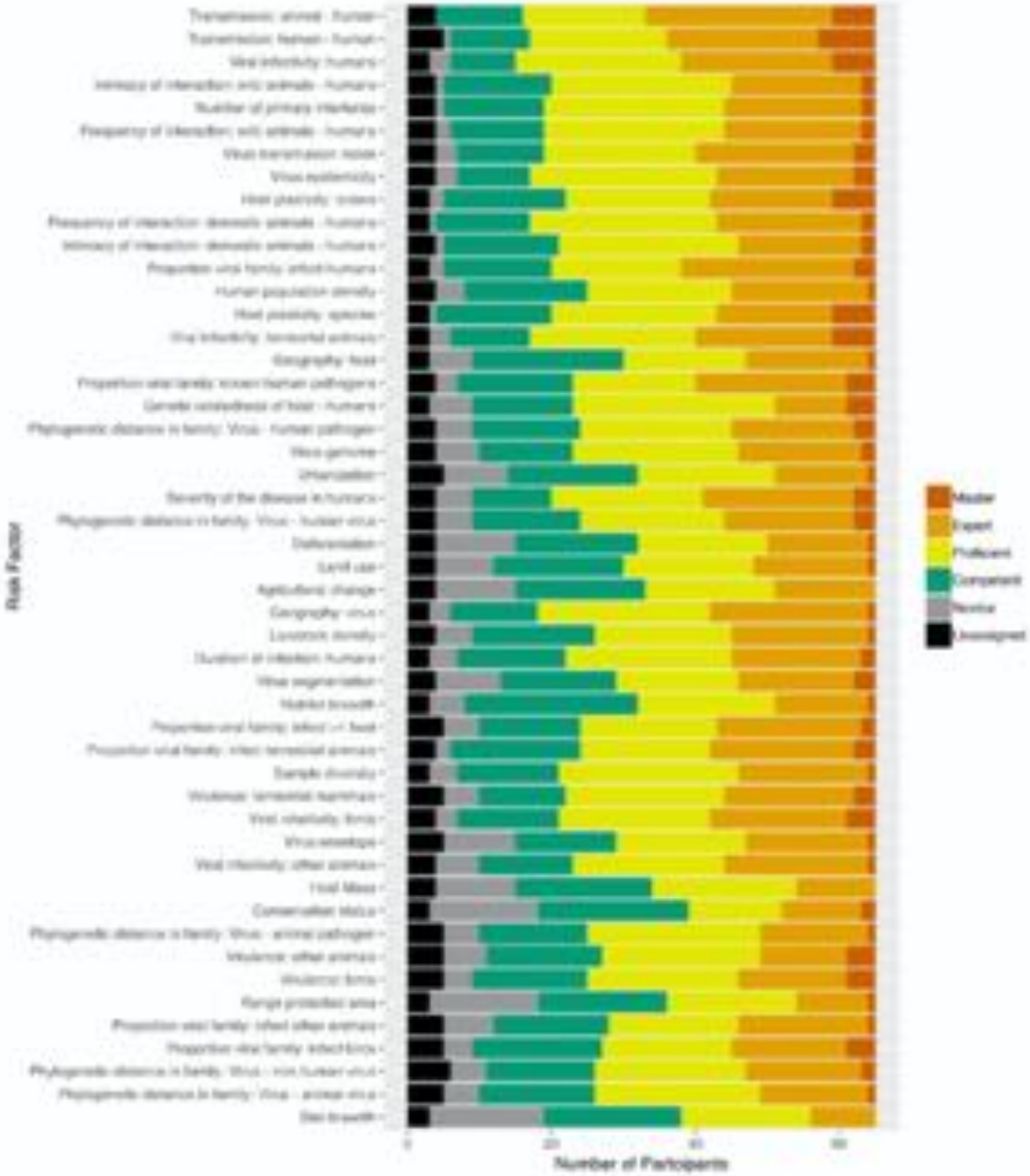


**Fig. S4** Participant (n = 65) self-assessment of their level of expertise for each attribute in the risk ranking assessment. In ascending order of competence, expertise was categorized as Novice (grey), Competent (Green), Proficient (yellow), Expert (orange) or Master (red). If the participant did not provide an answer, it was categorized as Unassigned (black)

UCDUSR0002880

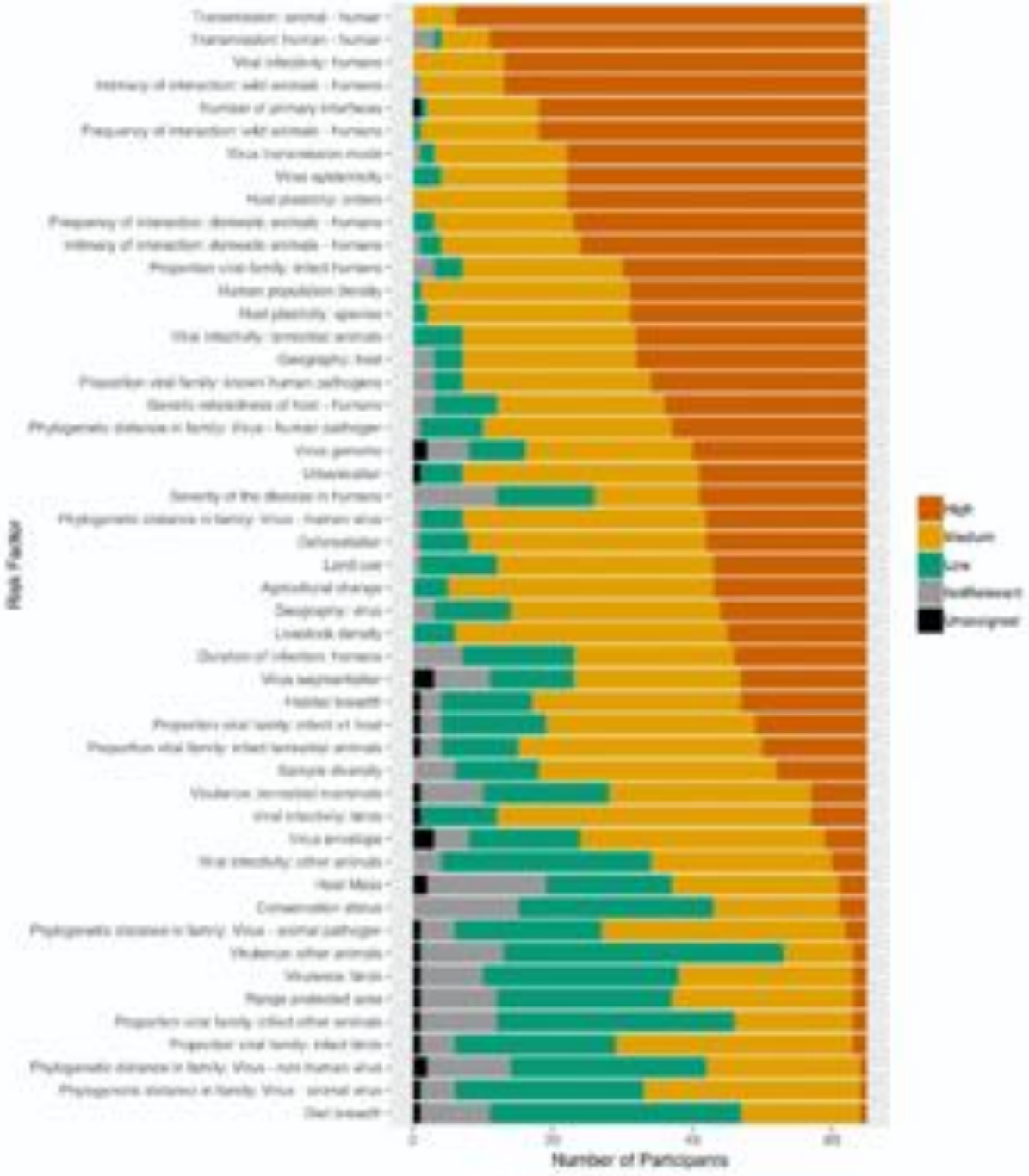


**Fig. S5** Participant (n = 65) responses to risk ranking assessment of host, virus and environmental attributes that could contribute to the risk of a new human viral spillover or epidemic event of animal-origin. Risk was categorized as High (red), Medium (orange), Low (green) or Not relevant to spillover (grey). If the participant did not provide an answer, it was categorized as Unassigned (black)

UCDUSR0002881

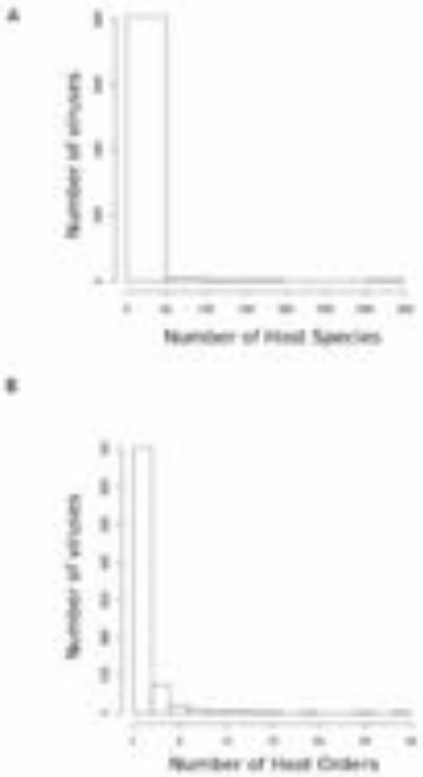


**Fig. S6** Number of host species and orders extracted from NCBI nucleotide records for 1049 viruses from the ICTV list.

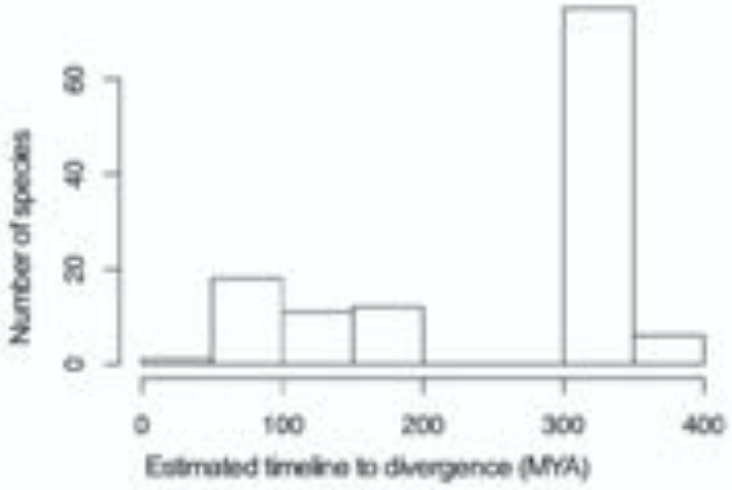


**Fig. S7** Estimated timeline of divergence between *Homo sapiens* and a selection of species representing all orders within the classes *Mammalia*, *Aves*, *Reptilia* and *Amphibia*

UCDUSR0002882

## Acknowledgements

In addition to those listed in the manuscript, we would like to thank survey participants who agreed to be named: L. Coffey, R. Corley, G. Dauphin, K. Fukuda, S. Goodman, J. Hughes, M. Jeggo, W. Karesh, M. Kurilla, N. Lewis, J. Mackenzie, W. Markotter, D. Merens, E. Muhlberger, S. Olson, Z. Shi, D. Streicker, O. Tomori, S. VonDobschetz, L. Wang, M. Ward, D. Wolking, M. Woolhouse Epigroup, and those participants who wish to remain anonymous.

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UCDUSR0002885

**From:** Andrew Clements <aclements@usaid.gov>
**To:** Christine Kreuder Johnson <ckjohnson@ucdavis.edu>
**CC:** Alisa Pereira <apereira@usaid.gov>;Cara Chrisman <cchrisman@usaid.gov>;Amalhin Shek <ashek@usaid.gov>;Jonna Mazet <jkmazet@ucdavis.edu>;predict Sympa List <predict@ucdavis.edu>
**Sent:** 10/31/2019 5:12:49 PM
**Subject:** Re: Consortium financial status - notice of operational deficit

Thanks, Chris.

Andrew Clements, Ph.D.
Senior Scientific Advisor
Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health
U.S. Agency for International Development
Mobile phone: 1-571-345-4253
E-mail: aclements@usaid.gov

*For more information on USAID's Emerging Pandemic Threats program, see* http://www.usaid.gov/ept2

On Thu, Oct 31, 2019 at 1:04 AM Christine Kreuder Johnson <ckjohnson@ucdavis.edu> wrote:

Dear Andrew,

Following our discussion on the PREDICT-2 Senior Management Team call yesterday, we wanted to officially notify you that members of our consortium will need to stop work in the extension period unless we receive the balance of our funding obligation for the approved PREDICT Year 5 (FY19) budget. We are at a critical point for sustainment and completion of our planned project deliverables and final report, and are on a very short timeline.

In brief:

- EcoHealth Alliance has been out of funds since the extension period began. Because EcoHealth Alliance leads the project's Modeling and Analytics, Behavioral Risk, and One Health governance activities, we require extensive input into core deliverables throughout this extension period which unfortunately are not achievable unless remaining FY19 funds are received. Because EcoHealth Alliance is at-risk financially, these key partners have been operating on a minimal basis, significantly slowing our progress, and preventing us from proceeding with analyses and modeling needed for the final report.
- Wildlife Conservation Society has sufficient funds in hand to cover staff time and remaining virus sequencing costs for October but will be officially out of funds at the end of the month.
- Smithsonian has limited funds remaining and is expected to be out of funding by the end of November 2019.
- UC Davis has reserved funds to cover critical personnel required for project and fiscal close-out in compliance with the terms and conditions of our cooperative agreement, but without receiving the $1.8M still pending obligation from our Year 5 budget, our work is substantially slowed and our ability to complete work for approved workplan deliverables and produce the project final report is severely compromised.

Without receiving the full Year 5 budget that our project was designed around, we cannot assure successful wrap-up of this extraordinary project nor adequate completion of all planned work as a return on USAID's 10-year investment. This issue with on-time receipt of funds has come at an especially unfortunate time because PREDICT data are just now being finalized and large-scale analyses and summaries need to ramp up immediately for reporting. Without funding, consortium partners described above will be forced to stop work and UC Davis will try to deliver on what we can, which is far from the astonishing potential that could have been achieved with on time receipt of remaining funds for this multi-disciplinary consortium.

Thank you for all of your work to ensure timely receipt of remaining funds.

Kind regards,

Chris

Christine Kreuder Johnson, VMD, PhD

Professor of Epidemiology and Wildlife Health

Director, EpiCenter for Disease Dynamics

Associate Director, One Health Institute

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UCDJSR0002887

**Sent:** Wed, 13 Nov 2019 16:14:16 -0800
**Subject:** Re: Guinea coordination
**From:** Jonna Mazet <jkmazet@ucdavis.edu>
**To:** Claire Standley <Claire.Standley@georgetown.edu>
**Cc:** Corina Grigorescu Monagin <cgmonagin@ucdavis.edu>, Ellen Carlin <carlin@ecohealthalliance.org>, "William B. Karesh" <karesh@ecohealthalliance.org>, Jon Epstein <epstein@ecohealthalliance.org>, Erin Sorrell <Erin.Sorrell@georgetown.edu>, "Frey, Kenneth G CIV USN NAVMEDRSCHCEN SVS MD (US)" <kenneth.g.frey4.civ@mail.mil>, "Philipson, Casandra W CIV DTRA R AND D (USA)" <casandra.w.philipson.civ@mail.mil>, Jaber Amine Belkhiria <jabelkhiria@ucdavis.edu>

Hi Claire,
I put this on Jonna's calendar. She's not a for sure yes because she has a lot of moving parts on Monday, but she will try to call in if she can.
Mary

On Wed, Nov 13, 2019 at 11:24 AM Claire Standley <Claire.Standley@georgetown.edu> wrote:

> Hi Corina,
> Thanks for the quick reply. 2pm Eastern on Monday would be great for me. I will set up a Zoom and send you the details - please feel free to forward to others as needed.

Hope everything is well on your end and looking forward to catching up.

Best,
Claire

On Wed, 13 Nov 2019, 20:14 Corina Grigorescu Monagin, <cgmonagin@ucdavis.edu> wrote:

> Hello again Claire!
>
> I'd be happy to talk next week. Monday after 1pm EST or Tuesday after 2pm EST works well.
>
> Thanks
>
> corina

---

**From:** Claire Standley <Claire.Standley@georgetown.edu>
**Date:** Wednesday, November 13, 2019 at 7:43 AM
**To:** Jonna Mazet <jkmazet@ucdavis.edu>
**Cc:** Ellen Carlin <carlin@ecohealthalliance.org>, William Karesh <karesh@ecohealthalliance.org>, Jon Epstein <epstein@ecohealthalliance.org>, Erin Sorrell <Erin.Sorrell@georgetown.edu>, "Frey, Kenneth G CIV USN NAVMEDRSCHCEN SVS MD (US)" [redacted], "Philipson, Casandra W CIV DTRA R AND D (USA)" [redacted], Jaber Amine Belkhiria <jabelkhiria@ucdavis.edu>, Corina Grigorescu Monagin <cgmonagin@UCDAVIS.EDU>
**Subject:** Re: Guinea coordination

Hi Mary,

Thanks very much for the email, I appreciate you getting back to me on this. I have previously had the pleasure of discussing

Guinea work with Corina although it was a couple of years ago now - certainly a catch up is overdue! My schedule is relatively flexible for a call, though I am usually based in Germany, which with the time difference from California can make finding a suitable time a bit difficult. That said, I will be in Washington DC all of next week (Nov 18-23) and would be happy to make the most of being only three hours ahead, if your side has availability then!

Thanks again for your assistance.

Best,

Claire

On Wed, Nov 13, 2019 at 1:08 AM Jonna Mazet <jkmazet@ucdavis.edu> wrote:

Hi Claire,

This is Mary Radford, Jonna's new assistant. She is currently on sabbatical and traveling. My apologies that this got missed. She requested that I introduce you to the two primary contacts for this project, Dr. Jaber Belkhiria and Dr. Corina Monagin. Perhaps you can all get acquainted and I'll be happy to schedule a call for you with Jonna.

Mary

On Sat, Sep 21, 2019 at 8:43 AM Claire Standley <Claire.Standley@georgetown.edu> wrote:

Jonna,

It was a pleasure to meet you, albeit briefly, at the DTRA Science Program Review last week. As I mentioned, we have been working with EcoHealth Alliance to develop two proposal concepts for DTRA in West Africa, related to determining the etiologies of acute febrile illness: one for Liberia (for which EHA is the lead, and which has recently been provisionally approved for funding - Ellen/Billy would be able to provide more details on the status and timeline), and one for Guinea (for which GU is the lead; we are running a few months behind EHA but are hoping to have the full proposal submitted soon).

Given your team's past work in Guinea under PREDICT, and the proposal for DTRA that you mentioned, perhaps it would be worth finding time for a call to coordinate efforts? It seems that DTRA is quite keen to engage with numerous different partners in Guinea, and particularly to sustain the USG investments made since 2014, so I imagine they are open to funding multiple projects and would appreciate knowing their implementers are communicating with each other!

Looking forward to touching base, and I hope you had a smooth journey home from Poland.

Best,

Claire

--

Claire J. Standley, PhD, MSc
Assistant Research Professor

Center for Global Health Science and Security
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Skype REDACTED

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Timezone: Central European Time (UTC +1)

**From:** Andrew Clements <aclements@usaid.gov>
**Sent:** Sun, 17 Nov 2019 23:53:18 -0800
**Subject:** Re: Request: Final Obligation-Country Breakdown
**To:** Christine Kreuder Johnson <ckjohnson@ucdavis.edu>
**Cc:** Elizabeth Leasure <ealeasure@ucdavis.edu>, Jonna Mazet <jkmazet@ucdavis.edu>, David John Wolking <djwolking@ucdavis.edu>, Cara Chrisman <cchrisman@usaid.gov>

Additional information: use of Ebola money for Africa-only analyses or pay for bills related to close out of activities in African countries.

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

On Nov 16, 2019, at 12:41 PM, Andrew Clements <aclements@usaid.gov> wrote:

> Does Ebola funding limited to AFR region make sense?

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

On Nov 15, 2019, at 11:36 PM, Amalhin Shek <ashek@usaid.gov> wrote:

> Hi Liz,
>
> Per last MT call, we are working with our program office to process an obligation of $150,000 (that can only be used in Africa) while we receive the remaining FY19 funds. Given the change in the extension period, could you help me complete the attached to make sure we have all the necessary documentation regarding the obligations by country? These levels must align with the exact country amounts to be disbursed between their obligation and the end of the award.
>
> Thanks in advance!

Amalhin Shek | Budget & Communications Analyst
Bureau for Global Health, Office of Infectious Disease, Emerging Threats Division
Phone: 202-916-2069(o) [redacted] (c) | UA 4.6.2H

USAID Contractor
GHSI-IF - Social Solutions International, Inc.

<Predict Planned obligations_revised_5.20.19 (3).xlsx>

**From:** Twitter <info@twitter.com>
**To:** PREDICT <predict@ucdavis.edu>
**Sent:** 2/6/2020 9:30:32 PM
**Subject:** [predict] Metabicta shared "How AI Helped Predict the Coronavirus Outbreak Bef...

# What's happening

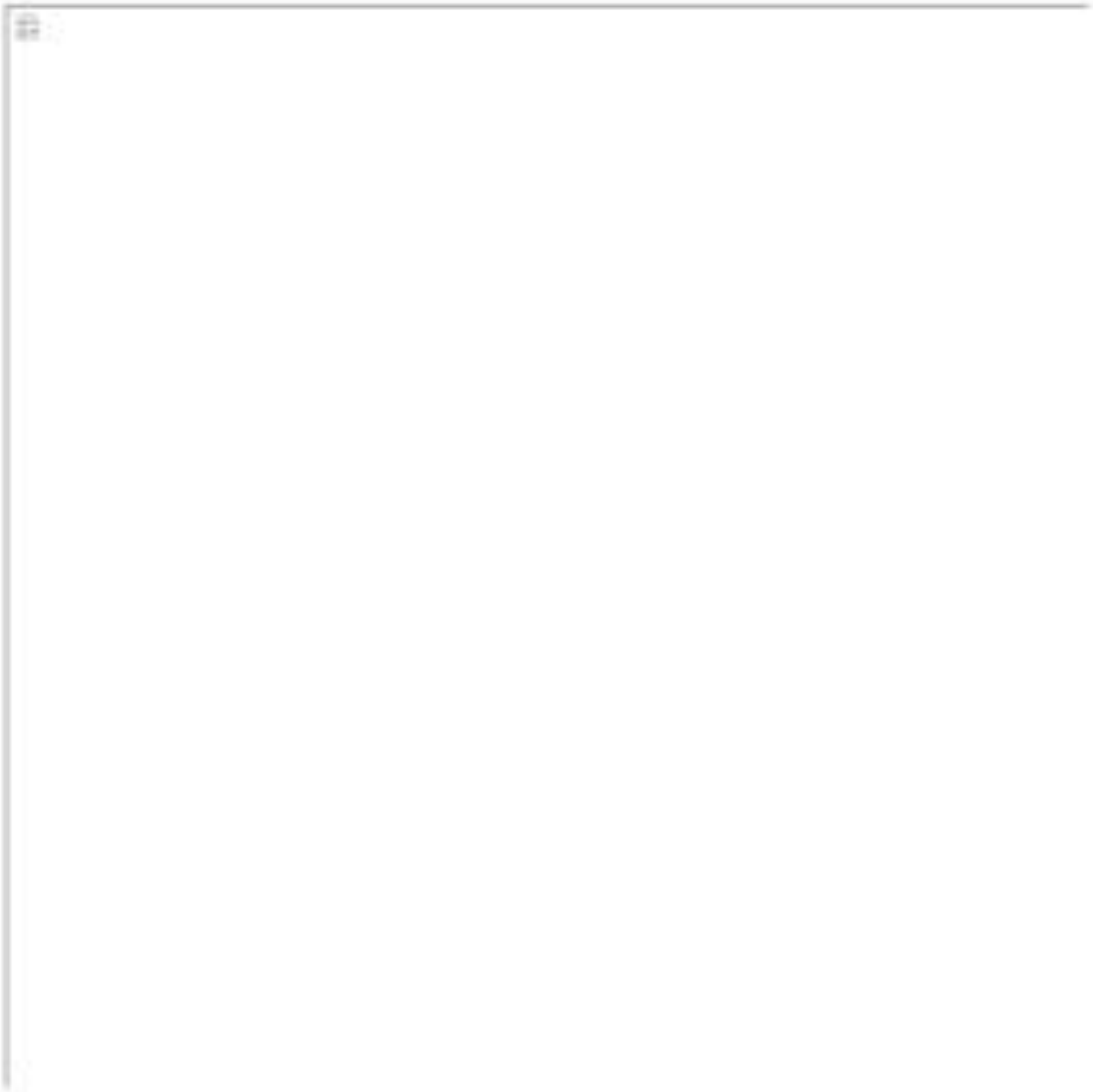
Metabicta shared

Singularity Hub

## How AI Helped Predict the Coronavirus Outbreak Before It Happened

On December 31st, the company sent out a warning about the virus. The WHO didn't send out a similar public notice unt...

Kevin J Oliva and 2 others shared

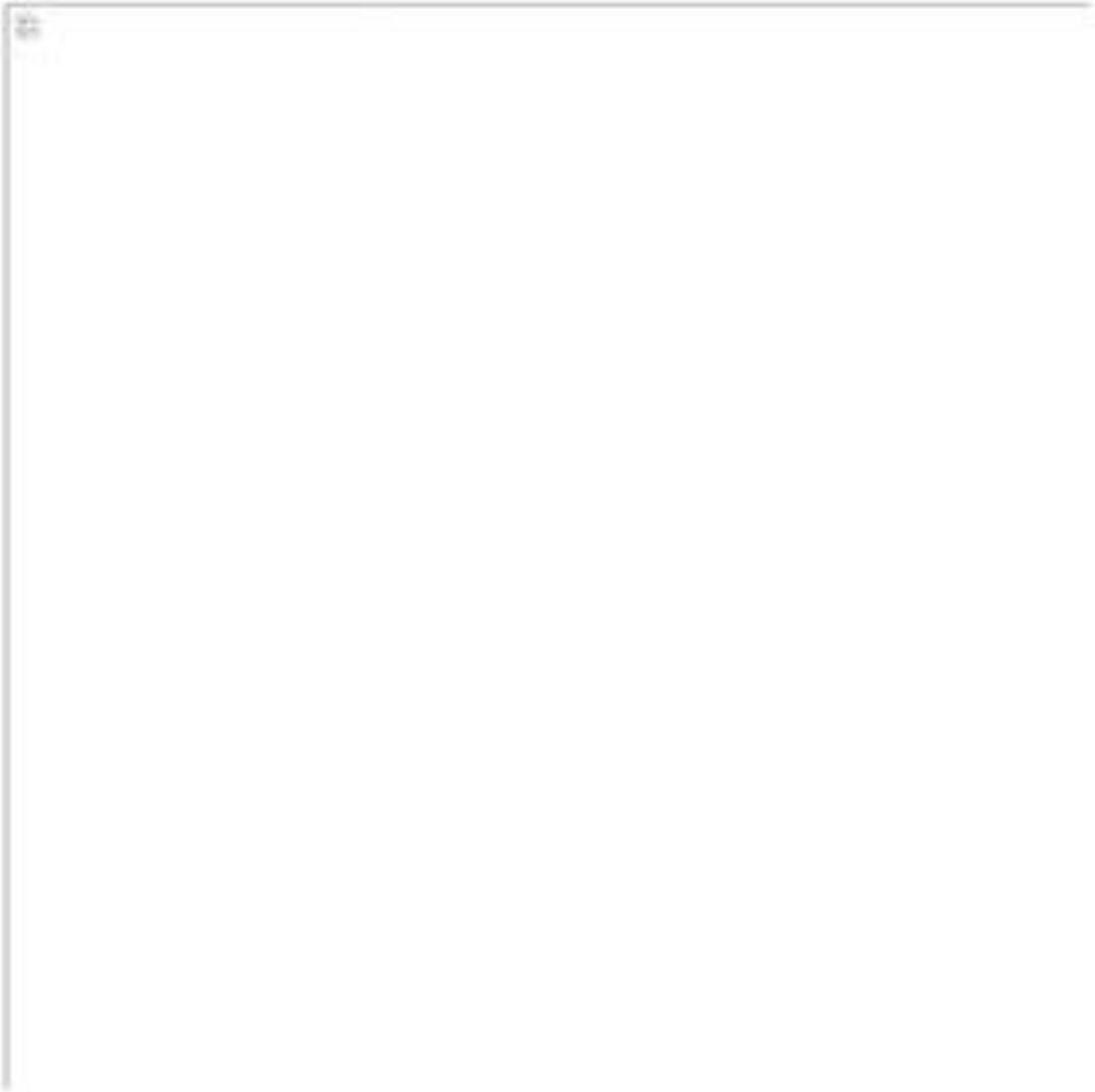


WSJ

## Scientists Link China Virus to Intersection of Humans and Wildlife

Scientists tracking how the deadly new coronavirus leapt from animals to humans said the likely source of the infecti...

Kevin J Oliva and 1 other shared

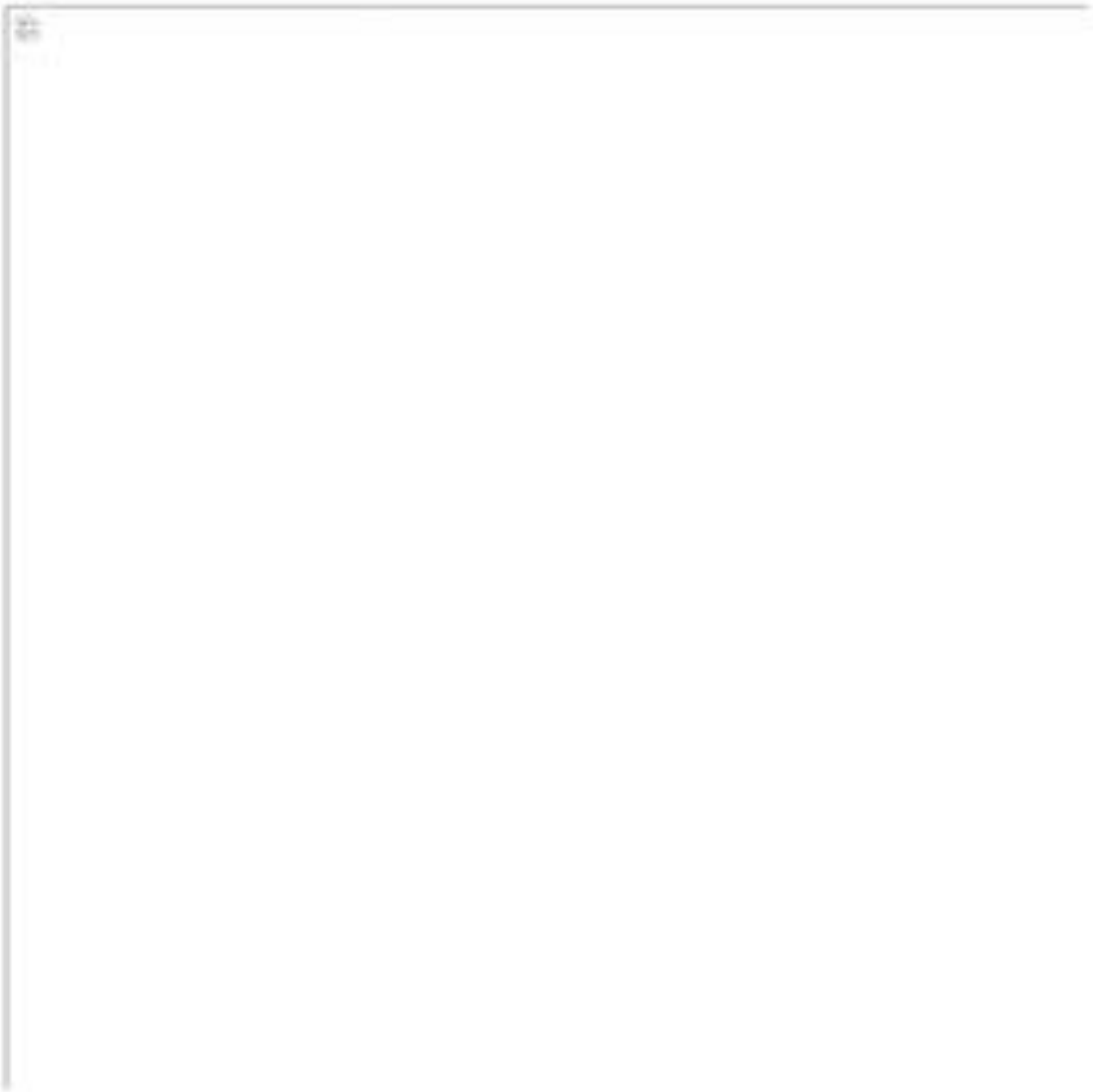


cbsnews.com

## Hundreds more Americans evacuated from virus outbreak epicenter

Another U.S. national has been confirmed to have the coronavirus and is now in a Japanese hospital - one of 10 who te...

Laura Kahn and 1 other shared



South China Morning Post

## Wild animal link to virus outbreak should change health strategy

The spread of disease cannot purely be explained and prevented by medical experts and scientists but requires the inp...

Laura Kahn and 1 other shared

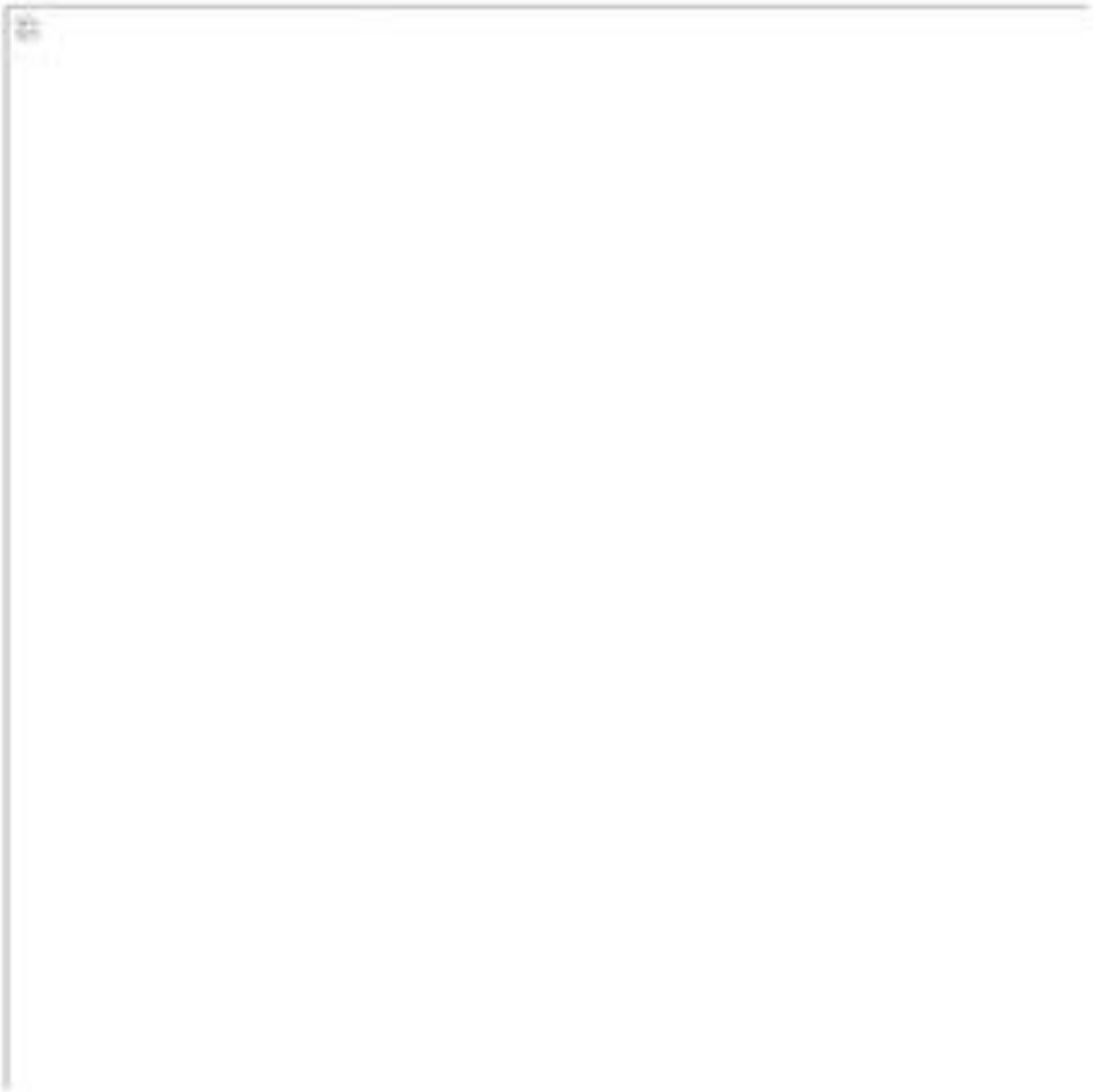
UCDJSR0002895

The Atlantic

## The 2020 Disinformation War

Deepfakes, anonymous text messages, Potemkin local-news sites, and opposition research on reporters—a field guide to ...

Noam Ross and 2 others shared



nature.com

## Calling all coronavirus researchers: keep sharing, stay open

As the new coronavirus continues its deadly spread, researchers must ensure that their work on this outbreak is share...

UCDJSR0002897

**From:** Jon Epstein <epstein@ecohealthalliance.org>
**Sent:** Mon, 10 Feb 2020 16:43:43 -0500
**To:** Woutrina A Smith <wasmith@ucdavis.edu>
**Cc:** Peter Daszak <daszak@ecohealthalliance.org>, "William B. Karesh" <Karesh@ecohealthalliance.org>, Kevin Olival <olival@ecohealthalliance.org>, Oladele Ogunseitan <oladele.ogunseitan@uci.edu>, "Rabkin, Miriam" <mr84@cumc.columbia.edu>, Brian H Bird <bhbird@ucdavis.edu>, Bruce B Struminger <BStruminger@salud.unm.edu>, onehealthnextgen Sympa List <onehealthnextgen@ucdavis.edu>, Christine Kreuder Johnson <ckjohnson@ucdavis.edu>
**Subject:** [onehealthnextgen] Re: OHW-NG concept for emergency response funds

Thanks for sharing this Woutrina. It's a great tool for this use. I'd be curious to learn more about the ECHO used in Vietnam. What content was delivered and how long was the video conference?

Cheers,
Jon

On Mon, Feb 10, 2020 at 12:11 PM Woutrina A Smith <wasmith@ucdavis.edu> wrote:

> Hi EHA team and OHW-NG Objective Leads,
>
> I know some of you will be attending high level 2019-nCoV meetings this week in Geneva, and some of us will be in Kampala working with AFROHUN team on OHW-NG implementation planning. So I wanted to loop everyone in here on a concept note that was invited Friday afternoon for submission to USAID first thing this morning, to share initial thoughts on how OHW-NG could engage uniquely in outbreak response and control efforts given the potential availability of emergency response funds. Attached is a OHW-NG concept for launching outbreak response ECHO platforms for SE Asia and Africa that I just shared with Marilyn Crane, and if there is interest in fleshing out the ideas further then we can coordinate on how best to do so. Thanks very much to the ECHO and UCD teams for quick work over the weekend.
>
> Best wishes, Woutrina

Woutrina Smith, DVM, MPVM, PhD
Professor of Infectious Disease Epidemiology
Associate Director, UCD One Health Institute
Technical Director, USAID One Health Workforce - Next Gen
Co-Director, UCGHI Planetary Health Center of Expertise
School of Veterinary Medicine, UC Davis
1089 Veterinary Medicine Dr
Davis, CA 95616 USA
wasmith@ucdavis.edu
+1 530 219-1369

--

Jonathan H. Epstein DVM, MPH, PhD

*Vice President for Science and Outreach*

EcoHealth Alliance
460 West 34th Street, Ste. 1701
New York, NY 10001
1.212.380.4467 (direct)
REDACTED (mobile)

web: ecohealthalliance.org

Twitter: @epsteinjon

*EcoHealth Alliance develops science-based solutions to prevent pandemics and promote conservation*

**From:** Andrew Clements <aclements@usaid.gov>
**Sent:** Tue, 11 Feb 2020 12:25:17 -0500
**Subject:** Re: plrease review
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**Cc:** Christine Kreuder Johnson <ckjohnson@ucdavis.edu>, Cara Chrisman <cchrisman@usaid.gov>, "Pereira, Alisa (GH/HIDN)" <apereira@usaid.gov>, Amalhin Shek <ashek@usaid.gov>, Jonna Mazet <jkmazet@ucdavis.edu>, Tracey Goldstein <tgoldstein@ucdavis.edu>, Elizabeth Leasure <ealeasure@ucdavis.edu>

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*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

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We can add the report on the nCoV work as an addendum to the final report with a due date of 12/31/20.

Does that sound okay?

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Hope that helps answer your question in some small way.

/ckj

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Please let us know what additional information you need from us to get this going.

Many thanks,

Chris

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**To:** Jonna Mazet <jkmazet@ucdavis.edu>, Christine Kreuder Johnson <ckjohnson@UCDAVIS.EDU>
**Cc:** Cara Chrisman <cchrisman@usaid.gov>, David John Wolking <djwolking@ucdavis.edu>, Elizabeth Leasure <ealeasure@UCDAVIS.EDU>, Alisa Pereira <apereira@usaid.gov>, Amalhin Shek <ashek@usaid.gov>
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costed out to the penny so don't go too crazy!

Thanks!

Andrew

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*For more information on USAID's Emerging Pandemic Threats program, see* http://www.usaid.gov/ept2

<PREDICT nCoV extended scope 2-4-20 [UCD].docx>

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**Sent:** Tue, 11 Feb 2020 12:25:34 -0500
**Subject:** Re: Quick request for tomorrow
**To:** David J Wolking <djwolking@ucdavis.edu>
**Cc:** Christine Kreuder Johnson <ckjohnson@ucdavis.edu>, Cara Chrisman <cchrisman@usaid.gov>, "Pereira, Alisa (GH/HIDN)" <apereira@usaid.gov>, Amalhin Shek <ashek@usaid.gov>, Jonna Mazet <jkmazet@ucdavis.edu>, Tracey Goldstein <tgoldstein@ucdavis.edu>, Elizabeth Leasure <ealeasure@ucdavis.edu>

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On Feb 11, 2020, at 2:19 PM, David J Wolking <djwolking@ucdavis.edu> wrote:

> Hi Andrew,
> I worked with our technical team on the numbers yesterday and again early this morning. There is a lot of dependency between the number of countries, sample sizes, and testing costs (e.g., type of testing). Ultimately, testing costs will be dictated by the strategy and plan we land on with you all, but here's a quick and rough cut on what was proposed so far.

These are fully loaded testing costs and include all personnel, travel, supplies, etc. required for success.

- All-in Objectives 1 & 2 (outbreak assistance for labs in all 28 countries + the reservoir host scope in ~8 countries): $3.56M
- Objective 2 only (focus on reservoir host in ~8 countries): $1.71M

> I'm not nearly as skilled as Liz at this stuff and no time for her to check my work at this hour before OOB on the East Coast, so I'm happy to connect with you and Chris if you have questions or concerns :-)

David

On Mon, Feb 10, 2020 at 2:06 PM Andrew Clements <aclements@usaid.gov> wrote:

> Hi Chris,
> By OOB tomorrow, can you give us a rough estimate (this is a no more than 15 minute exercise) of the cost for the testing under the extension?

Note that the testing would have to be done in the first three months according to a note relayed to me by Cara.

Thanks!

Andrew

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Thanks. Yes on keeping the SMT calls going.

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On Feb 12, 2020, at 4:17 AM, Christine Kreuder Johnson <ckjohnson@ucdavis.edu> wrote:

> Andrew,
> Great news that this is moving forward. We agree that timely reporting is of utmost importance and are still aiming for 90 days after 3/31. As you know, we were on a very tight timeline for what we hoped to achieve for this, and the outbreak has caused us to miss a few milestones over the past few weeks but hopefully we can get back on track for everything we want to accomplish. Plan for an nCoV addendum sounds good. We'll be giving you regular updates on our SMT calls too, which hopefully can be extended past March with an extension.
> Thank you
> /ckj
>
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*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email:* aclements@usaid.gov
On Feb 8, 2020, at 2:03 AM, Christine Kreuder Johnson <ckjohnson@ucdavis.edu> wrote:

Andrew,
The extended scope looks great to us all. We have a few edits tracked in attached for you to consider.
For Objective 1, we would prioritize outbreak assistance to the 28 countries in Asia and Africa. We think this could be most feasibly done by sending an outbreak kit of primers and probes that could test 300 or so samples from suspect human cases. We will also need to provide test confirmation support/expertise.
For Objective 2, an initial plan would involve 1) retesting samples from suspected bat reservoirs with the more sensitive PCR assay, 2) testing sympatric hosts in market and trade settings that could be intermediate host(s), 3) looking for serologic evidence in people at high risk of exposure, and 4) further characterization of high priority coronaviruses we've detected. As we all discuss more with partners, we would be keen to update this plan with the latest insights from you and the team.
We would propose retesting approximately 500 animals by PCR and 400 people by serology in Asia and Southeast Asia countries.
From our quick look at the P1 and P2 archive, we have plenty of animals and people sampled at relevant interfaces in prioritized countries. We also have about 250 *Rhinolophus affinis* sampled, which is the but species with the closest genetic relative to nCoV, and we have about 2,000 other *Rhinolophus* species sampled in the region (as cross-species transmission among co-occurring bats of the same spp is likely).
As you noted, we will need to sort out TVPA permissions, etc and determine which Asia and Southeast Asia countries will be most feasible in this v short timeline.
Hoping we can propose up to the $4.3M ceiling, with draft estimates as follows:
Salaries and wages: $467,403
Fringe benefits: $211,666
Travel: $64,400
Contractual: $746,271
Supplies: $1,521,480
Other costs: $7,000
Indirect costs: $1,295,068
We will need a little more time to come up with budget estimates by country but we could expect about 1/3 of effort/activities to go toward countries needing assistance under Objective 1 (28 countries), and 2/3 toward the ~ 8 countries neighboring China and/or within epizone of the suspected reservoir species.
Please let us know what additional information you need from us to get this going.
Many thanks,
Chris

---

**From:** Andrew Clements <aclements@usaid.gov>
**Date:** Tuesday, February 4, 2020 at 10:03 AM
**To:** Jonna Mazet <jkmazet@ucdavis.edu>, Christine Kreuder Johnson <ckjohnson@UCDAVIS.EDU>

**Cc:** Cara Chrisman <cchrisman@usaid.gov>, David John Wolking <djwolking@ucdavis.edu>, Elizabeth Leasure <ealeasure@UCDAVIS.EDU>, Alisa Pereira <apereira@usaid.gov>, Amalhin Shek <ashek@usaid.gov>

**Subject:** plrease review

Here's a first draft. Feel free to add specificity and add numbers of countries and samples that could be tested. Please also include a budget estimate against the usual sorts of categories used under Predict-2.

If you can get back to us by the end of the week, that would be great. It doesn't need to be voluminous or
costed out to the penny so don't go too crazy!

Thanks!

Andrew

P.S. As usual, this is not a commitment of funding by USAID.

Andrew Clements, Ph.D.
Senior Scientific Advisor
Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health
U.S. Agency for International Development
Mobile phone: 1-571-345-4213
E-mail: aclements@usaid.gov

*For more information on USAID's Emerging Pandemic Threats program, see:* http://www.usaid.gov/epet

<PREDICT nCoV extended scope 2-4-20 [UCD].docx>

**From:** Peter Daszak <daszak@ecohealthalliance.org>
**To:** Dennis Carroll <[redacted]>
**Cc:** Alison Andre <andre@ecohealthalliance.org>, Cara Chrisman <cchrisman@usaid.gov>, Cheryl Bennett <cheryl@gisaid.org>, "Dr. Suzan Murray" <MurrayS@si.edu>, Eddy Rubin <erubin@metabiota.com>, "Jennifer Gardy [redacted]", Jonna Mazet <jkmazet@ucdavis.edu>, Natalia Mercer <nmercer@gvn.org>, Oyewale Tomori [redacted], Peter Bogner <peter@gisaid.org>, Robert Kessler <kessler@ecohealthalliance.org>, Samtha Maher <maher@ecohealthalliance.org>, "cbrechot@gvn.org" <cbrechot@gvn.org>, "graca@usf.edu" <graca@usf.edu>
**Subject:** RE: GVP featured in NY Times Op Ed today
**Sent:** Fri, 28 Feb 2020 23:18:43 +0000

Fantastic interview Dennis – you came across as the "Voice of Reason", with a great zinger at the end about leadership from the top!

Will hunt for clips later and send round to all...

Cheers,

Peter

**Peter Daszak**
*President*

EcoHealth Alliance
460 West 34th Street – 17th Floor
New York, NY 10001

Tel. +1 212-380-4474
Website: www.ecohealthalliance.org
Twitter: @PeterDaszak

*EcoHealth Alliance leads cutting-edge research into the critical connections between human and wildlife health and delicate ecosystems. With this science we develop solutions that prevent pandemics and promote conservation.*

---

**From:** Peter Daszak
**Sent:** Friday, February 28, 2020 6:10 PM
**To:** 'Dennis Carroll'
**Cc:** Alison Andre; Cara Chrisman; Cheryl Bennett; Dr. Suzan Murray; Eddy Rubin; Jennifer Gardy [redacted]; Jonna Mazet; Natalia Mercer; Oyewale Tomori; Peter Bogner; Robert Kessler; Samtha Maher; cbrechot@gvn.org; graca@usf.edu
**Subject:** RE: GVP featured in NY Times Op Ed today

OK – watching it now Dennis, but I'm upping the ante – I'll be on CNN - Don Lemon's show tonight around 10:35-10:50pm.

I'll get a plug in for the GVP if I can..

Cheers,

Peter

**Peter Daszak**
*President*

EcoHealth Alliance
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**From:** Dennis Carroll [mailto:d[REDACTED]
**Sent:** Friday, February 28, 2020 5:12 PM
**To:** Peter Daszak
**Cc:** Alison Andre; Cara Chrisman; Cheryl Bennett; Dr. Suzan Murray; Eddy Rubin; Jennifer Gardy[REDACTED]; Jonna Mazet; Natalia Mercer; Oyewale Tomori; Peter Bogner; Robert Kessler; Samtha Maher; cbrechot@gvn.org; graca@usf.edu
**Subject:** Re: GVP featured in NY Times Op Ed today

FYI, I'll be on Judy Woodruff News Hour tonight 6:10ish - live

On Thu, Feb 27, 2020 at 9:14 AM Peter Daszak <daszak@ecohealthalliance.org> wrote:
Here's my op-ed in the NY Times today. Front page of NYT International also.

Clear case made for GVP, and the online version has a direct link to our website.

https://www.nytimes.com/2020/02/27/opinion/coronavirus-pandemics.html

Cheers,

Peter

**Peter Daszak**
*President*

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**From:** Peter Daszak

**Sent:** Wednesday, February 26, 2020 11:54 PM
**To:** 'Oyewale Tomori'; Samantha Maher (maher@ecohealthalliance.org)
**Cc:** Peter Bogner; Dennis Carroll; cbrechot@gvn.org; Jennifer Gardy [REDACTED] Jonna Mazet; Eddy Rubin; Dr. Suzan Murray; Cheryl Bennett; graca@usf.edu; Natalia Mercer; Alison Andre; Cara Chrisman; Robert Kessler (kessler@ecohealthalliance.org)
**Subject:** RE: GVP publicity: USA Today & NY Times
**Importance:** High

Nice story in the widely distributed journal USA Today:

https://www.usatoday.com/story/news/nation/2020/02/25/coronavirus-pandemic-can-outbreak-still-be-stopped/4865934002/

with Quote from Dennis Carroll: Dennis Carroll, former director of the U.S. Agency for International Development's Global Health Security and Development Unit, credited China's "extraordinary control measures" with delaying the spread of the virus, but he said avoiding a pandemic is "very unlikely."

"The dramatic uptick of cases in South Korea, Iran and Italy are reflective of a self-sustaining spreading of the virus and a clear message that the horse is out of the barn," Carroll, who leads the Global Virome Project science cooperative, told USA TODAY.

Tomorrow morning US Eastern time, there will be an Op Ed in the New York Times International, that will likely also appear in NY Times US edition online that will link to the GVP – details to come…

Cheers,

Peter

**Peter Daszak**
*President*

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New York, NY 10001

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Website: www.ecohealthalliance.org
Twitter: @PeterDaszak

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**From:** Oyewale Tomori [mailto:[REDACTED]
**Sent:** Friday, February 21, 2020 4:45 AM
**To:** Samtha Maher
**Cc:** Peter Bogner; Dennis Carroll; cbrechot@gvn.org; Peter Deszak; Jennifer Gardy [REDACTED]; Jonna Mazet; Eddy Rubin; Dr. Suzan Murray; Cheryl Bennett; graca@usf.edu; Natalia Mercer; Alison Andre; Cara Chrisman
**Subject:** Re: GVP Board Calls and Meeting Minutes

Thanks Samantha
Looking forward to the telecon on 27th
Regards

Oyewale
*Oyewale TOMORI*
Tel: +REDACTED

On Thu, Feb 20, 2020 at 9:31 PM Samantha Maher <maher@ecohealthalliance.org> wrote:
Dear GVP Board Members,

Thank you to everyone who attended our Initial Board of Directors in Washington DC this past week. It was wonderful to get everyone together, and I am excited about what the future holds for the Global Virome Project!

As decided at the meeting, we will be having monthly calls on the fourth Thursday at 1 pm EST, starting on February 27th. I will be sending out a calendar invite with the conference line information today for each month's call- please add that to your calendars. If you did not attend the meeting and this time does not work for you, please let me know.

I will also be sending out the meeting notes and materials before the call in addition a list of action items agreed upon during the meeting. Please send any agenda items for the call to me a day in advance and I will put together an agenda. This meeting fill focus on moving forward with fundraising efforts.

Sincerely,

Sam Maher

--

**Samantha Maher, MESc**
*Research Scientist, Conservation and Health*

EcoHealth Alliance
460 West 34th Street Ste. 1701
New York, NY 10001

212.380.4464 (direct)
REDACTED (mobile)
212.380.4465 (Fax)
www.ecohealthalliance.org

*EcoHealth Alliance develops science-based solutions to prevent pandemics and promote conservation.*

--

Dr Dennis Carroll
President, Global Virome Project
Senior Fellow, Scowcroft Institute of International Affairs at the Bush School of Government and Public Service, Texas A&M University
Counselor and Advisor to the Faculty of Tropical Medicine at Mahidol University

mobile: REDACTED
email: REDACTED

**From:** Andrew Clements <aclements@usaid.gov>
**To:** David J Wolking <djwolking@ucdavis.edu>
**CC:** Cara J. Chrisman <cchrisman@usaid.gov>;Amathin Shek <ashek@usaid.gov>;Alisa Pereira Emerging Threats Division <apereira@usaid.gov>;predict@ucdavis.edu <predict@ucdavis.edu>;Christine Kreuder Johnson <ckjohnson@ucdavis.edu>
**Sent:** 3/30/2020 4:56:53 PM
**Subject:** [predict] Re: Review: Draft press release and communications for PREDICT COVID-19 Support

Sorry, my comments were on the Predict news piece. Will have to look at the press piece.

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

On Mar 30, 2020, at 6:47 PM, David J Wolking <djwolking@ucdavis.edu> wrote:

Thanks Andrew, we'll adjust accordingly.

Any thoughts on a joint (USAID and UC Davis) release or should we just plan to push this out through the UCD channel and share with you all for amplification?

Also - any thoughts on the "PREDICT News" brief below that we would send out with the release to country partners and the global network in a more directed way?

Best,

David

On Mon, Mar 30, 2020 at 8:59 AM Andrew Clements <aclements@usaid.gov> wrote:
Hi David,

My comments:

1. I suggest moving the part about the COVID work (last paragraph) up to the beginning since that is the title of the communication. The other text can follow as background/justification.

2. In line with our discussion last week, I suggest finessing the language to indicate that there are limits to how much technical and other assistance will be available during the P2 extension so that we can manage expectations and not get inundated with requests for all kinds of support.

3. In mentioning the animal surveillance, the language says that the information will be used to develop strategies to reduce risk of future spillover. It would be good to make it very clear that Predict will not be able to develop strategies and that others will have to do that.

Let me know if you have any questions.

Andrew

*Andrew P. Clements, Ph.D.*

*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
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On Mar 27, 2020, at 11:04 PM, David J Wolking <djwolking@ucdavis.edu> wrote:

Andrew and team,

Attaching the draft press release here for your review in addition to the general communication for our network (see below). We'd love your feedback and to hear if USAID is planning any press or if UCD should go ahead with our one version vs. a joint release as done in the past.

Enjoy the weekend.

David

On Thu, Mar 26, 2020 at 3:38 PM David J Wolking <djwolking@ucdavis.edu> wrote:
Hi Andrew and team,

Any feedback on this message below? After our talk yesterday it likely needs some edits but if the overall tone is acceptable we'll move forward with it in some form.

Also - on the topic of a press release which would be sent around the same time, would USAID want to do a joint release or should UC Davis proceed independently (with your review of content and blessing of course) since you've already notified the missions and field offices?

Thanks!

David

On Wed, Mar 25, 2020 at 10:04 AM David J Wolking <djwolking@ucdavis.edu> wrote:

Hi Andrew,

This is a message we are planning to share with our global network and with you for distribution about the 6-month extension.

Let us know what you think, we are hoping go get this out into the universe this week if possible.

David
---------- Forwarded message ---------
From: **PREDICT Consortium** <predict@ucdavis.edu>
Date: Wed, Mar 25, 2020 at 9:21 AM
Subject: [TEST] PREDICT: COVID-19 Support
To: <djwolk@gmail.com>

preview email

# PREDICT

The emergence of COVID-19 highlights the critical importance of strengthening capabilities in surveillance, detection, and characterization of zoonotic threats, especially viruses that can be transmitted between animals and people. Since 2009, **PREDICT** has empowered partners in over 30 countries to deploy a One Health approach for zoonotic disease prevention, detection, and response. Our teams have collected and tested samples from over 164,000 animals and people and detected almost 1,200 potentially zoonotic viruses, among them 160 novel coronaviruses, including multiple SARS- and MERS-like coronaviruses.

In the earliest phase of the current COVID-19 outbreak, several of our laboratories in the South and Southeast Asia region were called into action to support early detection of the novel coronavirus now known as SARS-CoV-2 in patients. Using PREDICT's pathogen detection and discovery strategy, which uses broad-spectrum tools to detect viruses and their novel near neighbors, these labs independently detected the new virus before the availability of specific tests and supported national outbreak response plans. Additionally, through the network catalyzed by PREDICT, these colleagues continue to share information and data and work together to optimize detection and diagnostics, as cases in the region and across the globe continue to rise.

PREDICT's work illuminate both the threat that emerging viruses pose to us, as well as the impact that strategic investments in strengthening pre-emptive capacity for virus surveillance can have on rapid disease detection and response.

Building on these successes, the United States Agency for International Development

(USAID) has granted PREDICT an extension to continue working with our collaborating laboratories and global network to provide emergency support and short-term assistance during the pandemic. During this extension (through September 30, 2020), PREDICT will provide technical assistance with detection and characterization of human and animal SARS CoV-2 cases and general support for the COVID-19 public health response in partner countries. Additionally, PREDICT plans to continue investigations into the animal source(s) of this virus and other potential transmission hosts to help develop strategies aimed at reducing the risk of future spillovers of SARS CoV-2 and other yet-to-be identified viruses.

For questions on PREDICT's extension and plans for COVID-19 support, please contact **predict@ucdavis.edu**

To learn more about our work please visit: **www.p2.predict.global**

# IN THE NEWS



Simon Anthony, author of our landmark coronavirus diversity study, addresses concerns regarding the current novel coronavirus epidemic in China. Read more **here**.



There are about 1.67 million unknown viruses of the type that have previously emerged in people. Discovering and sequencing them should be a priority. Read more **here**.

Additional resources:

- **Pandemic: How to Prevent an Outbreak (Netflix)**
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- **PREDICT special feature: COVID-19 (PDF available for download)**

***PREDICT was initiated in 2009 to strengthen global capacity for detection and discovery of viruses with pandemic potential that can move between animals and people. Learn more at p2.predict.global.***

UCDUSR0002920

| | |
|---|---|
| **From:** | Andrew Clements <aclements@usaid.gov> |
| **To:** | Tracey Goldstein <tgoldstein@ucdavis.edu> |
| **CC:** | David J Wolking <djwolking@ucdavis.edu>;Amathin Shek <ashek@usaid.gov>;Alisa Pereira Emerging Threats Division <apereira@usaid.gov>;Cassandra Louis Duthil <clouisduthil@usaid.gov>;predict@ucdavis.edu <predict@ucdavis.edu> |
| **Sent:** | 4/1/2020 8:36:20 AM |
| **Subject:** | [predict] Re: Embargoed countries - UC Davis supply chain management list |

Thanks

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

On Apr 1, 2020, at 12:10 AM, Tracey Goldstein <tgoldstein@ucdavis.edu> wrote:

Thanks David, I already sent this, sorry didn't cc you... Marilyn sent an updated link of current countries that I have forwarded to UC Davis shipping
https://www.whitehouse.gov/presidential-actions/presidential-memorandum-determination-respect-efforts-foreign-governments-regarding-trafficking-persons/.

On Tue, Mar 31, 2020 at 3:06 PM David J Wolking <djwolking@ucdavis.edu> wrote:
Hi Andrew,

Following up from today's call. Below is the list that our university campus refers to as a source of embargoed countries (the recent decision to disallow shipment to Myanmar triggered this message).

Let us know if the "waiver for life saving conditions" would apply here and might help us out.

Thanks!

David

**From:** Mark D Blankinship <marblankinship@ucdavis.edu>
**Date:** Monday, March 30, 2020 at 12:00
**To:** Alexandre Tremeau-Bravard <atremeau@ucdavis.edu>
**Subject:** FW: CASE0045104 has been assigned to group FOA SCM - AggieShip

We cannot ship to embargoed countries. Please contact office of compliance if future assistance is needed. Here is the list.

https://en.wikipedia.org/wiki/United_States_sanctions

**Mark Blankinship**

Mail Operations & Logistics Supervisor

_____ | 530-752-8623

--

| | |
|---|---|
| **From:** | Andrew Clements <aclements@usaid.gov> |
| **To:** | David J Wolking <djwolking@ucdavis.edu> |
| **CC:** | ohi-covid-coms@ucdavis.edu <ohi-covid-coms@ucdavis.edu>;Cara J. Chrisman <cchrisman@usaid.gov>;Amalhin Shek <ashek@usaid.gov>;Alisa Pereira Emerging Threats Division <apereira@usaid.gov>;predict@ucdavis.edu <predict@ucdavis.edu>;Christine Kreuder Johnson <ckjohnson@ucdavis.edu> |
| **Sent:** | 4/1/2020 4:40:29 PM |
| **Subject:** | [predict] Re: Review: Draft press release and communications for PREDICT COVID-19 Support |

Thanks

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

On Apr 1, 2020, at 5:30 PM, David J Wolking <djwolking@ucdavis.edu> wrote:

Thanks Andrew, much appreciated.

We're tracking media attention so will keep you posted on news and loop in Amalhin and USAID in the social media strategy. Copying our newly formed communications task force here for awareness.

David

On Wed, Apr 1, 2020 at 6:45 AM Andrew Clements <aclements@usaid.gov> wrote:
Hi David,

Confirming by email what I said on the phone yesterday. Go ahead with a UCD press release (no quotes from USAID). USAID will not issue a press release.

Andrew

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
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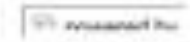
UCDU5R00002927







**From:** William B. Karesh <karesh@ecohealthalliance.org>
**To:** Jonathan M Sleeman <jsleeman@usgs.gov>
**CC:** Peter Daszak <daszak@ecohealthalliance.org>;Jonna Mazet <jkmazet@ucdavis.edu>;Tony Goldberg <tony.goldberg@wisc.edu>
**Sent:** 4/8/2020 3:47:39 PM
**Subject:** Re: STOP-Spillover

Always a pleasure to work with you and the NWHC team.

BK

**William B. Karesh, D.V.M**
*Executive Vice President for Health and Policy*

EcoHealth Alliance
460 West 34th Street - 17th Floor
New York, NY 10001 USA

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President, OIE Working Group on Wildlife

Co-chair, IUCN Species Survival Commission - Wildlife Health Specialist Group

EPT Partners Liaison, USAID Emerging Pandemic Threats - PREDICT-2 Program

***EcoHealth Alliance develops science-based solutions to prevent pandemics and promote conservation.***

On Apr 8, 2020, at 9:13 AM, Sleeman, Jonathan M <jsleeman@usgs.gov> wrote:

Dear Peter, Jonna, and Billy,

I hope this note finds you safe and well. Tony and I have been discussing the recent the STOP-Spillover conference call and we realized that we should probably reach out to you. We've been engaged in some unique activities lately that could form a stand-alone project, and we've been in discussions with USAID about these activities, but there are also advantages to various types of partnerships, depending on what everyone is planning.

Please let us know if you are interested in discussing ideas, and we will set up a call. Thanks for your consideration during this very busy time. We look forward to hearing from you.

Best wishes,

Jonathan

Jonathan Sleeman, MA, VetMB, Dipl. ACZM, Dipl. ECZM, MRCVS
[he/him/his]

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***The USGS National Wildlife Health Center's mission is to advance wildlife health science for the benefit of animals, humans, and the environment***

***OIE Collaborating Centre for Wildlife Health and Biodiversity***

***"I am what I am thanks to what we all are" Ubuntu Philosophy***

**From:** Jon Epstein <epstein@ecohealthalliance.org>
**Sent:** Wed, 22 Apr 2020 22:40:27 -0400
**Subject:** Re: Thank you Dr. Epstein!
**To:** Brian Bird <bhbird@ucdavis.edu>
**Cc:** "Jonna A.K. Mazet" <jkmazet@ucdavis.edu>, Woutrina Smith <wasmith@ucdavis.edu>, Kevin Olival <olival@ecohealthalliance.org>

Thanks, Brian! I was happy to do it.
I thought each of the speakers was really good and kept the discussion interesting.

Nice work all around guys!

Cheers,
Jon

On Wed, Apr 22, 2020 at 10:34 PM Brian Bird <bhbird@ucdavis.edu> wrote:

> That was great… thanks so much for being the moderator it was great! 

-B


--
Jonathan H. Epstein DVM, MPH, PhD

*Vice President for Science and Outreach*

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*EcoHealth Alliance develops science-based solutions to prevent pandemics and promote conservation*

**From:** Dennis Carroll [REDACTED]
**Sent:** Sat, 25 Apr 2020 09:38:29 -0400
**Subject:** Fwd: Goals for our discussion
**To:** Jonna Mazet <jkmazet@ucdavis.edu>, Peter Daszak <daszak@ecohealthalliance.org>
FDA One Health Steering Committee Goals and Objectives final.docx

A bit more info from FDA on what they might be thinking

---------- Forwarded message ---------
From: **Jones, Estella** <Estella.Jones@fda.hhs.gov>
Date: Fri, Apr 24, 2020 at 10:50 PM
Subject: Goals for our discussion
To: [REDACTED]
CC: Skinner, Brianna <Brianna.Skinner@fda.hhs.gov>, MacGill, Tracy <Tracy.MacGill@fda.hhs.gov>, Orr, Robert <Robert.Orr@fda.hhs.gov>

Dear Dr. Carroll,

It was great to speak with you today and have a chance to discuss the opportunities for future collaborations between GVP/PREDICT and the FDA. I have attached the goals of FDA's One Health Steering Committee and would like to call particular attention to Goal # 4. This plan has been endorsed by our Office of the Chief Scientist, under the Office of the Commissioner and we are particularly interested in helping prevent the next pandemic, as well as being prepared to interrupt the next emerging infectious disease outbreak.

I will provide a teleconference number prior to next Friday's discussion.

All the best,

Estella


RADM Estella Z. Jones, D.V.M.

U.S. Public Health Service

Assistant Surgeon General

Deputy Director

Office of Counterterrorism and Emerging Threats

Co-Chair, FDA Animal Welfare Council

Office of the Chief Scientist

Office of the Commissioner
U.S. Food and Drug Administration

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--

Dr Dennis Carroll
President, Global Virome Project
Senior Fellow, Scowcroft Institute of International Affairs at the Bush School of Government and Public Service, Texas A&M University
Counselor and Advisor to the Faculty of Tropical Medicine at Mahidol University, Bangkok, Thailand

mobile: REDACTED
email: REDACTED

# FDA One Health Steering Committee Goals and Objectives

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**FDA One Health Vision**: Optimal public health outcomes for humans and animals in their shared environment.

**FDA One Health Mission:** FDA collaborates with stakeholders across disciplines and sectors to promote the health of humans, animals, and the environment using science, technology, and innovation.

Goal 1: Create a multi-disciplinary mindset for the internal and external FDA stakeholders.

Objective 1: Build bridges among interested people.

**Action 1:** Develop a scientific working group for One Health through the Senior Science Council (SSC).

**Action 2:** Implement One Health training and interactive learning series.

Objective 2: Develop innovative ways for OH information sharing.

**Action 1:** Create FDA One Health websites.

**Action 2:** Create a shared set of documents for Centers to use to educate staff and leadership about One Health.

**Action 3:** Collect publications and presentations to be given internally and externally.

Objective 3: Engage FDA leadership to use the One Health approach.

**Action1:** Provide information to leadership about FDA's One Health approach.

**Action 2:** Encourage and Communicate with leadership to integrate the One Health approach whenever possible for current work.

Objective 4: Engage and communicate with external stakeholders.

**Action 1:** Hold a first One Health *Public Forum* with the Commissioner as keynote speaker and leadership panel.

Objective 5: Include diverse populations and communities in One Health policies and decision-making.

**Action 1:** Give One Health talks on behalf of FDA.

**Action2:** Collaborate on projects with a variety of Centers and Offices (*e.g.*, ORWHHE and FDA affinity groups looking at opioid addiction).

**Action 3.** Reflect One Health in the Regulatory Science Strategic Focus Areas.



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Goal 2: Provide Infrastructure to Sustain the Effort.

Objective 1: Develop mechanisms to track, coordinate, and initiate One Health activities (internal audience focus first for FY20).

**Action 1:** Develop a SharePoint site.

**Action 2:** Helping to ensure committee members have support within each Center.

Objective 2: One Health supports CVM's submission of an FDA budget and the One Health organizational structure for FY22.

**Action 1:** Create internal Center infrastructure to build a bridge between all Centers.

Objective 3: Create a governance structure for One Health activities.

**Action 1:** Create a charter for the FDA One Health Steering Committee that lays out roles and responsibilities for the One Health Steering Committee, the Co-Chairs, and members.

Goal 3: Engage Governmental Partners in Coordination, Communication, Outreach, and Inclusivity.

Objective 1: Determine what other government agencies already integrate One Health approaches into their activities.

**Action 1:** Invite representatives from other government agencies to present to the One Health Steering Committee Steering Committee and share how their One Health Steering Committee has enhanced their ability to fulfill their mission.

**Action 2:** Create awareness of One Health with FDA representatives to National Science and Technology Council (NSTP) and various subcommittees.

**Action 3:** Identify if anyone in Office of Science and Technology Policy Council (OSTP) is overseeing One Health activities for government, and if so, initiate FDA participation.

Goal 4: Reach Globally to expand FDA's Impact on Using OH Approach.

Objective 1: Have an international presence through talks, publications, and meetings.

**Action 1:** Include a slide on One Health for One Health Steering Committee members and staff who speak at international events or conferences.

Objective 2: Ensure that any FDA emergency preparedness plans consider aspects of One Health.

**Action 1:** Ensure Office of Counterterrorism and Emerging Threats (OCET) representation on One Health Steering Committee.

Objective 3: Participate in relevant international activities/groups.

**Action 1:** Determine what groups already exist focused on One Health Steering Committee, e.g., World Health Organization (WHO), and identify how to engage/participate.



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**From:** Stefano M Bertozzi <sbertozzi@berkeley.edu>
**Sent:** Thu, 7 May 2020 17:45:24 -0700
**Subject:** Fwd: USAID grant opportunity for stopping spillover of zoonotic viruses
**To:** Ben Oppenheim <boppenheim@metabiota.com>, Jonna Mazet <jkmazet@ucdavis.edu>, Dean Jamison <djamison@uw.edu>, Nita Madhav <nmadhav@metabiota.com>
T200AA20RFA00007 NOFO STOP Spillover.pdf

Dear all -- we (UCB) are clearly in no position to bid for this project as prime -- but if you are considering it or considering joining a consortium and might be interested in what we bring to the table, I'd love to have a discussion.
Many tks,
Stef

---------- Forwarded message ---------
From: **Smith Hughes, Carolyn** <Carolyn.Smithhughes@ucsf.edu>
Date: Tue, May 5, 2020 at 7:54 AM
Subject: USAID grant opportunity for stopping spillover of zoonotic viruses
To: sbertozzi@berkeley.edu <sbertozzi@berkeley.edu>

Hi Stef,

Hope you're doing well! If I recall correctly, you were or have been working on a project that includes modeling and prediction for zoonotic virus transmission to humans. If that's the case, I wanted to send you the following USAID opportunity, in case you and your team are interested. The NOFO is also attached.

https://www.grants.gov/web/grants/view-opportunity.html?oppId=325046

STOP Spillover will use existing and new evidence to develop, deploy, and evaluate interventions to reduce the spillover of emerging zoonotic viruses at high-risk animal-human interfaces and reduce amplification and spread of these threats at high-risk foci such as health care facilities. The goal of STOP Spillover is enhanced understanding and reduced risk of zoonotic viral spillover, amplification, and spread. The overall strategic focus of STOP Spillover will be on reducing spillover of emerging zoonotic viruses from wildlife to people and reducing amplification and spread of zoonotic viruses in people after they have spilled over from wildlife

Thanks!
Carolyn


--
**Stefano M Bertozzi MD, PhD**
Dean Emeritus and Professor of Health Policy & Management
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| | |
|---|---|
| Issue Date: | May 1, 2020 |
| Deadline for Question: | May 11, 2020, 1:00 p.m., Washington, DC Time |
| Closing Date: | June 1, 2020 |
| Closing Time: | 1:00 p.m., Washington, DC Time |

Subject: Notice of Funding Opportunity (NOFO) Number: 7200AA20RFA00007

Program Title: Strategies To Prevent (STOP) Spillover

Catalog of Federal Domestic Assistance (CFDA) Number: 98.001

Ladies/Gentlemen:

The United States Agency for International Development (USAID) is seeking applications for a cooperative agreement from qualified entities to implement the Strategies To Prevent (STOP) Spillover program. Eligibility for this award is not restricted.

USAID intends to make an award to the applicant(s) who best meets the objectives of this funding opportunity based on the merit review criteria described in this NOFO subject to a risk assessment. Eligible parties interested in submitting an application are encouraged to read this NOFO thoroughly to understand the type of program sought, application submission requirements and selection process.

To be eligible for award, the applicant must provide all information as required in this NOFO and meet eligibility standards in Section C of this NOFO. This funding opportunity is posted on www.grants.gov, and may be amended. It is the responsibility of the applicant to regularly check the website to ensure they have the latest information pertaining to this notice of funding opportunity and to ensure that the NOFO has been received from the internet in its entirety. USAID bears no responsibility for data errors resulting from transmission or conversion process. If you have difficulty registering on www.grants.gov or accessing the NOFO, please contact the Grants.gov Helpdesk at 1-800-518-4726 or via email at support@grants.gov for technical assistance.

USAID may not award to an applicant unless the applicant has complied with all applicable unique entity identifier and System for Award Management (SAM) requirements detailed in Section D.6.f. The registration process may take many weeks to complete. Therefore, applicants are encouraged to begin registration early in the process.

Please send any questions to the point(s) of contact identified in Section D. The deadline for questions is shown above. Responses to questions received prior to the deadline will be furnished to all potential applicants through an amendment to this notice posted to www.grants.gov.



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Issuance of this notice of funding opportunity does not constitute an award commitment on the part of the Government nor does it commit the Government to pay for any costs incurred in preparation or submission of comments/suggestions or an application. Applications are submitted at the risk of the applicant. All preparation and submission costs are at the applicant's expense.

Thank you for your interest in USAID programs.

Sincerely,

Patricia Elena Bradley (affiliate)

Digitally signed by Patricia Elena Bradley (affiliate)
Date: 2020.05.01 14:27:43 -04'00'

Patricia Bradley
Agreement Officer



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## SECTION A: PROGRAM DESCRIPTION

This funding opportunity is authorized under the Foreign Assistance Act (FAA) of 1961, as amended. The resulting award will be subject to 2 CFR 200 – Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards, and USAID's supplement, 2 CFR 700, as well as the additional requirements found in Section F.

### STRATEGIES TO PREVENT (STOP) SPILLOVER

### 1. Introduction

The recent spillovers of Ebola, Nipah, and SARS-CoV-2 viruses from wildlife are vivid reminders that gaps remain in the ability of countries to effectively manage outbreaks of emerging zoonotic viruses. For STOP Spillover, "emerging zoonotic viruses" include those that spill over from animals (through direct contact with animal reservoirs or intermediate hosts) to cause sporadic outbreaks, epidemics, or pandemics in human populations; these viruses do not routinely circulate within the human population. For the purposes of this document, "spillover" is defined as an event in which an emerging zoonotic virus is transferred from one animal host (livestock or wildlife) to another or to humans. Examples include Ebola, Lassa, Marburg, MERS-CoV, Nipah, SARS, and SARS-CoV-2. Viruses transmitted by insect vectors or that are "dead-end" infections in humans (e.g. rabies) are not included in the definition of "emerging".

A first line of defense against emerging zoonotic viruses is dependent on countries having adequate capacities for monitoring and reducing spillover of viruses from wildlife to people (either directly or through intermediate animals such as livestock), but these are often not sufficiently robust as evidenced most-recently by the spillover of SARS-CoV-2 from animals to people in Wuhan, China. The secondary, "fail-safe" strategy of limiting amplification and spread of emerging zoonotic viruses in animals and/or people once spillover has occurred has also been shown to be unreliable. For the purposes of this document, "amplification" is defined as an increase in the number of copies of a zoonotic virus either within animal or human populations and "spread" refers to an increase in the geographic distribution of a zoonotic virus. Recent examples include the 2014-2016 West Africa Ebola epidemic which affected 10 countries in Africa, Europe, and North America and the current SARS-CoV-2 epidemic which has spread to at least 212 countries/territories in Africa, Asia, the Americas, Europe, and the Middle East. In the absence of widely-available specific vaccines or medicines to prevent or treat human infections with emerging zoonotic viruses, it is crucial that evidence-based interventions are developed and introduced to (1) reduce the risk of spillover of emerging zoonotic viruses from animals to people and (2) reduce the amplification and geographic spread of these threats once in the human population. Otherwise, individual countries and the global community will continue to be vulnerable to the human and economic losses associated with epidemics and pandemics caused by emerging zoonotic viruses.

Through STOP Spillover, the U.S. Agency for International Development (USAID) seeks to reduce the vulnerability of high-risk[1]/low-capacity countries in Asia and Africa to (1) spillover of emerging zoonotic viruses from animal hosts (such as livestock or wildlife) to humans and (2) amplification and spread of these viruses once they have spilled over to humans. For the purposes of the STOP Spillover activity "wildlife" shall include terrestrial species that may act as



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a host or reservoir for the transmission of zoonotic pathogens to humans, and does not include captive zoo animals, fish and aquatic species, insects, plants, or domesticated animals such as dogs or cats.

STOP Spillover will build on more than 15 years of USAID investments in promoting a multisectoral[2] (One Health) approach to addressing emerging zoonotic viruses before they pose an overwhelming epidemic or pandemic threat. Specifically, STOP Spillover will assist targeted African and Asian countries in strengthening their capacities to identify, assess, and monitor risk associated with emerging zoonotic viruses, and developing and introducing risk reduction measures. These efforts will appropriately address gender in the development of effective control and response strategies.

The dynamics of spillover, amplification, and spread of emerging zoonotic viruses are shown in the figure below. More information on how USAID will address these dynamics under STOP Spillover is provided in the following sections. Even though STOP Spillover is focused on emerging zoonotic viruses, it is expected that the capacities and risk-reduction interventions developed may also reduce spillover, amplification, and spread of other zoonotic diseases.




## 2. Overview of USAID's Global Health Security Program

Global Health Security (GHS) programming enables the U.S. government (USG)—in partnership with other nations, international organizations, and public and private stakeholders—to prevent avoidable epidemics, detect threats early, and respond rapidly and effectively to disease outbreaks. In May 2019, the USG approved the Global Health Security Strategy (GHSS)[3], outlining the USG's approach to strengthening global health security, including accelerating the capabilities of targeted countries to prevent, detect, and respond to infectious disease outbreaks. The Strategy pursues three interrelated goals: 1) strengthened partner country global health security capacities; 2) increased international support for global health security; and 3) a homeland prepared and resilient against global health threats. Given its foreign affairs mandate, USAID directly contributes to the first two goals. USAID funds and programming focus on: addressing the health security capacity gaps in targeted countries at



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high risk of infectious disease threats and outbreaks (USAID's major contribution to the Global Health Security Agenda [GHSA]); targeted, applied GHS research; and critical policy and advocacy support for GHS. USAID funding is critical to address the alarming increasing frequency and severity of infectious disease outbreaks now occurring globally.

**3. History and Evolution of USAID's Global Health Security Investments**

**Evolution of Global Health Security Programming - A Decade of Learning and Adapting.** For more than 15 years, USAID has been a leader in the global response to the dangers posed by emerging pandemic threats and has invested in programs with the dual goals of minimizing the impact of existing pandemic influenza threats, particularly from the highly pathogenic H5N1 avian influenza, and pre-empting the emergence and spread of novel pandemic and epidemic threats arising from animal populations. The first phase of the program primarily focused on supporting countries to address these zoonotic threats and developing an understanding at the global level of how they spillover, amplify, and spread in animal and human populations. The One Health approach for achieving these goals was built around a suite of investments and targeted partnerships designed to give earlier insight into the emergence of new public health threats and enhance country-level capacities across sectors to mitigate their potential impact. With a total investment of over $1 billion covering high-risk countries in Africa, Asia, Latin America, and the Middle East, USAID's program to address emerging threats is the largest and most-extensive One Health program ever implemented.

The guiding principles for USAID's Emerging Pandemic Threats (EPT) program (2009-2019) have been to:

- build on the understanding that the future well-being of humans, animals, and the environment are inextricably linked, a concept known as "One Health";
- promote a cross-sectoral, gender-responsive One Health approach that spans the animal health, public health, environmental, and conservation communities;
- target promotion of policies and strengthening of skills and capacities critical for both minimizing the risk of new disease emergence and the ability to limit their social, economic, and public health impact; and
- use a risk-based approach to target investments where the likelihood of disease emergence is greatest.

**EPT-1 (2009-2014):** The first iteration of EPT built off of a previous One Health line of work supported by USAID between 2005 and 2009 which was aimed at addressing the immediate threat posed by highly pathogenic H5N1 avian influenza (AI). The EPT-1 portfolio was focused on building the capacities and evidence base needed to mitigate the impact of novel "high-consequence pathogens" arising from animals.

Specifically, the EPT-1 portfolio consisted of four complementary activities, including strategic partnerships with the Food and Agricultural Organization of the United Nations (FAO), World



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Health Organization (WHO) and World Organization for Animal Health (OIE), and was implemented in more than 20 countries across Africa, Asia, and Latin America:

- PREDICT-1: Focused on building a global early warning system for the emergence of diseases that move between wildlife and people, primarily through detection and discovery of viruses from 25 high-consequence viral families in wildlife species that have frequent contact with humans.

- PREVENT: Aimed at characterizing risks associated with practices and behaviors that facilitate disease transmission between animals and humans and developing strategies for lowering the risk of disease spillover.

- IDENTIFY: A partnership among WHO, FAO, and OIE, focused on strengthening laboratory capacities to safely diagnose and report priority animal and human pathogens.

- RESPOND: Focused on the central role of local universities to train cadres of upcoming professionals and practitioners responsible for supporting, promoting, and implementing the One Health approach.

Key accomplishments:

- Established the "proof of principle" that countries can carry out safe capture and sampling of wildlife followed by conventional PCR testing of blood, urine, feces, or oral/nasal swabs for up to 25 families of zoonotic viruses; sampled more than 56,000 animals and identified 815 novel viruses and 169 known viruses, making it the most comprehensive viral detection and discovery effort at that time; identified which animal species (i.e. rodent, bats, and non-human primates) were most associated with spillover of emerging zoonotic viruses; developed a global "hot spots" map for emergence of viral zoonoses. PREDICT-1 final report: https://obi.vetmed.ucdavis.edu/sites/g/files/dgvnsk5251/files/files/page/predict-final-report-lo.pdf
- Identified that new zoonotic viruses that are capable of infecting diverse host species have higher pandemic potential since these viruses are more likely to amplify by human-to-human transmission with spread on a global scale. https://www.nature.com/articles/srep14830
- Created region-specific lists of high-risk, human and animal diseases, developed/updated standard lab procedures for these diseases, and provided viral identification training for laboratories in Africa and Asia. https://www.usaid.gov/sites/default/files/documents/1864/IDENTIFY-Compilation-of-Accomplishments__1-12-2014.docx
- Characterized the nature and frequency of human contact with animals in Africa and Asia. https://www.fhi360.org/projects/prevent-%E2%80%94-emerging-pandemic-threats
- Improved the effectiveness of poultry vaccination in Indonesia (with demonstrated decrease in reported poultry outbreaks and human infections) by identifying which licensed vaccines were efficacious against the specific H5N1 avian influenza virus present in the country. https://ec.europa.eu/food/sites/food/files/animals/docs/ad_cm_ai_nrl-annual-meetings-14_prov-17.pdf
- Established two regional university networks (Central/East Africa and Southeast Asia) and four country university networks (Indonesia, Malaysia, Thailand, Vietnam) to



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formulate and introduce standardized One Health curricula for pre- and in-service training and serve as a One Health hub across participating universities and countries.

Lessons learned:

- The understanding of risk associated with spillover of emerging zoonotic viruses from animals to people could be further improved by focusing on a smaller subset of viral families and animal species (to allow for larger sample sizes for testing), adding surveillance of humans (virology and serology), focusing on common points where animals and humans interact (with behavioral surveillance), and sampling longitudinally in order to gain insight on any seasonality associated with spillover of emerging zoonotic viruses from animals to people.
- Universities play a critical role in creating long-term changes to workforce skills. They work on the cutting edge of their fields to educate students who will comprise tomorrow's workforce. Universities are also testing sites for education, where innovative and trans-disciplinary approaches to training professionals are constantly introduced and refined, including One Health approaches. By investing in universities in developing countries, we can create a long-term in-country capability for improved human resource capacity.
- Focused public sector investments in filling key knowledge gaps related to spillover, amplification, and spread of emerging zoonotic viruses can lead to private sector poultry producers changing their practices (if cost-neutral) based on evidence, thereby increasing the likelihood of sustainability.
- Behavior change communications for AI that were targeted at households increased knowledge, but did not change behaviors possibly because doing so cost more (*e.g.* buying fencing for household birds, buying feed for caged birds that were previously free-ranging) and/or because the risk of human infection was perceived to be much lower than other common diseases such as malaria or tuberculosis.
- Countries which did not have a strong history of cross-sectoral collaboration on zoonotic diseases, especially those in Africa, would benefit from support to establish or strengthen in-country platforms to coordinate zoonotic disease activities across sectors, especially public health, livestock, and wildlife.

**EPT-2 (2014-2020):** The second iteration of EPT built on the investments, partnerships, and lessons learned from EPT-1. The focus remained on preventing, detecting, and responding to emerging viral diseases using a One Health approach, but broadened investments around preparedness. The scope of the program also was expanded to address the threats posed by antimicrobial resistance (AMR), as the inappropriate use of antibiotics in animal husbandry and inappropriate "prescriber-user" practices associated with antibiotic use in clinical care were increasingly understood to be core drivers behind the emergence and global spread of antibiotic-resistant organisms. EPT-2 worked in more than 30 countries across Africa[4], Asia, and the Middle East[5], and was comprised of three activities as well as partnerships with FAO and WHO:

- PREDICT-2: Consolidated the scopes of EPT-1's PREDICT-1 and PREVENT to more-precisely identify and characterize emerging zoonotic viruses in animals and people, as well as behaviors, practices, and conditions associated with viral evolution, spillover,



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amplification, and spread. The number of targeted viral families was reduced to four[6] and targeted animal-human interfaces reduced to households, markets, and livestock/agricultural production. Longitudinal monitoring at high risk interfaces, human surveillance, animal and human serology, and a focus on Middle East Respiratory Syndrome coronavirus (MERS-CoV) in northeast Africa were also added.

- Preparedness and Response (P&R): Assisted countries in establishing and strengthening national One Health platforms to develop, formalize, and maintain multisectoral collaboration as well as develop country-specific plans for responding to public health events of unknown etiology.
- One Health Workforce (OHW): Built on the investments of EPT-1's RESPOND by strengthening the capacity of the One Health university networks to address the current workforce needs of ministries in addition to building a pipeline of future One Health workers, expanding the networks to include more countries, and strengthening the operational capacities of the university networks.
- FAO: Focused on risk characterization activities to understand biological drivers of zoonotic virus spillover (including AI and MERS-CoV), amplification, and spread; studied and promoted risk mitigation policies and practices for livestock that reduce the risk of zoonotic virus spillover, amplification, and spread; supported national One Health platforms (in coordination with P&R); strengthened national preparedness within the livestock sector to respond to events of public health concern including epidemiology training for veterinarians; strengthened global livestock surveillance networks; and provided emergency lab, commodity, and other support for outbreaks in livestock.
- WHO: Focused on strengthening influenza surveillance; strengthening national preparedness within the public health sector to respond to events of public health significance; supported One Health national platforms through the development of tools (in coordination with P&R) and invested in a One Health workforce (in coordination with OHW); and provided emergency lab, commodity, and other support for outbreaks in humans.

Key accomplishments:

- Conducted standardized and synchronized monitoring of wildlife, humans, and associated behaviors at specific animal-human interfaces across 28 countries; sampled >100,000 animals and humans and identified an additional 175 novel viruses (including a new Ebola species in Sierra Leone and Guinea and a new coronavirus associated with swine deaths in China) and 41 known viruses (in addition to those detected under PREDICT-1); and identified an association between RNA virus shedding by wildlife and animal value chains.
  https://www.nature.com/articles/s41564-018-0227-2
  https://www.nature.com/articles/s41586-018-0010-9
  https://ohi.vetmed.ucdavis.edu/programs-projects/predict-project/reports
  https://static1.squarespace.com/static/5c7d60a7311f7845f734d4a7/t/5e95b7253091848f8a1a76b2/1586887590640/PREDICT+March+18+Data+Discussion.pdf.
  https://p2.predict.global/interventions, https://p2.predict.global/insights.

- With CDC, co-identified Marburg virus in Sierra Leone, the first-ever detection of the virus in West Africa. https://www.ucdavis.edu/health/news/deadly-marburg-virus-found-sierra-leone-bats/



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- Collected evidence indicating previously-unrecognized spillover of Ebola viruses in the Democratic Republic of the Congo and Uganda. https://academic.oup.com/jid/article/218/suppl_5/S277/5039952; manuscript submitted for publication.
- Developed and validated a rapid, easy-to-use field diagnostic for identifying H5 and H7 influenza A viruses in birds which allows for faster response to contain these viruses in infected flocks and prevent spread to additional animals or people. https://onlinelibrary.wiley.com/doi/pdf/10.1111/irv.12646.
- Developed "Living Safely with Bats" (https://p2.predict.global/living-safely-with-bats-book) and "Living Safely with Animals" communication tools to convey risk and possible risk-reduction options to communities in West and East African countries. *[Note: these two tools have not yet been evaluated for effectiveness in increasing knowledge or changing behaviors.]*
- With the Australian Department of Foreign Affairs and Trade and FAO, enhanced farm and market biosecurity, flock health and hatchery management practices contributing to reduced disease and AMR risk in Cambodia, Laos, Myanmar, and Vietnam[7].
- Refined the global "hot spots" analyses for emergence of viral zoonoses. https://www.ecohealthalliance.org/wp-content/uploads/2017/10/s41467-017-00923-8.pdf.
- Developed tools, lessons learned, and economic analyses related to One Health programming and provided technical assistance and operational support to 15 One Health platforms in Africa and Asia.
- Developed and began implementing a district-level applied epidemiology training program (ISAVET) in East, Central, and West African countries.http://www.fao.org/resilience/news-events/detail/en/c/1171750/.
- Provided classroom and hands-on training in One Health core competencies to over 13,300 undergraduate students and 33,500 current One Health professionals across Africa and Asia.
- Developed gender-responsive curriculum and training of One Health professionals: Gender One Health and Infectious Disease Training Module. https://ohcea.org/index.php?option=com_content&view=article&id=165&Itemid=1055

Lessons learned:

- Concurrent, focused, and longitudinal surveillance of wildlife and human populations have provided additional insight on where, when, and how emerging zoonotic viruses (including Ebola) spill over at specific animal-human interfaces; this insight is critical to strengthening the ability of countries to begin developing and testing the effectiveness of interventions to reduce the risk of spillover of these threats from animals to people (although additional information related to spillover risk is needed for viruses such as Ebola, Nipah, animal-origin coronaviruses, and animal-origin influenzas).
- Data (unpublished) from northeast Africa suggest that camels have high exposure rates to MERS-CoV viruses, but that these viruses appear to be mainly from a non-zoonotic clade of the MERS-CoV family, meaning that not all of the MERS-CoV viruses from camels in Africa have public health importance.
- In Africa and Asia, the continued spillover, amplification, and spread of emerging zoonotic viruses highlight the large gaps that still exist in biosafety and biosecurity, particularly along animal value chains; the private sector so far has been an underutilized



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partner for broadly (as opposed to addressing disease by disease) reducing risk along livestock value chains. Reducing the risk of spillover of zoonotic viruses from wildlife to livestock and people (including through animal value chains) is also a gap that needs to be addressed.

- Workforce transformation is a long-term process that requires consultation and collaboration with a diverse set of stakeholders and a better understanding of labor markets' supply and demand curves. In order to better understand and target training opportunities and educational offerings, One Health university networks (OHUNs) must consult and collaborate with governments, non-governmental organizations (NGOs), donors, and the private sector on their needs and capacities.
- While countries appear to understand the benefits of One Health platforms and have utilized new tools developed with support from EPT-2, the degree to which countries engage with and support their platforms varies, and this has implications for long-term sustainability and the ability to attract donor funding.

**GHSA:** In 2014, USAID, along with other USG partners, including the National Security Council, Department of State, the U.S. Centers for Disease Control and Prevention (CDC), and the Department of Defense, joined more than 60 countries in implementing the GHSA. At the core of the GHSA is the goal of strengthening capacities for prevention, detection, and response for infectious disease outbreaks using multisectoral collaboration across public health, medicine, agriculture, animal/veterinary health, environment, education/academia, and defense/security agencies. USAID's GHSA activities have been geographically focused in 16 countries in Africa and Asia and used to build workforce capacity and surveillance, laboratory capacity, and preparedness and response systems for addressing prioritized endemic and emerging zoonotic threats. Going forward, USAID's emerging threats and GHSA activities constitute the agency's global health security investments under the GHSS.

Countries supported by USAID under EPT-1, EPT-2, and GHSA are shown in the map below.



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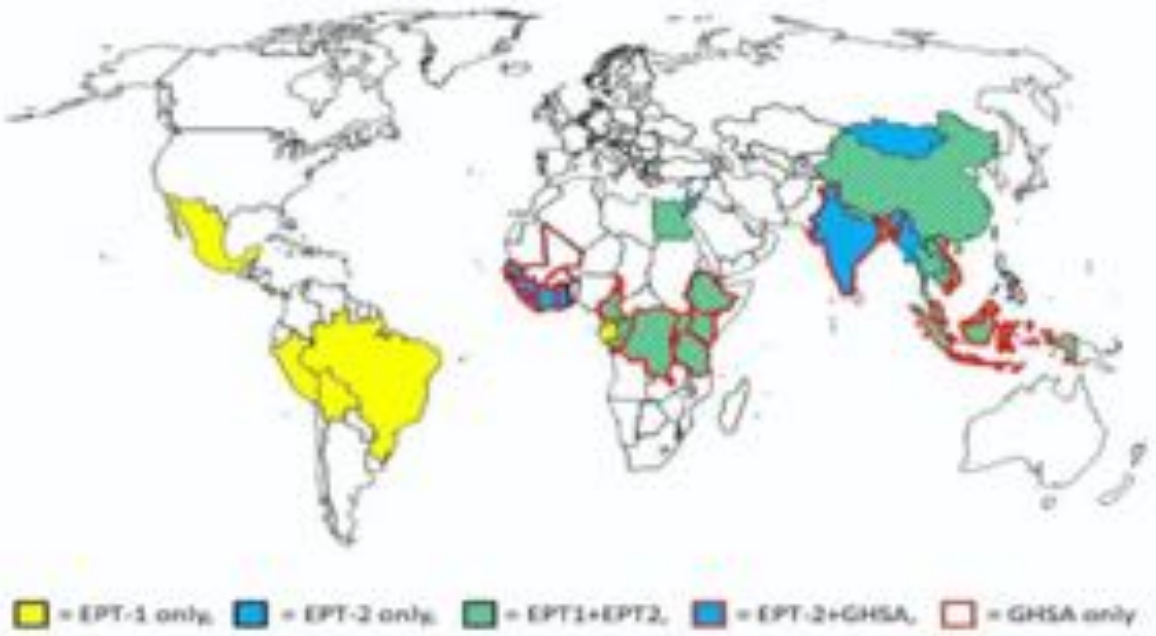


Between 2020 and 2025, USAID will continue its global health security investments with a focus on high-risk/low-capacity countries in Africa and Asia. STOP Spillover will complement other USAID partnerships that are described below in section 5 ("Collaboration with Other USAID/External Partners").

**4. STOP Spillover Goal & Objectives**

**Problem Statement**

An analysis of 335 emerging infectious diseases (EID) in humans between 1940 and 2004 revealed a number of important characteristics including: (1) the incidence of EID events is increasing over time; (2) 60% of EIDs are zoonotic and, of those, 72% are from wildlife; (3) the origins of EIDs are correlated with socio-economic, environmental, and ecological factors and are concentrated in tropical and subtropical regions of the world; and (4) global resources to address EIDs are poorly allocated[8].

Zoonotic diseases cause the loss of lives and livelihoods by disrupting local, regional, and global travel and trade, and by threatening the economic and political stability of some of the most vulnerable countries. Among zoonotic diseases, emerging zoonotic viruses are particularly problematic because (1) these pathogens generally lack specific treatments and vaccines (for animals or people), (2) human populations are more likely to be immunologically naive to novel viral zoonoses giving these pathogens a comparatively higher likelihood of epidemic and pandemic potential, and (3) these pathogens are often detected during or after amplification or spread in human populations which makes containment very difficult and very expensive.



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There have been several examples[9] between 2014 and 2019 which together demonstrate that many lower- and middle-income countries do not yet have adequate capacities and/or systems to respond to or reduce the spillover of emerging zoonotic viruses from animals to people or subsequent amplification and spread. Key reasons include lack of data to identify specific animal-human interfaces and behaviors associated with spillover, amplification, and spread and/or failure to develop new or deploy existing measures to reduce spillover, amplification, and spread using cross-sectoral, multidisciplinary approaches that focus on humans, livestock, wildlife, and the environment and take into account social, cultural and gender norms.

The general lack of medical countermeasures for emerging zoonotic viruses and the enormous challenge and cost of stopping their amplification and spread puts a premium on reducing the likelihood of their initial spillover from animals to people. Building on previous USAID global analyses of risk and investments in high-risk/low-capacity countries under EPT-1, EPT-2, and GHSA, STOP Spillover will use existing and new evidence to develop, deploy, and evaluate interventions to reduce the spillover of emerging zoonotic viruses at high-risk animal-human interfaces and reduce amplification and spread of these threats at high-risk foci such as health care facilities.

Because spillover, amplification, and spread of emerging zoonotic viruses potentially affects wildlife, livestock, and human populations, understanding and effectively addressing these processes requires in-country efforts to work collaboratively, ideally through multisectoral partnerships.

**Goal: Enhanced understanding and reduced risk of zoonotic viral spillover, amplification, and spread**

**Project Approach**

As mentioned above, the past 15 years of the USAID GHS program primarily focused on supporting countries to address zoonotic threats and understanding how these threats spill over, amplify, and spread in animal and human populations. The next phase of the program will begin to include a focus on interventions to reduce risk of spillover, amplification, and spread of zoonotic viruses in animal and human populations. Emerging zoonotic viruses are the primary focus of STOP spillover, however strengthening capacities and risk-reduction interventions to limit their spillover, amplification, and spread may also reduce the spillover, amplification, and spread of other zoonotic diseases.

To address the problem of low- and middle-income countries still not having adequate capacities and/or systems to respond to or reduce the spillover, amplification, and spread of emerging zoonotic viruses, USAID will place a greater emphasis on addressing these processes—especially spillover—at the country level. STOP Spillover will translate the knowledge gained about spillover risk into country-level capacity to assess and address risk at key animal-human interfaces, especially those viruses originating in wildlife[10]. As much as possible, STOP Spillover will partner with and strengthen in-country institutions (ministries, research organizations/academia, private sector, etc.) to contribute to USAID's sustainability policy (Journey to Self Reliance).



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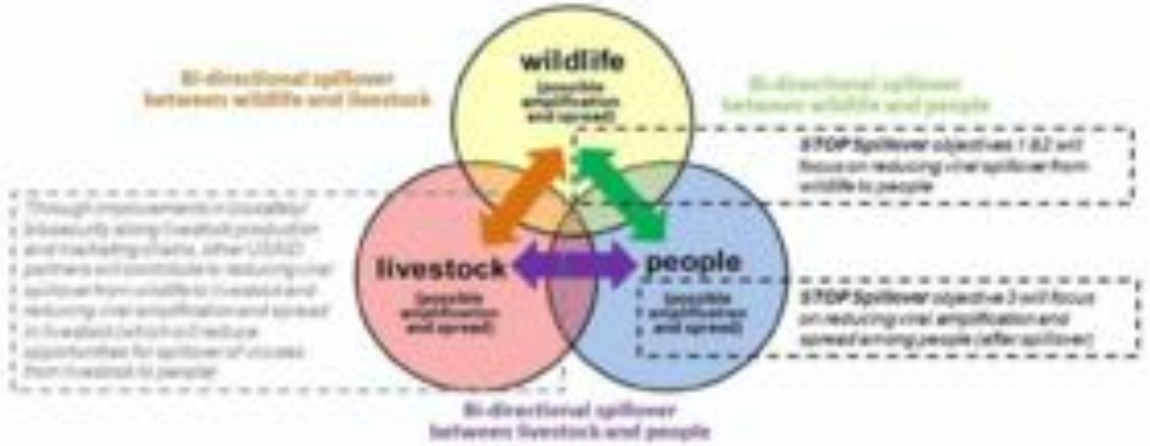
The overall strategic focus of STOP Spillover will be on reducing spillover of emerging zoonotic viruses from wildlife to people and reducing amplification and spread of zoonotic viruses in people after they have spilled over from wildlife (see figure below).




STOP Spillover will focus on a number of prioritized zoonotic viruses including Ebola, Lassa, Marburg, Nipah, animal-origin coronaviruses (including SARS, MERS-CoV, and SARS-CoV-2), and animal-origin influenza viruses. The selection of these viruses is based on: repeated, sporadic outbreaks with occasional epidemics or pandemics; the relatively low immunity and relatively high case fatality rates in human populations; the lack of specific and widely-available biomedical countermeasures (e.g. medicines, vaccines); and the inability of countries to reliably reduce spillover, amplification, and spread of these viruses. Note: the viruses to be addressed in each country will be determined through discussions with in-country counterparts (countries may opt to work on one or more of the priority viruses) and with the USAID management team reflecting evolving priorities and available funding.

Since STOP Spillover will focus on specific viruses (which affect some countries more than others) and will be learning during the development and deployment of risk-reduction interventions, the project will work in a number of prioritized countries. The implementing partner will implement the STOP Spillover project in up to 20 countries across four specific sub-regions (see table below). Five of these countries will be mandatory and approximately five (5) additional countries will be selected by the implementing partner. If funding is made available the partner will work in up to 20 countries.



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| Country category | West Africa sub-region | East/Central Africa sub-region | South Asia sub-region | East/Southeast Asia sub-region |
|---|---|---|---|---|
| Mandatory | Liberia or Sierra Leone | DR Congo<br>Uganda | Bangladesh | Vietnam |
| Optional | Liberia or Sierra Leone<br>Cote d'Ivoire<br>Ghana<br>Nigeria | Ethiopia<br>Kenya<br>Tanzania | India<br>Nepal | Cambodia<br>Indonesia<br>Laos<br>Malaysia<br>Myanmar<br>Thailand |

To ensure geographic representation, the number of countries in each of the four subregions needs to be at least two and not more than three (including mandatory countries).

STOP Spillover will start implementing in five countries (a mix of mandatory and optional countries that will be determined jointly by the partner and USAID project management team), and the remaining five countries will be phased-in based on an implementation plan agreed to by the partner and the USAID project management team. If additional funding becomes available at a later date, additional countries (beyond the initial 10) may be added using the same list above. Any additional countries would be jointly selected by the partner and the USAID project management team. Please note that countries may be added or removed, before or after award, based on the availability of funds and at the discretion of USAID due to changing priorities, policies, or global health events.

In collecting and using existing and new data to reduce risk of spillover, amplification, and spread of emerging zoonotic viruses, STOP Spillover will build on the investments in surveillance, laboratories, research, and partnerships in the selected countries that have been previously established or strengthened by USAID or other partners. STOP Spillover is expected to reference the many risk assessments and research findings (including those included above and below) already supported by USAID as well as other publicly-available resources to inform strategic planning, baseline analyses, and proposed activities in order to ensure STOP Spillover activities are not duplicative of these or other efforts.

USAID supported work related to risk understanding and risk reduction:

- FAO: http://www.fao.org/emergencies/fao-in-action/ectad/en/



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- PREDICT: https://ohi.vetmed.ucdavis.edu/programs-projects/predict-project
- PREVENT: https://www.fhi360.org/projects/prevent-%E2%80%94-emerging-pandemic-threats
- One Health Workforce: https://ohcea.org/index.php?option=com_content&view=article&id=165&Itemid=1055.

Overarching Expected STOP Spillover Results:

- Enhanced country capacities to assess risk and fill knowledge gaps associated with the prioritized emerging zoonotic viruses (see above) across animal, human health, and environmental sectors.
- Strengthened country capacities to develop, validate, and implement gender-responsive and culturally-appropriate interventions to reduce the risk of the prioritized viruses (see above) spilling over from wildlife (or intermediate animal hosts) to people.
- Strengthened country capacities to develop, validate, and implement gender-responsive and culturally-appropriate interventions to reduce the risk of the prioritized viruses being amplified and spread in people following their spillover from wildlife (or intermediate animal hosts).

**Local Partnerships and Sustainability**

Achieving the desired results of STOP Spillover will require engagement with relevant stakeholders, including government ministries, national One Health Coordination Mechanisms (e.g., National One Health Platforms), academia, civil society, and the private and NGO sectors, as well as coordination with WHO, FAO and other USAID and USG partners. Sustainability of the capacities, systems and garnered knowledge to reduce spillover risk will require an understanding of the specific contexts, including unique cultural, political and gender considerations, of the targeted countries. Therefore, it is expected that STOP Spillover will meaningfully build the capacities of and engage with local organizations as partners throughout the STOP Spillover planning, implementation and monitoring processes.

**Objectives and Illustrative Activities**

The primary focus of STOP Spillover is to use an evidence-based approach to reduce the risk of spillover of emerging zoonotic viruses from wildlife to people. Since there may be additional knowledge gaps regarding animal hosts and spillover dynamics associated with the priority viruses, it is anticipated that some additional applied research will be necessary. A secondary focus of STOP Spillover will be on reducing the likelihood of amplification and spread of zoonotic viruses after they have spilled over to humans.

**Objective 1: Strengthen country capacity to monitor, analyze and characterize the risk of priority emerging zoonotic viruses spilling over from animals to people**

Most countries have already completed prioritization of diseases that threaten public and livestock health; some of these countries have also developed a list of zoonotic disease priorities. In some instances, however, certain emerging zoonotic viruses (especially those originating in wildlife) as well as previously unknown ones may not have been considered because data were lacking due to limited surveillance[11]. In the past 10 years of EPT-1 and EPT-2, additional information has become available on existing and new viruses from wildlife that may represent



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threats to livestock, humans, or both. However, there may still be knowledge gaps associated with the viruses prioritized for STOP Spillover which have implications for assessing and reducing risk.

STOP Spillover will assist countries to improve their understanding of how the priority emerging zoonotic viruses[12] spill over from animals to people and what types of interventions might be feasible and cost-effective to reduce the risk. This support will include strengthening existing surveillance capacity to fill knowledge gaps related to viruses, interfaces, and populations most at-risk for spillover. The supported surveillance should be targeted to identified high-risk, animal-human interfaces, build on existing laboratory and data collection platforms, be coordinated with relevant efforts of in-country (USG, international or local) partners, and be at a scale and cost that take into consideration the host-country's monetary and staffing limitations going forward.

In addition, applied research addressing a set of strategic research questions is crucial for reducing future risk by generating the specific evidence needed to develop and test interventions targeted at high-risk animal-human interfaces and populations. All research efforts should leverage partnerships with in-country academic, private and public entities.

The investments for surveillance and research should be well-coordinated and synergistic, and together should improve the understanding of the biological, behavioral and ecological factors that impact spillover. The ultimate aim of both the surveillance and research investments should be to inform and refine spillover risk analyses and associated risk mitigation efforts.

This improved understanding of risk associated with emerging zoonotic viruses under Objective 1 will directly feed into and support Objectives 2 and 3 below, including the development of risk reduction measures.

Illustrative examples of knowledge gaps include, but are not limited to:

- At what animal-human interfaces and by what mechanism(s) are animal-origin coronaviruses such as SARS-CoV-2 spilling over from animals to people in the priority countries?
- What were the animal-human interfaces for the spillover of Nipah virus in Kerala, India in 2018 and 2019? Are they the same as the 1997 outbreak in Malaysia, the outbreaks in Bangladesh and West Bengal, India (2000-2020), or a new interface?
- At what animal-human interfaces and by what mechanism(s) is Lassa spilling over in Guinea, Liberia, Nigeria, and Sierra Leone?
- At what animal-human interfaces and by what mechanism(s) is Ebola spilling over in DR Congo and Uganda?
- What, if any, risk mitigation lessons can be learned from contexts in which known emerging zoonotic viruses are detected in animals[13], but human infections have not been detected?

Illustrative Activities for Objective 1 may include, but are not limited to, on a country-by-country basis:



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- Assist countries in mapping existing surveillance and monitoring systems relevant to emerging zoonotic viruses (including capacities in sampling, laboratory testing, and information systems) and identifying where gaps exist.
- Assist countries in strengthening local capacity to implement and sustain cost-effective, efficient, and targeted surveillance of emerging zoonotic viruses at high-risk settings/interfaces and in high-risk animal and human populations.
- Assist country partners across sectors to strengthen their capacity to routinely conduct and update risk analyses of high-risk animal-animal or animal-human interfaces (including animals and viruses present, ecological and behavioral risk factors, biosecurity issues, gender analyses, cultural factors, economic considerations, etc.). These analyses should take into account available data (from EPT-1, EPT-2, GHSA, others), tools, partners (avoiding duplication of efforts), and remaining gaps in knowledge on spillover risk of emerging zoonotic viruses in high-risk animal or human populations and at high-risk animal-human interfaces.
- Assist country partners across public health, livestock, and wildlife ministries, academia, private sector, and other relevant local institutions to use existing data-collection and laboratory platforms (with additional strengthening from STOP Spillover if needed) to conduct focused, applied research to fill knowledge gaps for the prioritized emerging zoonotic viruses to include behaviors related to human contact with animals and animal products at high-risk interfaces as well as other key information needed to develop and deploy interventions to reduce the risk of spillover, amplification, and spread of the priority viruses.
- Assist country partners to identify and characterize barriers/obstacles (e.g. behavioral, gender, financial, social, legal, etc.), incentives/motivations (e.g. money/profit, access to credit/loans, status in community, improved human and animal health, etc.), and any other enabling factors that are relevant to humans limiting direct contact with animals and animal products or limiting contact among animals of different species.
- Support economic analyses to demonstrate the value of investing in risk reduction interventions.

Objective 1 Expected results:

- The 10 countries are able to update risk assessments and identify key knowledge gaps related to risk of spillover, amplification, and spread of priority emerging zoonotic viruses in animal and human populations.
- The 10 countries have strengthened capacity to address these key knowledge gaps.

**Objective 2: Strengthen country capacity to develop, test, and implement interventions to reduce risk of priority emerging zoonotic viruses spilling over from animals to people**

Evidence-based interventions that take into account cultural, gender, economic and other factors are needed to reduce spillover of priority emerging zoonotic viruses from animals to people. These interventions may include behavior change communications, biosecurity/biosafety,



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advocacy, incentives, and/or policy change. Priority should be given to those interventions that are most likely to be sustainable at a point in the future when there is no external funding. STOP Spillover will support the testing and validation of existing interventions, and the development and validation of new interventions based on available information and tools. Additional interventions may be developed through the course of the project as knowledge gaps (see Objective 1) are filled. If validation is successful, these interventions may be implemented in high-risk animal-human interfaces.

Interventions will be specific to the focus countries and the priority emerging zoonotic viruses selected. Some illustrative activities include, but are not limited to:

- Assist countries in evaluating the acceptability and effectiveness of tree skirts by collectors of date palm sap and communities in Bangladesh and India to prevent bats from contaminating the sap with Nipah virus.
- Assist countries in evaluating the effectiveness of existing social and behavior change tools such as "Living Safely with Animals" in reducing indirect and direct contact with bats and rodents in Guinea, Liberia, and Sierra Leone to prevent Ebola, Marburg, and Lassa spillover and one country in Asia (TBD) to reduce coronavirus spillover from bats to guano farmers.
- Assist countries in developing and validating additional interventions/policies/regulations based on new data collected under objective 1 and to support objective 3.

Objective 2 Expected results:

- Up to 10 countries are able to use available information to test and validate the effectiveness of interventions to reduce spillover of priority emerging zoonotic viruses from animal to human.
- As appropriate, up to 10 countries are able to implement interventions, policies and regulations to reduce spillover of priority emerging zoonotic viruses from animal to human.

**Objective 3: Strengthen country capacity to mitigate amplification and spread of priority zoonotic diseases in human populations**

Recognizing that it will not be possible to prevent all spillover events from wildlife, STOP Spillover will work with relevant ministries (including agriculture, wildlife, forestry, among others), national One Health coordination bodies, local partners, FAO, WHO, and others to strengthen country capacity to limit the amplification and spread of emerging, re-emerging and endemic zoonoses once spillover from animals to humans has occurred. STOP Spillover may also provide limited support during and after outbreaks.

Illustrative activities for Objective 3 include, but are not limited to:

- Assist countries in developing/updating control and response plans based on risk analyses and surveillance data.
- Assist countries in strengthening early identification and detection, case management, and infection prevention and control based on an understanding of high risk locations and



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populations. Target groups may include communities, market workers, farmers, and health care workers in locations at high risk for spillover of zoonotic diseases from animals to people.
- As needed, assist countries with applied research, training, and "after-action reviews" related to reducing risk of amplification and spread of zoonotic diseases in high-risk human populations.
- Support zoonotic disease outbreak investigations, as appropriate.

Objective 3 Expected results:

- 10 countries have the capacity to understand risk and plan an appropriate response to contain amplification and spread of zoonotic disease events originating from wildlife.
- High-risk communities, workers, and health facilities in 10 countries can rapidly recognize and respond to suspect zoonotic disease events originating from wildlife.

**5. Collaboration with other USAID/External Partners**

USAID expects STOP Spillover to engage with and leverage USAID's GHS portfolio, the Bureau for Global Health and other USAID bureaus/offices in Washington, and at missions. Examples of potential areas of collaboration include, but are not limited to: cross-cutting activities in the areas of workforce strengthening across One Health competencies; biodiversity, conservation, and prevention of wildlife trafficking; safer animal value chains including markets and farms; research on risk of viral spillover and the environmental health and impacts of land use change; gender; private sector engagement; behavior change; laboratory and other health systems strengthening; and innovative financing strategies for One Health efforts.

USAID Missions may also opt to buy-in to STOP Spillover. Between 2016 and 2019, the PREDICT-2 activity received $600,000 in funding from USAID/Jordan's health office to conduct activities to strengthen surveillance and laboratory capacities for determining the burden of MERS-CoV in bat, camel, and human populations. USAID would support similar buy-ins from USAID Missions under STOP Spillover.

STOP Spillover also is expected to coordinate with U.S. Government partner agencies that work on One Health, including the U.S. Centers for Disease Control and Prevention (CDC), the Defense Advanced Research Projects Agency (DARPA), Defense Threat Reduction Agency (DTRA), and the National Institutes of Health. These agencies have a long history of supporting surveillance, labs, training, and research related to animal and human infectious diseases, including ones that are zoonotic. STOP Spillover activities must clearly complement and not compete with this programming.

*International Organizations*

The Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO), which are key partners under the Global Health Security portfolio, are working to strengthen the public health and animal health sector's capacity to prepare, prevent, detect and respond to emerging threats including zoonotic diseases and antimicrobial resistance. Work includes strengthening core capacities in surveillance, laboratory strengthening, and outbreak investigation and control. STOP Spillover should leverage interventions and tools



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developed and used by these organizations, avoid duplication and may work with FAO and WHO to further develop local capacity in these areas by providing in-service training opportunities for practical in-field experience.

As part of a whole-of-society, all hazards approach, the International Federation of Red Cross Red Crescent Societies (IFRC) is working to strengthen community-level epidemic and pandemic preparedness. STOP Spillover can work with the IFRC and its National Societies to improve community-based surveillance of zoonotic diseases and community preparedness for outbreaks of zoonotic diseases.

*Bilateral and Multilateral Community*

USAID anticipates that STOP Spillover may find opportunities to collaborate with other bilateral and multilateral partners. The Republic of Korea, through its Safe Life for All Initiative, has pledged $100 million in 13 countries over five years, focusing on immunization, national laboratory systems, and workforce development. The Australian Government's Health Security Initiative for the Indo-Pacific region was launched in 2017 to support the prevention and containment of infectious disease threats with the potential to cause social and economic harms on a national, regional or global scale. Through 2019, the Australian Department of Foreign Affairs and Trade (DFAT) contributed AUD$6 million through USAID programs to enhance prevention, detection and response to emerging infectious disease and AMR threats in the Mekong sub-region in Asia. Some of the countries that have been identified for support are STOP Spillover countries that could play a significant role under this initiative. Additionally, the World Bank has expressed interest in economic analyses of emerging diseases and supporting detection and response for outbreaks.

*Other Collaborating Partners*

In addition to the organizations listed above, STOP Spillover may collaborate with others engaged in One Health and related work, such as the World Organization for Animal Health (OIE), regional development banks, and CEPI (Coalition for Epidemic Preparedness Innovations). These engagements would create opportunities to collaborate on research, risk analyses, and risk reduction.

**Monitoring, Evaluation and Learning**

STOP Spillover will include a comprehensive monitoring, evaluation and learning (MEL) plan that clearly indicates the results that will be achieved during the life of the activity, relevant targets, sensible performance indicators, and a process for integrating learning into activity implementation. As appropriate, indicators should be culturally- and gender-sensitive and responsive. The MEL plan will also include data sources, methods and frequency of data collection, quality assurance procedures, and a process for how data will be analyzed, disseminated and used to inform activity planning, implementation and improvement. The proposed MEL framework must be aligned with agency priorities, including the U.S. Global



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Health Security Strategy (https://www.whitehouse.gov/wp-content/uploads/2019/05/GHSS.pdf) and USAID's Journey To Self-Reliance (https://www.usaid.gov/selfreliance).

An important component of STOP Spillover, will be the development of a learning agenda to identify and address specific knowledge gaps related to activity implementation and the dynamics of zoonotic spillover. The learning agenda should include a set of questions that will be addressed during the activity, a process for addressing each of these questions, and a plan to disseminate (to specific institutions) and use findings to improve activity implementation and reduce the risk of zoonotic spillover.

**Strategies To Prevent Spillover (STOP Spillover)**

Monitoring, Evaluation and Learning Framework

**Goal: Enhanced understanding and reduced risk of zoonotic viral spillover, amplification, and spread**

| **Objective 1:** | **Objective 2:** | **Objective 3:** |
|---|---|---|
| Strengthen country capacity to monitor, analyze and characterize the risk of priority emerging zoonotic viruses spilling over from animals to people | Strengthen country capacity to develop, test, and implement interventions to reduce risk of priority emerging zoonotic viruses spilling over from animals to people | Strengthen country capacity to mitigate amplification and spread of priority zoonotic diseases in human populations |
| **Expected Results** | | |
| • The 10 countries are able to update risk assessments and identify key knowledge gaps related to risk of spillover, amplification, and spread of priority emerging zoonotic viruses in animal and human populations.<br>• The 10 countries have strengthened capacity to address these key knowledge gaps. | • Up to 10 countries are able to use available information to test and validate the effectiveness of interventions to reduce spillover of priority emerging zoonotic viruses from animal to human.<br>• As appropriate, up to 10 countries are able to implement interventions, policies and regulations to reduce spillover of priority emerging zoonotic viruses from animal to human. | • 10 countries have the capacity to understand risk and plan an appropriate response to contain amplification and spread of zoonotic disease events originating from wildlife.<br>• High-risk communities, workers, and health facilities in 10 countries can rapidly recognize and respond to suspect zoonotic disease events originating from wildlife. |

**Gender**

Strategies to Prevent (STOP) Spillover will align with Agency-wide commitments mandated by the USAID Gender Equality and Female Empowerment Policy with the intent to support sustainable development outcomes. USAID conducted a contextual gender analysis that considered existing data (from EPT-1, EPT-2, GHSA, others), tools, and remaining gaps in knowledge on spillover risk of emerging zoonotic viruses in high-risk animal or human populations and at high-risk animal-human interfaces. The analysis revealed that although males and females are equally susceptible, biologically, to emerging disease threats, the impact of those infections is experienced differently by each group. The variability in gender constraints, such as roles and responsibilities, patterns of decision-making power, and cultural gender-related norms and beliefs affect men's and women's ability to change risky behaviors surrounding emerging



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disease threats and elimination interventions. STOP Spillover acknowledges the gendered nature of inequitable access to healthcare and differences in risk profiles and cultural norms that place an extra burden on women to provide care (including caring for sick family members in addition to general care in the household). The underlying disparities in healthcare access and disadvantaged socioeconomic status can translate into the lack of women's participation in health programs, research, outreach and education, One Health training, and animal health resources. Thus, this activity will support the strengthening of country capacities to develop, analyze, validate, and implement gender-responsive and culturally-appropriate interventions relevant to women, girls, men, and boys limiting direct contact with animals and animal products.

STOP Spillover has the opportunity to characterize the gender and sex-specific risks associated with high-risk animal-human interfaces through the applied research and testing/validating intervention strategies. The research findings will be to be integrated into risk mitigation efforts, therefore directly impacting gender and sex-specific risks. It is expected that the STOP Spillover implementing partner will conduct a thorough assessment of the context (barriers/obstacles, incentives, and any other enabling factors) and gender considerations that need to be addressed and provide a Gender Action Plan/Strategy to ensure that gender-sensitive approaches are integrated into programmatic operations in each country context. Women's empowerment and reducing gender inequality and discrimination should also be monitored as a critical component of the program's performance management plan. Additionally, STOP Spillover will be directly involved in increasing the capacity of governments to analyze and monitor gender-responsive and culturally-appropriate interventions to emerging zoonotic risks. This surveillance, research and related interventions, including training, will incorpoeate mapping gaps in knowledge, on-going analysis, and addressing unintended consequences for women, girls, men, and boys.

**Climate Risk Management**

Climate risk management (CRM) is required for all USAID-supported activities, with limited exceptions (see ADS 201 Mandatory Reference, https://www.usaid.gov/ads/policy/200/201mal). Climate risk is the potential for negative consequences on activity objectives and/or outcomes due to changing climatic conditions. Climate risks can be manifested through potentially severe adverse consequences for development programs resulting from the interaction of climate-related hazards with the vulnerability of societies and systems. A climate risk may arise when an activity element, target, or beneficiary is exposed to a climate hazard such as higher temperatures, flooding, or drought.

USAID will work with the successful applicant to identify climate risks that can affect the successful implementation of this program. The successful applicant will be encouraged to complete the Climate Risk Tool for any activities that meet the moderate to high risk rating. Per instructions in the award documentation, the successful applicant will be expected to ensure that subgrantees and subcontractors have the capability to implement CRM. The successful applicant will, if appropriate, provide orientation to subgrantees and subcontractors on climate risk management. Per Mandatory Reference for ADS Chapter 201 Climate Risk Management for USAID Projects and Activities, the successful applicant may integrate "documentation" of the benefits of taking action to reduce climate change impacts and/or increase adaptive capacity" in their performance monitoring in program elements with moderate or high risk ratings.



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[1] Throughout this document, "high-risk" is used to refer to countries, populations, and animal-animal or animal-human interfaces where there is an increased probability of spillover, amplification, or spread of emerging zoonotic viruses due to the presence of specific types of viruses, animals, behaviors, and conditions.

[2] "Multisectoral" refers to a broad coalition of partners that are needed for addressing emerging zoonotic viruses using an approach (*i.e.* "One Health") that considers the health of people, animals, and the environment. These partners may include public health, livestock, wildlife, public and private sectors, academia, and NGOs.

[3] https://www.whitehouse.gov/wp-content/uploads/2019/05/GHSS.pdf

[4] As a result of the 2014-2016 Ebola epidemic in West Africa and the launching of the Global Health Security Agenda in 2014, EPT-2 included countries in West Africa.

[5] Egypt and Jordan were included in EPT-2 in order to conduct Middle East Respiratory Syndrome coronavirus (MERS-CoV) surveillance.

[6] Influenzas, coronaviruses, filoviruses, and paramyxoviruses. All of these viral families include multiple members that have caused epidemics and/or pandemics.

[7] http://www.fao.org/3/ca5608en/CA5608EN.pdf; http://www.fao.org/3/ca5515en/ca5515en.pdf;

http://www.fao.org/3/ca5516en/ca5516en.pdf; http://www.fao.org/3/ca6642en/CA6642EN.pdf;
http://www.fao.org/3/ca7319en/CA7319EN.pdf; and gender assessment:
http://www.fao.org/3/ca6114en/CA6114EN.pdf

[8] Global Trends in Emerging Infectious Diseases, Jones, et al., Nature, 2008, Vol 451: pp 990-994.

[9] For example: 2015 MERS-CoV outbreak in South Korea; 2016 yellow fever outbreak in Angola with spread to DR Congo, Kenya, and China; 2017-2018 plague outbreak in Madagascar; 2018-present Lassa outbreak in Nigeria; 2018-present Ebola outbreak in DR Congo with spread to Uganda, and the 2019-present SARS-CoV-2 epidemic. Common characteristics of these six events include: rapid spread in urban areas (Ebola, MERS-CoV, plague, SARS-CoV-2, yellow fever); spread in health care settings (Ebola, Lassa, MERS-CoV, plague, SARS-CoV-2); and failure to rapidly apply proven interventions including vaccination (yellow fever) or IPC (Ebola, Lassa, MERS-CoV, plague, SARS-CoV-2).

[10] Wildlife species are the sources of many of the highly-lethal emerging zoonotic viruses that repeatedly and sporadically spill over into humans and are generally poorly controlled in human populations once spillover occurs.

[11] For example, since Marburg was only detected in West Africa in 2019, it is unlikely that any country in this region would have considered this virus during disease prioritization exercises or included it in routine disease diagnosis or laboratory protocols.

[12] Individual countries will be consulted with regarding which of the priority viruses will be included.

[13] E.g. Nipah in Thailand; MERS-CoV in horn of Africa; Ebola serological-positive samples from bats in Bangladesh, Malaysia, and southern China.

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## SECTION B: FEDERAL AWARD INFORMATION

### 1. Estimate of Funds Available and Number of Awards Contemplated

USAID intends to award one (1) Cooperative Agreement pursuant to this notice of funding opportunity. Subject to funding availability and at the discretion of the Agency, USAID intends to provide up to $100,000,000USD in total USAID funding over a five (5) year period. This Activity will be incrementally funded over the life of the Activity, subject to the availability of funds. However, USAID reserves the right to make more than one award under this NOFO.

### 2. Start Date and Period of Performance for Federal Awards

The anticipated period of performance is five (5) years. The estimated start date will be upon signature of the award, on or around September 30, 2020.

### 3. Substantial Involvement

USAID's substantial involvement during the implementation of STOP Spillover will be limited to approval by the Agreement Officer's Representative (AOR)-- delegated to the AOR by the Agreement Officer (AO)-- of the elements listed below, except for any changes to the program description, the period of performance, the approved budget, and/or key personnel that require AO approval.

a. Approval of all implementation plans, performance reports, and modifications to be carried out under the Agreement and sub-agreements. The AOR will ensure that the implementation plan fits within the scope, terms, and conditions of the Agreement.
b. Designation of key positions and approval of key personnel and any changes for the positions listed below.
    - Project Director/Chief of Party
    - Surveillance/Risk Assessment Coordinator (Objectives 1)
    - Risk Reduction Coordinator (Objectives 2 and 3)
c. Collaboration or joint participation of USAID with the recipient in accomplishing specific elements in the program description; where there are specific elements in the Program Description for which USAID's technical knowledge would benefit the recipient's successful accomplishment of stated program objectives, to include:
    - Collaborative involvement in the selection of advisory committee members, if the recipient establishes an advisory committee that provides advice to the recipient. The AOR may participate as a member of this committee.
    - Collaborative involvement in the selection of sub-awardees, grantees, and other partners.
    - USAID review and approval of monitoring, evaluation, and learning plans.
    - USAID involvement in the substantive direction/re-direction of interrelationships with other projects.



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- USAID involvement in monitoring progress toward achievement of the Objectives and Expected Achievements during the course of the Agreement(s) and in monitoring of financial expenditures.

**4. Authorized Geographic Code**

The geographic code for the procurement of commodities and services under this program is 937 (the United States, the recipient country, and developing countries other than advanced developing countries, but excluding any country that is a prohibited source).

**5. Nature of the Relationship between USAID and the Recipient**

The principal purpose of the relationship with the Recipient and under the subject program is to transfer funds to accomplish a public purpose of support or stimulation of the Strategies To Prevent (STOP) Spillover which is authorized by Federal statute. The successful Recipient will be responsible for ensuring the achievement of the program objectives and the efficient and effective administration of the award through the application of sound management practices. The Recipient will assume responsibility for administering Federal funds in a manner consistent with underlying agreements, program objectives, and the terms and conditions of the Federal award.

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## SECTION C: ELIGIBILITY INFORMATION

### 1. Eligible Applicants

Eligibility for this NOFO is not restricted.

USAID welcomes applications from organizations that have not previously received financial assistance from USAID.

### 2. Cost Sharing or Matching

USAID has established a suggested cost share of 5% for the Recipient of the award. Such funds may be mobilized from the Recipient; other multilateral, bilateral, and foundation donors; host governments; and local organizations, communities and private businesses that contribute financially and in-kind to implementation of activities at the country level. This may include contribution of staff level of effort, office space or other facilities or equipment which may be used for the program, peovided by the recipient. For guidance on cost sharing in grants and cooperative agreements see 2 CFR 200.306. If proposed, the cost-sharing plan should be discussed in the Budget Narrative to the extent necessary to demonstrate its feasibility and applicability to the program.

### 3. Other

An applicant may submit only one application under this NOFO.

## RISK ASSESSMENT

In order for an award to be made, the USAID Agreement Officer must evaluate the risks posed by applicants as outlined in 2 CFR 200.205 and ADS 303.3.9. This means that the applicant must possess, or must have the ability to obtain, the necessary management and technical competence to conduct the proposed program, and must agree to practice mutually agreed-upon methods of accountability for funds and other assets provided or funded by USAID.

In evaluating the risks posed by applicants, the Federal Awarding Agency uses a risk-based approach and may consider:

1. Financial stability;

2. Quality of management systems and ability to meet the management standards prescribed in this part;

3. History of performance. The applicant's record in managing Federal awards, if it is a prior recipient of Federal awards, including timeliness of compliance with applicable reporting requirements, conformance to the terms and conditions of previous Federal



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awards, and if applicable, the extent to which any previously awarded amounts will be expended prior to future awards;

4. Reports and findings from audits performed under Subpart F—Audit Requirements of this part or the reports and findings of any other available audits;

5. The applicant's ability to effectively implement statutory, regulatory, or other requirements imposed on non-Federal entities; and

6. That applicant is otherwise qualified to receive an award under applicable laws and regulations (e.g., Nondiscrimination, Lobbying, Debarment/Suspension, Terrorist Financing, etc.).

In the absence of a positive risk assessment, an award can ordinarily not be made. Awards to potential new partners may be significantly delayed if USAID must undertake necessary preaward reviews of these organizations to make an adequate risk assessment. These organizations should take this into account and plan their implementation dates and activities accordingly.

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## SECTION D: APPLICATION AND SUBMISSION INFORMATION

### 1. Agency Point of Contact

For submission of Questions and Applications: stopspillover@usaid.gov

### 2. Questions and Answers

Questions regarding this NOFO should be submitted to stopspillover@usaid.gov no later than the date and time indicated on the cover letter, as amended. Any information given to a prospective applicant concerning this NOFO will be furnished promptly to all other prospective applicants as an amendment to this NOFO, if that information is necessary in submitting applications or if the lack of it would be prejudicial to any other prospective applicant.

### 3. General Content and Form of Application

**Preparation of Applications:**

Each applicant must furnish the information required by this NOFO. Applications must be submitted in two separate parts: the Technical Application and the Business (Cost) Application. This subsection addresses general content requirements applying to the full application. Please see subsections 5 and 6, below, for information on the content specific to the Technical and Business (Cost) applications. The Technical application must address *technical aspects only* while the Business (Cost) Application must present the costs, and address risk and other related issues.

Both the Technical and Business (Cost) Applications must include a cover page containing the following information:

- Name of the organization(s) submitting the application;
- Identification and signature of the primary contact person (by name, title, organization, mailing address, telephone number and email address) and the identification of the alternate contact person (by name, title, organization, mailing address, telephone number and email address);
- Program name;
- Notice of Funding Opportunity number;
- Date of Submission; and
- Name of any proposed sub-recipients or partnerships (identify if any of the organizations are local organizations, per USAID's definition of 'local entity' under ADS 303).

Any erasures or other changes to the application must be initialed by the person signing the application. Applications signed by an agent on behalf of the applicant must be accompanied by evidence of that agent's authority, unless that evidence has been previously furnished to the issuing office.



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Applicants may choose to submit a cover letter in addition to the cover pages, but it will serve only as a transmittal letter to the Agreement Officer. The cover letter will not be reviewed as part of the merit review criteria.

Applications must comply with the following:

- USAID will not review any pages in excess of the page limits noted in the subsequent sections. Please ensure that applications comply with the page limitations.
- Written in English
- Use standard 8 ½" x 11", single sided, single-spaced, 12 point Times New Roman font, 1" margins, left justification and headers and/or footers on each page including consecutive page numbers, date of submission, and applicant's name.
- 10 point font can be used for graphs, tables and charts. In the event that a graph, chart, or figure cannot be edited or easily recreated, another legible font is acceptable.
- Submitted via Microsoft Word or PDF formats, except budget files which must be submitted in Microsoft Excel.
- The estimated start date identified in Section B of this NOFO must be used in the cost application.
- The technical application must be a searchable and editable Word or PDF format as appropriate.
- The Cost Schedule must include an Excel spreadsheet with all cells unlocked and no hidden formulas or sheets. A PDF version of the Excel spreadsheet may be submitted in addition to the Excel version at the applicant's discretion, however, the official cost application submission is the unlocked Excel version.

Applicants must review, understand, and comply with all aspects of this NOFO. Failure to do so may be considered as being non-responsive and may be evaluated accordingly. Applicants should retain a copy of the application and all enclosures for their records.

**4. Application Submission Procedures**

Applications in response to this NOFO must be submitted no later than the closing date and time indicated on the cover letter, as amended. Late applications will not be reviewed nor considered . Applicants must retain proof of timely delivery in the form of system generated documentation of delivery receipt date and time/confirmation from the receiving office/certified mail receipt.

Applications must be submitted by email to stopspillover@usaid.gov. Email submissions must include the NOFO number, applicant's name in the subject line heading and whether the email relates to the technical or cost application. In addition, for an application sent by multiple emails, the subject line must also indicate the desired sequence of the emails and their attachments (e.g. "No. 1 of 4", etc.). For example, if your cost application is being sent in two emails, the first email should have a subject line that states: "[NOFO number], [organization name], Cost Application, Part 1 of 2".

USAID's preference is that the technical application and the cost application each be submitted as consolidated email attachments, e.g. that you consolidate the various parts of a technical



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application into a single document before sending it. If this is not possible, please provide instructions on how to collate the attachments. USAID will not be responsible for errors in compiling electronic applications if no instructions are provided or are unclear.

After submitting an application electronically, applicants should immediately check their own email to confirm that the attachments were indeed sent. If an applicant discovers an error in transmission, please send the material again and note in the subject line of the email or indicate in the file name if submitted via grants.gov that it is a "corrected" submission. Do not send the same email more than once unless there has been a change, and if so, please note that it is a "corrected" email.

Applicants are reminded that email is NOT instantaneous, and in some cases delays of several hours occur from transmission to receipt. Therefore, applicants are requested to send the application in sufficient time ahead of the deadline. For this NOFO, the initial point of entry to the government infrastructure is the USAID mail server.

There may be a problem with the receipt of *.zip files due to anti-virus software. Therefore, applicants are discouraged from sending files in this format as USAID cannot guarantee their acceptance by the internet server. File size must not exceed 10MG per email.

**5. Technical Application Format**

The technical application will be the most important factor in selecting the awardee for the proposed cooperative agreement. The technical application should be specific, complete, and concise. The application must demonstrate the applicant's capabilities and expertise with respect to achieving the goals, objectives and expected results of this Activity. The application should take into account the requirements of the program and merit review criteria found in this NOFO.

The narrative for the technical application must be no more than 25 pages. Pages exceeding this limit will not be evaluated. The cover page, acronyms list, table of contents, executive summary, and annexes are not subject to the page limitation. Any figures and tables within the technical application (not the annexes) must fit within the 25 page limit.

The format of the technical application must follow the outline and order specified below.

**(a) Cover Page** (See Section D.3 above for requirements) (not included in the page limit)

**(b) Acronyms** (not included in the page limit)

**(c) Table of Contents** (not included in the page limit)

Include major sections and page numbering to easily cross-reference and identify merit review criteria.

**(d) Executive Summary (One page)** (not included in the 25 page limit)



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The Executive Summary must provide a high-level overview of key elements of the Technical Application.

**(e) Technical Understanding and Proposed Approach (no more than 15 pages, recommended section lengths below)**

The applicant must submit a technical approach describing how they will achieve the objectives and expected results of the STOP Spillover program description. The applicant must consider the Program Description in its entirety and provide a clear description of their proposed approach, spelling out a credible and feasible strategy for achieving all three (3) of STOP Spillover's objectives and describing the expected results.

The applicant's technical approach must focus on all five mandatory countries identified in the table below. In addition, the applicant will select five more countries from the list of optional countries. To ensure geographic representation, the applicant must select at least two and not more than three countries (including mandatory countries) from each subregion.

**SELECTION OF COUNTRIES**

| | **West Africa** | **East Africa** | **South Asia** | **Asia** |
|---|---|---|---|---|
| **Mandatory** | Sierra Leone ***or*** Liberia | Uganda ***and*** the Democratic Republic of Congo | Bangladesh | Vietnam |
| **Optional** | Sierra Leone ***or*** Liberia<br>Cote d'Ivoire<br>Ghana<br>Nigeria | Ethiopia<br>Kenya<br>Tanzania | India<br>Nepal | Cambodia<br>Indonesia<br>Laos<br>Malaysia<br>Myanmar<br>Thailand |

The approach must be clear, succinct and feasible to better understand and mitigate the risks of zoonotic spillover. The approach must address the challenges, limitations, and opportunities associated with this activity as well as the varying local, gender and cultural contexts that need to be considered. The following must be included in the approach:

a. Description of how the overarching goal, 3 objectives and results will be achieved
b. Plan for data collection, dissemination, and usage to include:
    i. what information will be used and/or analyzed
    ii. new data to be collected, if any, with the process of collection and quality assurance measures
    iii. plans for sharing data and resulting analyses
    iv. how the information collected will be used to fill key knowledge gaps and improve country capacities to understand and reduce the risk of zoonotic spillover.
c. One page table listing the 10 countries (5 mandated & 5 selected by applicant) targeted for implementation (see table above). Include:



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i. Proposed targeted pathogens and animal species (and animals?)
ii. Proposed targeted high-risk interfaces
iii. In-country partners, resources or networks to include as potential consortium members, collaborators or sub-awardees to maximize likelihood of success and sustainability

d. Sustainability and Local Inclusion Plan: Applicant must propose a plan to promote sustainability, local inclusion and ownership. The plan must include:
   i. Process of how local and other (in-country) stakeholders will be identified and meaningfully engaged as consortium members, collaborators and/or sub-awardees throughout implementation.
   ii. A plan, in alignment with USAID's Journey to Self-Reliance, describing how proposed activities will build in-country capacities, and how these will be maintained beyond the 5-year timeframe of this award. Key constraints that developing countries face in preventing the transmission and spread of emerging zoonotic diseases must be considered.
e. Monitoring, Evaluation and Learning (MEL): Plan must be comprehensive, cost-effective and clearly indicate the results to be achieved during the life of the activity, relevant targets, sensible performance indicators, and a process for integrating learning into activity implementation. This section must also include a learning agenda detailing a set of proposed questions to address during the activity, a process for addressing each of these questions, and a plan to disseminate and use findings to improve activity implementation and reduce the risk of zoonotic spillover.

**f) Management Approach** (no more than 5 pages)
The Management Plan must include the following:

a. A concise description of the roles for each consortium partner or sub-recipient and their associated technical capacities
b. The appropriate lines of authority for managing all staff, including consortium partners and sub-recipients, includes clear and feasible roles for any proposed sub-recipient, and outlines
c. A clear approach to managing technical and financial reporting, project logistics, and procurement issues while taking advantage of each organization's strengths, emphasizing cost effectiveness, and avoiding duplication of efforts.
d. In an Annex, Applicants must include an organizational chart to illustrate the proposed management structure.

**g) Staffing Plan and Key Personnel** (no more than 5 pages)

**Staffing Plan:** Applicants are expected to develop a comprehensive staffing plan that will enable achievement of STOP Spillover objectives and results as well as demonstrate an appropriate balance of skills.

The applicant must describe a staffing plan for all staff (both Key Personnel and non-Key Personnel) that demonstrates an appropriate balance of skills, expertise, and experience across



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the prime, consortium partners and/or sub-recipients to achieve the objectives of STOP Spillover. It must include a narrative description that explains how the Offeror's proposed combination of key personnel, other long-term staff, and short term technical assistance will collectively possess the required technical and management expertise and skills to lead the activities and deliver the results expected. The staffing plan must also demonstrate efficient use of resources. The Offeror must describe the division of roles and responsibilities between the prime contractor, subcontractors and other resource organizations in implementing the proposed technical approach.

The annex should include a table (no more than 2 pages) that identifies all staff positions, the percentage of time that each staff member would work on this activity, their areas of expertise, and their geographic regions of focus.

**Key Personnel.** Key personnel are those individuals whose performance is critical to the success of the STOP Spillover Activity. The applicant shall designate four (3) key personnel for the positions, as listed below. The Surveillance/Risk Assessment Advisor and the Risk Reduction Advisor are being prioritized as key personnel, as they will be directly accountable for achieving their respective objectives.

- Project Director/Chief of Party
- Surveillance/Risk Assessment Coordinator (Objectives 1)
- Risk Reduction Coordinator (Objectives 2 and 3)

The proposed key personnel must have appropriate qualifications and demonstrated ability to manage the various complex organizational, personnel, administrative, financial, and cross-cultural aspects of STOP Spillover. The key personnel must meet the minimum qualifications outlined below. In the main body of the proposal, at a minimum, Offerors must describe, for each of the three proposed Key Personnel positions, the Offeror's rationale for proposing the individual and explain how the Key Personnel complement each other's skills and qualifications in a manner that will result in a strong, balanced and highly qualified team.

In the annexes, the Offeror must submit the following documents for each Key Personnel candidate:

- Current CV/resume including the names of three (3) professional references, who are not employed by the prime applicant or any of the subcontractors, with contact information (email and telephone number), (maximum 3 pages);
- Signed statement of commitment, confirming immediate availability from each key personnel candidate (Limit: 1 page).

***Key Personnel Qualifications***

**Project Director:** The Contractor must designate a full-time Project Director who will serve as the main point of contact for STOP Spillover, providing vision, direction, leadership, and management for the project. S/he will serve as the Contractor's primary representative for all agreement-related issues, concerns, or problems.

Project Director's Qualifications:



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- Master's degree in a relevant field;
- At least 10 years of relevant experience within an international development context, and a demonstrated ability to create and maintain effective working relations with international organizations; US Government agencies; and NGO partners, private sector partners, and host country governments (including senior government officials) in developing countries;
- Minimum of five (5) years of demonstrated senior-level leadership (e.g., Chief of Party, Project Director, Deputy Director) to programs of similar magnitude and complexity is preferred; and
- Fluency in English oral and written communication.

**Surveillance/Risk Assessment Coordinator:** The applicant must designate a full-time Surveillance/Risk Assessment Coordinator who will work in collaboration with the Project Director in providing technical oversight for the achievement of Objective 1 as described in the Program Description.

Surveillance/Risk Assessment Coordinator's qualifications:

- Master's degree in a relevant field;
- At least 10 years of relevant experience within an international development context;
- Minimum five (5) years of experience that is highly related to Objective 1;
- Demonstrated experience bringing subject matter expertise and international best practices his/her field; and
- Fluency in English oral and written communication.

**Risk Reduction Coordinator:** The applicant must designate a full-time Risk Reduction Coordinator who will work in collaboration with the Project Director in providing technical oversight for the achievement of Objectives 2 and 3 as described in the Program Description.

Surveillance/Risk Assessment Coordinator's qualifications:

- Master's degree in a relevant field;
- At least 10 years of relevant experience within an international development context;
- Minimum five (5) years of experience that is highly related to Objectives 2 and 3;
- Demonstrated experience bringing subject matter expertise and international best practices to his/her field; and
- Fluency in English oral and written communication.

**h) Annexes** (not included in the page limit)

The annexes should include:



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- Organizational chart (maximum 2 pages)
- Staffing Table (maximum 2 pages)
- Key Personnel CVs (maximum 3 pages)
- Key Personnel Letters of Commitment (maximum 1 page per key personnel)
- Organizational Past Performance Reference Information (see Section D6.(h))
- If applicable, Consortium Partner and/or Sub-Recipients Letters of Commitment (maximum 2 pages per letter)

**DO NOT SUBMIT** promotional literature and materials regarding the applicant or any of the proposed consortium partners and/or sub-recipients, and/or other unsolicited material. Additional annexes to the Technical Application will not be reviewed.

### 6. Business (Cost) Application Format

The Business (Cost) Application must be submitted separately from the Technical Application. While no page limit exists for the full cost application, applicants are encouraged to be as concise as possible while still providing the necessary details. The business (cost) application must illustrate the entire period of performance, using the budget format shown in the SF-424A.

Prior to award, applicants may be required to submit additional documentation deemed necessary for the Agreement Officer to assess the applicant's risk in accordance with 2 CFR 200.205. Applicants should not submit any additional information with their initial application.

The Cost Application must contain the following sections (which are further elaborated below this listing with the letters for each requirement):

**a) Cover Page** (See Section D.3 above for requirements)

**b) SF 424 Form(s)**

The applicant must sign and submit the cost application using the SF-424 series at https://www.grants.gov/web/grants/forms/sf-424-family.html. Standard Forms can be accessed electronically at www.grants.gov or using the following links:

| | |
|---|---|
| **Instructions for SF-424** | https://apply07.grants.gov/apply/forms/instructions/SF424_2_1-V2.1-Instructions.pdf |
| **Application for Federal Assistance (SF-424)** | https://apply07.grants.gov/apply/forms/sample/SF424_2_1-V2.1.pdf |
| **Instructions for SF-424A** | https://apply07.grants.gov/apply/forms/instructions/SF424A-V1.0-Instructions.pdf |
| **Budget Information (SF-424A)** | https://apply07.grants.gov/apply/forms/sample/SF424A-V1.0.pdf |



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| | |
|---|---|
| **Instructions for SF-424B** | https://apply07.grants.gov/apply/forms/instructions/SF424B-V1.1-Instructions.pdf |
| **Assurances (SF-424B)** | https://apply07.grants.gov/apply/forms/sample/SF424B-V1.1.pdf |

Failure to accurately complete these forms could result in the rejection of the application.

**c) Required Certifications and Assurances**

The applicant must complete the following documents and submit a signed copy with their application:

(1) "Certifications, Assurances, Representations, and Other Statements of the Recipient" document found at https://www.usaid.gov/sites/default/files/documents/1868/303mav.pdf
(2) Assurances for Non-Construction Programs (SF-424B)
(3) Certificate of Compliance: Please submit a copy of your Certificate of Compliance if your organization's systems have been certified by USAID/Washington's Office of Acquisition and Assistance (M/OAA).

**d) Budget and Budget Narrative**

The detailed Budget must be submitted as one unprotected Excel file (MS Office 2000 or later versions) with visible formulas and references and must be broken out by project year, including itemization of the federal and non-federal (cost share) amount. Files must not contain any hidden or otherwise inaccessible cells. Budgets with hidden cells lengthen the cost analysis time required to make award, and may result in a rejection of the cost application. The Budget Narrative must contain sufficient detail to allow USAID to understand the proposed costs. The applicant must ensure the budgeted costs address any additional requirements identified in Section F, such as Branding and Marking. The Budget Narrative must be thorough, including sources for costs to support USAID's determination that the proposed costs are fair and reasonable.

The Budget must include the following worksheets or tabs, and contents, at a minimum:

- Summary Budget, inclusive of all program costs (federal and non-federal), broken out by major budget category and by year for activities implemented by the applicant and any potential sub-applicants for the entire period of the program. See Section H, Annex 1 for Summary Budget Template
- Detailed Budget, including a breakdown by year, sufficient to allow the Agency to determine that the costs represent a realistic and efficient use of funding to implement the applicant's program and are allowable in accordance with the cost principles found in 2 CFR 200 Subpart E.
- Detailed Budgets for each major* sub-recipient, for all federal funding and cost share, broken out by budget category and by year, for the entire implementation period of the project.



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*Major sub-recipient is defined as any entity receiving 20% or more of the total estimated budget, excluding funding to the networks.

A sample summary budget is shown below:

| Cost Element | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Total |
|---|---|---|---|---|---|---|
| Salaries and Wages | | | | | | |
| Fringe Benefits | | | | | | |
| Travel | | | | | | |
| Equipment | | | | | | |
| Supplies | | | | | | |
| Contractual | | | | | | |
| Other Direct Costs | | | | | | |
| Plug -In* | $8,000,000 | $8,000,000 | $8,000,000 | $8,000,000 | $8,000,000 | $40,000,000 |
| Total Direct Costs | | | | | | |
| Total Indirect Costs | | | | | | |
| TOTAL | | | | | | |

*See (7) below for an explanation.

The Detailed Budget must contain the following budget categories and information, at a minimum:



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1) Salaries and Wages – Must be proposed consistent with 2 CFR 200.430 Compensation - Personal Services. The applicant's budget must include position title, salary rate, level of effort, and salary escalation factors for each position. Allowances, when proposed, must be broken down by specific type and by position. Applicants must explain all assumptions in the Budget Narrative. The Budget Narrative must demonstrate that the proposed compensation is reasonable for the services rendered and consistent with what is paid for similar work in other activities of the applicant. Applicants must provide their established written policies on personnel compensation. If the applicant's written policies do not address a specific element of compensation that is being proposed, the Budget Narrative must describe the rationale used and supporting market research.

2) Fringe Benefits – (if applicable) If the applicant has a fringe benefit rate approved by an agency of the U.S. Government, the applicant must use such rate and provide evidence of its approval. If an applicant does not have a fringe benefit rate approved, the applicant must propose a rate and explain how the applicant determined the rate. In this case, the Budget Narrative must include a detailed breakdown comprised of all items of fringe benefits (e.g., superannuation, gratuity, etc.) and the costs of each, expressed in U.S. dollars and as a percentage of salaries.

3) Travel and Transportation – Provide details to explain the purpose of the trips, the number of trips, the origin and destination, the number of individuals traveling, and the duration of the trips. Per Diem and associated travel costs must be based on the applicant's normal travel policies. When appropriate please provide supporting documentation as an attachment, such as company travel policy, and explain assumptions in the Budget Narrative.

4) Procurement or Rental of Goods (Equipment & Supplies), Services, and Real Property – Must include information on estimated types of equipment, models, supplies and the cost per unit and quantity. The Budget Narrative must include the purpose of the equipment and supplies and the basis for the estimates. The Budget Narrative must support the necessity of any rental costs and reasonableness in light of such factors as: rental costs of comparable property, if any; market conditions in the area; alternatives available; and the type, life expectancy, condition, and value of the property leased.

5) Subawards – Specify the budget for the portion of the program to be passed through to any subrecipients. See 2 CFR 200.330 for assistance in determining whether the sub-tier entity is a subrecipient or contractor. The subrecipient budgets must align with the same requirements as the applicant's budget, including those related to fringe and indirect costs.

6) Other Direct Costs – This may include other costs not elsewhere specified, such as report preparation costs, passports and visas fees, medical exams and inoculations, as well as any other miscellaneous costs which directly benefit the program proposed by the applicant. The applicant should indicate the subject, venue and duration of any proposed conferences and seminars, and their relationship to the objectives of the program, along with estimates of costs. Otherwise, the narrative should be minimal.

7) Plug-In -- Since the time that the RFI for this award was issued, an additional $40,000,000 is now contemplated and the number of countries may fluctuate. Since these funds are not



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finalized, please use the amounts indicated in the chart above to reach the potential $100,000,000 of this NOFO.

8) Indirect Costs – Applicants must indicate whether they are proposing indirect costs or will charge all costs directly. In order to better understand indirect costs please see Subpart E of 2 CFR 200.414. The application must identify which approach they are requesting and provide the applicable supporting information. Below are the most commonly used Indirect Cost Rate methods:

Method 1 - Direct Charge Only
Eligibility: Any applicant
Initial Application Requirements: See above on direct costs

Method 2 - Negotiated Indirect Cost Rate Agreement (NICRA)
Eligibility: Any applicant with a NICRA issued by a USG Agency must use that NICRA
Initial Application Requirements: If the applicant has a current NICRA, submit your approved NICRA and the associated disclosed practices. If your NICRA was issued by an Agency other than USAID, provide the contact information for the approving Agency. Additionally, at the Agency's discretion, a provisional rate may be set forth in the award subject to audit and finalization. See USAID's Indirect Cost Rate Guide for Non Profit Organizations for further guidance.

Method 3 - De minimis rate of 10% of modified total direct costs (MTDC)
Eligibility: Any applicant that has never received a NICRA
Initial Application Requirements: Costs must be consistently charged as either indirect or direct costs, but may not be double charged or inconsistently charged as both. If chosen, this methodology once elected must be used consistently for all Federal awards until such time as a non-Federal entity chooses to negotiate an indirect rate, which the non-Federal entity may apply to do at any time. The applicant must describe which cost elements it charges indirectly vs. directly. See 2 CFR 200.414(f) for further information.

Method 4 - Indirect Costs Charged As A Fixed Amount
Eligibility: Non U.S. non-profit organizations without a NICRA may request, but approval is at the discretion of the AO
Initial Application Requirements: Provide the proposed fixed amount and a worksheet that includes the following:

- Total costs incurred by the organization for the previous fiscal year and estimates for the current year.
- Indirect costs (common costs that benefit the day-to-day operations of the organization, including categories such as salaries and expenses of executive officers, personnel administration, and accounting, or that benefit and are identifiable to more than one program or activity, such as depreciation, rental costs, operations and maintenance of facilities, and telephone expenses) for the previous fiscal year and estimates for the current year.



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- Proposed method for prorating the indirect costs equitably and consistently across all programs and activities of using a base that measures the benefits of that particular cost to each program or activity to which the cost applies.

If the applicant does not have an approved NICRA and does not elect to utilize the 10% de minimis rate, the Agreement Officer will provide further instructions and may request additional supporting information, including financial statements and audits, should the application still be under consideration after the merit review. USAID is under no obligation to approve the applicant's requested method.

9) Cost Sharing – If proposing cost share, the applicant should estimate the amount of cost-sharing resources to be provided over the life of the agreement and specify the sources of such resources, and the basis of calculation in the budget narrative. Applicants should also provide a breakdown of the cost share (financial and in-kind contributions) of all organizations involved in implementing the resulting award.

**e) Prior Approvals in accordance with 2 CFR 200.407**

Inclusion of an item of cost in the detailed application budget does not satisfy any requirements for prior approval by the Agency. If the applicant would like the award to reflect approval of any cost elements for which prior written approval is specifically required for allowability, the applicant must specify and justify that cost. See 2 CFR 200.407 for information regarding which cost elements require prior written approval.

**e) Approval of Subawards**

The applicant must submit information for all subawards that it wishes to have approved at the time of award. For each proposed subaward the applicant must provide the following:

- Name of organization
- DUNS Number
- Confirmation that the subrecipient does not appear on the Treasury Department's Office of Foreign Assets Control (OFAC) list
- Confirmation that the subrecipient does not have active exclusions in the System for Award Management (SAM)
- Confirmation that the subrecipient is not listed in the United Nations Security designation list
- Confirmation that the subrecipient is not suspended or debarred
- Confirmation that the applicant has completed a risk assessment of the subrecipient, in accordance with 2 CFR 200.331(b)
- Any negative findings as a result of the risk assessment and the applicant's plan for mitigation.

**f) Dun and Bradstreet and SAM Requirements**



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USAID may not award to an applicant unless the applicant has complied with all applicable unique entity identifier (DUNS number) and System for Award Management (SAM) requirements. Each applicant (unless the applicant is an individual or Federal awarding agency that is exempted from requirements under 2 CFR 25.110(b) or (c), or has an exception approved by the Federal awarding agency under 2 CFR 25.110(d)) is required to:

1. Provide a valid DUNS number for the applicant and all proposed sub-recipients;
2. Be registered in SAM before submitting its application. SAM is streamlining processes, eliminating the need to enter the same data multiple times, and consolidating hosting to make the process of doing business with the government more efficient (www.sam.gov).
3. Continue to maintain an active SAM registration with current information at all times during which it has an active Federal award or an application or plan under consideration by a Federal awarding agency.

The registration process may take many weeks to complete. Therefore, applicants are encouraged to begin the process early. If an applicant has not fully complied with the requirements above by the time USAID is ready to make an award, USAID may determine that the applicant is not qualified to receive an award and use that determination as a basis for making an award to another applicant.

DUNS number: http://fedgov.dnb.com/webform
SAM registration: http://www.sam.gov

Non-U.S. applicants can find additional resources for registering in SAM, including a Quick Start Guide and a video on how to obtain an NCAGE code, on www.sam.gov, navigate to Help, then to International Registrants.

**g) History of Performance**

The applicant and major sub-recipients must provide information regarding its recent history of performance for all its cost-reimbursement contracts, grants, or cooperative agreements involving similar or related programs, not to exceed three (3) years, as follows:

- Name of the Awarding Organization;
- Award Number;
- Activity Title;
- A brief description of the activity;
- Period of Performance;
- Award Amount;
- Reports and findings from any audits performed in the last three (3) years; and
- Name of at least two (2) updated professional contacts who most directly observed the work at the organization for which the service was performed with complete current contact information including telephone number, and e-mail address for each proposed individual.

If the applicant encountered problems on any of the referenced Awards, it may provide a short explanation and the corrective action taken. The applicant should not provide general



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information on its performance. USAID reserves the right to obtain relevant information concerning an applicant's history of performance from any sources and may consider such information in its review of the applicant's risk. The Agency may request additional information and conduct a pre-award survey if it determines that it is necessary to inform the risk assessment.

**h) Branding Strategy & Marking Plan**

The apparently successful applicant will be asked to provide a Branding Strategy and Marking Plan to be evaluated and approved by the Agreement Officer and incorporated into any resulting award

**1. Branding Strategy – Assistance (June 2012)**

a. Applicants recommended for an assistance award must submit and negotiate a "Branding Strategy," describing how the program, project, or activity is named and positioned, and how it is promoted and communicated to beneficiaries and host country citizens.

b. The request for a Branding Strategy, by the Agreement Officer from the applicant, confers no rights to the applicant and constitutes no USAID commitment to an award.

c. Failure to submit and negotiate a Branding Strategy within the time frame specified by the Agreement Officer will make the applicant ineligible for an award.

d. The applicant must include all estimated costs associated with branding and marking USAID programs, such as plaques, stickers, banners, press events, materials, and so forth, in the budget portion of the application. These costs are subject to the revision and negotiation with the Agreement Officer and will be incorporated into the Total Estimated Amount of the grant, cooperative agreement or other assistance instrument.

e. The Branding Strategy must include, at a minimum, all of the following:

(1) All estimated costs associated with branding and marking USAID programs, such as plaques, stickers, banners, press events, materials, and so forth.

(2) The intended name of the program, project, or activity.

(i) USAID requires the applicant to use the "USAID Identity," comprised of the USAID logo and brandmark, with the tagline "from the American people" as found on the USAID Web site at http://www.usaid.gov/branding, unless Section VI of the RFA or APS states that the USAID Administrator has approved the use of an additional or substitute logo, seal, or tagline.



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(ii) USAID prefers local language translations of the phrase "made possible by (or with) the generous support of the American People" next to the USAID Identity when acknowledging contributions.

(iii) It is acceptable to cobrand the title with the USAID Identity and the applicant's identity.

(iv) If branding in the above manner is inappropriate or not possible, the applicant must explain how USAID's involvement will be showcased during publicity for the program or project.

(v) USAID prefers to fund projects that do not have a separate logo or identity that competes with the USAID Identity. If there is a plan to develop a separate logo to consistently identify this program, the applicant must attach a copy of the proposed logos. Section VI of the RFA or APS will state if an Administrator approved the use of an additional or substitute logo, seal, or tagline.

(3) The intended primary and secondary audiences for this project or program, including direct beneficiaries and any special target segments.

(4) Planned communication or program materials used to explain or market the program to beneficiaries.

(i) Describe the main program message.

(ii) Provide plans for training materials, posters, pamphlets, public service announcement, billboards, Web sites, and so forth, as appropriate.

(iii) Provide any plans to announce and promote publicly this program or project to host country citizens, such as media releases, press conferences, public events, and so forth. Applicant must incorporate the USAID Identity and the message, "USAID is from the American People."

(iv) Provide any additional ideas to increase awareness that the American people support this project or program.

(5) Information on any direct involvement from host-country government or ministry, including any planned acknowledgement of the host-country government.

(6) Any other groups whose logo or identity the applicant will use on program materials and related materials. Indicate if they are a donor or why they will be visibly acknowledged, and if they will receive the same prominence as USAID.



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e. The Agreement Officer will review the Branding Strategy to ensure the above information is adequately included and consistent with the stated objectives of the award, the applicant's cost data submissions, and the performance plan.

f. If the applicant receives an assistance award, the Branding Strategy will be included in and made part of the resulting grant or cooperative agreement.

(END OF PRE-AWARD TERM)

**2. Marking Plan – Assistance (June 2012)**

a. Applicants recommended for an assistance award must submit and negotiate a "Marking Plan," detailing the public communications, commodities, and program materials, and other items that will visibly bear the "USAID Identity," which comprises of the USAID logo and brandmark, with the tagline "from the American people." The USAID Identity is the official marking for the Agency, and is found on the USAID Web site at http://www.usaid.gov/branding. Section VI of the RFA or APS will state if an Administrator approved the use of an additional or substitute logo, seal, or tagline.

b. The request for a Marking Plan, by the Agreement Officer from the applicant, confers no rights to the applicant and constitutes no USAID commitment to an award.

c. Failure to submit and negotiate a Marking Plan within the time frame specified by the Agreement Officer will make the applicant ineligible for an award.

d. The applicant must include all estimated costs associated with branding and marking USAID programs, such as plaques, stickers, banners, press events, materials, and so forth, in the budget portion of the application. These costs are subject to the revision and negotiation with the Agreement Officer and will be incorporated into the Total Estimated Amount of the grant, cooperative agreement or other assistance instrument.

e. The Marking Plan must include all of the following:

(1) A description of the public communications, commodities, and program materials that the applicant plans to produce and which will bear the USAID Identity as part of the award, including:

(i) Program, project, or activity sites funded by USAID, including visible infrastructure projects or other sites physical in nature;



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(ii) Technical assistance, studies, reports, papers, publications, audiovisual productions, public service announcements, Web sites/Internet activities, promotional, informational, media, or communications products funded by USAID;

(iii) Commodities, equipment, supplies, and other materials funded by USAID, including commodities or equipment provided under humanitarian assistance or disaster relief programs; and

(iv) It is acceptable to cobrand the title with the USAID Identity and the applicant's identity.

(v) Events financed by USAID, such as training courses, conferences, seminars, exhibitions, fairs, workshops, press conferences and other public activities. If the USAID Identity cannot be displayed, the recipient is encouraged to otherwise acknowledge USAID and the support of the American people.

(2) A table on the program deliverables with the following details:

(i) The program deliverables that the applicant plans to mark with the USAID Identity;

(ii) The type of marking and what materials the applicant will use to mark the program deliverables;

(iii) When in the performance period the applicant will mark the program deliverables, and where the applicant will place the marking;

(iv) What program deliverables the applicant does not plan to mark with the USAID Identity , and

(v) The rationale for not marking program deliverables.

(3) Any requests for an exemption from USAID marking requirements, and an explanation of why the exemption would apply. The applicant may request an exemption if USAID marking requirements would:

(i) Compromise the intrinsic independence or neutrality of a program or materials where independence or neutrality is an inherent aspect of the program and materials. The applicant must identify the USAID Development Objective, Interim Result, or program goal furthered by an appearance of neutrality, or state why an aspect of the award is presumptively neutral. Identify by category or deliverable item, examples of material for which an exemption is sought.



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(ii) Diminish the credibility of audits, reports, analyses, studies, or policy recommendations whose data or findings must be seen as independent. The applicant must explain why each particular deliverable must be seen as credible.

(iii) Undercut host-country government "ownership" of constitutions, laws, regulations, policies, studies, assessments, reports, publications, surveys or audits, public service announcements, or other communications. The applicant must explain why each particular item or product is better positioned as host-country government item or product.

(iv) Impair the functionality of an item. The applicant must explain how marking the item or commodity would impair its functionality.

(v) Incur substantial costs or be impractical. The applicant must explain why marking would not be cost beneficial or practical.

(vi) Offend local cultural or social norms, or be considered inappropriate. The applicant must identify the relevant norm, and explain why marking would violate that norm or otherwise be inappropriate.

(vii) Conflict with international law. The applicant must identify the applicable international law violated by the marking.

f. The Agreement Officer will consider the Marking Plan's adequacy and reasonableness and will approve or disapprove any exemption requests. The Marking Plan will be reviewed to ensure the above information is adequately included and consistent with the stated objectives of the award, the applicant's cost data submissions, and the performance plan.

g. If the applicant receives an assistance award, the Marking Plan, including any approved exemptions, will be included in and made part of the resulting grant or cooperative agreement, and will apply for the term of the award unless provided otherwise.

(END OF PRE-AWARD TERM)

**i) Funding Restrictions**

Profit is not allowable for recipients or subrecipients under this award. See 2 CFR 200.330 for assistance in determining whether a sub-tier entity is a subrecipient or contractor.

Construction will not be authorized under this award.

USAID will not allow the reimbursement of pre-award costs under this award without the explicit written approval of the Agreement Officer.



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Except as may be specifically approved in advance by the AO, all commodities and services that will be reimbursed by USAID under this award must be from the authorized geographic code specified in Section B.4 of this NOFO and must meet the source and nationality requirements set forth in 22 CFR 228.

**j) Conscience Clause**

[If the NOFO intends to obligate FY04 or later funds made available for HIV/AIDS activities, regardless of the program account, insert the Pre-award Term entitled **"CONSCIENCE CLAUSE IMPLEMENTATION (ASSISTANCE) – SOLICITATION PROVISION."** Further guidance is found in AAPD 14-04, Section 2.D.]

**k) Conflict of Interest Pre-Award Term**

CONFLICT OF INTEREST PRE-AWARD TERM (August 2018)

a. Personal Conflict of Interest

1. An actual or appearance of a conflict of interest exists when an applicant organization or an employee of the organization has a relationship with an Agency official involved in the competitive award decision-making process that could affect that Agency official's impartiality. The term "conflict of interest" includes situations in which financial or other personal considerations may compromise, or have the appearance of compromising, the obligations and duties of a USAID employee or recipient employee.

2. The applicant must provide conflict of interest disclosures when it submits an SF-424. Should the applicant discover a previously undisclosed conflict of interest after submitting the application, the applicant must disclose the conflict of interest to the AO no later than ten (10) calendar days following discovery.

b. Organizational Conflict of Interest

The applicant must notify USAID of any actual or potential conflict of interest that they are aware of that may provide the applicant with an unfair competitive advantage in competing for this financial assistance award. Examples of an unfair competitive advantage include but are not limited to situations in which an applicant or the applicant's employee gained access to non-public information regarding a federal assistance funding opportunity, or an applicant or applicant's employee was substantially involved in the preparation of a federal assistance funding opportunity. USAID will promptly take appropriate action upon receiving any such notification from the applicant.

(END OF PRE-AWARD TERM)

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## SECTION E: APPLICATION REVIEW INFORMATION

### 1. Criteria

The merit review criteria prescribed here are tailored to the requirements of this particular NOFO. Applicants should note that these criteria serve to: (a) identify the significant matters which the applicants should address in their applications, and (b) set the standard against which all applications will be evaluated.

Technical and other factors will be evaluated relative to each other, as described here and prescribed by the Technical Application Format. The Technical Application will be scored by a Selection Committee (SC) using the criteria described in this section.

### 2. Review and Selection Process

### Merit Review

USAID will conduct a merit review of all applications received that comply with the instructions in this NOFO. Applications will be reviewed and evaluated in accordance with the following criteria and sub-criteria, of which all are **equally important**. Each criteria and sub-criteria will be assigned an adjectival rating.

- **Technical Approach**
  The extent to which the technical approach is comprehensive, demonstrates an understanding of the technical and contextual challenges, can realistically achieve the stated objectives and expected results in the program description, and utilizes appropriate local partners to ensure feasibility and sustainability.

  The extent to which the proposed Monitoring, Evaluation, and Learning (MEL) Plan is sound, effective and efficient.

- **Management Plan**
  The extent to which the Management Plan:
  - Is consistent with the proposed technical approach;
  - Maximizes the strengths of all partners;
  - Is cost-effective;
  - Demonstrates clear lines of communication and authority, roles and responsibilities, and coordination processes.

- **Key personnel and staffing**
  The extent to which key personnel meet or exceed the minimum requirements stated in Section D.



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The degree to which the staffing plan for non-key personnel exhibits appropriate range of technical, administrative, and managerial expertise required to implement the proposed technical approach.

**Business Review**

The Agency will evaluate the cost application of the applicant(s) under consideration for an award as a result of the merit criteria review to determine whether the costs are reasonable and allowable in accordance with the cost principles found in 2 CFR 200 Subpart E.

The Agency will also consider (1) the extent of the applicant's understanding of the financial aspects of the program and the applicant's ability to perform the activities within the amount requested; (2) whether the applicant's plans will achieve the program objectives with reasonable economy and efficiency; and (3) whether any special conditions relating to costs should be included in the award.

Proposed cost share, if provided, will be reviewed for compliance with the standards set forth in 2 CFR 200.306, 2 CFR 700.10, and the Standard Provision "Cost Sharing (Matching)" for U.S. entities, or the Standard Provision "Cost Share" for non-U.S. entities.

The AO will perform a risk assessment (2 CFR 200.205). The AO may determine that a pre-award survey is required to inform the risk assessment in determining whether the prospective recipient has the necessary organizational, experience, accounting and operational controls, financial resources, and technical skills – or ability to obtain them – in order to achieve the objectives of the program and comply with the terms and conditions of the award. Depending on the result of the risk assessment, the AO will decide to execute the award, not execute the award, or award with "specific conditions" (2 CFR 200.207).

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## SECTION F: FEDERAL AWARD ADMINISTRATION INFORMATION

### 1. Federal Award Notices

Award of the agreement contemplated by this NOFO cannot be made until funds have been appropriated, allocated and committed through internal USAID procedures. While USAID anticipates that these procedures will be successfully completed, potential applicants are hereby notified of these requirements and conditions for the award.

### 2. Administrative & National Policy Requirements

The resulting award from this NOFO will be administered in accordance with the following policies and regulations.

For US organizations: ADS 303, 2 CFR 700, 2 CFR 200, and Standard Provisions for U.S. Non-governmental organizations.

For Non US organizations: Standard Provisions for Non-U.S. Non-governmental Organizations.

See Annex 1, for a list of the Standard Provisions that will be applicable to any awards resulting from this NOFO.

### 3. Reporting Requirements

**Financial Reporting**:
The recipient must submit the Federal Financial Form (SF-425) on a quarterly basis via electronic format to the U.S. Department of Health and Human Services. The recipient also must submit a copy of the SF-425 to the Agreement Officer (AO) and the Agreement Officer's Representative (AOR). These financial reports are due no later than 30 calendar days at the end of each quarter based on the federal fiscal calendar. The recipient must submit the original and two copies of all final financial reports to USAID/Washington, M/CFO/CMP-LOC Unit, the AO, and the AOR. The recipient must submit an electronic version of the final financial report to the U.S. Department of Health and Human Services in accordance with the paragraph above.

**Performance Reporting**
The recipient must submit via email a copy of semi-annual, annual, and final performance reports, in English, to the AOR in accordance with 2 CFR 200.328.

- **Semi-Annual and Annual Reports**
  The recipient will submit semi-annual and annual progress reports based on the federal fiscal calendar. The semi-annual report will be due within 30 days after the end of the reporting period and will cover the first six months of the year (October 1 - March 31). The annual report will cover the entire fiscal year (October 1 - September 30) and will be due within 90 days of the end of the federal fiscal year.



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- At a minimum, both semi-annual and annual reports will contain:
    - Narrative description of activities completed and major accomplishments achieved during the reporting period in all countries supported by STOP Spillover, presented by objective
    - Qualitative and quantitative data on program achievements and results
    - Progress on standard and agreed upon indicators, as outlined in the MEL plan, including status towards achieving targets and explanations for significant deviations
    - An updated MEL plan, including progress on the learning agenda (annually)
    - Problems encountered and whether they were solved or are still outstanding
    - Proposed solutions to ongoing or new problems
    - Success stories, blogs, articles, publications, press releases, and photographs, if available
    - Update on expenditures for the reporting period against the pipeline
    - Analysis and explanation of cost overruns or high unit costs, when applicable
    - Planned activities for the next performance period

- **Global Health Security Agenda (GHSA) reports**
  The Recipient will submit semi-annual GHSA performance reports within a timeframe and on a template designated by the AOR. The Recipient will submit the GHSA semi-annual reports to the AOR via email.

- There may be additional reporting requirements and ad hoc information requests including those associated with Mission buy-ins or additional sources of funding provided to STOP Spillover

- **Final Report**
  Within ninety (90) calendar days after the period performance date, the recipient will submit one (1) original and two (2) copies of the Final Report to the AOR and one (1) copy to the Agreement Officer. In addition, one (1) copy will be submitted to the Development Experience Clearinghouse:
    - 1) Electronically: http://www.usaid.gov/results-and-data/information-resources/developmentexperience-clearinghouse-dec
    - 2) By U.S. Postal Service delivery to:
      U.S. Agency for International Development
      Development Experience Clearinghouse
      M/CIO/ITSD/KM
      Ronald Reagan Building M. 01-010
      Washington, DC 20523-6100

- The final report must include a narrative report and summary table of results, a comparison of actual accomplishments to the objectives established for the period of performance, and a gender analysis that describes how gender equality issues were tracked and addressed. It should highlight accomplishments against implementation plans; outline progress of benchmarks against targets; describe results; document lessons learned during implementation; and recommend strategies for sustaining the networks



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and their activities. The Final Report also must contain a three-page executive summary, an index of all reports and information products produced under the agreement, and a summary of the program's finances. More details on the format of the final report will be provided after the award.

**Implementation Plans**
Annual implementation plans serve as a guide to activity implementation and detail how the recipient will use the implementation year to achieve the objectives of STOP Spillover. The implementation plan is intended to be an annual roadmap for USAID and the recipient. Upon consultation with the AOR, reasonable and justifiable modifications can be made to improve the chances of achieving the medium- and long-term results of the award. The recipient must submit the following implementation and reporting documents in English. The AOR and recipient will agree on the appropriate format and length.

**First Year Work Plan and Budget**
The recipient will submit a draft work plan for the first year within the 90 calendar days of executing the award. Depending on the start date of the agreement, the first year work plan may be less than a full year or more than a full year. The first year work plan must include a detailed budget for the first year. As part of the First Year Work Plan submission, the recipient will include a supplementary annual work plan describing planned contributions to the GHSA on a template designated by the AOR.

**Annual Work Plan and Budget**
Starting with the second year of the award and for each subsequent year of performance thereafter, the recipient will submit annual work plans to the AOR for the next federal fiscal year within 30 calendar days prior to the end of the current federal fiscal year in a format agreed upon by the AOR and the recipient. The recipient also will submit supplementary annual work plans describing planned contributions to the GHSA within a timeframe and on a template designated by the AOR.

**Monitoring, Evaluation and Learning (MEL) Plan**
The recipient will finalize a MEL plan for the life of STOP Spillover that derives from the activities outlined in the Program Description and submit it to the AOR within 90 calendar days of the award for approval. The MEL plan will outline key program interventions, indicators of achievement, associated annual and life-of-Activity targets and a learning agenda. The learning agenda will outline key questions to be addressed, a plan for addressing these questions, and a process for incorporating findings into program implementation and spillover risk reduction. Where appropriate, the MEL plan must track gender equality issues in implementing activities. The recipient will update the MEL plan annually and submit it as an attachment to the annual report.

**Gender Action Plan**
The recipient will conduct a gender analysis that assesses context and gender needs, including time constraints and participation limitations. This analysis will inform a subsequent gender action plan, which will be developed in collaboration with USAID management team and finalized within 90 calendar days of the award. The gender action plan will inform the Activity's



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technical approach as it relates to gender throughout the life of the Activity. It also will be used to inform the design of activities that seek to reduce opportunity gaps between men and women or address power differentials to promote gender equity. The gender action plans should be developed in conjunction with the Activity's monitoring, evaluation and learning plan, and progress should be reflected in annual work plans and performance reports.

**Closeout Plan**
No later than six (6) months prior to the completion date of the agreement, the recipient will submit a demobilization plan for Agreement Officer's approval. The demobilization plan shall include: 1) a draft property disposition plan, 2) a plan for the phase-out of in-country operations, 3) a staffing discharge plan, 4) a delivery schedule for all reports or other deliverables required under the agreement, and 5) a timetable for completing all required actions in the demobilization plan, including the submission date of the final property disposition plan to the Agreement Officer.

## 4. Program Income

Income earned during the Activity's period of performance must be added to the total program amount and used to further eligible objectives for the Activity.

## 5. Environmental Compliance

As required by the 22 CFR 216, an Initial Environmental Examination (IEE) was completed by the USAID/GH/ETD Office to ensure that proposed interventions adhere to U.S. and host countries' environmental requirements, and that appropriate environmental safeguards are adopted to prevent negative environmental consequences of USAID investment. The environmental determination for the STOP Spillover IEE was a "negative determination," given the activities proposed under this NOFO will not have a significant effect on the environment.

The partner's environmental compliance obligations under these regulations and procedures are specified in the attached Initial Environmental Examination (IEE). Applicants should reflect illustrative costs for environmental compliance implementation and monitoring in their cost applications.

Please note the project scope written in the IEE should not influence the Applicant's proposal as these may be outdated. The applicant should only consider the Program Description as laid out in Section A of the NOFO.

An annual screening must be conducted to determine whether activities under STOP Spillover contained in the categorical exclusion justification remain within the Activity's scope. Changes to the Activity require an environmental review and possible amendment of the negative determination to reflect the new activities. Per ADS 204, the IEE will need to be amended and environmental determination reviewed if there is any new information or changes in interventions that might require revision of the determination.



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**6. Other Requirements**

During the life of the award, the recipient may be required to prepare and submit other special reports concerning specific activities and/or analyses. These requests will be in writing and will specify the due date.

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**SECTION G: FEDERAL AWARDING AGENCY CONTACT(S)**

For submission of Questions and Applications: stopspillover@usaid.gov

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## SECTION H: OTHER INFORMATION

### 1. Other Information

USAID reserves the right to fund any or none of the applications submitted. The Agreement Officer is the only individual who may legally commit the Government to the expenditure of public funds. Any award and subsequent incremental funding will be subject to the availability of funds and continued relevance to Agency programming.

Applications with Proprietary Data

Applicants who include data that they do not want disclosed to the public for any purpose or used by the U.S. Government except for evaluation purpose, should mark the cover page with the following:

> "This application includes data that must not be disclosed, duplicated, used, or disclosed – in whole or in part – for any purpose other than to evaluate this application. If, however, an award is made as a result of – or in connection with – the submission of this data, the U.S. Government will have the right to duplicate, use, or disclose the data to the extent provided in the resulting award. This restriction does not limit the U.S. Government's right to use information contained in this data if it is obtained from another source without restriction. The data subject to this restriction are contained in sheets {insert sheet numbers}."

Additionally, the applicant must mark each sheet of data it wishes to restrict with the following:

> "Use or disclosure of data contained on this sheet is subject to the restriction on the title page of this application."

### 2. List of Annexes

Annex 1: Standard Provisions
Annex 2: Abbreviations and Acronyms
Annex 3: Past Performance Information
Annex 4: Initial Environmental Examination

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**ANNEX 1 - STANDARD PROVISIONS**

(Note: the full text of these provisions may be found at: https://www.usaid.gov/ads/policy/300/303maa and https://www.usaid.gov/ads/policy/300/303mab). The actual Standard Provisions included in the award will be dependent on the organization that is selected. The award will include the latest Mandatory Provisions for either U.S. or non-U.S. Nongovernmental organizations. The award will also contain the following "required as applicable" Standard Provisions:

**REQUIRED AS APPLICABLE STANDARD PROVISIONS FOR U.S. NONGOVERNMENTAL ORGANIZATIONS**

| Required | Not Required | Standard Provision |
|---|---|---|
| TBD | | RAA1. NEGOTIATED INDIRECT COST RATES - PREDETERMINED (DECEMBER 2014) |
| | | RAA2. NEGOTIATED INDIRECT COST RATES - PROVISIONAL (Nonprofit) (DECEMBER 2014) |
| | | RAA3. NEGOTIATED INDIRECT COST RATE - PROVISIONAL (Profit) (DECEMBER 2014) |
| X | | RAA4. EXCHANGE VISITORS AND PARTICIPANT TRAINING (JUNE 2012) |
| | X | RAA5. VOLUNTARY POPULATION PLANNING ACTIVITIES – SUPPLEMENTAL REQUIREMENTS (JANUARY 2009) |
| X | | RAA6. PROTECTION OF THE INDIVIDUAL AS A RESEARCH SUBJECT (APRIL 1998) |



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| | | |
|---|---|---|
| X | | RAA7. CARE OF LABORATORY ANIMALS (MARCH 2004) |
| X | | RAA8. TITLE TO AND CARE OF PROPERTY (COOPERATING COUNTRY TITLE) (NOVEMBER 1985) |
| X | | RAA9. COST SHARING (MATCHING) (FEBRUARY 2012) |
| X | | RAA10. PROHIBITION OF ASSISTANCE TO DRUG TRAFFICKERS (JUNE 1999) |
| | X | RAA11. INVESTMENT PROMOTION (NOVEMBER 2003) |
| X | | RAA12. REPORTING HOST GOVERNMENT TAXES (DECEMBER 2014) |
| X | | RAA13. FOREIGN GOVERNMENT DELEGATIONS TO INTERNATIONAL CONFERENCES (JUNE 2012) |
| | X | RAA14. CONSCIENCE CLAUSE IMPLEMENTATION (ASSISTANCE) (FEBRUARY 2012) |
| | X | RAA15. CONDOMS (ASSISTANCE) (SEPTEMBER 2014) |
| | X | RAA16. PROHIBITION ON THE PROMOTION OR ADVOCACY OF THE LEGALIZATION OR PRACTICE OF PROSTITUTION OR SEX TRAFFICKING (ASSISTANCE) (SEPTEMBER 2014) |
| X | | RAA17. USAID DISABILITY POLICY - ASSISTANCE (DECEMBER 2004) |
| | X | RAA18. STANDARDS FOR ACCESSIBILITY FOR THE DISABLED IN USAID ASSISTANCE AWARDS INVOLVING CONSTRUCTION (SEPTEMBER 2004) |



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| | | |
|---|---|---|
| | X | RAA19. STATEMENT FOR IMPLEMENTERS OF ANTI-TRAFFICKING ACTIVITIES ON LACK OF SUPPORT FOR PROSTITUTION (JUNE 2012) |
| | X | RAA20. ELIGIBILITY OF SUBRECIPIENTS OF ANTI-TRAFFICKING FUNDS (JUNE 2012) |
| | X | RAA21. PROHIBITION ON THE USE OF ANTI-TRAFFICKING FUNDS TO PROMOTE, SUPPORT, OR ADVOCATE FOR THE LEGALIZATION OR PRACTICE OF PROSTITUTION (JUNE 2012) |
| X | | RAA22. UNIVERSAL IDENTIFIER AND SYSTEM OF AWARD MANAGEMENT (July 2015) |
| X | | RAA23. REPORTING SUBAWARDS AND EXECUTIVE COMPENSATION (DECEMBER 2014) |
| X | | RAA24. PATENT REPORTING PROCEDURES (DECEMBER 2014) |
| | X | RAA25. ACCESS TO USAID FACILITIES AND USAID'S INFORMATION SYSTEMS (AUGUST 2013) |
| X | | RAA26. CONTRACT PROVISION FOR DBA INSURANCE UNDER RECIPIENT PROCUREMENTS (DECEMBER 2014) |
| X | | RAA27. AWARD TERM AND CONDITION FOR RECIPIENT INTEGRITY AND PERFORMANCE MATTERS (April 2016) |
| X | | RAA28. PROTECTING LIFE IN GLOBAL HEALTH ASSISTANCE (MAY 2017) |



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**ANNEX 2 - ABBREVIATIONS AND ACRONYMS**

| | |
|---|---|
| ADS | Automated Directives System |
| AMR | Antimicrobial Resistance |
| AO | Agreement Officer |
| AOR | Agreement Officer's Representative |
| CDC | U.S. Centers for Disease Control and Prevention |
| CEPI | Coalition for Epidemic Preparedness Innovations |
| CFDA | Catalog of Federal Domestic Assistance |
| CFR | Code of Federal Regulations |
| CRM | Climate Risk Management |
| DARPA | Defense Advanced Research Projects Agency |
| DFAT | Australian Department of Foreign Affairs and Trade |
| DTRA | Defense Threat Reduction Agency |
| EID | Emerging Infectious Diseases |
| EPT | Emerging Pandemic Threats |
| FAA | Foreign Assistance Act |
| FAO | Food and Agricultural Organization of the United Nations |
| GHSA | Global Health Security Agenda |
| GHSS | Global Health Security Strategy |
| IFRC | International Federation of Red Cross and Red Crescent Societies |
| MEL | Monitoring, Evaluation and Learning |
| MERS-CoV | Middle East Respiratory Syndrome Coronavirus |
| MTDC | Modified Total Direct Costs |
| NFO | Notice of Funding Opportunity |
| NGO | Non-Governmental Organization |
| NICRA | Negotiated Indirect Cost Rate Agreement |
| OFAC | Treasury Department's Office of Foreign Assets Control |
| OHUN | One Health University Networks |
| OHW | One Health Workforce |
| OIE | World Organization for Animal Health |
| P&R | Preparedness and Response |
| SAM | System for Award Management |
| SC | Selection Committee |
| STOP | Strategies to Prevent |
| USAID | United States Agency for International Development |
| USG | United States Government |
| WHO | World Health Organization |



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## ANNEX 3 – PAST PERFORMANCE INFORMATION

### Past Performance Information (PPI)

(TO BE COMPLETED BY THE APPLICANT)

| | |
|---|---|
| 1. | AWARD NUMBER: |
| 2. | CONTRACTOR/RECIPIENT (NAME AND ADDRESS): |
| 3. | TYPE OF AWARD: |
| 4. | COMPLEXITY OF WORK: DIFFICULT _____ROUTINE _____ |
| 5. | DESCRIPTION, LOCATION, AND RELEVANCY OF WORK: |
| 6. | DOLLAR VALUE OF WORK :<br>STATUS: ACTIVE<br>_____COMPLETED_____ |
| 7. | DATE OF AWARD: _____<br>AWARD COMPLETION DATE (INCLUDING EXTENSIONS): _____ |
| 8. | TYPE AND EXTENT OF SUBAWARDS: |



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9. NAME, ADDRESS, TELEPHONE NUMBER, AND E-MAIL ADDRESS OF THE AWARDING CONTRACTING/AGREEMENT OFFICER AND/OR THE CONTRACTING/AGREEMENT OFFICER'S REPRESENTATIVE (AND OTHER REFERENCES AS APPLICABLE):



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## ANNEX 4 - INITIAL ENVIRONMENTAL EXAMINATION



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# INITIAL ENVIRONMENTAL EXAMINATION

**PROJECT/ACTIVITY DATA**

| | |
|---|---|
| **Project/Activity Name:** | Strategies to Prevent Spillover (STOP Spillover) |
| **Geographic Location(s)** (Country/Region): | To be determined. The expectation is that the project will work in 5-8 countries selected from the following geographic regions: West Africa (e.g. Guinea, Liberia, Sierra Leone, Nigeria); Central/East Africa (e.g. DR Congo, Kenya, Uganda); and Asia (e.g. Bangladesh, India, Indonesia, Vietnam). |
| **Amendment** (Yes/No), if Yes indicate # (1, 2...): | No |
| **Implementation Start/End Date** (FY or M/D/Y): | October 2020 – September 2025 |
| **If Amended, specify New End Date:** | N/A |
| **Solicitation/Contract/Award Number(s):** | TBD |
| **Implementing Partner(s):** | TBD |
| **Bureau Tracking ID:** | GH-20-10339 |
| **Tracking ID of Related RCE/IEE** (if any): | |
| **Tracking ID of Other, Related Analyses:** | |

**ORGANIZATIONAL/ADMINISTRATIVE DATA**

| | |
|---|---|
| **Implementing Operating Unit(s):** (e.g. Mission or Bureau or Office) | Emerging Threats Division (GH/ID/ETD) |
| **Other Affected Operating Unit(s):** | |
| **Lead BEO Bureau:** | |
| **Funding Account(s)** (if available): | GHP-C-AI |
| **Original Funding Amount:** | Anticipated ceiling of $60million |
| **If Amended, specify funding amount:** | N/A |
| **If Amended, specify new funding total:** | N/A |
| **Prepared by:** | Alisa Pereira |
| **Date Prepared:** | February 18, 2020 |

**ENVIRONMENTAL COMPLIANCE REVIEW DATA**

| | |
|---|---|
| **Analysis Type:** | ☒Environmental Examination ☐Deferral |
| **Environmental Determination(s):** | ☐Categorical Exclusion(s)<br>☒Negative<br>☐Positive<br>☐Deferred (per 22 CFR 216.3(a)(7)(iv) |
| IEE Expiration Date (if applicable): | |
| Additional Analyses/Reporting Required: | |
| Climate Risks Identified (#): | Low 8 # Moderate 4 # High # |



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| Climate Risks Addressed (#): | Low 8 # | Moderate 4 # | High # |
|---|---|---|---|

# THRESHOLD DETERMINATION AND SU MMARY OF FINDINGS

PROJECT/ACTIVITY SUMMARY

Through the STRATEGIES TO PREVENT SPILLOVER (STOP SPILLOVER) project, the U.S. Agency for International Development (USAID) seeks to reduce the vulnerability of select countries in Asia and Africa to spillover of emerging viral zoonoses. STOP Spillover will build on more than 15 years of USAID investments in promoting multi-sectoral, "One Health" capacities to address emerging viral zoonoses before they pose an overwhelming epidemic or pandemic threat. Specifically, the project will support countries to strengthen their capacities to identify, assess, monitor and address risks for spillover of emerging viral zoonoses, with a strong focus on applied research and developing and investing in risk-reduction interventions. Spillover is defined as an event in which an emerging zoonotic virus is transferred from an animal host (livestock, wildlife, or pets) to humans. Two other important aspects of the emergence of viral zoonoses are "amplification" (an increase in number of copies of a zoonotic virus either in animal or human populations) and "spread" (an increase in host range and/or geographic distribution of a zoonotic virus).

**Objective 1: Country's capacity to monitor and analyze spillover risk improved**
*Illustrative Activities for Objective 1 include, but are not limited to:*

- Assist country partners across sectors to update risk analyses (including high-risk animal-animal or animal-human interfaces; behavioral risk factors, biosecurity issues, etc.) to include recent data on emerging viral zoonoses from USAID-funded and other partner activities.
- Assist country partners across sectors to identify existing data, tools, partners and remaining gaps in knowledge on spillover risk for emerging viral zoonoses in high-risk populations and at high-risk animal-human interfaces.
- Assist countries in mapping existing surveillance and monitoring systems (including capacities in sampling, laboratories, and information systems).
- For gaps in surveillance of emerging viral zoonoses at high-risk interfaces, recommend cost-effective strategies to fill gaps by public health, livestock, and wildlife ministries with the aim of enabling countries to better understand spillover risk and develop mitigation measures.
- Support economic analyses to demonstrate the cost-benefit of investing in of a rational monitoring and surveillance system.

Expected result: Target countries have updated spillover risk analyses, and gap analyses of the current monitoring system, and advocacy information to support future investments in surveillance.

Activity 1Threshold Determination: The above listed activities are categorically excluded from further environmental review pursuant to 22 216.2(c)(2)(i) Education, technical assistance, or training programs except to the extent such programs include activities directly affecting the environment (such as construction of facilities, etc.)

**Objective 2: Spillover Risk Reduction Interventions Developed and Tested**

**(2a) With available information, test, validate and potentially implement spillover interventions**

*Illustrative activities for Objective 2a may include the following:*

- Acceptability and effectiveness of tree skirts by producers and communities in Bangladesh to prevent contamination of date palm sap with Nipah virus.
- Effectiveness of existing "Living Safely With Animals" community education tool in reducing indirect and direct contact with bats and rodents in Liberia and Sierra Leone to prevent Ebola, Marburg, and Lassa spillover and 1 country in Asia (TBD) to prevent coronavirus spillover from bats to guano farmers
- Improving biosecurity (tools TBD) along livestock value chains in Africa and Asia to reduce AMR, AI, and other common pathogens.

**(2b) Future interventions: Identify and address missing information on spillover risk so that additional or improved interventions can be tested/validated**

*Examples of potential knowledge gaps:*

- Is the animal-human interface for the two Nipah outbreaks in Kerala, India (2018, 2019) the same as Malaysia (1997), Bangladesh and West Bengal, India (2000-2019), or a new interface? The answer will guide what future spillover intervention(s) should be used in Kerala.
- At what animal-human interfaces and by what mechanism(s) is Lassa spilling over in Liberia and Sierra Leone? The answers will guide what future spillover intervention(s) should be used and which population(s) and interface(s) should be targeted.
- At what animal-human interfaces and by what mechanism(s) is Ebola spilling over in DR Congo and Uganda? The answers will guide what future spillover intervention(s) should be used and which population(s) and interface(s) should be targeted.
- At what animal-human interfaces and by what mechanism(s) is disease X spilling over in county Y? The answers will guide what future spillover intervention(s) should be used and which population(s) should be targeted.

Activity 2 Threshold Determination: As the scope of activities in Objective 2 have not been identified, a Negative threshold Determination is given. Additional environmental review will be required once these activities are identified which may include categorically included actions, and other actions that require more detailed environmental review.

**Objective 3: Amplification and Spread of Emerging Zoonoses Mitigated**

*Illustrative Activities for Objective 3 include, but are not limited to:*

- As needed, assist countries (in coordination with FAO, WHO, others) to provide risk-reduction training (case-management, IPC, etc) for communities, market workers, farmers, and health care workers in locations at high risk for spillover.
- Limited support for outbreak related investigations including support for commodities, sampling, communications.
- As needed, provide countries with technical support and conduct applied research and/or after-action reviews (in coordination with other partners) to improve outbreak response.
- As needed, assist countries with after-action reviews.

Activity 3 Threshold Determination: As the scope of activities in Objective 3 have not been identified, a Negative threshold Determination is given. Additional environmental review will be required once these activities are identified which may include categorically included actions, and other actions that require more detailed environmental review.

Expected result: target countries will be able to limit amplification and spread by improving rapid detection and response to zoonotic EID outbreaks

## ENVIRONMENTAL DETERMINATIONS

Upon approval of this document, the determinations become affirmed, per Agency regulations (22 CFR 216).

TABLE 1: **ENVIRONMENTAL DETERMINATIONS**

| Projects/Activities | Categorical Exclusion Citation (if applicable) | Negative Determination | Positive Determination[1] | Deferral[2] |
|---|---|---|---|---|
| Objective/Activity 1: Country's capacity to monitor and analyze spillover risk improved | Categorical Exclusion | ☐ | ☐ | ☐ |
| Objective/Activity 2: Spillover Risk Reduction Interventions Developed and Tested | Negative determination. There is not enough information available at this project design stage. This may require further analysis that may or may not result in additional conditions and mitigation measures. | ☒ | ☐ | ☐ |
| Objective/Activity 3: Amplification and Spread of Emerging Zoonoses Mitigated | ND: There is not enough information available at this project design stage. This may require further analysis that may or may not result in additional conditions and mitigation measures. | ☒ | ☐ | ☐ |
| | | ☐ | ☐ | ☐ |
| | | ☐ | ☐ | ☐ |

## CLIMATE RISK MANAGEMENT

ETD completed the CRM analysis by: (1) Consulting with ETD's technical advisors and reviewing project-specific reports/data to identify any known climate risks and mitigation strategies that are applicable to ongoing ETD awards (2) Reviewing USAID's country/regional climate risk profile fact sheets from Asia and East/West Africa; (3) Using the Climate Risk Screening and Management Tool, referencing the "Health Annex," to assess climate risks and inform project design and (4) referencing CRM documentation for previously approved projects.

At this time, the project is at the design stage, and all activities listed are illustrative. A majority of expected activities/sub-activities present low risk (with a few moderate risks); please refer to the CRM table analysis in the Annex. The STOP Spillover project will include opportunities to strengthen climate resilience and address the identified risks at the project design stage, and include appropriate language and references to the CRM within the solicitation and award

[1] Positive Determinations require preparation of a Scoping Statement and Environmental Assessment.
[2] GH does not grant Deferrals for projects during the IEE process.

documentation. Applicants will be encouraged to complete the Climate Risk Tool for any activities that meet the moderate to high risk rating. ETD will continue to work with the implementing partners, once the projects are awarded, to address climate risk at the work planning level.

Per instructions in the solicitation and award documentation, the implementing partner will be expected to ensure that sub-grantees and subcontractors have the capability to implement CRM. The implementing partner will, if appropriate, provide orientation to sub-grantees and subcontractors on climate risk management. Per Mandatory Reference for ADS Chapter 201 Climate Risk Management for USAID Projects and Activities, implementing partners may integrate "documentation" of the benefits of taking action to reduce climate change impacts and/or increase adaptive capacity" in their performance monitoring in program elements with moderate or high risk ratings.

## BEO SPECIFIED CONDITIONS OF APPROVAL

### IMPLEMENTATION

In accordance with 22 CFR 216 and Agency policy, the conditions and requirements of this document become mandatory upon approval. This includes the relevant limitations, conditions and requirements in this document as stated in Sections 3, 4, and 5 of the IEE and any BEO Specified Conditions of Approval.

# USAID APPROVAL OF INITIAL ENVIRONMENTAL EXAMINATION

**PROJECT/ACTIVITY NAME: STOP Spillover**

**Bureau Tracking ID**: GH-20-10339

| | | |
|---|---|---|
| **Approval:** | Electronically Cleared<br>Padma Shetty, Acting Division Director, ETD [required] | 2/18/20<br>Date |
| Clearance: | Electronically Cleared<br>Andrew Clements, A/COR [required] | 2/19/20<br>Date |
| Clearance: | <br>Dennis Durbin, Climate Integration Lead | <br>Date |
| **Concurrence:** | <br>Dennis Durbin, GH Bureau Environmental Officer and Climate Integration Lead | <br>Date |
| **Concurrence:** | <br>[NAME], _____ Bureau Environmental Officer [*other BEOs required for cross Bureau funding or geographic responsibilities*] | <br>Date |

**DISTRIBUTION:**



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# INITIAL ENVIRONMENTAL EXAMINATION

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# 1.0 PROJECT/ACTIVITY DESCRIPTION

## 1.1 PURPOSE OF THE IEE

The purpose of this document, in accordance with Title 22, Code of Federal Regulations, Part 216 (22 CFR 216), is to provide a preliminary review of the reasonably foreseeable effects on the environment of the USAID intervention described herein and recommend determinations and, as appropriate, conditions, for these activities. Upon approval, these determinations become affirmed, and specified conditions become mandatory obligations of implementation. This IEE also documents the results of the Climate Risk Management process in accordance with USAID policy (specifically, ADS 201mal).

This IEE is a critical element of USAID's mandatory environmental review and compliance process meant to achieve environmentally sound design and implementation. Potential environmental impacts should be addressed through formal environmental mitigation and monitoring plans (EMMPs) and/or Environmental Assessments (EAs), if needed.

## 1.2 PROJECT/ACTIVITY OVERVIEW

Through the STOP SPILLOVER project, USAID will build on more than 15 years of investments in promoting multi-sectoral, "One Health" capacities to address emerging viral zoonoses before they pose an overwhelming epidemic or pandemic threat. Specifically, the project will support countries to strengthen their capacities to identify, assess, monitor and address risks for spillover of emerging viral zoonoses, with a strong focus on applied research and developing and investing in risk-reduction interventions. Spillover is defined as an event in which an emerging zoonotic virus is transferred from an animal host (livestock, wildlife, or pets) to humans. Two other important aspects of the emergence of viral zoonoses are "amplification" (an increase in number of copies of a zoonotic virus either in animal or human populations) and "spread" (an increase in host range and/or geographic distribution of a zoonotic virus).

Building on prior investments, the project will pivot from a global to a country-level lens and with a stronger development focus. The proposed new activity will translate the knowledge gained about risk previously, into country-level capacity to assess and address risk at key spillover interfaces, with the goal of reducing the occurrence and impact of zoonotic diseases, especially from wildlife. STOP Spillover will focus on selected 5-8 countries from the following three geographic clusters: West Africa (Guinea, Liberia, Sierra Leone, Nigeria); Central/East Africa (DR Congo, Kenya, Uganda); and Asia (Bangladesh, India, Indonesia, Vietnam). Please note: this is an illustrative list, and the final selection of countries will be based on: (1) host country interest and motivation; (2), availability of data; (3), receptivity of operational environments (including staff and institutional capacities); (4), opportunities to leverage USG and other partner investments; (5) availability of, global capacity assessments; (6), likelihood of success, and (7) potential for knowledge and lessons learned to be used to address similar issues in other countries.

In collecting and using data to reduce spillover risk, STOP Spillover will build on the surveillance, laboratory, research, tools, and partnerships that have been established or strengthened over the past decade by USAID or other partners. A number of risk assessments and research projects have already been supported by USAID and STOP Spillover is expected to reference these resources which are publicly available to inform strategic planning, baseline

analyses, and proposed activities, as well as to ensure STOP Spillover activities are not duplicative of these or other efforts.

## 1.3 PROJECT/ACTIVITY DESCRIPTION

STOP Spillover will primarily focus on an evidence-based approach for reduction of spillover risk which may include gathering additional knowledge to support it. A smaller, secondary focus will be on improving outbreak response to reduce the likelihood of amplification and spread of any emerging zoonotic viruses that succeed in spilling over.

**Objective 1: Country's capacity to monitor and analyze spillover risk improved**
The project will assist countries in mapping their existing capacity for monitoring spillover risk of specific (or related) zoonotic viruses, and identifying gaps and targeting investments to filling these gaps in monitoring spillover risk of specific emerging zoonotic viruses. The support will build on existing surveillance capacity and will target the locations, settings, and animal or human populations most at- risk for viral spillover. The approach used and systems supported will need to be cost-effective, take into account existing partners, surveillance and laboratory systems and local capabilities. This support will include updating their existing risk analyses to take into consideration new data on viral zoonoses.
*Illustrative Activities for Objective 1 include, but are not limited to:*

- Assist country partners across sectors to update risk analyses (including high-risk animal-animal or animal-human interfaces; behavioral risk factors, biosecurity issues, etc.) to include recent data on emerging viral zoonoses from USAID-funded and other partner activities.
- Assist country partners across sectors to identify existing data, tools, partners and remaining gaps in knowledge on spillover risk for emerging viral zoonoses in high-risk populations and at high-risk animal-human interfaces.
- Assist countries in mapping existing surveillance and monitoring systems (including capacities in sampling, laboratories, and information systems).
- For gaps in surveillance of emerging viral zoonoses at high-risk interfaces, recommend cost-effective strategies to fill gaps by public health, livestock, and wildlife ministries with the aim of enabling countries to better understand spillover risk and develop mitigation measures.
- Support economic analyses to demonstrate the cost-benefit of investing in of a rational monitoring and surveillance system.

Expected result: Target countries have updated spillover risk analyses, and gap analyses of the current monitoring system, and advocacy information to support future investments in surveillance.

**Objective 2: Spillover Risk Reduction Interventions Developed and Tested**

**(2a) With available information, test, validate and potentially implement spillover interventions**
*Illustrative activities for Objective 2a may include the following:*

- Acceptability and effectiveness of tree skirts by producers and communities in Bangladesh to prevent contamination of date palm sap with Nipah virus.
- Effectiveness of existing "Living Safely With Animals" community education tool in reducing indirect and direct contact with bats and rodents in Liberia and Sierra Leone to



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prevent Ebola, Marburg, and Lassa spillover and 1 country in Asia (TBD) to prevent coronavirus spillover from bats to guano farmers
- Improving biosecurity (tools TBD) along livestock value chains in Africa and Asia to reduce AMR, AI, and other common pathogens.

**(2b) Future interventions: Identify and address missing information on spillover risk so that additional or improved interventions can be tested/validated**

*Examples of potential knowledge gaps:*

- Is the animal-human interface for the two Nipah outbreaks in Kerala, India (2018, 2019) the same as Malaysia (1997), Bangladesh and West Bengal, India (2000-2019), or a new interface? The answer will guide what future spillover intervention(s) should be used in Kerala.
- At what animal-human interfaces and by what mechanism(s) is Lassa spilling over in Liberia and Sierra Leone? The answers will guide what future spillover intervention(s) should be used and which population(s) and interface(s) should be targeted.
- At what animal-human interfaces and by what mechanism(s) is Ebola spilling over in DR Congo and Uganda? The answers will guide what future spillover intervention(s) should be used and which population(s) and interface(s) should be targeted.
- At what animal-human interfaces and by what mechanism(s) is disease X spilling over in county Y? The answers will guide what future spillover intervention(s) should be used and which population(s) should be targeted.

**Objective 3: Amplification and Spread of Emerging Zoonoses Mitigated**

Recognizing that it will likely not be possible to prevent all spillover events, the project will also strengthen country capacity to contain and limit the amplification and spread of emerging zoonoses once spillover has occurred.

*Illustrative Activities for Objective 3 include, but are not limited to:*

- As needed, assist countries (in coordination with FAO, WHO, others) to provide risk-reduction training (case-management, IPC, etc) for communities, market workers, farmers, and health care workers in locations at high risk for spillover.
- Limited support for outbreak related investigations including support for commodities, sampling, communications.
- As needed, provide countries with technical support and conduct applied research and/or after-action reviews (in coordination with other partners) to improve outbreak response.
- As needed, assist countries with after-action reviews.

TABLE 2: DEFINED OR ILLUSTRATIVE PROJECTS/ACTIVITIES AND SUB-ACTIVITIES

| |
|---|
| **Objective/Activity 1 — Country's capacity to monitor and analyze spillover risk improved** |
| Sub-activity |
| 1.1 Update risk analysis |
| 1.2 Identify existing tools, data sets, and partners already in country |
| 1.3 Map surveillance systems within the country |
| 1.4 Recommend cost effective surveillance solutions where there are identified gaps |
| 1.5 Conduct economic analysis to provide rationale for governments to invest in surveillance and monitoring |
| **Objective/Activity 2 — Spillover Risk Reduction Interventions** |
| Sub-activity |
| 2.1 Test, validate, and potentially implement spillover interventions |
| 2.2 Applied research on key information gaps on pathogen transmission and spillover dynamics. Topics TBD. |



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**Objective/Activity 3 – Amplification and Spread of Emerging Zoonoses Mitigated**
Activities are TBD, but may include training, assistance with after action reviews, and/or provision of commodities in coordination with WHO and FAO.

**Will this project/activity involve construction[3] as defined by ADS 201 and 303? Yes ☐ No ☒**

## 2.0 BASELINE ENVIRONMENTAL INFORMATION

### 2.1 LOCATIONS AFFECTED AND ENVIRONMENTAL CONTEXT (ENVIRONMENT, PHYSICAL, CLIMATE, SOCIAL, THREATENED AND ENDANGERED SPECIES)

STOP Spillover is expected to focus on selected 5-8 countries from the following three geographic clusters (below). Note – this is an illustrative list and the final country selection will depend on: (1) host country interest and motivation; (2), availability of data; (3), receptivity of operational environments (including staff and institutional capacities); (4), opportunities to leverage USG and other partner investments; (5) availability of, global capacity assessments; (6), likelihood of success, and (7) potential for knowledge and lessons learned to be used to address similar issues in other countries.

- West Africa (Guinea, Liberia, Sierra Leone, Nigeria)
- Central/East Africa (DR Congo, Kenya, Uganda)
- Asia (Bangladesh, India, Indonesia, Vietnam).

Additional country and local information will be provided once specific activities and locations are identified.

### 2.2 APPLICABLE AND APPROPRIATE PARTNER COUNTRY AND OTHER INTERNATIONAL STANDARDS (E.G. WHO) ENVIRONMENTAL AND SOCIAL LAWS, POLICIES, AND REGULATIONS

The status of country level environmental policies, standards, laws and regulations vary by country. The final country selection for this project has not yet been made, so this baseline information is not yet available.

### 2.3 COUNTRY/MINISTRY/MUNICIPALITY ENVIRONMENTAL CAPACITY ANALYSIS (AS APPROPRIATE)

As noted above, this information is TBD.

[3] **Construction, as defined by ADS 201 and 303**, includes: construction, alteration, or repair (including dredging and excavation) of buildings, structures, or other real property and includes, without limitation, improvements, renovation, alteration and refurbishment. The term includes, without limitation, roads, power plants, buildings, bridges, water treatment facilities, and vertical structures. In the box below, describe any construction planned for this project/activity. Refer to ADS 201maw for required Construction Risk Management procedures.

# 3.0 ANALYSIS OF POTENTIAL ENVIRONMENTAL RISK

PROJECT/ACTIVITY 1: **COUNTRY'S CAPACITY TO MONITOR AND ANALYZE SPILLOVER IMPROVED.**

There are no adverse environmental impacts identified for the systems mapping, risk analysis training, linking in-country partners to fill surveillance gaps, or conducting economic analysis on the rationale for investing in surveillance as all are indoor activities.

**TABLE 3A. POTENTIAL IMPACTS – PROJECT/ACTIVITY 1**

| Project/Activity | Potential environmental and social impacts |
|---|---|
| Project/Activity 1: | None. All activities are considered technical assistance (desktop reviews or other indoor trainings), education or capacity building, that do not have an impact on the environment. |
| Sub-activity 1.1: | |
| Sub-activity 1.2: | |
| [*Add rows as needed*] | |

PROJECT/ACTIVITY 2: **SPILLOVER RISK REDUCTION INTERENTIONS DEVELOPED AND TESTED**

The existing interventions to be tested have not yet been determined, and depend on the final selection of countries. Illustrative examples include measuring the effectiveness of the Living Safely with Bats community education tool, assessing the acceptability of tree skirts in Bangladesh to the date palm producers and consumers, and improving farm biosecurity practices along the livestock value chain in Africa and Asia. While testing some interventions will have no environmental impact (e.g. a community educational tool), there may be some interventions that have a limited and inadvertent impact on the environment (e.g. potential impact of upgrading biosecurity practices on farms on the environment, production of medical/hazardous waste if testing samples in the laboratory for specific pathogens, etc.). Once more specific activities are identified, additional environmental review will be conducted in accordance with 22 CFR 216.

The second sub-activity that refer to applied research on data gaps and potential interventions will be defined during the implementation of the project with country representatives. At this time, it is not possible to provide a clear description of exactly what may be included in this research and/or the methodologies that will be applied. Additional environmental review may be required once activities are further developed.

**TABLE 3B. POTENTIAL IMPACTS – PROJECT/ACTIVITY 2**

| Project/Activity | Potential environmental and social impacts |
|---|---|
| Project/Activity 2: | |
| Sub-activity 2.1: | Testing/monitoring existing methodologies: Although the final list of interventions have not yet been determined, there is likely to be limited environmental/social impact. |
| Sub-activity 2.2: | Applied Research: The questions/interventions will be identified during implementation. Once sub-activities are identified, additional environmental review will be undertaken to determine the environmental impacts. environmental or social impacts. |
| [*Add rows as needed*] | |

**PROJECT/ACTIVITY 3: Amplification and Spread of Emerging Zoonoses Mitigated**

There is not enough information available at this time to precisely define the range of activities that could take place under this objective, as each emerging zoonotic disease outbreak will vary by situational context (can vary by pathogen, country capacity, etc.). Illustrative examples of types of activities include training staff, assisting with after action reviews, and/or coordinating with U.N. Food and Agriculture Organization (FAO; a current implementing partner) and the World Health Organization (WHO) for the provision of commodities (including personal protective equipment, laboratory reagents and supplies for testing, etc.). Additional environmental review may be required once these activities are identified.

**TABLE 4B. POTENTIAL IMPACTS – PROJECT/ACTIVITY 2**

| Project/Activity | Potential environmental and social impacts |
|---|---|
| Project/Activity 2: | |
| Sub-activity 2.1: | Training for outbreak staff and/or government officials will not have an environmental impact. |
| Sub-activity 2.2: | Assisting with after action reviews will not have an environmental impact<br>The provision of commodities will be determined on a case by case basis during an outbreak situation. Typically USAID's commodities include Personal Protective Equipment (masks, gloves, gowns, etc) and lab supplies. Once specific activities are identified, the environmental impacts and corresponding mitigation measures will be assessed in further environmental review. |
| [*Add rows as needed*] | |

# 4.0 ENVIRONMENTAL DETERMINATIONS

## 4.1 RECOMMENDED ENVIRONMENTAL DETERMINATIONS

The following table summarizes the recommended determinations based on the environmental analysis conducted. Upon approval, these determinations become affirmed, per 22 CFR 216. Specified conditions, detailed in Section 5, become mandatory obligations of implementation, per ADS 204.

TABLE 4: **ENVIRONMENTAL DETERMINATIONS**

| Projects/Activities | Categorical Exclusion Citation (if applicable) | Negative Determination | Positive Determination[4] | Deferral[1] |
|---|---|---|---|---|
| **Activity 1: Country's Capacity to Monitor and Analyze Spillover Improved.** | CE; per 22 CFR 216.2.(c)(2) (i) Education, technical assistance. | ☐ | ☐ | ☐ |
| **Activity 2: Spillover risk reduction interventions developed and Tested** | | ☒ | ☐ | ☐ |
| **Activity 3: Amplification** | CE; same as above | ☐ | ☐ | ☐ |

[4] Positive Determinations require preparation of a Scoping Statement and Environmental Assessment.

[1] Deferrals must be cleared through an Amendment to this IEE prior to implementation of any deferred activities.

| | | | | |
|---|---|---|---|---|
| **and Spread of Emerging Zoonoses Mitigated** | | | | |
| Sub-activity 2.1: Title | | ☐ | ☐ | ☐ |
| *[Add rows as needed]* | | ☐ | ☐ | ☐ |

### 4.2 CLIMATE RISK MANAGEMENT

This section summarizes the methodology used and findings of the CRM Screening, in accordance with ADS 201mal. The project design team, in consultation with the CIL, considered the potential effect of climate risks/stressors on the sustainability of the project (changing precipitation patterns, rising temperature, floods, droughts, fires, landslides, etc.) in addition to the impact of project activities on the climate (increased greenhouse gas emissions, land use changes, etc.). See Annex 1 for the compete CRM table.

ETD completed the CRM analysis by: (1) Consulting with ETD's technical advisors and reviewing project-specific reports/data to identify any known climate risks and mitigation strategies that are applicable to ongoing ETD awards (2) Reviewing USAID's country/regional climate risk profile fact sheets from Asia and East/West Africa; (3) Using the Climate Risk Screening and Management Tool, referencing the "Health Annex," to assess climate risks and inform project design and (4) referencing CRM documentation for previously approved projects.

At this time, the project is at the design stage, and all activities listed are illustrative. A majority of expected activities/sub-activities present low risk (with a few moderate risks); please refer to the CRM table analysis in the Annex. The STOP Spillover project will include opportunities to strengthen climate resilience and address the identified risks at the project design stage, and include appropriate language and references to the CRM within the solicitation and award documentation. Applicants will be encouraged to complete the Climate Risk Tool for any activities that meet the moderate to high risk rating. ETD will continue to work with the implementing partners, once the projects are awarded, to address climate risk at the work planning level.

Per instructions in the solicitation and award documentation, the implementing partner will be expected to ensure that sub-grantees and subcontractors have the capability to implement CRM. The implementing partner will, if appropriate, provide orientation to sub-grantees and subcontractors on climate risk management. Per Mandatory Reference for ADS Chapter 201 Climate Risk Management for USAID Projects and Activities, implementing partners may integrate "documentation" of the benefits of taking action to reduce climate change impacts and/or increase adaptive capacity" in their performance monitoring in program elements with moderate or high-risk ratings.

## 5.0 CONDITIONS AND MITIGATION MEASURES

### 5.1 CONDITIONS

The environmental determinations in this IEE are contingent upon full implementation of the following general implementation and monitoring requirements, as well as ADS 204 and other relevant requirements.

#### 5.1.1 During Pre-Award:

5.1.1.1 Pre-Award Briefings: As feasible, the design team and/or the cognizant environmental officer(s) (e.g., MEO, REA, BEO) will provide a pre-award briefing for potential offerors on environmental compliance expectations/responsibilities at bidders' conferences.

5.1.1.2 Solicitations: The design team, in coordination with the A/CO, will ensure solicitations include environmental compliance requirements and evaluation criteria. A/CO will ensure technical and cost proposal requirements include approach, staffing, and budget sufficient for complying with the terms of this IEE.

5.1.1.3 Awards: The A/COR, in coordination with the A/CO, will ensure all awards and sub-awards, include environmental compliance requirements.

5.1.1.4 Training: The A/COR and AM(s) assigned to this project are to enroll in and successfully complete the Bureau for Global Health Environmental Management Process Training online course prior to receiving GH BEO clearance on this document.

**5.1.2 During Post-Award:**

5.1.2.1 Post-Award Briefings: The A/COR and/or the cognizant environmental officer(s) (e.g., MEO, REA, BEO) will provide post-award briefings for the IP on environmental compliance responsibilities.

5.1.2.3 Workplans and Budgeting: The A/COR will ensure the IP integrates environmental compliance requirements in work plans and budgets to comply with requirements, including EMMP implementation and monitoring.

5.1.2.4 Staffing: The A/COR, in coordination with the IP, will ensure all awards have staffing capacity to implement environmental compliance requirements.

5.1.2.5 Records Management: The A/COR will maintain environmental compliance documents in the official project/activity file and upload records to the designated USAID environmental compliance database system.

5.1.2.6 Host Country Environmental Compliance: The A/COR will ensure the IP complies with applicable and appropriate host country environmental requirements unless otherwise directed in writing by USAID. However, in the case of a conflict between the host country and USAID requirements, the more stringent shall govern.

5.1.2.7 Work Plan Review: The A/COR will ensure the IP verifies, at least annually or when activities are added or modified, that activities remain with the scope of the IEE. Activities outside of the scope of the IEE cannot be implemented until the IEE is amended.

5.1.2.8 IEE Amendment: If new activities are introduced or other changes to the scope of this IEE occur, an IEE Amendment will be required. Activities under objectives 2 and 3 will require additional environmental review once identified. A new

Request for Categorical Exclusion, Initial Environmental Examination, or Environmental Assesment will be undertaken as required.

5.1.2.14 USAID Monitoring Oversight: The A/COR or designee, with the support of the cognizant environmental officer(s) (e.g., MEO, REA, BEO), will ensure monitoring of compliance with established requirements (e.g., by desktop reviews, site visits, etc.).

5.1.2.16 Environmental Compliance Mitigation and Monitoring Plan: The A/COR will ensure the IP develops, obtains approval for, and implements Environmental Mitigation and Monitoring Plan(s) (EMMP(s)) that contain(s) mitigation measures that are responsive to the stipulated environmental compliance requirements. The A/COR must review and approve the EMMP(s) and provide a copy to the GH BEO for review and concurrence before work on the project/activities can be initiated.

Activities under Objective 1 are categorically excluded and do not require an EMMP. Once activities under objectives 2 and 3 are identified and a threshold determination given, EMMPs may be required.

5.1.2.17 Environmental Compliance Reporting: The A/COR will ensure the IP includes environmental compliance in regular project/activity reports, using monitoring indicators as appropriate; develops and submits the Environmental Mitigation and Monitoring Report(s) (EMMR(s)) annually within 45 days after the end of each fiscal year to document compliance with the conditions of this IEE and the mitigation measures contained in the applicable EMMP(s); and completes and submits a Record of Compliance (RoC) describing the IP's implementation of EMMP requirements in conjunction with the final EMMR or at the close of sub-activities (as applicable).

And where required by Bureaus or Missions, ensure the IP prepares a closeout plan consistent with contract documentation for A/COR review and approval that outlines responsibilities for end-of-project operation, the transition of other operational responsibilities, and final EMMR with lessons learned.

5.1.2.18 Corrective Action: When noncompliance or unforeseen impacts are identified, IPs must notify the A/COR, place a hold on activities, take corrective action, and report on the effectiveness of the corrective action(s). The USAID responsible person (e.g., MEO and/or REA) will verify that the Corrective Action Plan (CAP) has been adequately and reasonably completed. Then, the BEO will review the applicable corrective and preventive actions and, when satisfied that they are suitable, adequate, and effective, shall authorize closure of the CAP. Where required by Bureaus or Missions, the A/COR will ensure an Record of Compliance (ROC) is completed.

## 5.2 AGENCY CONDITIONS

5.2.1 Sub-award Screening: The A/COR will ensure the IP uses an adequate environmental screening tool, , such as the GH Environmental Screening Tool, to screen any sub-award applications and to aid in the development of EMMPs.



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5.2.3 Supplemental IEEs (SIEEs): An SIEE will be prepared for any new project/activity outside of the scope of an existing IEE. The SIEE will provide more thorough analysis of the planned activities, additional geographic context and baseline conditions as well as specific mitigation and monitoring requirements. Activities under Objectives 2 and 3 once identified will require an SIEE, a Request for Categorical Exclusion, or an Environmental Assessment as appropriate.

5.2.4 Other Supplemental Analyses: The A/COR will ensure supplemental environmental analyses that are called for in the IEE are completed and documented.

5.2.5

5.2.6 Positive Determination: If a Positive Determination threshold determination was made, the A/COR will ensure a Scoping Statement, and if required an Environmental Assessment (EA), is completed and approved by the BEO before the subject activities are implemented.

5.2.7 Compliance with human subject research requirements: The AM, A/COR shall assure that the IP and sub-awardees, -grantees, and -contractors demonstrate completion of all requirements for ethics review and adequate medical monitoring of human subjects who participate in research trials carried out through this IEE and ensure appropriate records are maintained. All documentation demonstrating completion of required review and approval of human subject trials must be in place prior to initiating any trials and cover the period of performance of the trial as described in the research protocol.

5.2.8 Pesticides or Pesticide Products: Any activities conducted under this IEE involving the procurement, use, research, or disposal of pesticides and/or larvicides and their waste products will require a supplemental IEE, supplemental EA, or PERSUAP based on consultations with the GH BEO.

## 5.3 MITIGATION MEASURES

The mitigation measures presented in this section constitute the minimum required based on available information at the time of this IEE and the environmental analysis in Section 4. These measures shall provide general direction for completing the project/activity Environmental Mitigation and Monitoring Plan (EMMP) and/or the EA and PERSUAP, if required.

Mitigation measures may be required for activities under Objectives 2 and 3 once those activities are identified. Any mitigation measures will be included in any SIEE or Environmental Assessment prepared for those activities.

### PROJECT/ACTIVITY 1: TITLE XXX

**TABLE 5A. SUMMARY OF MITIGATION MEASURES FOR PROJECT/ACTIVITY 1**

| Project/Activity | Mitigation Measure(s) |
|---|---|
| Project/Activity 1: | none |
| | |



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PROJECT/ACTIVITY 2: **TBD**

**TABLE 5B. SUMMARY OF MITIGATION MEASURES FOR PROJECT/ACTIVITY 2**

| Project/Activity | Mitigation Measure(s) |
|---|---|
| Project/Activity 2: | |
| Sub-activity 2.1: | |
| Sub-activity 2.2: | |
| | |

[*Add summary tables as needed for additional project/activity components.*]

## 6.0 LIMITATIONS OF THIS INITIAL ENVIRONMENTAL EXAMINATION

The determinations recommended in this document apply only to projects/activities and sub-activities described herein. Other projects/activities that may arise must be documented in either a separate IEE, an IEE amendment if the activities are within the same project/activity, or other type of environmental compliance document and shall be subject to an environmental analysis within the appropriate documents listed above.

Other than projects/activities determined to have a Positive Threshold Determination, it is confirmed that the projects/activities described herein do not involve actions normally having a significant effect on the environment, including those described in 22 CFR 216.2(d).

In addition, other than projects/activities determined to have a Positive Threshold Determination and/or a pesticide management plan (PERSUAP), it is confirmed for those activities identified, willnot involve any actions listed below. Any of the following actions would require additional environmental analyses and environmental determinations:

- Support project preparation, project feasibility studies, or engineering design for activities listed in §216.2(d)(1);
- Adversely affect endangered and threatened species or their critical habitats per §216.5, FAA 118, FAA 119;
- Provide support to extractive industries (e.g. mining and quarrying) per FAA 117;
- Promote timber harvesting per FAA 117 and 118;
- Lead to new construction, reconstruction, rehabilitation, or renovation work per §216.2(b)(1);
- Support agro-processing or industrial enterprises per §216.1(b)(4);
- Provide support for regulatory permitting per §216.1(b)(2);
- Lead to privatization of industrial facilities or infrastructure with heavily polluted property per §216.1(b)(4);
- Research, testing, or use of genetically engineered organisms per §216.1(b)(1), ADS 211
- Assist the procurement (including payment in kind, donations, guarantees of credit) or use (including handling, transport, fuel for transport, storage, mixing, loading, application, clean-up of spray equipment, and disposal) of pesticides or activities involving procurement, transport, use, storage, or disposal of toxic materials. Pesticides cover all insecticides, fungicides, rodenticides, etc. covered under the Federal Insecticide, Fungicide, and Rodenticide Act per §216.2(e) and §216.3(b).

## 7.0 REVISIONS

Per 22 CFR 216.3(a)(9), when ongoing programs are revised to incorporate a change in scope or nature, a determination will be made as to whether such change may have an environmental impact not previously assessed. If so, this IEE will be amended to cover the changes. Per ADS 204, it is the responsibility of the USAID A/COR to keep the MEO/REA and BEO informed of any new information or changes in the activity that might require revision of this environmental analysis and environmental determination.

ATTACHMENTS:

Annex 1: Climate Risk Management Summary Table for Projects/Activity

ANNEX 1. STOP SPILLOVER ACTIVITY CLIMATE RISK MANAGEMENT SUMMARY TABLE

| Tasks/Defined or Illustrative Interventions | Climate Risks[6] | Risk Rating[7] | How Risks are Addressed[8] | Opportunities to Strengthen Climate Resilience[9] |
|---|---|---|---|---|
| **Objective/Activity 1: Country's capacity to monitor and analyze spillover risk improved**<br>**A1.1**: Assist country partners across sectors to update risk analyses (including high-risk animal-animal or animal-human interfaces; behavioral risk factors, biosecurity issues, etc.) to include recent data on emerging viral zoonoses and identify existing data, tools, partners and remaining gaps in knowledge on spillover risk | • Potential disruption to planned activities due to extreme weather/climate event (flooding, road closures) or infectious disease outbreak | Low | Ensure flexibility is built in to the scheduling of in-person meetings, and plans can be adapted accordingly (e.g. switching to virtual meetings) | ETD will integrate opportunities to strengthen climate resilience at the project design level where appropriate. Once awarded, ETD will work with implementing partners to ensure that they conduct their own CRMs and develop contingency plans for minimizing disruptions to planned activities.<br><br>ETD will leverage existing USAID/USG investments such as early warning systems to plan around climate events that affect population mobility and ensure emergency plans and policies take climate into consideration. |
| | • Inability to access appropriate data/information due to weather/climate related infrastructural disruption (e.g. loss of electricity/internet) | Low | Ensure documents, data, etc. are housed in multiple modes (paper, electronic, cloud or external hard drives) | |
| | | | | |
| **A1.2**: Assist countries in mapping existing surveillance and monitoring systems (including capacities in | Access to project sites may be delayed due to extreme weather/climate events | Moderate | Find alternate routes to project sites, determine if site visits can be done virtually. | Same as above |
| | | | | |

[6] List key risks related to the defined/illustrative interventions identified in the screening and additional assessment.
[7] Low/Moderate/ High
[8] Describe how risks have been addressed in activity design and/or additional steps that will be taken in implementation. If you chose to accept the risk, briefly explain why.
[9] Describe opportunities to achieve multiple development objectives by integrating climate resilience or mitigation measures



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| | | | | |
|---|---|---|---|---|
| sampling, laboratories, and information systems) and, where gaps exist. | | | | |
| **A1.3**: Recommend and implement cost-effective strategies to fill gaps by public health, livestock, and wildlife ministries, academia, private sector or other local partners with the aim of enabling countries to better understand spillover risk and develop mitigation measures. | No risks have been identified this project element. This is technical assistance, and not subject to climate risk. | Low | N/A | Same as above |
| | | | | |
| | | | | |
| **A1.4**: Build local capacity to implement and maintain monitoring system and to collect and use the data | No risks have been identified this project element. This is technical assistance, and not subject to climate risk. | Low | N/A | Same as above |
| | | | | |
| | | | | |
| **A1.5**: Support economic analyses to demonstrate the cost-benefit of investing in a rational monitoring and surveillance system. | No risks have been identified this project sub-activity. This is technical assistance, and not subject to climate risk. | Low | N/A | Same as above |
| | | | | |
| | | | | |
| **Objective/Activity 2: Spillover Risk Reduction Interventions Developed and Tested**<br>**A2.1**: Support countries to develop and implement appropriate spillover interventions, using their | • Potential disruption to planned activities due to extreme weather/climate event (flooding, road closures) or infectious disease outbreak | Low/Moderate | Ensure climate risks and potential impacts are taken into consideration when developing/planning and implementing interventions, and ensure flexibility/adaptability is built in | Same as above |



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| | | | | |
|---|---|---|---|---|
| available data/information (e.g. testing the acceptability of tree skirts by producers/communities in Bangladesh to prevent contamination of date palm sap with Nipah virus). | | | | |
| **A2.2:** Identify and address missing information on spillover risk so that additional or improved interventions can be tested/validated | No risks have been identified with this project sub-activity. This is technical assistance, the details of which are yet to be determined. | N/A | N/A | Same as above |
| | | | | |
| | | | | |
| **Objective/Activity 3: Amplification and Spread of Emerging Zoonoses Mitigated**<br>**A3.1:** Assist countries (in coordination with FAO, WHO, others) to provide risk-reduction training (case-management, IPC, etc) for communities, market workers, farmers, and health care workers in locations at high risk for spillover. | • Disruption to planned risk-reduction training due to extreme weather or climate event (flooding, road closures) or infectious disease outbreak | Low | •Introducing virtual/web-based trainings (as a back-up or alternative option) may minimize any potential disruptions.<br>• Incorporating climate risk management in the curriculum as an explicit part of the risk reduction training would be another opportunity to address climate risks for the target population (farmers, market workers, communities etc.) | Same as above |
| | | | | |
| | | | | |
| | | | | |
| **A3.2:** Limited support for outbreak related investigations including support for commodities, sampling, | Shipping, disbursement and delivery of commodities (personal protective equipment, lab reagents, etc.) may be | Moderate | Country specific risk assessments will be conducted and appropriate contingency plans will be developed. This includes (1) determining if | Same as above |



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| | | | | |
|---|---|---|---|---|
| communications. | delayed due to extreme weather events | | alternate shipping and delivery routes are available, and (2) commodities can be procured from alternate suppliers | |
| | Potential disruptions to outbreak investigation activities (sample collection, transport of samples, communication) due to extreme/weather events (infrastructure damage, road closures, flooding, etc.) | Moderate | • Develop transport systems resilient to climate and consider back-up options to continue transport if impacted by severe weather<br>• Ensure alternate mechanisms for communication in case of disruptions are in place<br>• Consider renewable energy technologies for both primary and backup systems, where feasible | |
| | | | | |
| | | | | |
| **A3.3**: As needed, provide countries with technical support and conduct applied research and/or after-action reviews (in coordination with other partners) to improve outbreak response. | No risks have been identified this project element as location and nature of assistance have not been fully developed. | Low | N/A | Same as above |
| | | | | |
| | | | | |
| | | | | |



UCDUSR0003024

**From:** "William B. Karesh" <karesh@ecohealthalliance.org>
**To:** Amanda Fine <afine@wcs.org>
**Cc:** Chris Johnson <ckjohnson@UCDAVIS.EDU>, Suzan Murray <MurrayS@si.edu>, Peter Daszak <daszak@ecohealthalliance.org>, Brian Bird <bhbird@ucdavis.edu>, Terra Kelly <trkelly@ucdavis.edu>, Sarah Olson <sOlson@wcs.org>, "Zimmerman, Dawn" <ZimmermanD@si.edu>, Christian Lange [redacted] "Karen Saylors" [redacted], Kevin Olival <olival@ecohealthalliance.org>, Tracey Goldstein <tgoldstein@ucdavis.edu>, David John Wolking <djwolking@ucdavis.edu>, Elizabeth Leasure <ealeasure@UCDAVIS.EDU>, Hannah R Chale <hrchale@UCDAVIS.EDU>, Matthew Blake <mblake@ucdavis.edu>, "Farnham, Mac" <FarnhamM@si.edu>, Jon Epstein <epstein@ecohealthalliance.org>, Carlos Zambrana-Torrelio <zambrana@ecohealthalliance.org>, Christian Walzer <cwalzer@wcs.org>, "Lucy Keatts" [redacted], Jennifer K Lane <jklane@ucdavis.edu>, "Beth Edson" [redacted] "Churchill, Carolina" <cchurchill@wcs.org>, "Galicia, Veronica" <GaliciaV@si.edu>, Mary Radford <maradford@ucdavis.edu>, Jonna Mazet <jkmazet@ucdavis.edu>, Alison Andre <andre@ecohealthalliance.org>, Kirsten Gilardi <kvgilardi@ucdavis.edu>, Michael Ziccardi <mhziccardi@ucdavis.edu>, Woutrina A Smith <wasmith@ucdavis.edu>, Tierra Smiley Evans <tsmevans@ucdavis.edu>, "Hassell, James M." <HassellJM@si.edu>, Nicole R Gardner <nrgardner@ucdavis.edu>
**Subject:** Re: influenza in wildlife
**Sent:** Fri, 8 May 2020 15:28:32 +0000

Yep, that's that I was guessing too Amanda.
We found a lot in bats in Egypt but that country is no longer included - and I know there were a lot of findings in Bangladesh and Indonesia so that is encouraging for one two countries. And I'm am guessing you did well with birds in Mongolia, but again not included.

Otherwise mostly domestic poultry and pigs I am thinking.

BK

**William B. Karesh, D.V.M**
*Executive Vice President for Health and Policy*

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EPT Partners Liaison, USAID Emerging Pandemic Threats - PREDICT-2 Program

*EcoHealth Alliance develops science-based solutions to prevent pandemics and promote conservation.*

> On May 8, 2020, at 11:22 AM, Fine, Amanda <afine@wcs.org> wrote:
>
> Hello Billy,
>
> I was wondering the same as I worked on the influenza google sheet. In Viet Nam during P1 we found an influenza in a bamboo rat in a restaurant but were never able to characterize it despite getting samples exported to try full genome sequencing. No influenza in the wildlife sampled in VN in P2 but we did not target wild birds. Found IBR and New Castle in jungle fowl in a wildlife restaurant but no influenza.
>
> Amanda

—
Amanda E. Fine, VMD, PhD
Wildlife Health Program Associate Director - Asia
Wildlife Conservation Society (WCS)

REDACTED

**From:** Billy Karesh
**Date:** Friday, May 8, 2020 at 8:44 PM
**To:** Christine Johnson
**Cc:** Suzan Murray, Peter Daszak, "bhbird@ucdavis.edu", Terra Kelly, Sarah Olson, Dawn Zimmerman, Christian Lange, Karen Saylors, Kevin Olival, Tracey Goldstein, David Wolking, Elizabeth Leasure, Hannah R Chale, Matthew Blake, "Farnham, Mac", Jon Epstein, Carlos Zambrana-Torrelio, Christian Walzer, Amanda Fine, Lucy Keatts, Jennifer K Lane, Beth Edison, Carolina Churchill, "Galicia, Veronica", Mary Radford, Jonna Mazet, Alison Andre, Gilardi Kirsten, Michael Ziccardi, Woutrina Smith, Tierra Smiley Evans, "Hassell, James M.", Nicole R Gardner
**Subject:** influenza in wildlife

EXTERNAL EMAIL - **Please Use Caution**

Can someone do a quick run in EIDTH see where we have found a decent percentage of wildlife samples positive for influenza? Since STOP is about wildlife and not poultry, we should think about how we are going to address that in the proposal for the countries listed.

Years of sampling in wild birds down is southeast Asia have been traditionally very unproductive, and not that great for west and central Africa either.

Maybe it's just as simple as making sure countries are able to assess risk conceptually, conduct basic sampling and testing and link with public and ag sectors which is what we always do anyway?

**BK**

| | |
|---|---|
| **From:** | Andrew Clements <aclements@usaid.gov> |
| **To:** | Jonna Mazet <jkmazet@ucdavis.edu>;Christine Kreuder Johnson <ckjohnson@ucdavis.edu>;djwolking@ucdavis.edu <djwolking@ucdavis.edu>;Tracey Goldstein <tgoldstein@ucdavis.edu> |
| **CC:** | predictmgt@usaid.gov <predictmgt@usaid.gov>;pshelly@usaid.gov <pshelly@usaid.gov>;ealeasure@ucdavis.edu <ealeasure@ucdavis.edu> |
| **Sent:** | 5/11/2020 1:52:58 PM |
| **Subject:** | Fwd: AID-OAA-A-14-00102 Mod 21 |

FYI. Last chunk of COVID-19 funds for Cambodia, Egypt, Myanmar.

Let me know if you need help deciphering the country codes.

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

Begin forwarded message:

**From:** Jose Nunez Grullon <jnunezgrullon@usaid.gov>
**Date:** May 11, 2020 at 1:50:57 PM GMT+2
**To:** Elizabeth Leasure <ealeasure@ucdavis.edu>, Andrew Clements <aclements@usaid.gov>, Paula Noble <pnoble@ucdavis.edu>
**Cc:** "OBLDOCCMP (USAID)" <obldoccmp@usaid.gov>, "CFO.CMP Letter of Credit Activity (USAID)" <loc@usaid.gov>, Patricia Bradley <pbradley@usaid.gov>
**Subject: AID-OAA-A-14-00102 Mod 21**

Dear All,

Please find attached modification 21 to subject award.

Should you have any questions in this regard, please do not hesitate to contact this office.

Sincerely,

**JOSE L. NUNEZ**
Acquisition and Assistance Specialist, M/OAA/GH
U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT
**New Location**
USAID Annex (UA) Room 11.4.28
500 D St
Washington, DC, 20547
T 202 916 2680
**(Contractor-Jefferson Solutions, LLC)**

# MODIFICATION OF ASSISTANCE AWARD



| 1. MODIFICATION NUMBER: | 2. EFFECTIVE DATE OF MODIFICATION: | 3. AWARD NUMBER: | 4. EFFECTIVE DATE OF AWARD: |
|---|---|---|---|
| 21 | See Block 15 | AID-OAA-A-14-00102 | 10/01/2014 |

**5. RECIPIENT:**

University of California, Davis
School of Veterinary Medicine,
1850 Research Park Dr.
Davis, CA 95618

DUNS No.: 047120084
TIN No.: 94-6036494 LOC: 29BSP

**6. ADMINISTERED BY:**

U.S. Agency for International Development
Office of Acquisition and Assistance
M/OAA/GH/HDN
1300 Pennsylvania Ave., NW
SA-44, 549
Washington, DC 20532-7900

**7. FISCAL DATA:**

**Amount Obligated:** $742,562.00
**Detail:** (See Page 2)

**8. TECHNICAL OFFICE:**
USAID/GH/ID

**9. PAYMENT OFFICE:**

U.S. Agency for International Development
M/FM/CMP/LOC
loc@usaid.gov

**10. FUNDING SUMMARY:**

| | Obligated Amount | Total Est. Amount |
|---|---|---|
| Amount Obligated prior to this Modification: | $ 136,319,834.95 | $136,400,000.00 |
| Change made by this Modification: | $ 742,562.00 | $ 0.00 |
| New/Current Total: | $ 137,062,396.95 | $136,400,000.00 |

**11. DESCRIPTION OF MODIFICATION:**

The purpose of this modification is to provide incremental funding in the amount of $742,562.00, changing the total obligated amount from $136,319,834.95 to $137,062,396.95, leaving $1,337,603.05 to be obligated against the total award amount of $138,400,000.00.

All other terms and conditions remain unchanged.

**12. THIS MODIFICATION IS ENTERED INTO PURSUANT TO THE AUTHORITY OF THE FOREIGN ASSISTANCE ACT OF 1961, AS AMENDED. EXCEPT AS SPECIFICALLY AMENDED HEREIN, ALL TERMS AND CONDITIONS OF THE AWARD REFERENCED ON BLOCK #3 ABOVE, AS IT MAY HAVE HERETOFORE BEEN AMENDED, REMAIN UNCHANGED AND IN FULL FORCE AND EFFECT.**

**13. RECIPIENT** ☐ **IS** ☒ **IS NOT REQUIRED TO SIGN THIS DOCUMENT TO RECONFIRM IT'S AGREEMENT WITH THE CHANGES EFFECTED HEREIN.**

**14. RECIPIENT:**

BY: _____

_____
**(Name Typed or Printed)**

TITLE: _____

DATE: _____

**15. THE UNITED STATES OF AMERICA**
**U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT**

BY: Patricia Elena Bradley (affiliate) Digitally signed by Patricia Elena Bradley (affiliate) Date: 2015.05.08 10:52:11 -04'00'

Patricia E. Bradley
**(Name Typed or Printed)**

TITLE: Agreement Officer

DATE: _____

The Cooperative Agreement is modified as follows:

1) On the **COVER PAGE, A. GENERAL**:

- On Line 1. "Amount Obligated this Action", DELETE the amount of "$2,257,438.00" and REPLACE with "$742,562.00".
- On Line 3. "Total Obligated USAID Amount", DELETE the amount of "$136,319,834.95" and REPLACE with "$137,062,396.95".

2) On the **COVER PAGE, B. SPECIFIC**, add the following accounting and appropriation data:

| Account ID | Accounting Template | BBFY | EBFY | Fund | Operating Unit | Prog Area | Program Name | Dist Code | BOA | SOC | Funded Amount |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1-106 | GH-HN Program Funds | 2019 | 2020 | GH-C-AI | GHID | HL.4 | Global Health Security in Development (GHSD) | 442-GH-W | 442 | 4100201 | $348,992.00 |
| 1-107 | GH-HN Program Funds | 2019 | 2020 | GH-C-AI | GHID | HL.4 | Global Health Security in Development (GHSD) | 263-GH-W | 263 | 4100201 | $22,290.00 |
| 1-108 | GH-HN Program Funds | 2019 | 2020 | GH-C-AI | GHID | HL.4 | Global Health Security in Development (GHSD) | 482-GH-W | 482 | 4100201 | $371,280.00 |

| | |
|---|---|
| Amount Obligated this Action: | $ 742,562.00 |
| Total Estimated USAID Amount: | $138,400,000.00 |
| Total Obligated USAID Amount: | $137,062,396.95 |
| Amount Remaining to be Obligated: | $ 1,337,603.05 |

3) In **ATTACHMENT A – SCHEDULE, Section A.3 AMOUNT OF COOPERATIVE AGREEMENT AND PAYMENT**, DELETE the amount of "$2,257,438.00" and REPLACE with "$742,562.00".

All other terms and conditions remain unchanged.

**- END OF MODIFICATION NO. 21 -**



UCDUSR0003029

**From:** Elizabeth Leasure <ealeasure@ucdavis.edu>
**To:** Paula Noble <pnoble@ucdavis.edu>
**CC:** predict Sympa List <predict@ucdavis.edu>,David John Wolking <djwolking@ucdavis.edu>
**Sent:** 5/12/2020 7:03:01 PM
**Subject:** [predict] RE: AID-OAA-A-14-00102 Mod 21

Here you go, Paula. Thanks!

*Elizabeth Leasure*
*Financial Operations Manager*
*One Health Institute*
*530-304-1403 (cell)*
*530-754-9034 (office)*
*Skype: ealeasure*

**From:** Paula Noble
**Sent:** Monday, May 11, 2020 8:29 AM
**To:** Elizabeth Leasure
**Subject:** RE: AID-OAA-A-14-00102 Mod 21

Hi Liz,

Can you send budget? Thanks.

**Paula Noble**
**Assistant Director, Negotiations & Subawards**
Office of Research, Sponsored Programs | University of California, Davis
(530) 754-8135

**From:** Jose Nunez Grullon <jnunezgrullon@usaid.gov>
**Sent:** Monday, May 11, 2020 4:51 AM
**To:** Elizabeth Leasure <ealeasure@UCDAVIS.EDU>; Andrew Clements <aclements@usaid.gov>; Paula Noble <pnoble@ucdavis.edu>
**Cc:** OBLDOCCMP (USAID) <obldoccmp@usaid.gov>; CFO/CMP Letter of Credit Activity (USAID) <loc@usaid.gov>; Patricia Bradley <pbradley@usaid.gov>
**Subject:** AID-OAA-A-14-00102 Mod 21

Dear All,

Please find attached modification 21 to subject award.

Should you have any questions in this regard, please do not hesitate to contact this office.

Sincerely,

**JOSE L. NUNEZ**
Acquisition and Assistance Specialist, MFO/AA/OH
U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT
**New Location**
USAID Annex (UA) Room 11-4.2E
500 D St
Washington, DC, 20547
T 202 916 2040
**(Contractor-Jefferson Solutions, LLC)**

PRODUCED IN NATIVE FORMAT

**From:** Andrew Clements <aclements@usaid.gov>
**To:** Elizabeth Leasure <ealeasure@ucdavis.edu>
**CC:** Jonna Mazet <jkmazet@ucdavis.edu>;predict Sympa List <predict@ucdavis.edu>;Christine Kreuder Johnson <ckjohnson@ucdavis.edu>;Alisa Pereira <apereira@usaid.gov>;Amalhin Sheik <asheik@usaid.gov>;Cara Chrisman <cchrisman@usaid.gov>
**Sent:** 5/15/2020 6:20:05 AM
**Subject:** Re: PREDICT Y6Q2 Expend by Country/Category Report

Thanks, Liz.

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

On May 15, 2020, at 12:11 AM, Elizabeth Leasure <ealeasure@ucdavis.edu> wrote:

Hi Andrew. Please find attached the quarterly expenditure by country and category report for January-March 2020 (Y6Q2). If you have any questions, please let me know.

Thanks,
Liz

*Elizabeth Leasure*
*Financial Operations Manager*
*One Health Institute*
*530-304-1403 (cell)*
*530-754-9034 (office)*
*Skype: ealeasure*

**From:** Dennis Carroll [REDACTED]
**Sent:** Fri, 5 Jun 2020 15:24:54 -0400
**Subject:** Re: Simon?
**To:** "Murray, Suzan" <MurrayS@si.edu>
**Cc:** Jonna Mazet <jkmazet@ucdavis.edu>, Peter Daszak <daszak@ecohealthalliance.org>, Samantha Maher <maher@ecohealthalliance.org>

Mobile: [REDACTED]

Office: 212-342-0558

On Fri, Jun 5, 2020 at 3:14 PM Murray, Suzan <MurrayS@si.edu> wrote:

> Thanks v much. Would anyone have a phone number?
>
> Sent from my iPhone
>
> > On Jun 5, 2020, at 3:09 PM, Jonna Mazet <jkmazet@ucdavis.edu> wrote:
> >
> > External Email - Exercise Caution
> >
> > Shorter version of that works, too: Simon Anthony <sja2127@columbia.edu>
> >
> > On Fri, Jun 5, 2020 at 11:52 AM Dennis Carroll <[REDACTED]> wrote:
> >
> > > The address I have is
> > >
> > > sja2127@cumc.columbia.edu
> > >
> > > On Fri, Jun 5, 2020 at 2:22 PM Murray, Suzan <MurrayS@si.edu> wrote:
> > >
> > > > Dear GVP cohort
> > > >
> > > > Would any of you know how to reach Simon? The smithsonian magazine wants to put content on line but can't until they hear back from him. If anyone knows how to reach him we would appreciate it
> > > >
> > > > Thanks so much
> > > >
> > > > Suzan

--
Dr Dennis Carroll
President, Global Virome Project
Senior Fellow, Scowcroft Institute of International Affairs at the Bush School of Government and Public Service, Texas A&M University
Counselor and Advisor to the Faculty of Tropical Medicine at Mahidol University, Bangkok, Thailand

mobile: [REDACTED]
email: [REDACTED]

--

Dr Dennis Carroll
President, Global Virome Project
Senior Fellow, Scowcroft Institute of International Affairs at the Bush School of Government and Public Service, Texas A&M University
Counselor and Advisor to the Faculty of Tropical Medicine at Mahidol University, Bangkok, Thailand

mobile: REDACTED
email:

**From:** Hannah R Chale <hrchale@ucdavis.edu>
**To:** David John Wolking <djwolking@ucdavis.edu>, Jasen D Okunnuga <jdokunnuga@ucdavis.edu>
**Cc:** Elizabeth Leasure <ealeasure@ucdavis.edu>, predict Sympa List <predict@ucdavis.edu>
**Sent:** Wed, 15 Jul 2020 00:38:41 +0000
**Subject:** RE: [predict] RE: PREDICT Closeout Plans and Guidance (due to UCD August 1st)
Negative Patent Report_SUA_F.pdf
Attachment

Hi Jasen,

I am connecting you here with David Wolking. He will be your primary contact for all PREDICT Closeout matters in Tanzania which includes the Subawards to SUA & IHI.

Hi David,

Since we ended up with a "Year 6", this triggered some PREDICT Closeout actions we need to revise.

1. Please verify via email that Jasen has permission to revise the Negative Patent Form dates (both attached) to Sept 30, 2020
2. Please verify via email either; no VAT was spent with the Y6 funds or if VAT was spent, please report VAT spent to Jasen via email.
3. Supply & Equipment Closeout should not need updating – I am thinking they will use all supplies (please let him know if that is not the case)
4. Subaward Closeout form should not need revising, but Jasen will touch base with you if that changes.

Thank you All!

**Hannah Chale, CRA**
Research Administrator
One Health Institute
University of California, Davis
**Cell –** REDACTED
http://www.vetmed.ucdavis.edu/ohi/

**From:** David J Wolking <djwolking@ucdavis.edu>
**Sent:** Wednesday, September 4, 2019 7:56 AM
**To:** Hannah R Chale <hrchale@UCDAVIS.EDU>; Elizabeth Leasure <ealeasure@UCDAVIS.EDU>
**Subject:** Fwd: [predict] RE: PREDICT Closeout Plans and Guidance (due to UCD August 1st)

---------- Forwarded message ---------
From: **Rudovick Kazwala** <REDACTED>
Date: Wed, Sep 4, 2019, 4:35 AM
Subject: Re: [predict] RE: PREDICT Closeout Plans and Guidance (due to UCD August 1st)
To: David J Wolking <djwolking@ucdavis.edu>
Cc: Grace Mwangoka <gmwangoka@ihi.or.tz>, Zenna Babu Emmanuel <REDACTED>, Happy Mkali <hmkali@ihi.or.tz>, Catherine Ringo <cringo@ihi.or.tz>, Hadija Mlege <hmlege@ihi.or.tz>, Jennifer Lane <jklane@ucdavis.edu>

Hi David,
Find attached the filled form on patent
I hope it is in order.
Thanks

Rudovick R. Kazwala

Professor Ecosystems and Public Health
Department of Veterinary Medicine and Public Health
Sokoine University of Agriculture

REDACTED

On Tue, 3 Sep 2019 at 20:09, David J Wolking <djwolking@ucdavis.edu> wrote:
Hi there,

Please find below additional guidance and a new deadline for the equipment and supplies information (inventory etc.). These are due to HQ on September 13, 2019.

Let us know if you have any questions!

David

---------- Forwarded message ----------
From: **Hannah R Chale** <hrchale@ucdavis.edu>
Date: Wed, Aug 28, 2019 at 9:20 AM
Subject: [predict] RE: PREDICT Closeout Plans and Guidance (due to UCD August 1st)
To: Elizabeth Leasure <calcasure@ucdavis.edu>, Kirsten Gilardi <kvgilardi@ucdavis.edu>, Corina Grigorescu Monagin <cgmonagin@ucdavis.edu>, Brian H Bird <bhbird@ucdavis.edu>, David John Wolking <djwolking@ucdavis.edu>, Christine Kreuder Johnson <ckjohnson@ucdavis.edu>, Tracey Goldstein <tgoldstein@ucdavis.edu>, Terra Kelly <trkelly@ucdavis.edu>, Woutrina A Smith <wasmith@ucdavis.edu>
Cc: Jaber Amine Belkhiria <jabelkhiria@ucdavis.edu>, Kevin N Gonzalez <kngonzalez@ucdavis.edu>, Lucy Keatts REDACTED, Rima D Shrestha <rdshrestha@ucdavis.edu>, Jennifer K Lane <jklane@ucdavis.edu>, predict Sympa List <predict@ucdavis.edu>

Hello All,

I am following up about the additional documents needed for the Closeout Plans.

"Any additional documents that may be required as a result of your responses (such as itemized supply/equipment lists) will be due at a later date (to be provided)."

If your response required additional documents, these need to be **completed and returned to UC Davis by COB on Friday September 13.**

These need to be submitted before the weekend so I have time to review before Bali

Please let me know if you have any questions

Thank you!

**Hannah Chale, CRA**
Research Administrator
One Health Institute
University of California, Davis

**Cell –** REDACTED
http://www.vetmed.ucdavis.edu/ohi/

---

**From:** Elizabeth Leasure <calcasure@UCDAVIS.EDU>
**Sent:** Wednesday, July 24, 2019 1:45 PM
**To:** Kirsten Gilardi <kvgilardi@ucdavis.edu>; Corina Grigorescu Monagin <cgmonagin@UCDAVIS.EDU>; Brian H Bird <bhbird@ucdavis.edu>; David John Wolking <djwolking@ucdavis.edu>; Christine Kreuder Johnson <ckjohnson@UCDAVIS.EDU>; Tracey Goldstein <tgoldstein@ucdavis.edu>; Terra Kelly <trkelly@ucdavis.edu>; Woutrina A Smith <wasmith@ucdavis.edu>
**Cc:** Jaber Amine Belkhiria <jabelkhiria@ucdavis.edu>; Kevin N Gonzalez <kngonzalez@ucdavis.edu>; Hannah R Chale <hrchale@UCDAVIS.EDU>; Lucy Keatts <REDACTED>; Rina D Shrestha <rdshrestha@ucdavis.edu>; Jennifer K Lane <jklane@ucdavis.edu>; predict Sympa List <predict@ucdavis.edu>
**Subject:** PREDICT Closeout Plans and Guidance (due to UCD August 1st)

Hi everyone. You are receiving this email as Global lead for a UCD-led country and are expected to work with your in-country partners to complete the attached documents, which include the subaward closeout and equipment and supply closeout plan documents. Both documents are fillable forms that need to be **completed and returned to UC Davis by COB on August 1st**. Any additional documents that may be required as a result of your responses (such as itemized supply/equipment lists) will be due at a later date (to be provided).

The **Subaward Closeout Plan** document attached is geared towards financial and administrative closeout of subawards, and the **Equipment and Supply Closeout Plan** document covers tangible and intangible property disposition. Each in-country partner who received a subaward from UCD for PREDICT needs to complete and submit one of each by August 1st.

If you have any questions, please let me know.

Thanks!
Liz

*Elizabeth Leasure*
*Financial Operations Manager*
*One Health Institute*
REDACTED *cell)*
*530-754-9034 (office)*
*Skype: calcasure*

PREDICT Negative Final Patent Report

Due to UC Davis September 13, 2019

Entity: Sokoine University of Agriculture (SUA)

Principal Investigator: Prof. Rodovick R. Kazwala

PREDICT Subaward Number: 201403200-02

Dates of USAID PREDICT Subaward: 01-Oct-2014 to 30-Sep-2019

There are no Patents or Inventions produced as a result of the USAID PREDICT project or funds.

Prof. Rudovick R. Kazwala -PI

Name and Title

Signature

04-Sep-2019

Date

UCDUSR00003038

**From:** Andrew Clements <aclements@usaid.gov>
**To:** David J Wolking <djwolking@ucdavis.edu>
**CC:** PREDICTMGT <predictmgt@usaid.gov>;Christine Kreuder Johnson <ckjohnson@ucdavis.edu>;Prof. Jonna Mazet <jkmazet@ucdavis.edu>;predict@ucdavis.edu <predict@ucdavis.edu>
**Sent:** 7/15/2020 9:33:18 AM
**Subject:** Re: P2 country reports - distribution question

Go ahead and send directly to the in-country partners with a cc: to us. Thanks!

Andrew Clements, Ph.D.
Senior Scientific Advisor
Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health
U.S. Agency for International Development
Mobile phone: 1-571-243-4233
E-mail: aclements@usaid.gov

*For more information on USAID's Emerging Pandemic Threats program, see* http://www.usaid.gov/ept2

On Wed, Jul 15, 2020 at 12:54 AM David J Wolking <djwolking@ucdavis.edu> wrote:
Hi Andrew,

We are finalizing a number of country reports this week and wanted to seek guidance on the process for sharing them. Would you like us to send them to you and the team in Washington before circulating them to our in-country partners and network?

Thanks in advance!

David

--
David J. Wolking
Senior Manager, Global Programs, One Health Institute
Global Operations Officer, PREDICT Project of USAID Emerging Threats Division
Senior Manager, PREEMPT Project
School of Veterinary Medicine
University of California, Davis

**From:** Dennis Carroll [redacted]
**Sent:** Fri, 11 Sep 2020 15:26:46 -0400
**Subject:** Re: Reporter funding question about predict and eco health, also gvp FW: to Kat Kerlin
**To:** Jonna Mazet <jkmazet@ucdavis.edu>
**Cc:** Peter Daszak <daszak@ecohealthalliance.org>

Thanks for the heads up. I have not interacted with him (presuming gender) before

d

On Fri, Sep 11, 2020 at 3:24 PM Jonna Mazet <jkmazet@ucdavis.edu> wrote:

> FYI, that this reporter is inquiring. Maybe you've already seen +/- engaged. We only answered the last question, as we didn't want to respond on your behalf.
> Have a nice weekend,
> Jonna

---------- Forwarded message ---------
From: **Kat E Kerlin** <kekerlin@ucdavis.edu>
Date: Thu, Sep 10, 2020 at 4:27 PM
Subject: Reporter funding question about predict and eco health, also gvp FW: to Kat Kerlin
To: Jonna Mazet <jkmazet@ucdavis.edu>, Christine Kreuder Johnson <ckjohnson@ucdavis.edu>

Hi Jonna and Chris,

Reporter Sam Husseini, an independent journalist who has written

several pieces for Salon of a political nature, would like to know "how much funding UC Davis has given (through PREDICT and otherwise) to EcoHealth Alliance?"

I told him USAID is the funding agency for PREDICT but that I'd check with the program leads about UC Davis funds. He asks that we reply by Friday as he's pulling his story together this weekend.

He also had a handful of questions (at bottom of thread) about Dennis and Peter with relation to PREDICT and GVP. I directed him to them to respond, as I don't represent them.

Hope you are both staying well. –kat

Kat Kerlin

*[she/her/hers]*

UC Davis News and Media Relations Specialist

UC Davis Strategic Communications

530-750-9195

@UCDavis_Kerlin

Science & Climate

---

**From:** Sam Hussein REDACTED

**Date:** Thursday, September 10, 2020 at 4:13 PM

**To:** Kat E Kerlin <kekerlin@ucdavis.edu>

**Subject:** Re: to Kat Kerlin

Kat -- Thanks for your response. Trust you can tell me how much funding UC Davis has given (through PREDICT and otherwise) to EcoHealth Alliance?

Thanks.

On Thu, Sep 10, 2020 at 7:06 PM Kat E Kerlin <kekerlin@ucdavis.edu> wrote:

Hi Sam,

I am the default media contact for GVP since UC Davis is the program's administrative home, but I don't personally represent Drs. Carroll and Daszak. You can reach them directly

with your questions at [redacted] for Dennis Carroll and

daszak@ecohealthalliance.org for Peter Daszak.

Best,

Kat

Kat Kerlin

UC Davis News and Media Relations Specialist

UC Davis Strategic Communications

530-750-9195

@UCDavis_Kerlin

Science & Climate

---

**From:**

Sam Husseini [redacted]

**Date:** Thursday, September 10, 2020 at 3:25 PM

**To:** Kat E Kerlin <kekerlin@ucdavis.edu>

**Subject:** to Kat Kerlin

Hope you're well.

I'm a journalist and have recently written for Salon, *The Nation* and other publications.

I have a series of questions about GVP and saw that you were listed as the media contact.

Can you tell me when Dennis Carroll joined the group?

When did he leave USAID?

What exactly was his role at USAID -- was he in charge of funding PREDICT?

When did Peter Daszak join GVP?

How much has UC Davis through PREDICT given to EcoHealth Alliance?

Please acknowledge receipt of this email soonest. I am wanting to pull together my piece this weekend, would be great if you could give me replies by the end of work Friday.

many thanks,

Sam Husseini

--
Dr Dennis Carroll
President, Global Virome Project
Inline image

Senior Fellow, Scowcroft Institute of International Affairs at the Bush School of Government and Public Service, Texas A&M University
Counselor and Advisor to the Faculty of Tropical Medicine at Mahidol University, Bangkok, Thailand

mobile: REDACTED
email: REDACTED

**From:** Peter Daszak <daszak@ecohealthalliance.org>
**To:** David J Wolking <djwolking@ucdavis.edu>
**Cc:** Christine Kreuder Johnson <ckjohnson@ucdavis.edu>, Elizabeth Leasure <ealeasure@ucdavis.edu>, "Prof. Jonna Mazet" <jkmazet@ucdavis.edu>
**Subject:** One small chnge to the PREDICT Management Team Agenda - Monday January 9, 2017 @ 10AM PST
**Sent:** Thu, 5 Jan 2017 20:49:25 +0000

Hi David,

The only change I'd like to make is to put the Pathway analysis as a separate agenda item, between M&A and Surveillance. If you just allocate 20 minutes, you can take some of the time from the M&A for this. The reason for this is that it's really separate to both sections, with implications for each...i.e. it's something that will involve a lot of analysis, and potential shifts to the surveillance plans for some (a few) sites.

Hope that makes sense and look forward to the meeting...

Cheers,

Peter

**Peter Daszak**
*President*

EcoHealth Alliance
460 West 34th Street – 17th Floor
New York, NY 10001

+1.212.380.4473 (direct)
+1.212.380.4465 (fax)
www.ecohealthalliance.org

*EcoHealth Alliance leads cutting-edge research into the critical connections between human and wildlife health and delicate ecosystems. With this science we develop solutions that promote conservation and prevent pandemics.*

**From:** David J Wolking [mailto:djwolking@ucdavis.edu]
**Sent:** Thursday, January 5, 2017 2:15 AM
**To:** David J Wolking
**Cc:** Alisa Pereira Emerging Threats Division; Cassandra Louis Duthil; Christine Kreuder Johnson; Clements, Andrew (GH/HIDN); Eddy Rubin; Elizabeth Leasure; Lindsay Parish; Peter Daszak; Prof. Jonna Mazet; Shana Gillette; William B. Karesh; PREDICTMGT; Cara J. Chrisman; Ava Sullivan; Alison Andre; Amanda Fuchs; Catherine Machalaba; Evelyn Luciano; Molly Turner; Taylor Elnicki
**Subject:** Re: PREDICT Management Team Agenda - Monday January 9, 2017 @ 10AM PST

Hi again,

Just sharing the latest version of our semi-annual consortium meeting agenda for discussion on the call.

Cheers,

David

On Wed, Jan 4, 2017 at 4:56 PM, David J Wolking <djwolking@ucdavis.edu> wrote:
Hi there,

Attached and below is the call-in information and agenda for PREDICT's Management Team call next Monday January 9,

2017 at 10AM PST/1PM EST.

I'll follow-up with the calendar reminder next.

Best,

David

**PREDICT Management Team Agenda**
**Monday, January 9, 2017**
**10:00am PST/1:00pm EST**
**#800-444-2801, Access code** REDACTED
**International Dial-in number: 310-765-4820 (toll charges apply)**

**Standing items**
**USAID Updates**

1. **Administrative items**
    a. Annual report feedback
    b. CIPs for GHSA Phase 2 countries (DRC and Rwanda request)
    c. Senior behavioral surveillance coordinator update
    d. Metabiota travel situation and ITA for DRC
    e. Yellow fever plans and carry-over in DRC
    f. GHSA M&E
2. **Mission communication round-up**
    a. Indonesia
    b. Ethiopia
    c. Uganda
    d. CIV
    e. Sierra Leone
    f. Guinea
    g. Liberia
3. **Semi-annual Consortium meeting, January 10-11 in Pacifica, CA**: last call for agenda comments, feedback, or questions (agenda will be shared before the call)
4. **FAO collaboration/coordination updates (Billy)**
5. **Other coordination and engagement priorities (Billy)**

**From:** Andrew Clements <aclements@usaid.gov>
**Sent:** Thu, 19 Jan 2017 21:14:41 +0100
**Subject:** Re: Rwanda HPAI Development Update
**To:** Jonna Mazet <jkmazet@ucdavis.edu>

Thanks

*Andrew P. Clements, Ph.D.*
*Senior Scientific Adviser*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email:* aclements@usaid.gov

On Jan 19, 2017, at 8:55 PM, Jonna Mazet <jkmazet@ucdavis.edu> wrote:

> FYI -- we'll keep you apprised,
> J

---------- Forwarded message ----------
From: **Kirsten Gilardi** <kvgilardi@ucdavis.edu>
Date: Thursday, January 19, 2017
Subject: Fwd: Rwanda HPAI Development Update
To: Jonna Mazet <jkmazet@ucdavis.edu>, "predict@ucdavis.edu" <predict@ucdavis.edu>

Sharing this update from Mike:

> Begin forwarded message:
>
> **From:** Mike Cranfield <mrcranfield@gorilladoctors.org>
> **Subject: Re: Rwanda HPAI Development Update**
> **Date:** January 19, 2017 at 5:52:24 AM PST
> **To:** Ashna Kibria <akibria@usaid.gov>
> **Cc:** Serge Nzietchueng <[redacted]>, John Mckay [redacted], Lisa Kramer <lkramer@usaid.gov>, Julius Nziza [redacted], Richard <rmunyaneza@usaid.gov>, Robert Kibuuka [redacted], Jean-Felix Kinani <[redacted]>, Andrew Kitua [redacted], "Sambe Duale/PRP/Projects/DAI" [redacted], Susan Scribner <[redacted]>, Gilardi Kirsten <kvgilardi@ucdavis.edu>
>
> I just got off the phone with Julius and the team found 2 pigeons and 3 speckled mouse birds dead. It appears like there was heavy pesticide use last week in the area which is a more probable cause of death then influenza. The team is again sensitizing the local communities to report dead birds but as it stands now it does not appear to involve avian influenza. Mike
>
> On Wed, Jan 18, 2017 at 10:17 AM, Ashna Kibria <akibria@usaid.gov> wrote:
>
> > Hi Serge and Mike,
> > Thanks the info on the HPAI alert in Rwanda. As the situation progresses, could you please keep the all of the USAID staff (John, Richard, Lisa, and Ashna) and EPT-2 partners on this email thread informed about any new developments? We are keeping an eye on Uganda, Tanzania and Rwanda right now.

Serge could you also forward the P&R update that you shared with John/Richard to me as well?

Thanks,
Ashna

On Wed, Jan 18, 2017 at 7:59 AM, <REDACTED> wrote:

Hi John,

Thank you for the update regarding the Zoonotic diseases prioritization activity.

Relate to the HPAI alert in Rwanda, P&R NOTHA is providing technical support to the Rwanda OH steering Committee and the National OH coordinator has started to play its role. Yesterday, the NOTHA sent you and to Richard an update, I am going to forward the email.

Don't hesitate to cc Dr Jean Felix REDACTED He or myself will provide you an update tomorrow morning.

Thank you,

Serge

Serge Nzietcheung
Deputy Director and Senior Technical Advisor, East and Central Africa Region
USAID Preparedness & Response Project
Emerging Pandemic Threat 2 Program (EPT 2)

REDACTED

Email: REDACTED
Skype REDACTED

http://preparednessandresponse.org/

From: John Mckay REDACTED
To: REDACTED Robert Kibuuka <REDACTED Mike Cranfield <mcranfield@partnersdoctors.org>, Julius Nzioka REDACTED
Cc: Lisa Kramer <lkramer@usaid.gov>, Ashna Kibria <akibria@usaid.gov>, Richard <rmunyaneza@usaid.gov>
Date: 01/18/2017 06:47 AM

Subject: Re: PLEASE CONFIRM - RWANDA Coordination Meeting WEDNESDAY, 11 JANUARY

---

Hello EPT II Partners,

I hope this finds you well. It is my hope that I will have an update on the Zoonotic Prioritization workshop later this week. In more pressing matters, a CDC colleague just informed me of the Avian Flu outbreak in Uganda, they had also mentioned that Rwanda had begun some surveillance and/or

preparations. Any updates you have heard on this, particular as pertaining to Rwanda, would be greatly appreciated. I heard that Dr. Gafarasi convened a meeting earlier this week? Did any EPT II partners attend?

Thanks in advance,

John

—
**JOHN MCKAY**
Health Service Delivery Team Lead
U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT
REDACTED
USAID.gov REDACTED @USAIDRwanda

—
Aishna Kibria, MPH
Public Health Advisor
Emerging Threats Division
USAID/Washington, Bureau for Global Health
Phone: 202.712.1219 (office) | REDACTED (cell)
Email: akibria@usaid.gov

**From:** William B. Karesh <karesh@ecohealthalliance.org>
**To:** Alisa Pereira <apereira@usaid.gov>
**CC:** Amanda Fuchs <fuchs@ecohealthalliance.org>;aclements@usaid.gov" <aclements@usaid.gov>;predict@ucdavis.edu <predict@ucdavis.edu>
**Sent:** 2/3/2017 8:33:21 PM
**Subject:** [predict] Re: Semi-Annual Meeting and Data Sharing Meeting

Sure

Sent from my iPhone

**William B. Karesh, D.V.M**
*Executive Vice President for Health and Policy*

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President, OIE Working Group on Wildlife

Co-chair, IUCN Species Survival Commission - Wildlife Health Specialist Group

EPT Liaison - USAID Emerging Pandemic Threats - PREDICT 2 program

***EcoHealth Alliance leads cutting-edge research into the critical connections between human and wildlife health and delicate ecosystems. With this science we develop solutions that promote conservation and prevent pandemics.***

On Feb 3, 2017, at 4:05 PM, Alisa Pereira <apereira@usaid.gov> wrote:

Can we do it after Labor Day? Kids will be back in school, etc

Sent from my iPhone

On Feb 3, 2017, at 3:54 PM, Amanda Fuchs <fuchs@ecohealthalliance.org> wrote:

Good afternoon,

Billy and I spoke about scheduling the next Semi-Annual meeting as well as Data Sharing meeting for the last week in August or beginning of September. We are proposing to have both meetings over the course of one week. Please advise if there are preferred dates. Thank you and hope you have a great weekend!

Best,

**Amanda Fuchs, LMSW**

*Administrative Assistant to the Executive Vice President for Health &Policy*

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Communications Coordinator, Future Earth oneHEALTH Project

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**From:** Jonna Mazet <jkmazet@ucdavis.edu>
**To:** Daniel Schar <dschar@usaid.gov>
**CC:** Clements, Andrew (GH/HIDN) <AClements@usaid.gov>;Pereira, Alisa (GH/HIDN) <apereira@usaid.gov>;PREDICTMGT <PREDICTMGT@usaid.gov>;Damrongwatanapokin, Sudarat (RDMA/DPH) <sdamrongwatanapokin@usaid.gov>;Tracey Goldstein <tgoldstein@ucdavis.edu>;Anthony, Simon J. <sja2127@cumc.columbia.edu>
**Sent:** 2/24/2017 5:51:19 AM
**Subject:** Re: Potential In Kind Equipment Support

Hi Dan,
Thanks for thinking of Predict.
I'm in Ghana today and headed to the field and potentially out of internet until Tuesday. Our lab team leads are in Liberia and headed to Sierra Leone, incidentally, so I'm not sure we'd be able to discuss and/or pull things together until after March 1, so timing might be rough at this point. Would probably be best to discuss your idea, so we have a better concept of what you think would be possible, but with this message I'm sending on to them in case they can brainstorm on the road.
Hope we can get with you in time & really appreciate it,
Jonna

On Thu, Feb 23, 2017 at 9:34 PM, Daniel Schar <dschar@usaid.gov> wrote:
Hi Jonna... our office director will be in Singapore, meeting with, amongst others, BD and J&J, in early March. We might want to take this opportunity to gauge interest in a partnership where in-kind equipment can be donated for ongoing surveillance in the region.

If this is of interest, could your team let me know product types and volumes that would be of utility, and we can take that to them as an "ask" -- I'm thinking at a minimum, cryotubes, sterile swabs, vacutainers, needles, syringes. If there are any specific diagnostic reagents that could be provided, pls include those as well.

The BD catalog is here.

By mid next week should be fine. Any briefers you have that can accompany the request also appreciated.

Separately, we may look to entertain a conversation with Illumina around potential partnerships across the molecular diagnostics space. If this is something you've already explored, that would be helpful insight, and whether extending this to include P2 work is of interest.

Thanks,
Dan

**Sent:** Wed, 29 Mar 2017 22:54:15 -0700
**Subject:** Re: GVP numbers...
**From:** Jonna Mazet <jkmazet@ucdavis.edu>
**To:** Peter Daszak <daszak@ecohealthalliance.org>

Thanks!
J

On Wed, Mar 29, 2017 at 9:31 PM, Peter Daszak <daszak@ecohealthalliance.org> wrote:

By the way – I know the numbers in the abstract are slightly different from the ones we've been using up to now. This follows reviewer's comments on the paper, which ask for us to put another viral family in. I'll explain on the call tomorrow so you all feel comfortable about them.

We also now have a standard error for all the estimates – something the reviewer asked for. The good news is that the estimates of viral diversity aren't radically different from the ones we've been using (1.7 million vs. 1.3). The costs for the total 100% mammalian virome is not actually higher, but our value of $7.5 billion now includes all mammals, water birds (not just anatidae) and limited domestic animal sampling. The good news is that we now have a much more palatable cost when we go to an 85% coverage of around $1.69 billion ($169 million annually for 10 years).

Even better than that – given the current political climate, we can go to Russia to cover much of the work on influenzas because that's where the water birds breed....

Cheers,

Peter

**Peter Daszak**

*President*

EcoHealth Alliance

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**From:** [redacted] **On Behalf Of** Jonna Mazet
**Sent:** Wednesday, March 29, 2017 5:34 PM
**To:** Cara Chrisman
**Cc:** Kevin Olival, PhD; Peter Daszak; Brooke Watson; Yasha Feferholtz; George F Gao (gaof@im.ac.cn); Eddy Rubin; Nathan Wolfe; Dennis Carroll (DCarroll@usaid.gov); Alison Andre
**Subject:** Re: GVP targeting abstract for PMAC

Hi Peter,

Thanks for including -- happy to be a co-author.

My main comment is consistent with Cara's. I'm concerned with using these prices and numbers as they are quite escalated compared to those we have prepared for publication and have been discussing with donors. While they may be true, and we need to evaluate that further, I don't think we, as a group, have come to a consensus on that, and I would hate to be contradicting ourselves so much with what we are putting out in other (especially peer-reviewed) venues.

Maybe a softer approach to avoid a last minute or rushed discussion over this topic would be to avoid the specific numbers and use orders of magnitude, such as "billions" and "less than the cost of response to one major incident or epidemic" or "less than a tenth of the cost of a high-consequence pandemic".

Have a nice evening,

Jonna

On Wed, Mar 29, 2017 at 2:19 PM, Cara Chrisman <cchrisman@usaid.gov> wrote:

Hi Peter,

Thanks for pulling this together and sharing. Dennis and I are happy to be included as authors and our names & affiliations look good (although, if easy enough, could you add my middle initial? Cara J. Chrisman).

In the process of reviewing, we had two items of feedback for your consideration before submitting:

1) Given when this will be presented (2018), we thought it might be helpful to, instead of including the current numbers, discuss the strategies which you are currently undertaking related to modeling all of this and state that the updated numbers will be shared at the meeting during the presentation. As it stands, these numbers may be out-of-date to some extent and don't indicate the whole story.

2) It would be helpful if documents such as this include not only the impact on human health, but the destructive impact on livestock/animal health. Especially considering the intent to include the food security angle in PMAC, and our outreach to those folks related to the GVP overall, including that would be much appreciated.

Best,

Cara

Cara J. Chrisman, PhD
Senior Infectious Diseases Technical Advisor
Emerging Threats Division
Office of Infectious Disease
Bureau for Global Health
U.S. Agency for International Development (USAID)

Desk: (202) 712-1161
Cell: REDACTED
E-mail: cchrisman@usaid.gov

On Wed, Mar 29, 2017 at 3:38 PM, Kevin Olival, PhD <olival@ecohealthalliance.org> wrote:

Looks great Peter, no edits and happy to be coauthor.

Cheers,

Kevin

**Kevin J. Olival, PhD**
*Associate Vice President for Research*

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On Mar 29, 2017, at 3:27 PM, Peter Daszak <daszak@ecohealthalliance.org> wrote:

Hi everyone – Abstracts for PMAC are due tomorrow by mid-afternoon US Eastern time. I've drafted one on the Modeling and Analytics WG's efforts to target the GVP program to get maximum impact.

Please have a quick look at it and let me know if it's ok to include you as authors. I'm not looking for major edits, but if there are typos, or address problems, please let me know that as well. The max. word count is 300 and this is 290.

Cheers,

Peter

**Peter Daszak**

*President*

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<PMAC GVP targeting.docx>

**From:** Dennis Carroll <dcarroll@usaid.gov>
**Sent:** Sat, 8 Apr 2017 14:09:25 -0400
**Subject:** Re: CUGH
**To:** Peter Daszak <daszak@ecohealthalliance.org>
**Cc:** Jonna Mazet <jkmazet@ucdavis.edu>, Eddy Rubin <erubin@metabiota.com>, Catherine Machalaba <machalaba@ecohealthalliance.org>

Yes. See you in the lobby at 7:00

Dr Dennis Carroll
Director, Emerging Threats Program
U.S. Agency for International Development
Office: (202) 712-5009
Mobile: REDACTED

On Apr 8, 2017, at 10:04 AM, Peter Daszak <daszak@ecohealthalliance.org> wrote:

> Sounds like a plan - I'm at the Washington Hilton where the conference is – just up Connecticut Ave from Dupont Circle. Do you want to meet there in the lobby at 7pm?
>
> Cheers,
>
> Peter
>
> **Peter Daszak**
> *President*
>
> EcoHealth Alliance
> 460 West 34th Street – 17th Floor
> New York, NY 10001
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> *EcoHealth Alliance leads cutting-edge research into the critical connections between human and wildlife health and delicate ecosystems. With this science we develop solutions that promote conservation and prevent pandemics.*
>
> **From:** Dennis Carroll [mailto:dcarroll@usaid.gov]
> **Sent:** Friday, April 7, 2017 4:18 PM
> **To:** Peter Daszak
> **Cc:** Jonna Mazet; Eddy Rubin
> **Subject:** Re: CUGH
>
> Do we want to meet at one of your hotels at 7:00 Saturday night? If we are near Dupont Circle lots of dinner options
>
> On Fri, Apr 7, 2017 at 1:26 AM, Peter Daszak <daszak@ecohealthalliance.org> wrote:
> Sounds like a plan. I will be with Billy's sr staffer Catherine machalaba -is it ok if I bring her along?
>
> Cheers,

Peter

Peter Daszak
(Sent from my iPhone)

President
EcoHealth Alliance

460 West 34th Street, New York, NY10001, USA

www.EcoHealthAlliance.org
On Apr 5, 2017, at 8:56 PM, Dennis Carroll <dcarroll@usaid.gov> wrote:

> Ok. We will be absent the coolest person on this email (thats you Jonna), but what about getting together on Saturday night to do some bonding?

Sent from my iPad
> On Apr 5, 2017, at 3:54 PM, Peter Daszak <daszak@ecohealthalliance.org> wrote:
>
> > I'm going back Sunday afternoon because I've got a road trip with the family on Monday... I'll be there Sat evening though if youse guys are around...
> >
> > Cheers,
> >
> > Peter
> >
> > **Peter Daszak**
> > *President*
> >
> > EcoHealth Alliance
> > 460 West 34th Street – 17th Floor
> > New York, NY 10001
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> >
> > *EcoHealth Alliance leads cutting-edge research into the critical connections between human and wildlife health and delicate ecosystems. With this science we develop solutions that promote conservation and prevent pandemics.*
> >
> > **From:** jonna.mazet@gmail.com [mailto:jonna.mazet@gmail.com] **On Behalf Of** Jonna Mazet
> > **Sent:** Wednesday, April 5, 2017 2:23 PM
> > **To:** Eddy Rubin
> > **Cc:** Dennis Carroll; Peter Daszak
> > **Subject:** Re: CUGH
> >
> > Hi,

Thanks for asking. Unfortunately (or fortunately for balance), I already made plans with family Saturday and have to fly out Sunday after our presentation.
Sorry,
Joona

On Wed, Apr 5, 2017 at 11:01 AM, Eddy Rubin <erubin@metabiota.com> wrote:
Good idea. I would be up for Sunday but arrive 9PM Friday
On Apr 5, 2017, at 9:34 AM, Dennis Carroll <dcarroll@usaid.gov> wrote:

> Hey all, I am slowly wrapping my head around that we have this upcoming talk THIS Sunday. When will everyone be in town? Would you like to get together for dinner/drinks etc? And has anyone RSVP'd to the CUGH dinner?
>
> d
>
> --
> Dr. Dennis Carroll
> Director, Emerging Threats Program
> Bureau for Global Health
> U.S. Agency for International Development
>
> Office: 202-712-5009
> Mobile: REDACTED

--
Dr. Dennis Carroll
Director, Emerging Threats Program
Bureau for Global Health
U.S. Agency for International Development

Office: 202-712-5009
Mobile: REDACTED

| | |
|---|---|
| **From:** | David J Wolking <djwolking@ucdavis.edu> |
| **To:** | Prof. Woutrina Smith <wasmith@ucdavis.edu>;Brian Bird <bhbird@ucdavis.edu>;Jonna Mazet <jkmazet@ucdavis.edu> |
| **CC:** | Elizabeth Leasure <ealeasure@ucdavis.edu>;Elizabeth VanWormer <liz.vanwormer@unl.edu> |
| **Sent:** | 4/19/2017 7:36:45 PM |
| **Subject:** | Re: TZ grants - Request for NCE and Annual Meeting |

This is timely and getting tricky with the NCE mixed in with the annual meeting and future collabs angle. The last call I had with Falgu about the equipment process was pretty awkward thanks to that future directions conversation and I simply deflected that one. But without any connections with Mary or the DTRA team directly how should we plan the diplomatic approach for: 1) pass through via MB for the NCE proposal and 2) working around MB to explore future projects?

I'm not responding until we're on the same page here with strategy as Falgu often cold calls me by phone or Skype...

David

On Wed, Apr 19, 2017 at 9:32 AM, Falgunee K. Parekh <fparekh@metabiota.com> wrote:

Hi All,

Now that the Year 3 funds have been released and the equipment purchase has been approved, I think it is a good time to discuss the Request for No Cost Extension (NCE). Currently the Period of Performance is set to end around August 5, 2017. How much additional time do you think we need? I know that we have previously discussed 6 months, but would 9 months be more appropriate to account for variations in seasonality and any potential delays in sample collection and analysis? Please let me know what would work best for you and also provide a justification for that amount of time that we can present to DTRA.

Also, I spoke with Mary briefly about the annual meeting. The earliest that she could be available for in-country meetings is end of July/beginning of August. She would prefer to see some preliminary results at the annual meeting, so if we need to delay to the fall then that is fine. Can you please let me know when you may have some preliminary results ready to present, and when would be a good time to have in-country meetings?

Finally, Mary seems very supportive of us pursuing follow-on work. This would be done through the normal BAA process, however prior to submitting an abstract we can have preliminary conversations to discuss potential concepts. Please send any potential research concepts that you may be interested in pursuing that would be reasonable follow-ons to the current projects. I would like to set up a meeting in the next few weeks to discuss potential concepts so that we can begin those conversations with Mary. As you may recall with these current grants, the process can take some time with DTRA, so now is the right time to start planning for the follow-on. Thanks.

Falgunee

**Falguree K. Parekh,** MPH, PhD

Staff Scientist, Epidemiology

Metabiota, Inc.

Tel: 301.876.1919 | Email: fparekh@metabiota | skype: falgureep

metabiota.com

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| | |
|---|---|
| **From:** | Brian Bird <bhbird@ucdavis.edu> |
| **To:** | David J Wolking <djwolking@ucdavis.edu>;Prof. Woutrina Smith <wasmith@ucdavis.edu>;Jonna Mazet <jkmazet@ucdavis.edu> |
| **CC:** | Elizabeth Leasure <ealeasure@ucdavis.edu>;Elizabeth VanWormer <liz.vanwormer@unl.edu> |
| **Sent:** | 4/19/2017 10:22:48 PM |
| **Subject:** | Re: TZ grants - Request for NCE and Annual Meeting |

Makes most sense to me to just be straight forward. Tell MB that we would like to pursue the NCE with them and that we've valued their help in managing the project, but that we'll be striking it out on our own on the next grants moving forward. We might want to have a call with them to help smooth the blow?

And communicate the same to Mary and her team (probably after the NCE is put in and hopefully approved?) so that they are aware.

Perhaps that's not very savvy, but at least it's clean and simple.

-b
aka "bull in china shop"?

**From:** David J Wolking
**Date:** Wednesday, April 19, 2017 at 12:36 PM
**To:** "Prof. Woutrina Smith" , Brian Bird , Jonna Mazet
**Cc:** Elizabeth Leasure , Elizabeth VanWormer
**Subject:** Re: TZ grants - Request for NCE and Annual Meeting

This is timely and getting tricky with the NCE mixed in with the annual meeting and future collabs angle. The last call I had with Falgu about the equipment process was pretty awkward thanks to that future directions conversation and I simply deflected that one. But without any connections with Mary or the DTRA team directly how should we plan the diplomatic approach for: 1) pass through via MB for the NCE proposal and 2) working around MB to explore future projects?

I'm not responding until we're on the same page here with strategy as Falgu often cold calls me by phone or Skype...

David

On Wed, Apr 19, 2017 at 9:32 AM, Falgunee K. Parekh <fparekh@metabiota.com> wrote:
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Finally, Mary seems very supportive of us pursuing follow-on work. This would be done through the normal BAA process, however prior to submitting an abstract we can have preliminary conversations to discuss potential concepts. Please send any potential research concepts that you may be interested in pursuing that would be reasonable follow-ons to the current projects. I would like to set up a meeting in the next few weeks to discuss potential concepts so that we can begin those conversations with Mary. As you may recall with these current grants, the process can take some time with DTRA, so now is the right time to start planning for the follow-on. Thanks.

Falgunee

**Falgunee K. Parekh,** MPH, PhD
Staff Scientist, Epidemiology

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Tel: 301.678.1919 | E-mail: fparekh@metabiota | skype: falguneep
metabiota.com

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**From:** Prince Mahidol Award Conference <pmaconference@mahidol.ac.th>
**To:** 'Supat Vanichakarn' <supat.van@mahidol.ac.th>, [redacted]
**Cc:** Pla Chatlada <platos.july@gmail.com>, Pattaraporn Khongboon <[redacted]
**Subject:** FW: Nomination of Dr. Dennis Carrol for the 2018 Prince Mahidol Award
**Sent:** Wed, 31 May 2017 11:41:35 +0700
D Carroll PMA 2018 Nomination Mazet.pdf
D Carroll selected publications.pdf

Dear Dr. Mazet,

Thank you very much for your email. We forward your email to Dr. Supat Vanichakarn, Secretary-General of the Prince Mahidol Award Foundation. If you have any further inquiries regarding the Prince Mahidol Award Nominations, please directly contact Dr. Supat.

Best regards,
PMAC Secretariat

**From:** REDACTED [mailto:jonna.mazet@gmail.com] **On Behalf Of** Jonna Mazet
**Sent:** Wednesday, May 31, 2017 11:19 AM
**To:** Prince Mahidol Award Conference <pmaconference@mahidol.ac.th>
**Subject:** Nomination of Dr. Dennis Carrol for the 2018 Prince Mahidol Award

Dear Secretariat,
I completed the Prince Mahidol Award 2018 nomination form online and submitted the materials through the website. However, the website instructions indicated that:
"After you fill out the form completely and submit your information, you will see the information that you have had submitted. Please print it out, sign your name, attach other required documents and send to the address that will be shown when you have had submitted."
The above result did not occur. Instead, I received this message:
"Thank you very much for filling the Prince Mahidol Awards nomination form."

Therefore, just in case, I am submitting the attached signed nomination letter containing the same information, as well as a pdf of Dr. Carroll's recent selected publications.

Thank you for your careful consideration of this nomination,
Jonna Mazet

Jonna AK Mazet, DVM, MPVM, PhD
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# Financing of international collective action for epidemic and pandemic preparedness

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For the Coalition for Epidemic Preparedness Innovations see http://cepi.net

The global pandemic response has typically followed cycles of panic followed by neglect. We are now, once again, in a phase of neglect, leaving the world highly vulnerable to massive loss of life and economic shocks from natural or human-made epidemics and pandemics. Quantifying the size of the losses caused by large-scale outbreaks is challenging because the epidemiological and economic research in this field is still at an early stage. Research on the 1918 influenza H1N1 pandemic and recent epidemics and pandemics has shown a range of estimated losses (panel).[1–3]

A limitation in assessing the economic costs of outbreaks is that they only capture the impact on income. Fan and colleagues[3] recently addressed this limitation by estimating the "inclusive" cost of pandemics: the sum of the cost in lost income and a dollar valuation of the cost of early death. They found that for Ebola and severe acute respiratory syndrome (SARS), the true ("inclusive") costs are two to three times the income loss. For extremely serious pandemics such as that of influenza in 1918, the inclusive costs are over five times income loss. The inclusive costs of the next severe influenza pandemic could be US$570 billion each year or 0·7% of global income (range 0·4–1·0%)[3]—an economic threat similar to that of global warming, which is expected to cost 0·2–2·0% of global income annually. Given the magnitude of the threat, we call for scaled-up financing of international collective action for epidemic and pandemic preparedness.

Two planks of preparedness must be strengthened. The first is public health capacity—including human and animal disease surveillance—as a first line of defence.[4] Animal surveillance is important since most emerging infectious diseases with outbreak potential originate in animals. Rigorous external assessment of national capabilities is critical; WHO developed the Joint External Evaluation (JEE) tool specifically for this purpose.[4,5] Financing for this first plank will largely be through domestic resources, but supplementary donor financing to low-income, high-risk countries is also needed.

The second plank is financing global efforts to accelerate research and development (R&D) of vaccines, drugs, and diagnostics for outbreak control, and to strengthen the global and regional outbreak preparedness and response system. These two international collective action activities are underfunded.[6]

Medical countermeasures against many emerging infectious diseases are currently missing. We need greater investment in development of vaccines, therapeutics, and diagnostics to prevent potential outbreaks from becoming humanitarian crises. The new Coalition for Epidemic Preparedness Innovations (CEPI), which aims to mobilise $1 billion over 5 years, is developing vaccines against known emerging infectious diseases as well as platforms for rapid development of vaccines against outbreaks of unknown origin. The WHO R&D Blueprint for Action to Prevent Epidemics[7] is a new mechanism for coordinating and prioritising the development of drugs and diagnostics for emerging infectious diseases. Consolidating and enhancing donor support for these new initiatives would be an efficient way to channel resources aimed at improving global outbreak preparedness and response.

Crucial components of the global and regional system for outbreak control include surge capacity (eg, the ability to urgently deploy human resources); providing technical guidance to countries in the event of an outbreak; and establishing a coordinated, interlinked global, regional, and national surveillance system. These activities are the remit of several essential WHO financing envelopes that

**Panel: Health and economic impacts of epidemics and pandemics**

**H1N1 influenza (1918)**
- 50 million deaths;[1] gross domestic product (GDP) loss of 3% in Australia, 15% in Canada, 17% in the UK, and 11% in the USA[2]

**Severe acute respiratory syndrome (SARS) (2003)**
- 774 deaths;[3] global economic loss of US$52·1 billion[3]

**Ebola (2013)**
- 10 600 deaths and a GDP loss of US$2·8 billion across Guinea, Liberia, and Sierra Leone[3]

**Zika (2015–16)**
- 20 deaths[3] and an expected loss of US$3·5 billion in the Latin American and Caribbean region[3]



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all face major funding shortfalls. The Contingency Fund for Emergencies finances surge outbreak response for up to 3 months. The fund has a capitalisation target of $100 million of flexible voluntary contributions, which needs to be replenished with about $25–50 million annually, depending on the extent of the outbreak in any given year. However, as of April 30, 2017, only $37·65 million had been contributed, with an additional $4 million in pledges.[6] The WHO Health Emergencies and Health Systems Preparedness Programmes face an annual shortfall of $225 million in funding their epidemic and pandemic prevention and control activities.[10]

Previous health emergencies have shown that it can take time to organise global collective action and provide financing to the national and local level. In such situations, a global mechanism should offer a rapid injection of liquidity to affected countries. The World Bank's Pandemic Emergency Financing Facility (PEF) is a proposed global insurance mechanism for pandemic emergencies.[11] It aims to provide surge funding for response efforts to help respond to rare, high-burden disease outbreaks, preventing them from becoming more deadly and costly pandemics. The PEF currently proposes a coverage of $500 million for the insurance window; increasing the current coverage will require additional donor commitments. In addition, the PEF has a $50–100 million replenishable cash window.

As the world's health ministers meet this month for the World Health Assembly, we propose five key ways to help prevent mortality and economic shocks from disease outbreaks. First, to accelerate development of new technologies to control outbreaks, donors should expand their financing for CEPI and support the WHO R&D Blueprint for Action to Prevent Epidemics. Second, funding gaps in the WHO Contingency Fund for Emergencies and the WHO Health Emergencies Programme should be urgently filled and the PEF should be fully financed. Third, all nations should support their own and other countries' national preparedness efforts, including committing to the JEE process. Fourth, we believe it would be valuable to create and maintain a regional and country-level pandemic risk and preparedness index. This index could potentially be used as a way to review preparedness in International Monetary Fund article IV consultations (regular country reports by staff to its Board). Finally, we call for a new global effort to develop long-term national, regional, and global investment plans to create a world secure from the threat of devastation from outbreaks.

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This article summarises the recommendations of a workshop held at the National Academy of Medicine, Washington, DC, USA, co-hosted by the Center for Policy Impact in Global Health at Duke University, Durham, NC, USA and the Coalition for Epidemic Preparedness Innovations, Oslo, Norway. Participants' travel and accommodation were supported by the Center for Policy Impact in Global Health. BO is a consultant to Metabiota, a private company engaged in infectious disease risk modelling and analytical services. In this capacity, he has led the development of an index measuring national capacity to respond to epidemic and pandemic disease outbreaks.

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Policy Forum

# Preventing Pandemics Via International Development: A Systems Approach

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## Outbreaks, Driving Factors, and Development

Outbreaks of emerging infectious diseases place significant burden on public health and global economies [1]. The process leading to spillover, localized emergence, and finally pandemic spread is complex, but is generally driven by underlying ecological, political, or socio-economic changes [2,3] (Figure 1). These "drivers" [2,4] include for example, climate change, urbanization, international travel and trade, land use change, and the breakdown or complete lack of public health measures. Yet despite the growing literature on driving factors [4], the impact of these drivers lacks appropriate attention and is currently an understudied area of research [3].

Examining a dataset of outbreaks of international concern assembled as part of a recently published study by Chan et al. [5], we assess the distribution of outbreaks across driving factors. We find that the most prominent driver is the breakdown or lack of public health infrastructure and argue that there is a mismatch between the drivers of public health events and current trends in public health spending and pandemic prevention. We propose a three-pronged approach within development agencies as the most promising solution to this disconnect. The approach includes: (1) Developing policies that deal with different stages of emergence, from spillover and localized outbreaks to pandemic spread; (2) Actively engaging a systems approach to pandemic prevention that changes pathogen dynamics at the intersection of people and their environment; and (3) Shifting the funding framework in development agencies from short-term emergency funding to a longer-term strategy.

## Determining Drivers of Outbreaks of International Concern

Epidemiological data on officially confirmed outbreaks of international concern collected by the Global Alert and Response (GAR) department of the World Health Organization (WHO) can facilitate understanding of threats to global health, with particular attention to the local spread of pathogens (Figure 1B at the critical juncture following spillover into humans but preceding pandemic spread. Events of "international concern" are published in Disease Outbreak News (DON, available online, http://www.who.int/csr/don/en/) and defined according to the International Health Regulations (IHR) as either specific diseases (Table S1) or events that are "serious" or "unusual" or pose the potential risk of spreading globally or imposing restrictions on travel or trade (http://www.who.int/ihr). The inclusion criteria for events evolved from 1969 when the IHR covered only six diseases, to amendments in 1973 and 1982 to focus specifically on cholera, yellow fever, and plague, and to revisions again in 1995 to cover almost all public health risks (biological, chemical, radiological, or nuclear), though these final revisions were only formally adopted in 2005 and did not go into effect until 15 June 2007. The IHR now require states to have or develop "minimum core public health capacities," including the detection, assessment, and notification of events.

Using the Chan et al. [6] dataset of 397 outbreaks from DON reports between 1996 and 2009, we identified the proximate driver implicated in each outbreak through manual evaluation of WHO outbreak reports related to each event (Text S1). Driving factors were defined according to the Institute of Medicine

The Policy Forum allows health policy makers around the world to discuss challenges and opportunities for improving health care in their societies.

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**Competing Interests:** DC is the director of USAID's Avian Influenza and Other Emerging Threats Unit. All other authors have declared that no competing interests exist.

**Abbreviations:** IHR, International Health Regulations; WHO, World Health Organization; IOM, Institute of Medicine

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**Provenance:** Not commissioned; externally peer reviewed.



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## Summary Points

- The way in which public health programs are designed and funded has changed significantly; however, the trend toward establishing vertical, disease-specific global health programs may be at the cost of strengthening basic public health infrastructure and development in the long term.
- In a review of nearly 400 public health events of international concern, we found that a breakdown or absence of public health infrastructure was the driving factor in the largest fraction of outbreaks (39.5%). No single other driving factor accounted for more than 10% of outbreaks.
- The relative roles of emergency response versus long-term development strategies to mitigate infectious disease threats are being debated within bilateral and intergovernmental aid agencies.
- We propose a systems approach within development agencies to address pandemic prevention at the intersection of people and their environment where the risk of disease emergence is highest. To achieve this goal, mainstream development funding, rather than emergency funding, is required.

countries such as Indonesia and Egypt were identified as regions with repeated, small-scale outbreaks that suggested chronic persistence [8]. The connection between H5N1 and backyard poultry production in particular has led to significant interest and support in a "systems approach" to combating avian influenza as a development agenda driven by agricultural, cultural, poverty, and equity constraints, rather than a purely human health issue (also see http://www.upstreamresearch.net/main.php) [9]. These efforts have led to broader programs including inter-agency "One Health" initiatives, and global programs specifically

IOM [2] with modifications as in Jones et al. [4], including the re-classification of "economic development and land use" and "technology and industry" to form more descriptive categories: "agricultural industry changes," "medical industry changes," "food industry changes," "land use changes," and "bushmeat" (See Text S1 for a full list of drivers). Drivers were assigned on the basis of a text search of the outbreak reports for key words and phrases indicating an IOM-defined driver directly or inferred from text describing actions taken immediately following the outbreak (Table S2). Breakdown of public health measures accounted for the largest fraction (39.5%) of outbreaks (Figure 2; Table S3). According to the IOM [2], breakdown of public health measures includes inadequate sanitation and hygiene, e.g., the shortage of potable water, poor immunization coverage or the lack of infrastructure to purchase and deliver vaccine, and the deterioration of vector-borne and zoonotic disease control. We include the absence of public health infrastructure in "breakdown of public health measures," but use the IOM naming construct of "breakdown" for consistency. All other drivers accounted for 10% or less of outbreaks each (Table S3). While many of these outbreaks do not pose a pandemic threat, they are evidence of an environment that may prove unable to deal with a novel pandemic threat.

## Limitations to Determining Drivers of Outbreaks of International Concern

The ability to accurately assess the driving factors of outbreaks and target aid is limited by strong disincentives that still exist for states to report outbreaks of disease (e.g., disruption to tourism or trade) [7]. Further, a lack of standard practices for sharing biological samples limits our ability to detect and report disease threats rapidly. The Nagoya Protocol to the Convention on Biological Diversity set the groundwork for sample sharing, but does not include human samples and still requires significant deliberation prior to implementation of a fair sharing system [7].

Despite disincentives and surveillance issues, the significant subset of events that do get reported through IHR mechanisms point to a role for development in preventing future outbreaks. Currently, the role of international development in global health and pandemic prevention programs in the United States and internationally is being debated.

## The Changing Role of International Development in Pandemic Prevention

Historically, dealing with infectious disease outbreak threats has been under the aegis of state, national, and international public health agencies (e.g., US Centers for Disease Control, WHO), and basic public health infrastructural development has been the responsibility of bilateral and international development aid agencies (e.g., United States Agency for International Development [USAID] and World Bank, respectively), and national and international non-governmental organizations (e.g., Bill & Melinda Gates Foundation). There has been an increased role for bilateral and international development aid agencies in addressing pandemic prevention as a development issue, typically funded through emergency response avenues. This shift followed the emergence of highly pathogenic H5N1 avian influenza, in which developing

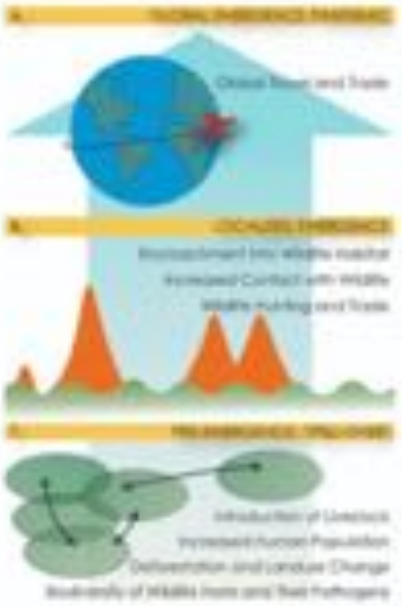


**Figure 1. Figurative description of the multi-scale, multi-step process of pandemic emergence.** Pandemic impact is highest when diseases are transmitted rapidly from human to human, and spread via travel and trade networks (A). At that point, their impact is greatest in developed countries, with economic dependence on globalized travel and trade (e.g., SARS). However, most emerging diseases do not reach this stage, and emerge as localized outbreaks, often small and contained (B, red spikes), or spillover repeatedly from animals (B, green line). Here, control is most effective at the countries of origins that are often developing countries, where breakdown of public health measures exacerbates human-to-human spread. Prior to localized outbreaks of zoonoses, perturbations in the environment lead to spillover of pathogens from one animal species to another or their range expansion (C, green circles). The most effective pandemic prevention at this early stage would be via measures that target the underlying causes of disease emergence.
doi:10.1371/journal.pmed.1001354.g001



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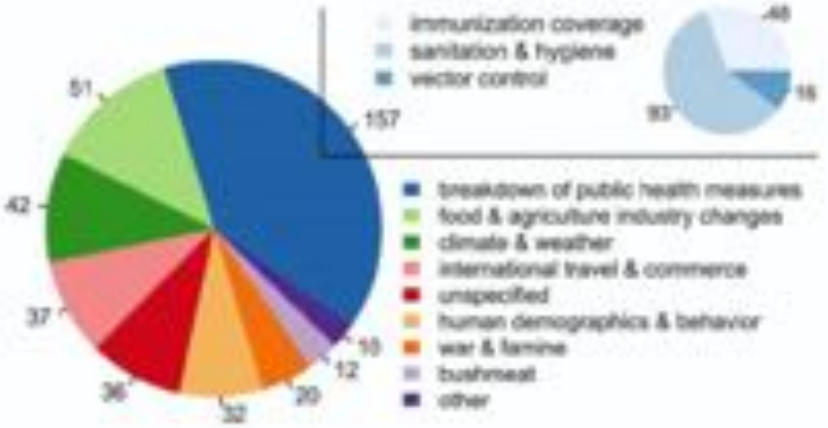


**Figure 2. The number of outbreaks by driver, with the subplot representing the subdrivers within the category "breakdown of public health measures" (Table S3).** The number of outbreaks as taken from the Chan et al. [6] dataset of OIDH reports attributed to different ecological, socioeconomic, and political drivers. There are some inherent uncertainties in the reported set of outbreaks, and biases in the reporting of disease outbreaks have been discussed previously [4,6]. As the breakdown of public health measures accounted for the greatest number of outbreaks, for that driver, three additional subcategories were examined, including inadequate sanitation and hygiene, poor immunization coverage, and vector-borne and zoonotic disease control measures (e.g., bednets and improved drainage to eliminate standing water). Drivers associated with fewer than ten events (which included "human susceptibility to infection," "land use changes," and "medical industry changes") were combined into the single category "other." Outbreak events with unassigned or uncertain drivers (e.g., disagreement between sources) were labeled as "unspecified."
doi:10.1371/journal.pmed.1001354.g002

targeting pandemic infectious disease threats through development [10,11].

Within development agencies trends in health spending have moved from broad system based investments to a more specialized, infectious disease model, resulting in a decline in systems capacities, potentially contributing to increased risk of disease spread. According to the Organization for Economic Co-operation and Development (OECD), infectious disease control aid commitments have increased from 8% between 1990 and 1998 to 16% between 2001 and 2008, while basic health infrastructure aid commitments have declined from 11% to 5% during this period. In response, aid has been criticized as duplicative and inefficient, aimed at high-profile diseases (e.g., HIV/AIDS) rather than public health in general, and too often tied to short-term numerical targets, such as patients treated or lives saved [12]. Further, the proliferation of donors with program-specific "earmarking" of funds for vertical spending may create a fragmented landscape of development aid and translate into additional costs on donor and recipient countries [13]. Therefore, the decline in broad health systems capacities could be due not simply to the structure of aid being too vertical or "stovepiped" along "high profile diseases," but also to inflexible funding cycles bent on metrics with little long-term effect. While vertical programs do have their successes, often programmatic and structural details helped overcome the vertical nature of the program, e.g., the high coverage of excellent and evolving vertically oriented interventions that contributed to smallpox eradication [14].

## Conclusion and Recommendations

We suggest a central role for development agencies in pandemic prevention and highlight three critical policy issues. The first is to develop policies that deal with different stages of emergence, from spillover and localized outbreaks to pandemic spread. Stronger public health infrastructure (e.g., expanded surveillance, better diagnostic capacity, and rapid reporting and control) in developing countries will likely help prevent localized outbreaks of newly emerged pathogens becoming pandemic. For example, in China the SARS crisis exposed weaknesses in the health system and the ability to effectively communicate and control an epidemic threat [15]. China has made a series of changes to public health policy and infrastructure specifically targeting SARS-like illnesses, as well as other emerging diseases [16,17]. It is likely that any future spillover of SARS, either from animals or via laboratory accidents, or emergence of a similar but novel disease would be less likely to result in international spread [17–19]. Similarly, extensive national and intergovernmental efforts to detect and control influenza A/H5N1 in Indonesia and other southeast Asian countries may have played a role in the lack of sustained human-to-human transmission in the region [20]. The majority of the events that the WHO has classified as internationally significant are in fact vaccine preventable or can be contained with basic public health measures, e.g., yellow fever, polio, cholera, and meningitis, making the bulk of events in the Chan et al. [6] dataset preventable. These generalized approaches are distinct from efforts to target specific diseases that have emerged, particularly those with rapid, silent (during the asymptomatic period) transmission, such as the proposed distribution of oseltamivir as a prophylaxis during the early stages of the 2009 H1N1 pandemic [21]. Here, the practicalities of distribution among individuals or households to achieve optimal coverage proved difficult and this model of pandemic control via prophylaxis is seen as overly optimistic [22,23], especially in the context of a developing country.

Second, we propose that development agencies should actively engage a systems approach to pandemic prevention that changes pathogen dynamics at the intersection of people and their environment, broadening the development toolkit significantly and imaginatively. A systems approach to pandemic prevention moves beyond the "One Health" concept of linking human and veterinary medicine with an understanding of environmental drivers of health to focus also on the socio-ecological context of disease emergence [24]. There has been significant movement in One Health, however, "operationalizing" One Health seems to hit a glass ceiling because there is not a specific defined budget among the agencies, and each relevant agency competes for funds. For H5N1, reducing the risk of the emergence of a new pandemic variant includes increasing biosecurity on poultry farms and within backyard flocks [25] as well as strengthening surveillance along routes from farms to markets. To address the key drivers of most pandemics, this will mean development agencies playing a role in such diverse strategies as strengthening animal health diagnostic laboratories, training veterinarians in public health (e.g., epidemiology for disease surveillance, outbreak detection, investigation, and intervention), the promotion of biosecurity measures on farms, educating businesses and governments on disease risks, and working with the extractive industries in emerging



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infectious disease "hotspots" to reduce the risk of new pathogens emerging (See figure 1 in [6]). In 2009, USAID launched the Emerging Pandemic Threats program with the specific aim of reducing opportunity for the emergence of new, potentially pandemic zoonoses at their source by building local public health capacity to predict, identify, respond to, and prevent disease emergence (http://avianflu.aed.org/epprograms/).

Third and finally, we point to the need for a critical shift in the funding framework from which disease-oriented development assistance is administered. Within development agencies, pandemic prevention programs are most commonly funded through emergency or disaster relief mechanisms. In this transition, development agencies should consider adopting a long-term funding strategy that invests in a development approach to pandemic prevention consistent with a systems approach. These recommendations align with others who have urged previously for a strengthening of national health systems with a "diagonal" approach [26], where interest in particular initiatives or diseases can be used to drive broad-based improvements to the overall public health system. Not only will this better address the most significant global health threats, but it will also provide the broad scale first line of defense against the next unknown contagion.

## Supporting Information

**Table S1 WHO Diseases of Focus (http://www.who.int/csr/disease/en/).**
(PDF)

**Table S2 Summary of outbreak information extracted from the WHO Disease Outbreak News reports by disease, country, and date, with corresponding driver classification.**
(PDF)

**Table S3 Number of outbreaks by driver as used in Figure 2.**
(PDF)

**Text S1 Supplemental online material.**
(DOC)

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## Author Contributions

Analyzed the data: TLB RC EC DS LP. Wrote the first draft of the manuscript: TLB. Contributed to the writing of the manuscript: TLB RC DS EC LP AC DC PD JSR. ICMJE criteria for authorship read and met: TLB RC DS EC LP AC DC PD JSR. Agree with manuscript results and conclusions: TLB RC DS EC LP AC DC PD JSR.

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# Prediction and prevention of the next pandemic zoonosis

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## Abstract

Most pandemics—eg, HIV/AIDS, severe acute respiratory syndrome, pandemic influenza—originate in animals, are caused by viruses, and are driven to emerge by ecological, behavioural, or socioeconomic changes. Despite their substantial effects on global public health and growing understanding of the process by which they emerge, no pandemic has been predicted before infecting human beings. We review what is known about the pathogens that emerge, the hosts that they originate in, and the factors that drive their emergence. We discuss challenges to their control and new efforts to predict pandemics, target surveillance to the most crucial interfaces, and identify prevention strategies. New mathematical modelling, diagnostic, communications, and informatics technologies can identify and report hitherto unknown microbes in other species, and thus new risk assessment approaches are needed to identify microbes most likely to cause human disease. We lay out a series of research and surveillance opportunities and goals that could help to overcome these challenges and move the global pandemic strategy from response to pre-emption.

## Introduction

The emergence of novel infectious diseases such as HIV/AIDS, severe acute respiratory syndrome (SARS), and pandemic influenza has shown the vulnerability of human beings to new zoonotic health threats. The mortality and morbidity associated with HIV/AIDS have devastated communities in some countries and led to global changes in public health. The rapid pandemic spread of SARS coronavirus in 2003 and a new triple-reassortant H1N1 influenza in 2009 both resulted in substantial economic loss as the pathogens exploited—and in some instances closed down—global travel and trade networks.[1] These vulnerabilities

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SSM and PD selected the topics for review, wrote portions of the paper, and coordinated and edited the contributions of all other authors. SSM did the searches of scientific literature, with contributions from the other authors. CZ-T analysed the underlying data and produced the hotspot map; all other authors contributed sections of the Series paper, provided references, and contributed to revisions. All authors reviewed the paper.

**Conflicts of interest**

We declare that we have no conflicts of interest.

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emphasise the need for a systematic, pre-emptive approach that aims to prevent the spread, or even the initial emergence, of pandemics.

The emergence of novel pandemic agents often seems to be inherently unpredictable.[2] Indeed, no pathogens have been predicted before their first appearance. However, patterns in the origins and spread of new pathogens can be noted and are an intrinsic, albeit ad-hoc, part of surveillance strategy. For example, more than 60% of the roughly 400 emerging infectious diseases that have been identified since 1940 are zoonotic,[3] and these pathogens are the focus of particular public health interest.[4,5] Similarly, specific geographical regions or interfaces between people, wildlife, livestock, and the environment have been identified as the origins of recent emerging infectious diseases, and thus are targets for intense surveillance.[3,5–7] Analysis of previous emergence events has led to a better understanding of the causes (so-called drivers) of emergence.[6,8] These advances, coupled with a better understanding of the dynamics of pathogen transmission, ecology, and evolution as they emerge and spread, promise the possibility to predict pandemics. Here we review these findings and the most promising strategies to improve anticipation, prediction, and preemption of the next pandemic zoonosis at the source.

## Origins and dynamics of pandemic zoonoses

When the origins of emerging infectious diseases are traced back to first emergence in the human population, some distinctive patterns are revealed that could be used in disease control.[3,8] First, the frequency with which new pathogens emerge is increasing, even when the increased surveillance globally is taken into account,[3] suggesting that efforts to coordinate the global strategy to fight pandemics are timely and of growing importance.[9,10] Second, the emergence of all major groups of emerging infectious diseases correlates strongly with human population density, supporting the hypothesis that disease emergence is driven by largely anthropogenic changes, such as the expansion of agriculture, travel routes, and trade, and changes in land use.[11] Finally, the emergence of zoonotic pathogens of wildlife origin (which have dominated the pandemics of the past 100 years) correlates strongly with both human density and the global distribution of wildlife biodiversity.[3,8] Spatially explicit models can be used to identify the regions most likely to produce the next emerging zoonoses (so-called hotspots of emerging infectious disease).[3] These hotspots are regions where human activities take place against a background of high wildlife biodiversity, with concomitant microbial biodiversity (figure 1). Targeting of surveillance to such regions provides a rationale for better allocation of global resources to prevent emerging infectious disease or rapidly deal with outbreaks.[3]

The process through which pandemic zoonoses emerge can be analysed to identify the crucial control points and specific research challenges (panel 1, figure 2). The model we adopt here (developed by Daszak) to assess pandemic potential has three stages—no human infection (stage 1), localised human infection (spillover; stage 2), and widespread transmission and global dissemination (stage 3). The frequency at which stages 1 and 2 occur is unknown but probably high. That human populations are continually exposed to a wide variety of non-human-animal pathogens, many of which infect human beings, seems reasonable to assume. To assess the role of pathogen biology in emergence, investigators need to know how many pathogens people are exposed to and how many successfully cross the species barrier. A complete inventory of spillovers is not available, but researchers have a good working knowledge of pathogens of domestic livestock and pets (species in frequent contact with human beings). Almost 50% of the roughly 1000 species of pathogens that are noted in livestock and pets are zoonotic,[17] implying that any barriers between these hosts and human beings are routinely breached by many different pathogens. More than 50% of the recognised pathogens of human beings can infect other vertebrate hosts.[18] Many non-



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human pathogens can infect several hosts, and clear examples of viruses transferring between different animal hosts to cause outbreaks in other species have been reported.[17,19] Pathogens can transfer from human beings to animals and between different animal species before being transferred back to people, allowing remixing and evolution with spill-back and potentially enhanced pathogenicity (eg, influenza).[20,21]

Human pathogens from all taxa contain zoonotic species. Roughly 80% of viruses, 50% of bacteria, 40% of fungi, 70% of protozoa, and 95% of helminths that infect human beings are zoonotic.[18] Most of the identified reservoirs are mammalian (roughly 80%) or, to a lesser extent, avian,[18,22] although people share some pathogens with invertebrates, which act as vectors[23] or intermediate hosts. Identification of the key taxonomic groups that are sources for the emergence of zoonotic disease could help to improve targeting of surveillance and interventions. Ungulates are the mammalian taxa with which human beings share the most pathogens[17]—perhaps not surprising because, as major food sources, these animals are often in close proximity to people, and their diseases have been studied extensively. Rodents, carnivores, and primates are also well represented. Although pathogens deemed emerging or re-emerging are disproportionately likely to be zoonotic,[18] their reservoirs are much the same as those of non-emerging zoonoses.[22]

The situation, however, is substantially different for pathogens that have reached stage 3. A disproportionate number of these pathogens are viruses, suggesting that viruses have the potential to evolve more rapidly than do other kinds of pathogen. However, this finding could be due to ascertainment bias. Less complete knowledge is available about the diversity of viruses than that of other pathogens, and researchers might still be missing many at stages 1 and 2.[24] Although a lot of stage 3 pathogens that infect only people don't strictly have reservoirs (eg, HIV-1), many are thought to have had zoonotic origins, including in non-human primates, which contrasts strongly with the minor contribution of primates as reservoirs for zoonoses in general. If risk is a function of contact frequency and probability of successful adaptation to human beings, pathogens acquired from other primates might already be better adapted to successful transmission than those from other mammals (exposure from rodents, bats,[25] and other common vertebrates are the most frequent).

Many pandemic zoonoses (ie, those that reach stage 3), such as HIV/AIDS,[26] have achieved sustained person-to-person transmission without the need for a non-human reservoir. For example, SARS, which originated from the SARS-like coronaviruses of bats, emerged in China in 2003 and was due to hunting and trading of bats for food.[27] In the wildlife markets of southern China these bat viruses seemed to become stage 1 pathogens, which spilled over to civets before being transmitted to people and achieving stage 2.[28] SARS coronavirus then underwent repeated cycles of transmission in people, and spread nationally and then globally (ie, reached stage 3), including 251 cases as far away as Toronto. Non-human hosts can have a role in the maintenance and transmission of some stage 3 pathogens (eg, influenza A virus).[20,21] Of the 400 or so known emerging pathogens, roughly 100 occur only as human pathogens—ie, such specialisation is rare.[29] Some of the seemingly specialist human pathogens are thought to have had zoonotic origins much further back in evolutionary time (eg, Plasmodium *falciparum*).[30] This pattern could be the norm, but the origins of most specialist human pathogens are unknown.[11] Much more is known about the dynamics of pandemic pathogens once they can be transmitted among people. Transmission rates are often higher in dense than in sparse populations, and spread is often greatly enhanced by air travel or human migration. The mathematics of these spreading events is well known, and a sophisticated array of computational models have been used to back-predict such events accurately—eg, the first case clusters of SARS[31] and the subsequent global spread, including the country-by-country distribution of human cases.[32] Models based on air travel, realistic human contact networks, and individual countries' capacities to



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deal with outbreaks can now produce reasonably accurate predictions of future pandemic spread (particularly for influenza).[33, 34] However, less is known about the factors that enable pathogens to move from stage 2 to stage 3 and ultimately achieve pandemic status. During this process, stuttering chains of novel human transmission (as with human monkeypox in Africa, for example[36,37]) can become self-sustaining (which monkeypox has still not achieved in people[38]). The distribution and behaviour of human beings, reservoir hosts, and vectors are crucial for emergence, and human demographics and behaviour often establish capacity for person-to-person transmission.

Differential host physiology, especially age and immunocompetence, affect susceptibility to infection.[38,39] The surge in immunocompromised patients during the HIV/AIDS pandemic was associated with an upsurge in other emerging pathogens.[7,9] Host factors often receive less research focus than does pathogen virulence, but improved knowledge of host responses is essential to understand the species barrier and why some zoonotic pathogens are benign in their natural hosts but lethal when introduced to other species.[38,39]

In view of the importance of human activities in emergence, integration of social sciences research — particularly that focused on human behaviour and demographics — into models of infectious disease emergence and evolution is essential to understand pandemics.[40,41] The importance of human exposure throughout the emergence process also suggests that simple behavioural precautions could greatly reduce risk. Risks to hunters, food handlers, and livestock workers from occupational exposure could be reduced in hotspots of emerging infectious diseases though routine sanitation and biosafety precautions, as has been tried with H5N1 in agricultural settings.[42] Nosocomial spread could be prevented by stringent adherence to infection control practices—eg, use of sterile injection equipment.

A successful pathogen needs to possess the molecular machinery to infect people, invade human cells or tissues, replicate, and access tissues from which it can exit the host and transmit (directly or indirectly) to other people.[38,43] Historical examples are few, and thus to quantify the relative contribution of exposure frequency versus phylogenetic relatedness to the risk of successful infection is difficult. Analysis of host–pathogen databases of primates shows that closely related sympatric host species are more likely to share parasite species than are distantly related sympatric host species.[44] Although any pathogen from a mammalian (or avian) host is a potential threat, that exposure of people to novel pathogens from our closest animal relatives poses the greater risk to public health is at least plausible.

Microbes often evolve substantially during emergence (eg, SIVcpz evolved into HIV-1), and the role of evolutionary adaptation in enabling pathogen establishment in human populations is a subject of active research.[45,46] Alternatively, some pathogens can spread between human beings without evolutionary change from the genotypes present in the wildlife host (eg, Ebola virus), and thus can enter the human population at stage 2. Phylodynamics, which combines a modelling frame work for host, epidemiological, and molecular data,[47,48] especially for RNA viruses, shows particular promise for understanding of patterns of viral evolution during epidemics.[48,49]

Testing of the relative importance of exposure and host relatedness in stage 2 emergence is an important challenge. For plant pathogens, experimental infection of closely or distantly related plants with a range of fungal pathogens has shown that host relatedness is a key factor in the ability of a pathogen to infect a novel host.[50] Such a study would be logistically and ethically challenging in mammals, but experimental work with several model systems and various other organisms is underway, and systematic studies of host–parasite data bases might provide an alternative. These studies might provide new surveillance opportunities by



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allowing improved targeting of the key wildlife species most likely to harbour the next emerging zoonosis.

## Pathogen discovery

Identification of zoonotic pathogens has been substantially improved by advances in molecular diagnostics, which make possible the identification of hitherto unknown pathogens in nature (so-called pathogen discovery).[51,52] This process also includes differential diagnosis of infectious disease and surveillance for known or novel microbes that are normally benign in natural hosts but have the potential to become pathogenic in other hosts. Traditionally, microbe hunters used many techniques, including in-vitro and in-vivo culture, immunohisto chemistry, electron microscopy, and serology. Immunohistochemistry of clinical samples was used successfully in several cases. Molecular techniques were used to first identify sin nombre virus, Nipah virus, West Nile virus, SARS coronavirus, and Lujo virus, among others. With the advent of unbiased molecular methods, the use of visualisation techniques has already begun to shift from discovery to provision of evidence of causal relations between an infectious agent and disease, by locating evidence of the agent at sites of pathological changes, including in both chronic and acute disease.[51]

Rapid, cost-effective molecular techniques allow broadscale screening of samples, and pathogen discovery could be a strategy in wildlife to pre-empt pandemic zoonotic disease emergence through early identification. This strategy might be particularly effective when enhanced by hotspot modelling, which allows targeting of specific regions with the highest spillover risks. Historically, most surveillance efforts have been designed to detect individual pathogens in natural reservoirs, vectors, or at-risk human or animal populations through use of individual (so-called singleplex) PCR assays or serology. However, the costs for multiplex PCR, micro arrays, and high-throughput sequencing continue to fall, and thus these assays are increasingly used as primary techniques for syndromic surveillance and studies of microbial diversity and discovery.[51,52] The challenge with any of these tech nologies is determination of the relevance of a microbial signature. 5000 species of mammals and 10 000 species of birds are known, each of which probably has at least several unique endemic viruses. Therefore the total number of new pathogens awaiting discovery is probably far higher than the 2000 to 3000 characterised. When other vertebrate-associated microbes are also considered, clearly the unfocused application of high-throughput screening could rapidly exhaust resources without substantively reducing pandemic risk. Therefore, discovery efforts need to be directed toward reservoirs and vectors where human being–animal interfaces[6] and hotspot modelling[3] or other information suggest an increased risk of trans mission. In the past few years, the abundance and availability of molecular sequence data have made possible the identifi -cation of unknown microbes in nature based on similarities to the sequences of known organisms, even in crude nucleic acid extracts (so-called metagenomics).[51,52] This approach has clear value during the early stages of emergence. However, sequence data became available while an epidemic was still in progress for the first time only during the West Nile outbreak in 1999, and then again during the 2003 SARS outbreak and the 2009 influenza H1N1 pandemic. This information was invaluable for rapid development of diagnostics, identification of the source of the infection, and pathogen discovery. However, the rapid sequencing and identification of new pathogens before large-scale spread remain a substantial challenge.

## Prediction of pandemic potential in novel microbes

Advances in meta-genomic technology have led to efforts in which molecular data are prospectively used to identify potential human pathogens in other species. The goal of such studies is to characterise novel microbes and assess probable virulence and transmissibility



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in people. However, crucial challenges exist in prediction of the effects of these new microbes, especially for viruses.[53] In some cases (eg, coronaviruses[54]), host range can at least partially be predicted by receptor specificity and other factors.[24,54] When virulence factors are known (as for many bacteria[38]), meta-genomic analysis for these factors can be very useful.[52] Such analysis is more challenging with viruses than with other microbes,[19,43,55] although the experimental development of mutations in H5N1 that increase trans missibility in a ferret model has allowed targeted surveillance for isolates that are most likely to become efficient human pathogens.[56] However, even when putative human pathogens can infect human-cell cultures, they are often unable to infect people. Genetically humanised murine models have been developed for SARS[57] and hepatitis C virus (which usually can infect only human beings and chimpanzees).[58] Humanised mice,[59] or other model systems, could perhaps be adapted to screen for the ability of newly discovered microbes from wildlife reservoirs to infect people. Workers at the Rockefeller Foundation Virus Program in the mid-20th century used a low-tech version of the strategy—intra cerebral inoculation— on suckling mice, which are susceptible to many infections by this route.[60] However, screening in humanised mice is not yet widely available. In most cases, prediction of human virulence or transmissibility from molecular or phylogenetic data alone is still not feasible (another crucial unmet need), although promising work has been done with in-vitro tests to assess ability to induce a hyperinflammatory cytokine response in human cells as a predictor of virulence.[61,62] Molecular data will be of increasing predictive value as the global genomic database expands, thereby allowing wider comparisons and identification of commonalities. The predictive value will increase further if these molecular data are correlated with epidemiological and clinical data, and as our understanding of host requisites for trans mission and barriers to cross-species transfer improves. As programmes for pathogen discovery in wildlife expand rapidly, the development of risk assessment criteria for the importance of these microbes is crucial. In our opinion, crucial questions remain and further research could substantially improve our under standing and our capacity to prevent pandemics before they emerge (panel 2).

These research questions are part of a much-needed basic research programme to investigate prediction of pandemics. However, previous evidence of pathogen spillover is a simple predictor of possible future emergence, and an active interface between human beings and other species is an obvious sine qua non. The capacity of a novel virus to transmit to people, and especially to cause illness, is a clue that the virus can replicate well in human beings, and thus could gain the properties that allow onward transmission. Spillover infections just below the threshold for self-sustainment in people (ie, infections with a basic reproduction number slightly <1) have been suggested as the prime epidemics-in-waiting,[71,72] although they are difficult to identify in advance. Thus, spillover events of any magnitude should be carefully monitored. For H5N1, intensive monitoring of each spillover case in endemic countries is crucial for prediction of if and when this pathogen moves from stage 2 to 3. Additionally, because pandemic zoonoses are such a large threat to global public health, to understand the ecological, virological, and social rules governing their emergence seems important. A concerted, interdisciplinary research focus on the process of disease emergence is urgently needed, and should include all sectors of the medical sciences, ecologists, social scientists, and wildlife biologists, among others.

## Global strategy for surveillance and prevention

For emerging infections, strengthening of public health surveillance worldwide to provide early warning has been the primary recommendation of expert groups for the past two decades.[4,5,10,37,38] Although greatly improved, public health surveillance capabilities remain restricted and fragmented, and have uneven global coverage.[20,64,73] ProMED and the ProMED-mail e-mail LISTSERV and website were developed in the 1990s to improve



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early-warning capacity.[77] This notion has expanded substantially, with a series of new initiatives such as WHO's Global Outbreak Alert and Response Network,[80] a tripartite One Health initiative involving WHO, the Food and Agriculture Organization of the UN, and the World Organisation for Animal Health; HealthMap.org (and similarly Canada's Global Public Health Intelligence Network), a system that does high-capacity searching and filtering of internet feeds to identify novel pathogen outbreaks as rapidly as possible;[81] and, in the USA, the Centers for Disease Control and Prevention's Global Disease Detection programme, the Department of Defense's Global Emerging Infections Surveillance and Response System, and other initiatives. These initiatives have been assisted by regional coordination and the formation of, for example, the European Centre for Disease Prevention and Control, and subregional networks such as the Mekong Basin Disease Surveillance Network.[82,83] The adoption of the revised International Health Regulations, which have a target of establishment of minimum core capacities, or specific plans, by mid-2012, by the 194 member states of WHO was a noteworthy advance.[84] The revised Regulations incorporate a broad definition of outbreaks of public health concern, which include outbreaks in non-human animals, and provides an incentive for low-income countries to build capacity for pandemic surveillance and prevention. Although implementation will probably be delayed because many countries have so far been unable to achieve minimum core capacity goals, the adoption of the Regulations should greatly improve standards for surveillance, reporting, and response.[82]

Efforts to reduce or prevent pandemic zoonoses before they emerge in people have also begun, and might form the template for a new, globally coordinated pandemic prevention strategy. For influenza, these efforts have been focused on animal surveillance as a strategy to identify periods when the risk of spillover to people is high.[64] Wider surveillance in wildlife to include targeted pathogen discovery has been called for.[3,5,7,64] However, few coordinated efforts have been implemented to pre-empt zoonotic disease emergence with wildlife surveillance. The Emerging Pandemic Threats programme is a noteworthy project initiated in 2009 by the US Agency for International Development. The programme is a suite of capacity-building investments designed to rapidly identify (and eventually predict) the emergence of new public health threats and increase country-level capacities to mitigate the potential effects of these threats.[85] It draws heavily from efforts to address the H5N1 threat, and emphasises a strategic approach that builds on the understanding that the health and well being of people, animals, and the environment are inextricably linked; promotes a One Health approach that spans the animal health, public health, environmental, and conservation communities;[86] targets promotion of policies and capacities to identify and minimise the risk of emergence of new disease; and uses a risk-based approach to target investments where the likelihood of disease emergence is greatest.

The Emerging Pandemic Threats programme, through its PREDICT component, has developed an approach in which predictive modelling is used to identify the regions, wildlife hosts, and human being–animal interfaces most likely to propagate the next emerging zoonosis. The approach brings together experts from specialties, including wildlife ecology, epidemiology, genetics, virology, informatics, and veterinary medicine, all focused on building of a global early warning system for emerging diseases that move between wildlife and people. The programme's first goal is to obtain timely and reliable data for zoonotic threats, through internet surveillance of reports of unusual events in hotspot countries, analyses of the capacity of pathogens to emerge and then spread under different social systems in hotspots, and in-depth sample collection from the wildlife hosts most likely to harbour zoonoses. Samples are analysed to identify known zoonotic pathogens and new, closely related viruses, and then those deemed most likely to infect and cause illness in people are more fully characterised.



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PREDICT is active in 20 developing countries in emerging infectious disease hotspots and focuses on surveillance at human being–animal interfaces where cross-species trans mission is most likely. Infection in the natural or reservoir hosts is often asymptomatic,[20] and thus testing of seemingly healthy animals is essential, but might be resource intensive, and unproductive if done randomly. To avoid this issue, PREDICT uses a combination of risk modelling to target locations, interfaces, and host taxa, and computerised data collection and analysis and active wildlife field sampling at high-risk sites to collect and identify viruses that might transfer from wildlife and cause disease. The programme partners with national and local governments, in-country scientists, and other local specialists who are active in outbreak reporting, microbial characterisation, and pathogen discovery, in collaboration with other US Agency for International Development Emerging Pandemic Threats projects as appropriate. These partnerships are intended to ensure the longevity of the programme by building capacity in the most in-need regions. The programme's scale gives some indication of how feasible this type of approach is for identification of the many thousands of novel pathogens that are probably in wildlife globally. In the first two years of the programme, around 100000 samples from 20000 animals (mainly bats, rodents, and non-human primates) in 20 countries have yielded 150 novel viruses from families known to harbour zoonoses. These data will be used to further refine global hotspot mapping and modelling strategies and test hypotheses about zoonotic transmission. They will also be shared as open source information, after the appropriate country clear ances, through an interactive application at HealthMap.org. In selected high-risk regions, the associations between viral diversity, biological diversity, patterns of human contact with wildlife and livestock, and changes in land use are being explored to decipher the rules that govern disease emergence.

The ultimate goal of the Emerging Pandemic Threats programme is to develop a strategy to prevent future pandemics at the source before they infect human beings—an ambitious goal that requires more than building of health-care capacity or surveillance and diagnostic programmes. The challenge to true pandemic prevention (and pre-emption) is how to address the underlying drivers that are essentially ecological (eg, juxtaposition of livestock production and wildlife populations) or occur on large spatial scales because of economic activity (eg, change in land use related to development of tropical forests).[1] In the case of both Nipah virus[14] and H5N1,[87,88] economic development resulted in changes to animal production that led to the opening of a new niche for a pathogen. Could the seemingly opposing forces of economic development and public health have been reconciled before rather than after these outbreaks occurred? Expansion of so-called health impact assessments is a possible approach.[12] Incentives for industries with roles in activities that propagate pandemics could be linked to development initiatives. For example, concessions in development of logging or mining could include better food supply chains as an alternative to bushmeat hunting, better clinics for migrant workers than are available, and more intensive surveillance of livestock at these crucial interfaces. Similarly, efforts to curtail the wildlife trade for food and pets in hotspot and other countries could include creation of incentives for consumers that lead to certification of industries promoting healthy practices.

## Conclusion

The basis on which to build a global pandemic prevention strategy has changed substantially over the past few decades. A newly revised global reporting system of outbreaks and new molecular methods for pathogen identification and discovery are available, and advances in communications technology—eg, access to mobile phones and the Internet, even in remote areas—have enabled improved reporting. The early identification of a new human coronavirus respiratory disease from Saudi Arabia[89] and a novel haemorrhagic fever virus in central Africa[90] are examples of the great improvement in surveillance capabilities.



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Understanding of the process of emergence and spread has moved from anecdotal through analytical to potentially predictive. Researchers are positioned to move from a paucity of data to a wealth of information on potential pathogens in nature. The challenge is to develop the basic research agenda to allow potential pathogens to be distinguished from harmless microbes by use of molecular sequence data only (the most commonly collected information), or information that can be deduced from these data—eg, structures of key proteins.

Political will for countries to act together to strengthen global networks against pandemic emergence also seems to have become positive. This new approach to pandemic prevention is shown by the handling of the discovery, in 1997, of a highly pathogenic influenza A (H5N1) of avian origin that infects people (precursor of the now widespread H5N1 avian influenza).[91] Since then, and despite the virus's continued inability to transmit effectively between people, the public health community has recognised that a lethal virus circulating only in wildlife and domestic animals creates extraordinary opportunities to mitigate future risk.[54] The response to H5N1 has implicated not only clinical, diagnostic, and therapeutic advances, but also better understanding of avian ecology, the economics of poultry production in low-income countries, and the ecology of the virus across the virus's broad host range. For perhaps the first time, the response to a zoonotic pandemic has included development agencies improving individual countries' abilities to identify new zoonoses early and mitigate quickly any new health threats arising within their borders.

The challenge is to establish whether and how researchers can intervene before a pathogen reaches the human population and develop appropriate triggers for action. Zoonotic diseases, by definition, should be a key mission of human-health agencies, agricultural authorities and producers, and natural resource managers, all working cooperatively. Substantial investments in each of these challenges are essential because the ecological and social changes worldwide that allow the emergence of infectious diseases are increasing at an unprecedented rate. Integration of efforts and coordination of budgetary resources for prevention and control is clearly a challenge that governments, both local and national, need to confront, and building of capacity to sustain these efforts might be the greatest challenge of all.

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**Key messages**

- Most recent pandemics, such as HIV/AIDS, severe acute respiratory syndrome, and pandemic influenza, are caused by zoonotic pathogens (ie, pathogens harboured by non-human animals), are viral diseases, and originated in wildlife
- Such infections are usually driven to emerge by ecological, behavioural, or socioeconomic changes
- Technological advances in mathematical modelling, diagnostics, communication, and informatics enable targeted global surveillance of emerging and previously unknown infections in both human beings and other species
- New risk-assessment approaches show promise for the use of these capabilities to predict and pre-empt potential pandemics at their source (eg, in wildlife or other animals), and need to be further developed



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### Search strategy and selection criteria

We searched PubMed and ISI Web of Knowledge with the terms "emerging infectio*", "zoonos*", or "pathogen discovery" in combination with the terms "modeling", "prediction", "surveillance", "evolution", "ecology", or "methodology" for papers published in any language before Sept 25, 2012. We did our searches when we began to develop and write the paper and again before submission of the revised, final version. Some coauthors provided references that they deemed of particular importance. We largely selected publications from the past 5 years, but did not exclude commonly referenced and highly regarded older publications. We also searched the reference lists of articles identified by our searches and selected those judged relevant. Reviews and book chapters are cited to provide readers with more detailed information and references than is possible in the space allowed. Our reference list was modified on the basis of comments from peer reviewers.



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### Panel 1: Stages in disease emergence

Several researchers have separated the process of emergence into distinct steps or stages. Morse originally divided the process into two steps, introduction (into a new species, such as human beings) and establishment dissemination.[6,12] Wolfe and colleagues[13] subsequently developed a model with five stages—a so-called pathogen pyramid—to represent successively greater pathogen adaptation to successful human infection and transmission, from inability to infect human beings (stage 1) to exclusively human disease (stage 5).

Figure 2 shows an alternative depiction of the stages of emergence, which emphasises the dynamics of infection rather than pathogen properties. The frequency of these events probably diminishes from stage 1 to stage 2, and the final stage, true pandemic emergence (ie, intercontinental spread of a pathogen in human beings), is far rarer than the initial localised emergence events.

Stage 1 (pre-emergence): the putative pandemic pathogen is still in its natural reservoir. Ecological, social, or socioeconomic changes (eg, change in land use) alter the dynamics of pathogen transmission within the host or between hosts and allow the pathogen to expand within its host population, spread to a new region, or be transmitted to another non-human host population or species. Each of these changes increases the likelihood of the pathogen making contact with and spilling over into human beings (and thus progressing to stage 2).[1,6,7] The drivers that cause stage 1 emergence tend to be large-scale environmental, agricultural, or demographic shifts—eg, moving of livestock to a region for the first time, or transportation of wildlife from a region for food. Such events happened before the emergence of Nipah virus in Malaysia in 1997, after intensively managed pig farms and fruit orchards were built in a region frequented by fruit bats (the natural reservoir). These bats began to feed on fruit trees around pigsties, enabling viral transmission to pigs and stage 1 emergence.[14] Similarly, change in land use in Africa has brought livestock, people, and wildlife into the same habitat, leading to multidirectional pathogen transmission between livestock and non-human primates (stage 1), and some spillover into people (stage 2).[15]

Stage 2 (localised emergence): initial spillover of a wildlife or livestock pathogen to people. Causes range from handling of butchered wildlife to exposure to fomites in wildlife markets or livestock farms, or in the wild. Outcomes vary widely, from small clusters of human cases (eg, Menangle virus)[15] to large outbreaks, some with limited person-to-person transmission (eg, Ebola virus) and some without (eg, Hendra virus).

Stage 3 (full pandemic emergence): sustained person-to-person transmission and large-scale spread, often aided by global air travel (eg, HIV/AIDS, severe acute respiratory syndrome) or the international movement of reservoir hosts or vectors through trade (eg, West Nile virus). Stage 3 pandemics are rare because even pathogens capable of some person-to-person transmission might not be able to maintain long enough chains of transmission to spread (eg, Nipah virus in Bangladesh).



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**Panel 2: Prediction of pandemic potential**

Programmes for pathogen discovery (including within wildlife populations) are expanding rapidly, and development of risk assessment and prioritisation criteria for these microbes is crucial. Several lines of inquiry could substantially increase capacity to prevent pandemics before emergence.

- Research about the relative importance of host relatedness versus contact frequency: evidence shows that pathogens from closely related host species might be better able to spill over from one to the other.[63] Emerging pathogens in people have originated in both closely related host species (eg, HIV-1 from chimpanzees[20]) and distantly related hosts with which human beings have had close recent contact (eg, severe acute respiratory syndrome from bats and civets,[27] Nipah virus from bats and pigs,[14] influenza from pigs and birds[20,64]).
- Analysis of viral relatedness as a predictor of emergence: wildlife viruses that are more closely related to known human pathogens are often assumed to be more likely to infect people than are those not similar to human pathogens. However, with the possible exception of the orthomyxoviruses and paramyxoviruses, the viral families that caused the most important recent zoonoses in human beings (ie, lentiviruses and coronaviruses) were recognised to have the potential for emergence only after they had already done so. Analysis of viral traits and phylogenetic correlations, and how these correlate with pathogenicity after a virus spills over, will be crucial.[65,66]
- Host range and plasticity: emerging pathogens often have a broad host range. Pathogens that are more able to undergo successful transmission between different host taxa are also more likely to infect human beings than are those less able to transmit between different host taxa.[22] These mechanisms should be elucidated and predictive correlations made.
- Estimates of a virus's ability to evolve: the factors that allow a pathogen to successfully jump species are poorly known, but might include high mutability and an absence of proofreading to correct mutations, which are thought to explain the high proportion of negative-stranded RNA viruses in emerging pathogens.[19,29] So-called evolvability[67] might help to explain why some pathogens have a high propensity for host jumps.[19]
- Research about host–receptor interactions: receptor binding is an essential first step in cell infection and has been associated with changes in host and tissue tropism.[19,24,45] Prediction of receptor binding necessitates understanding of the interactions for commonly expressed receptors (eg, sialic acids or heparan sulfate proteoglycans) or case of adaptation of the virus to a new host receptor.[24] However, the cell receptor is still unknown for more than 50% of human viruses. Highly host-specific receptor structures are a barrier to infection of a new host. Receptor binding is a necessary (but not sufficient) condition to enable viral entry to a cell and successful replication. Changing of receptor affinity (from avian-type to mammalian-type) was the first step in the adaption of H5N1 avian influenza virus to mammalian transmission, but other mutations were also needed.[68,69] Intracellular barriers and host resistance factors also exist for many viruses.[43,55,70,71] Viral genes that interfere with these functions might be identified on the basis of signatures or similarity to known genes.
- Capacity to exploit new routes of transmission: widespread outbreaks are often correlated with high transmission efficiency, which might be partly related to



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the route or frequency of spread.[72] Human behaviour is an important component that should be integrated into any predictive model,[41] but the aspects of behaviour that matter are established by the pathogen's mode of transmission.

- *Prediction of virulence in human beings*: along with prediction of human transmissibility, perhaps the biggest challenge is to assess the likelihood that a wildlife or livestock virus will cause noteworthy disease if the virus does infect people. True risk to human beings is related to both the transmissibility of a pathogen and the severity of the disease that results, and many zoonotic viruses that infect people cause no disease (eg, simian foamy viruses[73]) or mild symptoms (eg, Menangle virus[58]). Why some viruses that are benign in their natural hosts induce a severe or lethal hyperinflammatory response in a new host (eg, Ebola virus, sin nombre virus) is not well understood, but the causative pathogen components or structures should be identified and the mechanisms of species specificity further elucidated.
- *Patterns of host–virus coevolution*: coevolutionary relationships in a group of related viruses and their wildlife hosts can be assessed easily by analysing genetic sequences.[74] Strong patterns of coevolution during recent evolutionary time suggest stable long-term interactions with little host-switching, but pathogens that have frequently moved from one host to another have poorly aligned coevolutionary trees. Improved understanding of the pathogen's opportunities for transfer are needed for prediction.



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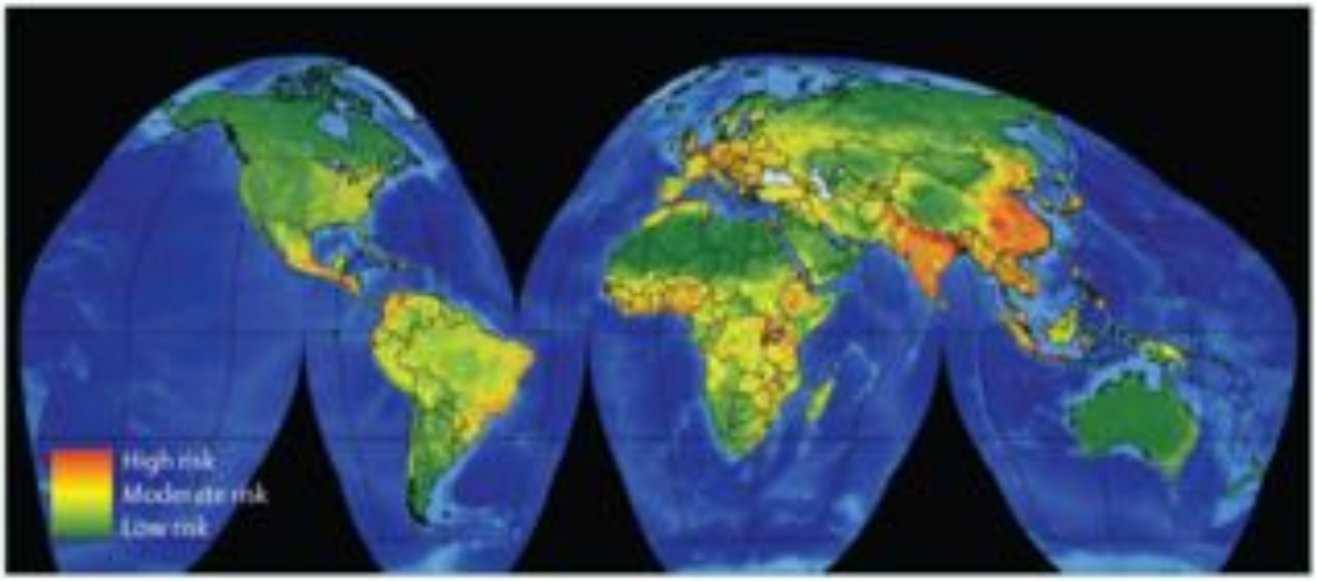


**Figure 1. Global hotspots for emerging infectious diseases that originate in wildlife**

A database of all known emerging infectious diseases[1] since 1940 was used to identify the most likely origins of each separate emergence event. Presence or absence of infections emerging from wildlife was analysed with logistic regression against a series of known drivers, including human population density, change in human population density, and wildlife diversity (mammalian species richness), gridded at 1 km$^2$ resolution. The global distribution of model outputs gives a measure of the likelihood of a region to generate a new zoonotic emerging infectious disease that originates in wildlife. Because previous pandemics have mainly originated in wildlife, these maps identify hotspots where the next pandemic is most likely to originate.



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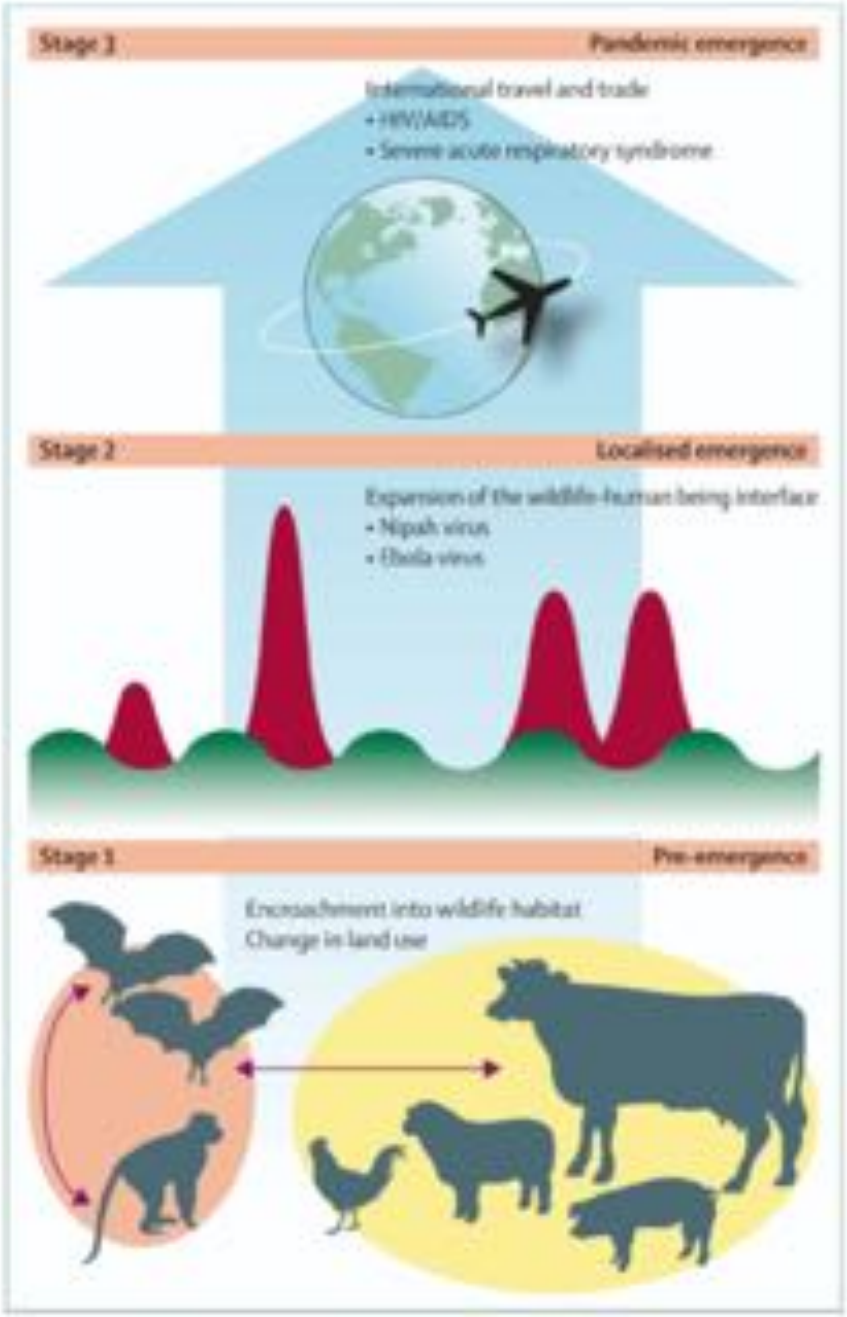


**Figure 2. Emergence of pandemic *zoonotic* disease**

Stage 1 is a pre-emergence state, in which naturally occurring microbes are transmitted between their animal reservoirs. Disturbances to the ecology of these populations (eg, due to changes in land use) change the dynamics of microbial transmission and can lead to a heightened risk of pathogen spillover to other non-human wildlife or livestock hosts (but not people). Stage 2 is localised emergence, either through self-limiting spillover events (green peaks and troughs, representing the rise and fall in numbers of infected people with time) or large- scale spillover (red peaks, representing spikes in the number of infected people with time), that leads to person-to-person transmission for a few pathogen generations. In stage 3, some spillover events might lead to indefinitely sustained person-to-person outbreaks.



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international or global spread, and the emergence of a true pandemic. The size, spread, and potential effect of events increase from stage 1 to stage 3, but the frequency falls so that full stage 3 pandemics are quite rare. By dissecting this process and analysing the interactions of the underlying drivers with the risk of spillover and spread, development of a more structured approach to pandemic prevention is possible. The ultimate goal of successful pandemic prevention is to move the control point to stage 1.



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possibly larger than the yearly health budgets of these countries, are allocated to these weak systems. Such large sums will have serious consequences for the painstakingly achieved progress of reforms and risk further increasing the imbalance of the systems. It will also have to mean a step away from the present stress on sector-wide approach, to a maybe more realistic combined approach (the whole sector including projects). Certainly, money would be welcomed, but preferably in reasonable portions at a measured pace and combined with an increase in qualified manpower to handle it. Initially, for enforced AIDS projects to be effective they need, against the flow of reforms, to be directed from the centre, have strong vertical components, and be carried out in project form at least partly outside the reforming systems, but in close cooperation with these and with the aim of strengthening existing horizontal functions—when possible—rather than establishing new systems. Since adequate human resources are not available inside the countries the governments will have to request support from outside to improve human resources in relation to the increased funding. The problem here will be in finding experienced regional and culturally competent international staff who are willing and able to work in roles that subordinate their work to the strengthening of the overall system, and yet manage to achieve the objectives of AIDS control. This requires great consideration to the maintenance of informally agreed principles on maximising reduction of the overall burden of disease, cost-effectiveness, and feasibility of interventions as well as the establishment of balanced systems. Or, as pointed out on May 27 in a statement[7] by the Executive Director of UNAIDS: "resources carefully spent on scientifically proven interventions can dramatically reduce the toll of HIV/AIDS, even when the epidemic is most severe".

Both giving and receiving large sums of money thus implies a serious challenge, certainly a great responsibility, and, as pointed out in the *Washington Post* editorial, care must be taken to insure the gesture "will not prove empty down the road". If this care is not taken the developing countries might end up in a much more difficult situation than if a much smaller sum of money had been given. That risk is very real, but which politician can afford to say no to large sums of money, especially for such a noble, life-saving cause?

**Stefan Hanson**

*SH is at the Department of Public Health Sciences Division of International Health (IHCAR), Karolinska Institutet, Stockholm, Sweden, and is presently working as advisor to the National AIDS Control Programme, Ministry of Health, Tanzania*

**Correspondence:** *Dr S Hanson, Department of Public Health Sciences Division of International Health (IHCAR), Karolinska Institutet, SE-171 76 Stockholm, Sweden.*
*Email hansonl@raqobi.org*

**References**

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## Scaling-up and sustaining insecticide-treated net coverage

Curtis and colleagues' reject the Roll Back Malaria (RBM) strategies for scaling-up insecticide-treated net (ITN) coverage in Africa, and propose instead a strategy of "free ITNs for all in rural areas". However, they seem to have misunderstood what RBM actually recommends, including RBM's emphasis on the need for sustained subsidies. They also greatly underestimate the public health contribution made by commercial net markets in Africa, China, and Vietnam.

Both Curtis et al and the RBM strategic framework[2] cite China and Vietnam as successful models, where high levels of ITN coverage have been sustained on a large scale and over many years. In both these countries, insecticide treatment of nets is provided free of charge by the government. What Curtis et al fail to mention is that to take advantage of this service most people in malarious parts of China and Vietnam must buy their own nets from the unsubsidised commercial market; limited numbers of free nets are given to deprived and ethnic minority communities in high-risk areas.[3]

The question of whether local African markets in nets can make any useful contribution to public health goals is a key issue in this debate, because the strategy proposed by Curtis et al, if implemented in full, would almost certainly destroy these markets. Curtis and colleagues argue that commercial net markets have no useful role to play in maintaining high levels of ITN coverage, and cite the example of Tanzania. In fact, unsubsidised commercial net sales in Tanzania have grown by about 20% per year for the past 8 years, from less than 300 000 per year in 1994 to more than 1·5 million per year in 2000. Overall coverage in that country (% of households with at least one net) has now reached 37%, and is still increasing steadily, with the help of a donor-funded promotional campaign. Soon, all of the nets sold by Tanzania's three net manufacturers will be bundled with an insecticide-treatment kit.

During this process, retail prices of Tanzanian nets have declined dramatically. There remains a tendency, as Curtis et al point out, for coverage to be higher in urban areas and in richer households, but this does not mean that poor rural households are completely excluded. There is strong evidence that socioeconomic differentials have declined as coverage has increased,[4] and more than half the net-owning households in Tanzania are now in rural areas. To accelerate this process, and to ensure that Tanzania will meet the Abuja targets of



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60% coverage of target groups by 2005, a major national subsidy programme is about to begin, supported by the Global Fund to Fight AIDS, TB, and Malaria (GFATM). The subsidy will be distributed through antenatal clinics, to protect those most at risk of malaria (ie, pregnant women and their newborn children), and will be delivered in the form of a voucher that gives a substantial discount on commercial purchases. This scheme is expected to promote further market growth, by contrast with the provision of subsidised goods, which would have the opposite effect.

In some other parts of Africa, the use of locally made nets is a long-standing tradition, and coverage among poor rural households is already quite high. This is the case in Madagascar, and in large parts of the Sahel. In Mali, for example, overall national coverage is about 54%, and in the area around Tombouctou it is 84%.[1] In Madagascar, Senegal, and The Gambia, net use is actually more common in rural areas and among poorer households than it is in urban areas and among richer households.

Subsidies, and how to provide them, are a key element of debates over ITN implementation strategies. Curtis et al suggest that the RBM strategic framework allows for only short-term subsidies. This is quite incorrect. In fact, the framework explicitly and repeatedly emphasises the need for sustained subsidies, and therefore the need for a subsidy system that can be sustained in the long run.

Curtis and colleagues suggest that their alternative—free nets and insecticide delivered by a newly created vertical system—would cost less than US$300 million per year. This estimate is based on experience in small-scale operations carried out by specialised teams, supported by unusually high levels of training and supervision in a research context. A routine system operating at national scale would almost certainly have to be very different. A more serious attempt to cost such a system would be worthwhile, but in the meantime the figure quoted by Curtis et al must be regarded as unreliable, and probably very optimistic. Moreover, even this estimate of annual costs greatly exceeds the total made available for ITNs through the GFATM over the first 2 years of its operation.

We agree that bringing effective malaria control to Africa's rural populations will require massive and sustained international investment. But there are other urgent demands, apart from ITNs, on the region's weak and over-burdened public health systems. In many countries, public expenditure on all health purposes is now less than $5 per person per year, and many people in rural areas still have little or no access to prompt diagnosis and effective treatment, which RBM stresses is the first priority for malaria control. In Tanzania, government spending on health in 1999 was estimated as $1·40, of which $0·42 (30%) was spent on all forms of malaria control.[2] Spending an additional $1·50 per person per year would therefore entail a doubling of Tanzanian government spending on health, and a three-fold increase in spending on malaria. To spend all this money on ITNs, while poor people have to pay user fees to obtain life-saving treatment, and while the clinics often run out of drugs, is surely not the most sensible way to use public funds.

Curtis et al make bold statements about how the world "should" be, but they do not address the question that confronts every programme manager: how best to use resources that are limited and that are not enough to do everything for everyone?

They recommend a "one size fits all" quick-fix solution, which would foster a permanent dependency on goods handed out by donors, and would prevent the growth of locally appropriate and sustainable distribution systems.

As the RBM strategic framework points out, adequate ITN coverage in Africa is unlikely to be achieved in an equitable and sustainable manner by either public sector or the private sector alone. Private sector net markets are efficient and sustainable but they have important limitations. In most countries, they currently provide only untreated nets. The coverage they provide is inadequate, and in some places coverage is biased towards urban areas and richer households. That is why the strategic framework stresses the need for sustained subsidies, and identifies how the public and the private sectors can have complementary, cooperative and mutually supportive roles. Tanzania, China, and Vietnam are all good examples of what can be achieved, and more importantly sustained, if public and private sectors work together.

**Jo Lines, Christian Lengeler, Kabir Cham, Don de Savigny, John Chinsumbwa, Peter Langi, Dennis Carroll, Anne Mills, Kara Hanson, Jayne Webster, Matthew Lynch, Whitney Addington, Jenny Hill, Mark Rowland, Eve Worrall, Michael MacDonald, and Albert Kilian**

*JL, AM, KH, JW, MA, MR, and EW are at the London School of Hygiene and Tropical Medicine, London, UK. CL is at the Swiss Tropical Institute, Basel, Switzerland. KC is at the Malaria Control Department, WHO, Geneva, Switzerland. DdeS is at the Tanzania Essential Health Intervention Project, Dar es Salaam, Tanzania. JC and MM are at the National Malaria Control Programme, Lusaka, Zambia. PL is at the National Malaria Control Programme, Kampala, Uganda. DC and MI, are at the US Agency for International Development (USAID), Washington, DC, USA. JH is at the Liverpool School of Tropical Medicine, Liverpool, UK. AK is at USAID/CDC, Kampala, Uganda.*

**Correspondence:** *Dr Jo Lines, Disease Control and Vector Biology, London School of Hygiene and Tropical Medicine, Keppel Street, London WC1H 9PW, UK. Tel +44 (0)20 7927 2674; fax +44 (0)20 7580 9075; email jo.lines@lshtm.ac.uk*

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PMAC Secretariat
Via Email: pmaconference@mahidol.ac.th

May 30, 2017

Re: Nomination of Dr. Dennis Carroll for the 2018 Prince Mahidol Award

Dear Secretariat and Review Committee,

It is with a great deal of enthusiasm and anticipation that I nominate Dr. Dennis Carroll for the 2018 Prince Mahidol Award. Dr. Dennis Carroll has contributed to scientific advances in malaria, tuberculosis, avian influenza, and emerging pandemic threats throughout his career. While his achievements in the development of scientific advances and technologies of disease prevention and response are noteworthy, it is his leadership and facilitation of change in global health that is the subject of this nomination.

I and my colleagues believe that Dr. Dennis Carroll is responsible for the most incredible sea change in global health in recent decades. He has almost single-handedly championed and facilitated the application of One Health by the United States government. While many in the global health community, especially in academia, have been calling for more holistic approaches to global health problem solving, it was Dr. Dennis Carroll who compiled, digested, interpreted, and presented the evidence base for One Health and delivered it to global policy makers in an accessible format. He has put into practice evidence-based solutions, considering the interconnectedness among people, animals, and the environment at a large scale with U.S. financial support. Dr. Carroll has been responsible for the development of programs and the operationalization of more than a billion U.S. dollars worth of programs with these sound scientific and collaborative underpinnings -- none of which would have been possible without his keen scientific acumen and data interpretation skills. He has done what none of us before him could do – make the case for One Health and put into practice for the betterment of global health, especially in less developed contexts. Without his maverick approach, I'm afraid that we would not be able to gather an international conference, such as is the subject of PMAC 2018.

Dr. Dennis Carroll joined the U.S. Agency for International Development (USAID) in 2005 when he assumed responsibility for leading its response to the spread of avian influenza. Previously, he was directly involved in the development and introduction of a range of new technologies for disease prevention and control, including: community-based delivery of treatment for onchocerciasis, rapid diagnostics for malaria, new treatment therapies for drug resistant malaria, intermittent therapy for pregnant women, and "long-lasting" insecticide treated bednets for prevention of malaria. He was responsible for the initial design and development of the U.S. President's Malaria Initiative. Currently, the reach of Dr. Carroll's amazing vision has resulted in the development of curricula that cross human and veterinary medicine and public health disciplinary boundaries and are being implemented across continents in dozens of universities. His scientific approaches are being used by ministries in more than 30 countries to develop their disease detection, surveillance, and response plans. Finally, he has supported the careers of hundreds of global health scientists around the globe, ensuring a better future for us all, including the animals and ecosystems of our planet.

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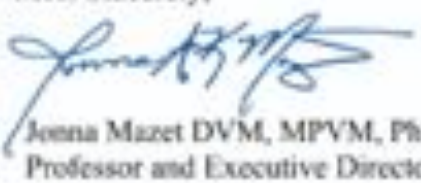
Dr. Dennis Carroll's Emerging Pandemic Threats Program strengthens capacities in developing countries to prevent, detect, and control infectious diseases in animals and people with an emphasis on early identification of, and response to, dangerous pathogens from animals before they can become significant threats to human health. He has used science to justify and launch programs across the globe to aggressively pre-empt or combat avian influenza and other diseases that could spark future pandemics. He has ingeniously drawn upon expertise from across the animal and human health sectors to build regional, national, and local One Health capacities for early disease detection, laboratory-based disease diagnosis, rapid response and containment, and risk reduction.

Dr. Carroll has facilitated partnerships among governments and other key in-country and regional institutions to enhance the understanding of viral distribution and key drivers of disease emergence—from deforestation and land use change to wildlife trade and livestock product demands. This information, along with other investments for which he is responsible, is strengthening country-level capacities for routine infectious disease detection and outbreak response. His efforts have helped to safeguard human and animal health and livelihoods in locations in Africa, Asia, and Latin America where new pandemic threats are likely to emerge. It is for these accomplishments that I respectfully nominate him for the 2018 Prince Mahidol Award, especially for this most fitting thematic year.

Most Sincerely,



Jonna Mazet DVM, MPVM, PhD
Professor and Executive Director

**Nominee:**

Dr. Dennis Carroll
Director, Emerging Threats Program
Bureau for Global Health
U.S. Agency for International Development

**Awards & Honours:**

- 2015 USAID Distinguished Service Award
- 2008 USAID Administrator's Management Innovation Award for his management of the Agency's Avian and Pandemic Influenza program
- 2006 USAID Science and Technology Award for his work on malaria and avian influenza

**Education:**

PhD in biomedical research with a special focus in tropical infectious diseases from the University of Massachusetts at Amherst, USA

**Positions:**

2005-Current:
Director, Emerging Threats Program
Bureau for Global Health
U.S. Agency for International Development
1300 Pennsylvania Avenue, NW
Washington, DC 2004 USA

1995-2005
Senior Infectious Diseases Advisor, responsible for overseeing the USAID's programs in malaria, tuberculosis, antimicrobial resistance, disease surveillance, as well as neglected and emerging infectious diseases
U.S. Agency for International Development
1300 Pennsylvania Avenue, NW
Washington, DC 2004 USA

1991-1995
Senior Public Health Advisor
U.S. Centers for Disease Control and Prevention
1600 Clifton Rd, Atlanta, GA 30333, USA

Prior to 1991:
Research Scientist, studying the molecular mechanics of viral infection
Cold Spring Harbor Laboratory
1 Bungtown Rd,
Cold Spring Harbor, NY 11724, USA

**Selected Publications:**

Yamey G, Schäferhoff M, Aars OK, Bloom B, Carroll D, Chawla M, Dzau V, Echalar R, Gill IS, Godal T, Gupta S, Jamison D, Kelley P, Kristensen F, Mundaca-Shah C, Oppenheim B, Pavlin J, Salvado R, Sands P, Schmunis R, Soucat A, Summers LH, El Turabi A, Waldman R, Whiting E. Financing of international collective action for epidemic and pandemic preparedness. *Lancet Glob Health*. 2017 May 18. pii: S2214-109X(17)30203-6. doi: 10.1016/S2214-109X(17)30203-6.

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**From:** Jon Epstein <epstein@ecohealthalliance.org>
**To:** Sangeeta Kaul <skaul@usaid.gov>
**CC:** Manish Kakkar <manish.kakkar@phfi.org>;Sara Heydari <sheydari@usaid.gov>;rajesh bhatia [REDACTED] Debapriyo Chakraborty <chakraborty@ecohealthalliance.org>;predict@ucdavis.edu <predict@ucdavis.edu>;Tapan Dhole [REDACTED]
**Sent:** 6/9/2017 3:34:05 PM
**Subject:** [predict] Re: Meeting on June 14th

Thanks Sangeeta.
Cheers,
Jon

On Jun 9, 2017 11:24 AM, "Sangeeta Kaul" <skaul@usaid.gov> wrote:
Hi Jon

Thanks for the message.

This is a USAID partners meeting with a focus on learning and sharing among the partners.

There are no formal partner presentations, but each partner can participate in the discussions after each session.

Regards
Sangeeta
Sent from my iPhone

On 09-Jun-2017, at 7:37 PM, Jon Epstein <epstein@ecohealthalliance.org> wrote:

Dear Sangeeta,
Please see the email to Sara below regarding the June 14th partners meeting.

Cheers,
Jon

On Jun 9, 2017 9:53 AM, "Jon Epstein" <epstein@ecohealthalliance.org> wrote:
Hi Sara,
Rajesh is going to attend the USAID partners meeting on behalf of PREDICT. I saw the agenda, and it didn't look like there were partner presentations. Could you tell us bit more about the meeting and whether we'll need to prepare anything specific?

Cheers,
Jon

**From:** Brian Bird <bhbird@ucdavis.edu>
**To:** Brooke Genovese <bgenovese@ucdavis.edu>;Corina Grigorescu Monagin <cgmonagin@ucdavis.edu>;Jonna Mazet <jkmazet@ucdavis.edu>;Tracey Goldstein <tgoldstein@ucdavis.edu>;predict@ucdavis.edu <predict@ucdavis.edu>
**Sent:** 6/9/2017 3:42:23 PM
**Subject:** Re: Phone call between Predict/HQ and Guinea Mission

I'll be On the plane to TZ.

B

On Fri, Jun 9, 2017 at 8:14 AM Corina Grigorescu Monagin <cgmonagin@ucdavis.edu> wrote:
For some reason they changed this to Tuesday. Are people still available?

Sent from my iPhone

Begin forwarded message:

**From:** Andrew Clements <aclements@usaid.gov>
**Date:** June 9, 2017 at 7:22:02 AM PDT
**To:** <cgmonagin@ucdavis.edu>, Tracey Goldstein <tgoldstein@ucdavis.edu>, "Jonna Mazet" <jkmazet@ucdavis.edu>, Brooke Genovese <bgenovese@ucdavis.edu>
**Cc:** Alisa Pereira <apereira@usaid.gov>, Kendra Chittenden <kchittenden@usaid.gov>, Shana Gillette <sgillette@usaid.gov>
**Subject: Phone call between Predict/HQ and Guinea Mission**

The follow up call between Predict and the Guinea Mission is proposed for Tuesday at 16:30 Guinea time which will be 9:30 am Pacific Time.

Does that work for most/all of you?

Thanks!

*Andrew P. Clements, Ph.D*
*Senior Scientific Adviser*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*
--
Brian H. Bird, DVM, MSPH, PhD
One Health Institute
University of California, Davis School of Veterinary Medicine
bhbird@ucdavis.edu

**From:** Andrew Clements <aclements@usaid.gov>
**Sent:** Wed, 30 Aug 2017 20:09:36 +0700
**Subject:** Re: updated guidance on Ebola country levels
**To:** Jonna Mazet <jkmazet@ucdavis.edu>, Elizabeth Leasure <ealeasure@ucdavis.edu>, David J Wolking <djwolking@ucdavis.edu>
**Cc:** Shana Gillette <sgillette@usaid.gov>, "Pereira, Alisa (GH/HIDN)" <apereira@usaid.gov>, Amahin Shek <ashek@usaid.gov>, Cara Chrisman <cchrisman@usaid.gov>

Hi all,

Apologies if I missed it while training and on vacation for a good part of August, but did you send a reply to the email below?

Despite the many subsequent discussions about budget numbers for the ceiling increase, we still need your proposed country breakout of Ebola funds (total of 53.3 M). These numbers have to been approved by Richard and Robbin in order to be finalized.

Thanks!

Andrew

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

On Aug 12, 2017, at 2:03 AM, Andrew Clements <aclements@usaid.gov> wrote:

> Hi Jonna, David, and Liz,
>
> We had a productive discussion today about the Ebola country levels and we have the following (updated but not final yet) guidance to share with you.
>
> 1) The new USAID proposed levels are as follows:
>
> BF 0.0 (Product had proposed 0.0)
>
> Cameroon 6.0 (6.0)
>
> Cote d'Ivoire 4.0 (4.1)
>
> Ethiopia 3.6 (3.6)
>
> Guinea 1.5 (1.7)
>
> Kenya 2.0 (2.2)
>
> Liberia 1.5 (1.7)
>
> Mali 0.0 (0.0)
>
> Senegal 4.2 (4.2)
>
> Sierra Leone 2.7 (3.2)
>
> Tanzania 6.0 (6.0)
>
> Uganda 6.5 (6.5)
>
> W AFR EHP 4.0 (11.9)

DRC 6.0 (7.1)

Ghana 3.0 (3.0)

(Note: USAID total is only 51.0 million; see #3 below)

2) The total for DRC and Ghana cannot exceed $9.0 million, but you have flexibility to move one country up and one down as long as the total doesn't change. **Please let me know if you want exercise this option or keep the levels as they are.**

3) There is an additional $2.3 million which has not yet been included in the USAID-proposed totals above. **Predict should recommend where it thinks the 2.3 million should go.** (As indicated previously, we view EHP as a top priority.) Note that it is not possible to put any of these funds into DRC or Ghana.

4) The total for Guinea plus Liberia plus Sierra Leone cannot be lower than $9.7 million (but you can adjust the levels among these 3 countries if you want). The total can go higher if some/all of the $2.3 million (see #3 above) goes into any of these countries. **Please propose revised levels for each country.**

5) These country levels can be further adjusted in the future if needed based on pipelines and burn rates.

6) We have been told that there is a possibility of an additional $3.0 million for EHP that can be obligated when the expenditures for Guinea, Liberia, and Sierra Leone reach a certain threshold. We are still working on the specific conditions which would trigger this action, but it will likely be something like when there is less than a certain number of months of funding remaining. For now, **can you estimate at what point in the future that the combined pipeline for the 3 EHP countries will be sufficient for only 6 months of activity (based on your current obligations, pipelines, burn rates, and your proposed revised country levels [after making any adjustments in 2, 3, 4 above])?**

Please let me know if you have any questions and when you think you might be able to provide this information. The next step is to share this information with Richard and Robbin for final approval.

Thanks!

Andrew

--

Andrew Clements, Ph.D.
Senior Scientific Advisor
Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health
U.S. Agency for International Development
Mobile phone: 1-571-345-4253
E-mail: aclements@usaid.gov

*For more information on USAID's Emerging Pandemic Threats program, see:* http://www.usaid.gov/ept2

**From:** Andrew Clements <aclements@usaid.gov>
**Sent:** Fri, 1 Sep 2017 02:03:54 +0700
**Subject:** Fwd: Application Process for PMAC 2018 Side Meetings
**To:** Jonna Mazet <jkmazet@ucdavis.edu>, David J Wolking <djwolking@ucdavis.edu>
**Cc:** Cara Chrisman <cchrisman@usaid.gov>, Alisa Pereira <apereira@usaid.gov>, Shana Gillette <sgillette@usaid.gov>

FYI

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

Begin forwarded message:

**From:** Marilyn Crane <mcrane@usaid.gov>
**Date:** September 1, 2017 at 1:55:30 AM GMT+7
**To:** "GHSD Unit Mail List (USAID)" <ghsdunitmaillistusaid@usaid.gov>
**Subject: Application Process for PMAC 2018 Side Meetings**

Dear Colleagues,

I have been communicating with Sudarat concerning the application submission process for side meetings at PMAC 2018.

Sudarat noted that there are a few important changes from previous years. In the past, USAID submitted concept notes to the PMAC Secretariat directly. However, for the coming year, applicants are now required to first register for the conference before submitting a concept note for the side event.

In terms of deadlines, invitations to participate in the PMAC 2018 conference will be issued by this coming Monday. The online submission process should be ready to accept applications around Sept 15, and the deadline for concept note submission for side meetings has been extended to Oct 15.

Please note that concept notes for side meetings should include a USAID contact person along with a main contact person for the project. Sudarat has been asked by the PMAC Secretariat team to serve as USAID's liaison, or point of contact, so if any of your projects plan to submit an application for a side meeting, please instruct them to include her as the USAID point of contact.

Interestingly, Ricardo and I have learned that OHW and P&R plan to submit an application together. We will keep you informed as we learn more!

Best,
Marilyn

--

Marilyn Crane
Senior International Higher Education Advisor
Emerging Threats Division

Office of Infectious Disease
Bureau for Global Health
U.S. Agency for International Development (USAID)

Telephone: (202) 712-4224
Cell Phone: REDACTED
Email: mcrane@usaid.gov

**From:** Andrew Clements <aclements@usaid.gov>
**To:** Dennis Carroll <dcarroll@usaid.gov>;rgreene@usaid.gov <rgreene@usaid.gov>;Lisa Kramer (Nairobi/EA/RHH) <lkramer@usaid.gov>;spaige@usaid.gov <spaige@usaid.gov>;Angela Wang <awang@usaid.gov>;alongwagar@usaid.gov <alongwagar@usaid.gov>;akibria@usaid.gov <akibria@usaid.gov>;Alisa Pereira <apereira@usaid.gov>;Gregory Adams (GH/AA/GH) <gadams@usaid.gov>;Jonna Mazet <jkmazet@ucdavis.edu>;Christine Kreuder Johnson <ckjohnson@ucdavis.edu>;Kirsten Gilardi <kvgilardi@ucdavis.edu>;mcranfield@gorilladoctors.org <mcranfield@gorilladoctors.org>
**Sent:** 10/25/2017 2:56:53 PM
**Subject:** WHO | Marburg virus disease – Uganda

FYI. Good description of how the confirmed and suspected cases are connected.

http://who.int/csr/don/25-october-2017-marburg-uganda/en/

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

**From:** Dennis Carroll <dcarroll@usaid.gov>
**Sent:** Tue, 14 Nov 2017 14:45:12 -0500
**Subject:** Fwd: News coverage of last week's PIP Session (Nagoya-GSD- Seasonal)
**To:** Gian Luca Burci <gian-luca.burci@graduateinstitute.ch>, Eddy Rubin <erubin@metabiota.com>, Peter Daszak <daszak@ecohealthalliance.org>, Jonna Mazet <jkmazet@ucdavis.edu>
First Consultations Held On WHO Pandemic Flu Framework Options - Intellectual Property Watch.pdf

Something of interest

d

---------- Forwarded message ----------
From: **Peter Bogner** <peter@gisaid.org>
Date: Tue, Nov 14, 2017 at 10:50 AM
Subject: News coverage of last week's PIP Session (Nagoya-GSD- Seasonal)
To: Dennis Carroll <dcarroll@usaid.gov>

Good Day Dennis;

Allow me to forward an article from IP Watch that was shared with us this morning, touching on some of last week's proceedings in Geneva.

Hope this finds you well,
Peter

**The GISAID Initiative**
*promoting the sharing of all influenza data*
*in a Public-Private-Partnership with the Federal Republic of Germany*
*GISAID, from Vision to Reality* http://tinyurl.com/hec2pg

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--
Dr. Dennis Carroll
Director, Emerging Threats Program
Bureau for Global Health
U.S. Agency for International Development

Office: 202-712-5009
Mobile: REDACTED

# First Consultations Held On WHO Pandemic Flu Framework Options

10/11/2017 BY CATHERINE SAEZ, INTELLECTUAL PROPERTY WATCH — 2 COMMENTS

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The World Health Organization is consulting member states and stakeholders on the future of its mechanism to help prepare the world for the next influenza pandemic. It is particularly asking whether countries should submit not only the biological samples of their influenza viruses, but also their genetic information through the mechanism. Also in question is whether the mechanism should be extended to cover seasonal influenza. Stakeholders had different views but all questioned the absence of recognition by the WHO of a widely used database currently hosting most of the world's influenza genetic information.



Flu vaccine

Two days of consultation were organised on 6-7 November by the WHO on both issues and on a "scoping paper" [pdf] drafted by the secretariat to facilitate discussions (IPW, WHO, 24 October 2017). The consultations will be followed by a draft analysis by the WHO, and another round of consultations. The progress is expected to be reported at the annual World Health Assembly (WHA) in May 2018, and recommendations on future action will be delivered.

The last Health Assembly in May decided that the WHO should conduct a "thorough and deliberative analysis" of issues raised by the Pandemic Influenza Preparedness (PIP) Framework Review Group's recommendations on seasonal influenza and genetic sequence data (GSD), "including the implications of pursuing or not pursuing possible approaches" (IPW, WHO, 26 May 2017). The PIP Framework

currently only covers influenza viruses with a human pandemic potential.

As shown in the draft agenda [pdf], the first day of the consultation was devoted to the issue of GSD, and the second day to seasonal influenza. The consultations included two sessions during which "relevant international organizations, databases and initiatives, and all interested stakeholders" could join member states, the PIP Advisory Group, and representatives of the WHO Global Influenza Surveillance and Response System (GISRS).

Press were not allowed in the sessions of the consultation organised for stakeholders.

**Genetic Sequence Data, Questions on Prominent Database**

The issue of genetic sequence data is that under the current functioning of the PIP Framework, only biological materials that are shared by countries and used by third parties such as industry, through the GISRS, trigger the benefit-sharing aspect of the PIP Framework and the financial contribution which is paid by third parties to use the system.

With technological advances, the sharing of influenza viruses is done more and more through the sharing of the viruses' genetic information. Laboratories could create the viruses from this genetic information and potentially escape their benefit-sharing obligation under the PIP Framework.

According to sources, stakeholders taking the floor on 6 November included representatives of the pharmaceutical industry, civil society, and one database.

The International Federation of Pharmaceutical Manufacturers & Associations (IFPMA) representative questioned the emphasis in the scoping paper on changing the framework language on databases, sources said.

The scoping paper, following the recommendation of the PIP Framework Review Group, suggests that the original language in the framework which states, "The WHO GISRS laboratories will submit genetic sequences data to GISAID and Genbank or similar databases in a timely manner consistent with the Standard Material Transfer Agreement," be replaced. It would say, "The WHO GISRS

laboratories will submit genetic sequences data to one or more publicly accessible database of their choice in a timely manner consistent with the Standard Material Transfer Agreement."

The IFPMA representative said GISAID (Global Initiative on Sharing All Influenza Data) is used by the majority of WHO Collaborating Centers and industry alike, and this fact is not acknowledged in the scoping paper, sources said. The representative said GISAID already has a user agreement in place.

The IFPMA declined to provide comments on their intervention.

The nongovernmental Third World Network, attending the consultation, remarked that the definition of PIP biological materials in the PIP Framework is non-exhaustive and open-ended, the TWN representative told *Intellectual Property Watch*. Any suggestion that the definition of PIP biological materials does not and should not include GSD is untenable, she said.

However, standard material transfer agreements between WHO and entities outside of WHO such as vaccines manufacturers is only triggered on access to PIP biological materials, not GSD, she said.

If the definition of PIP biological materials is not clarified, there will be uncertainty in responding to a pandemic, she said.

The PIP Framework is built on the foundational principle that sharing of influenza viruses with pandemic potential should be on an equal footing with sharing the benefits arising from the use of those viruses, and maintaining that equal footing requires the PIP biological materials to include GSD, she said.

TWN underlined the importance of a data access and user agreement for databases wishing to host GSD. The representative noted that GISAID already utilises a data access and user agreement but noted that the scoping paper fails to mention this fact.

It would be unacceptable, according to TWN, that GISRS laboratories should submit GSD to one or more publicly accessible databases of their choice since it would allow a GISRS lab to submit GSD to any database, irrespective of whether or

not the database implements the PIP Framework.

**GISAID: A Global Go-To Resource**

According to a source, the president of the GISAID initiative reminded members of the PIP Advisory Group that GISAID's sharing mechanism for GSD was developed over an 18-month period, before it went live in 2008. It predates the PIP Framework (2011), and was established in collaboration with low, middle-income, and industrialised nations which were both parties and non-parties to the United Nations Convention on Biological Diversity.

The objective was to provide an alternative to sharing GSD via public domain databases, where access to data takes place anonymously and providers' rights are either unprotected or forfeited, he said, according to the source. From the very beginning, GISAID outpaced other sharing platforms and emerged as a global "go to" resource, he added.

It would be important in future documentation to recognise the role of GISRS and member states in the creation of the GISAID Initiative and also reflect the distinction between GISAID sharing mechanism and those databases such as GenBank that do not have any sharing mechanism in place, the GISAID president explained, according to the source.

GISAID expressed its ongoing concern about the PIP secretariat's controversial role, in that past PIP documentation did not capture the significant differences relevant to PIP. GISAID has previously offered comments on these issues.

**Pharmaceutical companies: Restriction Can Hinder Progress**

The pharmaceutical industry, according to sources, said placing restriction on access would delay the dissemination of information in scientific and industrial circles, and might hinder progress towards pandemic preparedness.

Many companies receive both PIP biological materials and GSD, already contribute to the PIP Framework, and have signed standard material transfer agreements, the IFPMA representative said, according to sources. Companies using GSD for commercial products could self-declare, the representative said.

**Civil Society Opposes Extension of Framework to Seasonal Flu**

On the seasonal influenza question, the scoping paper proposed three possible approaches:

"Approach 1: Expand the PIP Framework to include seasonal influenza viruses.

Approach 2: Do not expand the PIP Framework so that national access and benefit-sharing regimes under the Nagoya Protocol apply to the sharing of seasonal influenza viruses.

Approach 3: Do not expand the PIP Framework and develop or adapt another instrument to cover seasonal influenza viruses, with a view to that instrument being recognized as an SII (special international instrument) under the Nagoya Protocol."

The TWN representative said during the negotiation leading to the PIP Framework, the inclusion of seasonal influenza was considered, and rejected. Expanding the framework would mean unravelling and renegotiating the framework, she said, which does not seem advisable given its good results.

On Approach 2, the representative said there is no a priori conflict between national access and benefit sharing regimes implementing the Nagoya Protocol (Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity) and access to seasonal influenza viruses.

TWN said that the development of a new instrument could borrow the approach of the PIP Framework with specific provisions pertaining to access and benefit sharing of seasonal influenza viruses.

TWN remarked that the scoping paper states that "to a certain degree seasonal influenza is already included in (PIP) benefit sharing arrangements," and said this is incorrect and should be deleted.

Image Credits: Flickr – Athit Perawongmtha

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WHO Group To Consult On Pandemic Flu Framework In Lead-Up To Assembly
A key World Health Organization advisory group has invited stakeholders to consultations this month on the contribution of the
02/05/2011
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*Catherine Saez may be reached at info@ip-watch.ch.*

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## Trackbacks

**Links 11/11/2017: Mesa 17.2.5 and Wine 2.21 Released | Techrights** says:
11/11/2017 at 11:22 pm
[...] First Consultations Held On WHO Pandemic Flu Framework Options [...]

UCDUSR0003114

**From:** Sudaret Damrongwatanapokin <sdamrongwatanapokin@usaid.gov>
**Sent:** Wed, 29 Nov 2017 12:22:00 +0700
**Subject:** Fwd: Global Virome Project Concept note/ PMAC 2018 side meeting
**To:** Prince Mahidol Award Conference <pmaconference@mahidol.ac.th>, Chumnurtai Kanchanachitra
REDACTED
**CC:** Dennis Carroll <dcarroll@usaid.gov>, "Clements, Andrew(ANE/TS)" <AClements@usaid.gov>, Jonna Mazet <jkmazet@ucdavis.edu>, Daniel Schar <dSchar@usaid.gov>, Anchalee Jatapai <ajatapai@usaid.gov>
GVP Concept Note PMAC_Oct11 (1).docx

Dear PMAC Secretariat,
Not sure that concept note has been submitted to you. The Correspondence person: Jonna has not received the approval notification from you.

Best regards,
Sudaret Damrongwatanapokin, D.V.M., Ph.D.
Regional Animal Health Advisor
USAID Regional Development Mission Asia
REDACTED
E-mail: sdamrongwatanapokin@usaid.gov
REDACTED

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# Concept Note for Side Meeting at PMAC 2018

**Meeting title** The Global Virome Project: the Beginning of the End of the Pandemic Era

**Organizers**

Core group of the Global Virome Project: Dennis Carroll [1], Jonna A.K. Mazet [2¶], Peter Daszak [3], Eddy Rubin [4], Nathan Wolfe [4], Cara Chrisman [1], Brooke Watson [1] REDACTED

1. U.S. Agency for International Development
2. One Health Institute, University of California, Davis
3. EcoHealth Allicance
4. Metabiota

¶Corresponding members:
Jonna A.K. Mazet jkmazet@ucdavis.edu
REDACTED

**Duration**

We propose two half-day sessions during the following times.

- Closed session: Half-day session 1, Monday 29 January 2018, 9.00-12.30
- Invited launch: Half-day session 2, Monday 29 January 2018, 14.00-17.30

**Background**

We live in an era when the threats posed by global pandemics are greater than at any other point in human history. We live in fear of a previously-unknown pathogen suddenly emerging and sweeping through every household, through every community, irrespective of borders, or of its hosts' social and economic standing. This fear alone can cost billions, as we saw in the global panic that followed the SARS and H1N1 influenza virus outbreaks. It is not unfounded, as evidenced by the 35-year HIV/AIDS epidemic that has cost over 35 million lives.

Despite the potential impact of viral threats, the world remains unable to predict when, where, or from what species the next emerging virus will break out. Global trends indicate that over the course of this century, new microbial threats will continue to emerge at an accelerating rate, driven by the world's expanding population, growing interconnectedness, and increasing interactions with animal populations (1). The majority of these threats originate in a seemingly endless pool of viruses carried by our relatives in the Animal Kingdom (2). Modern science has been able to characterize some of these viruses and trace their roots to their mammalian origins – for example, HIV-1 that spilled over from chimpanzees to people and Ebolavirus carried by bats in Africa (3). However, recent estimates put the total number of these animal viruses that could threaten us at more than 1.5 million, spanning 24 viral families (4). Compared to the 260+ viruses currently known from humans (5), this viral "dark matter" represents 99.9% of the potential pandemic threat. It means that, for every known strain of the SARS virus there are likely thousands of unknown "SARS-like" viruses (6) circulating in wildlife that could emerge in the future.



UCDUSR0003116

The Global Virome Project (GVP) was conceived in response to the challenge posed by the repeated and unpredictable emergence of high impact viral epidemics. These outbreaks compromise global health security and the well-being of the people of the world (1). The recently launched Coalition for Epidemic Preparedness Innovations (CEPI) represents a critical step to address known but long-neglected viral threats, such as MERS-CoV, Lassa Fever, and Nipah Virus (7). This vital work addresses long-known but underfunded viral threats; however, a tremendous challenge remains: how do we best prepare for unknown future threats?

The GVP's goal is to characterizing the vast pool of unknown viral threats in wildlife, their natural hosts. Knowing what viruses are available and able to infect humans and their epidemiological circumstances will allow us to prepare for viruses before they jump into people. It will transform our culture from one that responds to outbreaks to one that predicts and prevents future pandemics. It will also better prepare us to prevent accidental or intentional release of laboratory-enhanced virus variants. With broad support for the GVP, the world will be better prepared to deal with the consequences of escalating spillover of deadly viruses, likely in just ten years. The initiative will generate an unprecedented atlas of viral diversity, build global surveillance and laboratory capacity in the most high-risk areas, catalyze technological advances in diagnostics and vaccines, and establish a global framework for triaging and neutralizing novel viral outbreaks before they spread between humans.

The project is now at a critical point of gaining increasing support from new partners and collaborators, starting pilot projects in several countries, and ready for its official global launch. We believe that GVP's concept and goal aligns perfectly with the subtheme for PMAC 2018 - Making the World Safe from the Threats of Emerging Infectious Diseases and would very much appreciate the opportunity to officially launch the initiative in the ideal setting. In short, the GVP is designed to herald in the beginning of the end of the Pandemic Era, and PMAC 2018 will be the optimal stage for launching this next 'big science' project.

**Objectives**

Our primary objective is to have two half-day side meetings at PMAC in order to bring scientists together and officially launch the Global Virome Project. Our specific objectives are as follows:

- First, in a closed session, assemble members of the Global Virome Project Steering Committee and Working Groups and provide a platform to discuss specific critical points, including but not limited to in-country operations, laboratory testing, data sharing and ethical and legal topics.
- Second, in an open session, officially launch the initiative by introducing the concept, objectives, approach and anticipated outcomes of the Global Virome Project to PMAC attendees.
- Share information with project members and PMAC attendees on pilot projects in first-wave countries that are ready for operation, or are in the final planning stage (Thailand, China, Costa Rica etc.).
- Foster collaboration between GVP members and country officials who are interested in participating in the project in the future.



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**Proposed meeting format**

- Half-day session 1
  We propose a roundtable conference for the closed session. Presentations will be made by the core working group members on the progress of GVP since its last meeting in Beijing, China in February 2017. Working groups will spilt up into smaller discussions (in the same single room) to address specific challenges and improve the operational flow of the overall project.

- Half-day session 2
  The open session will consist of presentations and moderated panels. This format will allow for the official launch with presentations by the core members to introduce the progress of GVP, and to have discussions to further identify, discuss and address challenges that GVP will likely face and overcome as the project launches.

**Expected output/outcome**

Through two half-day meetings, we anticipate the following outcomes.

- Strengthened collaborations between Steering Committee members and Working Group members and an improved operational infrastructure for launch of GVP activities.
- Enhanced interest from countries who are willing to participate in this global initiative, and communication between country officials and GVP members.
- Defined short-term, mid-term and long term goals for GVP to track its development since the last international planning meeting in Beijing in February 2017 and onward.
- An internal report of the proceedings of the closed session meeting for information sharing within the GVP and core PMAC group.
- A report outlining proceedings of the open launch session. This piece has been drafted, and will be published and publicly available in form of a manuscript.
- New media content (photographs, discussions and other news) to be shared with the public through PMAC and GVP outreach activities.

**Target and estimated number of participants**

- Half-day session 1
  Approximately 40 participants are expected to attend this side meeting. This session will be closed to invited members only. The targeted audience will be members of the Steering Committee and Working Groups of the Global Virome Project who have been instrumental in launching the project, as well as honored PMAC organizers.

- Half-day session 2
  Approximately 100 participants are expected to attend this side meeting. This meeting will be open to PMAC participants. The targeted audience will be relevant authorities in the international organizations, governments, academia and non-governmental organizations.

**Room set up**



UCDUSR0003118

- Half-day session 1: Roundtable style
- Half-day session 2: Theater style

**Meeting agenda**

- Closed session: Half-day session 1, Monday 29 January 2018, 9.00-12.30

| Time | Agenda | Details |
|---|---|---|
| 8.30-9.00 | Registration | |
| **Part 1** | **Opening and Introduction** | |
| 9.00 – 9.15 | Welcome and Opening | |
| 9.15 – 9.30 | Meeting overview – introduction of participants and objectives | |
| **Part 2** | **Updates from teams** | |
| 9.30 – 9.50 | Progress on structure and implementation | Core committee |
| 9.50 – 10.20 | Governance updates | Ethical, Legal and Social Implications Working Group (WG)<br>Governance, Advisory, Partnerships WG |
| 10.10 - 10.40 | Science and Technology updates | Lab Platform WG<br>Modeling and Risk Analytics WG<br>Metadata Platform WG<br>Behavioral Risk WG |
| 10.40 – 11.00 | Coffee break | |
| 11.00 – 11.30 | Implementation updates | General Management & Partner Engagement WG<br>Data Management WG<br>Field Operations and Surveillance WG<br>Lab & Biosafety Implementation WG |
| 11.00 - 12.00 | Discussion | |
| **Part 3** | **Summary and closing** | |
| 12.10 – 12.30 | Summary remarks | |



UCDUSR0003119

- Invited launch: Half-day session 2, Monday 29 January 2018, 14.00-17.30

| Time | Agenda |
|---|---|
| 13.30-14.00 | Registration |
| **Part 1** | **Opening and Introduction** |
| 14.00 – 14.15 | Welcome and Opening |
| 14.15 – 14.30 | Meeting overview – introduction of participants and objectives |
| 14.30 – 15.00 | Background and rationale |
| 15.00 – 15.20 | Call to Action |
| 15.20 - 15.40 | Coffee break |
| **Part 2** | **GVP countries and partners** |
| 15.40 – 16.00 | Country plans and commitments (country #1) |
| 16.00 – 16.20 | Country plans and commitments (country #2) |
| 16.20 – 17.00 | Collaborator plans and commitments |
| **Part 3** | **Summary and closing** |
| 17.00 – 17.30 | Summary remarks |

## References


1. Jones KE, Patel NG, Levy MA, Storeygard A, Balk D, Gittleman JL, et al. Global trends in emerging infectious diseases. Nature. 2008;451:990-3.
2. Prediction and prevention of the next pandemic zoonosis. (2012).
3. Leroy EM, Kumulungui B, Pourrut X, Rouquet P, Hassanin A, Yaba P, et al. Fruit bats as reservoirs of Ebola virus. Nature. 2005;438:575-6.
4. Carroll DD, Peter; Wolfe, Nathan D.; Gao, George F.; Morel, Carlos; Morzaria, Subhash; Tomori, Oyewale; Macet, Jonna A.K. The Global Virome Project. Science (in review). 2017.
5. Olival KJ, Hosseini PR, Zambrana-Torrelio C, Ross N, Bogich TL, Daszak P. Host and viral traits predict zoonotic spillover from mammals. Nature. 2017.
6. Ge XY, Li JL, Yang XL, Chmura AA, Zhu G, Epstein JH, et al. Isolation and characterization of a bat SARS-like coronavirus that uses the ACE2 receptor. Nature. 2013;503(7477):535-8.
7. Brende B, Farrar J, Gashumba D, Moedas C, Mundel T, Shiozaki Y, et al. CEPI—a new global R&D organisation for epidemic preparedness and response. The Lancet. 2017;389:233-5.




UCDUSR0003120

**From:** Peter Daszak <daszak@ecohealthalliance.org>
**To:** [redacted]
**Cc:** "Jonna Mazet (jkmazet@ucdavis.edu)" <jkmazet@ucdavis.edu>, Brooke Watson <watson@ecohealthalliance.org>
**Subject:** WHO Bulletin paper
**Sent:** Tue, 19 Dec 2017 05:24:03 +0000

GVP PMAC WHO Bulletin second revision.docx
PMAC response to reviewers.docx

Here's the paper, and the response to reviewer's comments.

Jonna – have a look if you have time. Brooke did a great job with the response, and I've tightened them up a bit.

We've both edited the paper to cut out a lot of the repetition, hyperbole and waffle, and to make it substantially different from the Science paper.

It's now down to 1370 words or so – well below the 1500 word limit, so that's good as well.

[redacted] once Jonna's given it a final look/edit, please upload and submit to WHO Bulletin.

Cheers,

Peter

**Peter Daszak**
*President*

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www.ecohealthalliance.org

*EcoHealth Alliance leads cutting-edge research into the critical connections between human and wildlife health and delicate ecosystems. With this science we develop solutions that prevent pandemics and promote conservation.*

**Launching the Global Virome Project:**

**The Beginning of the End of the Pandemic Era**

Summary: At the Prince Mahidol Awards Conference on January 30, 2018, representatives from across the globe –policy and decision makers, thought leaders, subject matter experts, researchers, donors, and representatives from the private sector – came together to launch the Global Virome Project (GVP), an innovative 10 year partnership to develop a global atlas of the majority of the planet's naturally-occurring potentially zoonotic viruses. The GVP aims to transform the study of emerging diseases into a data-rich field – driving the advanced development of prevention efforts and countermeasures against future threats. This international alliance will connect the next generation of local scientists, build capacity at hotspots of viral emergence, and promote equitable access to data and strategies to prevent pandemics.



UCDUSR0003122

Despite the human and economic impacts of viral epidemics, the world remains unprepared for the next emerging virus. Global trends indicate that new microbial threats will continue to emerge at an accelerating rate, driven by the our growing population, our expanded travel and trade networks, and our encroachment into wildlife habitat (1). The majority of emerging viruses are zoonotic, or diseases that are transferred between vertebrates and humans (2). Nearly all zoonoses originate in mammalian or avian hosts (3-5) – HIV-1 spilled over from chimpanzees to people, for example, and Ebola virus from bats (6). Estimates put the total number of these mammalian and waterfowl viruses at more than 1.5 million, spanning 24 viral families (4). Compared to the 260+ viruses known in humans (7), this viral "dark matter" represents 99.9% of potential zoonoses, and they remain undetected usually until they cause disease in people.

Discovering and characterizing viruses in wildlife reservoirs is economically and technologically challenging. However, recent initiatives including the USAID Emerging Pandemic Threats/PREDICT program have shown that systematic viral discovery in countries with limited laboratory infrastructure is feasible (8, 9). Previous studies have identified mammalian species (10), geographic regions (11), and zoonotic viral transmission pathways (12, 13) with increased risk of zoonotic disease emergence. These enable targeting of viral discovery in wildlife to expand our database of likely zoonotic agents with a high potential for spillover to people. The USAID EPT/PREDICT project has already discovered over 1,000 viruses, including novel SARS-like coronaviruses that are able to infect human cells (14). The Global Virome Project (GVP) seeks to significantly expand the scale of targeted viral discovery, to build a comprehensive global atlas



UCDUSR0003123

of the majority of potentially zoonotic viruses in wildlife by systematically collecting and characterizing viruses and their associated metadata in mammalian and waterfowl reservoirs, over a decade-long sampling-and-testing period. It goals are to identify over 70% of uknown viral diversity, catalog the ecological conditions at sampling sites, and collect metadata that can be used to analyze risk of spillover. These data will be housed on open-access databases available to the global science community. They will be used to develop, train and test machine learning models for spillover risk, and will be developed via a global ethical framework for benefit sharing, including authorship and intellectual property.

The GVP was conceptualized by an international consortium of leading disease ecologists, public health practitioners, veterinarians, biologists, ecologists, lab scientists, and others [4]. It will operate as a federation of national and regional projects, led by in-country researchers, connected to a global hub that provides standardized protocols and monitors and evaluates progress towards discovery of the majority of currently-unknown viruses. The GVP will maximize benefits to public health by selecting sampling sites and species that harbor the greatest number of "unknown" zoonoses [7]. Protocols for implementation of the GVP including training, sampling, specimen handling, laboratory testing, reporting and data management developed from the USAID EPT/PREDICT project, which has been operating for eight years in over 35 countries [8, 9].

**Building capacity at the forefront of disease emergence**



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Novel viruses usually emerge in regions where dense human populations and biodiversity intersect (11). However, these areas often have limited laboratory, surveillance, and health system infrastructure, which promotes spread of the pathogens that do emerge, and their potential to become pandemic (15). Thus, the most effective sites for pandemic prevention are the source of viral spillover events, prior to their regional spread (16). The GVP seeks to make data on novel potential zoonotic viruses available to public health agencies facing undiagnosed illness in both humans and animals. It has potential to benefit both public and livestock health through broad measures such as: 1) using PCR assays to an expanded diversity of potentially zoonotic viruses to decrease the time lag between outbreak detection and pathogen identification; 2) strengthening global epidemic preparedness through investment and training in epidemiological surveillance, field biology, laboratory techniques, and biosafety; 3) identifying high-risk pathogens in populations of wildlife that have high contact with people (e.g. hunted species, peridomestic species); 4) establishing sample biobanks for further research, making data and samples available for public health risk assessments and mitigation and more detailed pathogen studies; 5) identifying intervention strategies to human behaviors that have a high risk of providing a transmission pathway for novel viral spillover.

**Enhancing our understanding of pandemic threats**

The GVP will catalyze novel approaches to identifying which viruses represent the greatest threat to public or livestock health. It will use machine learning methods across the largest viral dataset ever assembled, much as machine learning techniques are used in genomics to identify gene



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function, expression, and biomarkers for disease (17). It will use a risk assessment framework that includes data on viral phylogeny, host traits, the ecological conditions where the virus exists, and a series of viral characteristics known to be associated with spillover, to triage viruses for further characterization (4). The scale of the GVP viral testing will enable piloting and enhancement of novel testing platforms technologies such as viral capture and sequencing (18)

Like the Human Genome Project, the GVP is ambitious but feasible, enabled by technological developments that allow for rapid and affordable genetic and viral sequencing. It is time-bound and limited in scope, with tangible progress metrics. Just as the Human Genome Project was focused on the genome with the greatest relevance to people, the Global Virome Project aims to test the minimum viable number of mammalian and waterfowl samples that have the greatest potential of harboring potentially-zoonotic viruses. The exclusion of invertebrates, plants, fish, and other hosts from GVP's core focus reflects a deliberate intent to address zoonotic disease. The ultimate success of the Human Genome Project is in the medical advances made since the project's conclusion. It is likely that the legacy of the GVP will live on in the countermeasures, diagnostics, vaccines, policies and systems that it enables. Thus, the GVP will achieve for pandemics and large-scale epidemics what the Human Genome



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Project is just beginning to do for personalized medicine (19).

**Supporting development of novel countermeasures**

The development of countermeasures to viral threats requires significant time and investment, and it is unlikely that this would occur during the initial GVP project period. The recently launched Coalition for Epidemic Preparedness Innovations (CEPI) represents a critical step to address known viral threats, such as MERS-CoV, Lassa Fever, and Nipah Virus for which vaccine or countermeasure development is challenging (20). The GVP will complement CEPI by characterizing the size, structure, and composition of the pool of unknown viruses related to the viral targets CEPI is focused on. For example, if a candidate MERS-CoV vaccine can be tested against hundreds of near relatives of MERS-CoV, those that have broader prevention capacity can be rolled out and provide better protection against future emergence. This approach could enhance biotechnological efforts to move from single-virus therapeutics and vaccines to ones that target a whole family of viruses (21).

**Investing in viral discovery and detection**

In one single outbreak, in one year, the SARS virus wiped between $10 billion and $50 billion of value from Asian stock markets due to disrupted trade and commerce (22, 23). Pandemics are estimated to cause an average of $570 billion in economic damages per year to our the global economy (24), and these costs will rise as our economies expand and become more



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interconnected. The GVP will cost $1.2 billion, which is less than 0.2% of this figure (4), and less than spending on the 2014-2015 Ebola response alone. Much like the Global Fund, GAVI, and other international public health initiatives, the Global Virome Project will rely on a broad mix of funding streams from governments, development agencies, research agencies, and private foundations or industries. In light of the increasingly inevitability of pandemics, and their substantial economic impacts, The generation of scientists and field workers trained through GVP will have the capacity to surveil viral evolution throughout the coming years, and the GVP open database will catalyze technological advances in risk assessment, diagnostics and countermeasures. In short, GVP is designed to herald in the beginning of the end of the Pandemic Era.



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*Note: The views expressed in this document do not necessarily reflect the views of the United States Agency for International Development.*



UCDUSR0003130

**Response to Reviewers' Comments**

**1. Please do not imply that this project will prevent epidemics, as such an outcome is unlikely to happen. There is still no cure or vaccine for many viruses that infect humans, despite complete descriptions of their genomes and proteomes. For those with vaccines in development, such as Ebola and Dengue, efficacy is hard to evaluate due to the number of people infected or subtypes of the viruses. At this stage it is unlikely that the sampling of mammalian viruses that may, in future, spill over to humans can prevent epidemic spread.**

Thank you for this comment. We do not wish to imply that therapeutics will be developed during the GVP timeline, nor that having such a viral database will in itself spur investment in vaccines and other antivirals for emerging and neglected viruses. It is certainly the case that vaccines can't undergo Phase 3 trials for viruses that have not even yet emerged in humans, and we have removed any language that implied the GVP involves making and approving vaccines for undiscovered viruses. While the GVP will likely provide data of value to vaccine initiatives like the Coalition for Epidemic Preparedness Innovations (CEPI), the near-term value of such a viral database will lie primarily in its usefulness in the hands of frontline practitioners and governments in targeting prevention and response initiatives. We have expanded this use case in the text, and hope that it clarifies the more near-term value of such a dataset.

**Also, the project does not address arboviruses that can cause epidemics, such as the Zika virus and Chikungunya.**

Actually, the viral testing protocols proposed for the GVP would identify novel viruses from viral families to which Zika and Chikungunya belong. We have updated the text to explain this and have included the WHO's definition of zoonotic – "diseases and infections naturally transmitted between people and vertebrate animals."(1).

**2. Please revise the text to describe only the aim of the virome project and to explain how it will be done. Please avoid the use of language that plays on fear. For example, in the introductory paragraph with the sentences "Global trends indicate that over the course of this century…", most of the information can be kept. However, the numbers originating from reference 4 can only be included if that article has since been accepted for publication. The first three sentences of the following paragraph need to be deleted.**

We have removed the three sentences at the reviewer's request. We have also moderated the language, removing all instances of the word "fear," many superfluous uses of the word "threat", etc. Reference 4 has now been accepted for publication in *Science*.

**3. Please explain the project in detail so readers can understand its feasibility and scope of operations, including:**
**- why is this project needed?**
**- what will the results offer? (some valuable points are included in the list of what could be achieved in 10 years, eg. increasing knowledge, determining geographical spread and movement, improving assessment of the risk of spillover, creating biobanks and establishing a global ethical framework).**

We have added a discussion on the need for increased surveillance, and for an understanding of baseline data on pathogen diversity. We have also added an overview of the results and the mechanisms the GVP will use to ensure that the results support the countries and regions most at risk. Given the word limit of this piece (1500), we feel that these additions are sufficient to introduce the capacity-building elements Global Virome Project, and add a unique public health perspective that is not captured in reference 4.

**4. Please discuss logistics and how the samples will be collected and analysed (viral isolation, sequencing etc). Where will samples be collected and by whom? Where will they they be processed? Please include the level of biosafety to which the entire sampling, collection, transport, processing and archiving chain of this project will adhere.**

We have added references to detailed protocols for sampling, specimen handling, shipping, laboratory testing, reporting and data management. The GVP has, with permission, adapted these from protocols created by the USAID PREDICT project under the Emerging Pandemic Threats program. Given the word limit of a perspective piece and the detail of these protocols, we have included these as references.

**5. Please clarify whether you aim to target a certain area or certain types of mammals first.**

We have clarified in the text that the GVP targets both high-risk geographic regions *and* high risk mammals in the first wave of sampling. We have included references that define "high risk" for both of these categories. The methods for site selection are the subject of a separate full manuscript that we are preparing for publication elsewhere. However, we have added a line in the text that cites methods published in Nature for estimating "missing zoonoses" (Olival et al. 2017).

**6. If there are 1.5 million viruses, it is hard to countenance the claim that most can be detected and identified, because of difficulties in sampling and virus isolation.**
**How do you plan to influence aspects that depend on countries' resources, such as surveillance?**

We have updated the text to demonstrate that the GVP will be funded by both government funding in-country and donated funding from out of country.

**7. Please clarify the stated intent to identify markers for transmission and pathogenicity of high-risk viruses. Which markers? When you refer to high-risk viruses are these the viruses that have the greatest potential for a spill over or the most virulent? How will you study pathogenicity?**

Thank you for this comment – we agree that this sentence was vague in the original text, and could seem to refer only to virological "markers". We have now rephrased the text to clarify the metadata and sequence data that we plan to collect, and describe in brief how statistical learning models will be used to identifying which variables provide signals that indicate a virus's increased odds of emergence. We have also refined the text to state that these algorithms will at first be most concerned with characterizing risk of viral emergence. The data could later be useful to identify risk factors for high pathogenicity in a virus, but that data will require more extensive laboratory experiments and testing. We hope this clarifies any points of confusion in the text.

**8. Please acknowledge the limitation that the data generated from this project are unlikely to result in the creation of a vaccine against a whole virus family. The scientific community has not managed to do this for the flaviviruses, where a wealth of data exists.**

We have reworded the text to clarify that this prospect is not guaranteed, and that the data would only support ongoing efforts to create a broad-spectrum therapeutic.

**From:** "Katherine Leasure" <kaleasure@ucdavis.edu>
**To:** "Andrew Clements" <aclements@usaid.gov>
**Cc:** "PREDICTMGT" <predictmgt@usaid.gov>, "Predict inbox" <predict@ucdavis.edu>, <jkmazet@ucdavis.edu>
**Subject:** RE: Change to Approved Group ITA - GVP Bangkok
**Sent:** Fri, 5 Jan 2018 08:25:51 -0800
Attachment

Hi Andrew,

My apologies for the confusion. You are correct; we are amending a previously approved ITA; RDMA concurred to the original ITA on December 20 (attached).

To confirm, the individuals listed below are approved for travel as outlined in the amended ITA, and can proceed with booking reservations?

Thank you,
Katie

---

**From:** Andrew Clements [mailto:aclements@usaid.gov]
**Sent:** Friday, January 05, 2018 8:06 AM
**To:** Katherine Leasure
**Cc:** PREDICTMGT; Predict inbox; jkmazet@ucdavis.edu
**Subject:** Re: Change to Approved Group ITA - GVP Bangkok

Yes. Sorry, I thought you were amending a previously-approved ITA.

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email:* aclements@usaid.gov
On Jan 5, 2018, at 4:43 PM, Katherine Leasure <kaleasure@ucdavis.edu> wrote:

> Hi Andrew. Are these individuals okay to proceed with booking their accommodations, or do we need to wait for re-concurrence from RDMA?
>
> ---
>
> **From:** Andrew Clements [mailto:aclements@usaid.gov]
> **Sent:** Friday, January 05, 2018 3:06 AM
> **To:** Katherine Leasure
> **Cc:** PREDICTMGT; Predict inbox; jkmazet@ucdavis.edu
> **Subject:** Re: Change to Approved Group ITA - GVP Bangkok
>
> Thanks
>
> *Andrew P. Clements, Ph.D.*
> *Senior Scientific Advisor*
> *Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
> *U.S. Agency for International Development*
> *Mobile phone: 1-571-345-4253*
> *Email:* aclements@usaid.gov
> On Jan 5, 2018, at 12:18 AM, Katherine Leasure <kaleasure@ucdavis.edu> wrote:
>
> > *Hi Andrew. Please find below an amendment to the GVP Bangkok ITA for those participants who will also be attending the Prince Mahidol Award Conference (per verbal discussion with Dennis Carroll). Thanks!*
> >
> > **AMENDMENT**
> > The Global Virome Project requests approval for the individuals listed below to travel from their respective departure locations to Bangkok, Thailand from January 28 to February 4, 2018 to participate

in the Global Virome Project meeting on January 29, and the Prince Mahidol Award Conference (PMAC 2018) January 29 to February 3.

**Trip purpose**: The GVP meeting will bring together the core croup, working group chairs and global stakeholders for presentations and meetings regarding various critical topics to move the project forward, including best practices for implementation, country coordination and governance. This will enable GVP to coordinate global planning and project implementation for the coming years, and will provide the unique opportunity to bring all stakeholders and key personnel from around the world to one location. This meeting is key to implementing the project successfully. The Prince Mahidol Award Conference 2018, "Making the World Safe from the Threats of Emerging Infectious Diseases," will provide a sharing and learning forum for multi-sectoral experts in zoonosis, AMR, climate change and related environmental fields, as well as the opportunity to engage in side meetings with partners and collaborators.

| NAME |
| --- |
| Jonna Mazet |
| REDACTED |
| Tracey Goldstein |
| David Wolking |
| Simon Anthony |
| Eddy Rubin |
| Brooke Watson |
| Peter Daszak |
| Billy Karesh |
| Jon Epstein |
| Leilani Francisco |
| Kevin Olival |
| Chris Johnson |
| Carlos Zambrana-Torrelio |
| Hongying Li |
| Yasha Feferholtz |
| Catherine Machalaba |
| Tom Hughes |
| Ariful Islam |
| Rudovick Kazwala |

| |
|---|
| Gian Luca Burci |
| Renata Curi |
| Keiji Fukuda |
| Oyewale Tomori |


Katherine Leasure
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University of California, Davis
530-752-7526
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To post to this group, send email to predictmgt@usaid.gov.
To view this discussion on the web visit https://groups.google.com/a/usaid.gov/d/msgid/predictmgt/03ba01d385b2%2457edc6f0%2407c954d0%24%40ucdavis.edu.

**From:** Peter Daszak <daszak@ecohealthalliance.org>
**To:** 'Carlos Morel' <cmmorel@gmail.com>
**Cc:** Nathan Wolfe <nwolfe@metabiota.com>, Dennis Carroll <dcarroll@usaid.gov>, "Subhash (FAORAP) Morzaria [redacted]", Oyewale Tomori <[redacted]>, "Jonna Mazet" [redacted], Ariel Pablos-Mendez [redacted], "George F Gao (gaof@im.ac.cn)" <gaof@im.ac.cn>, Brooke Watson <watson@ecohealthalliance.org>
**Subject:** RE: Authorship Form for your Science Manuscript aap7463
**Sent:** Mon, 5 Feb 2018 19:19:42 +0000

Cc'ing Brooke Watson on this email chain. She'll be available to help coordinate if you aren't sure about these forms.

Cheers,

Peter

**Peter Daszak**
*President*

EcoHealth Alliance
460 West 34th Street – 17th Floor
New York, NY 10001

Tel. +1 212-380-4473
www.ecohealthalliance.org

*EcoHealth Alliance leads cutting-edge research into the critical connections between human and wildlife health and delicate ecosystems. With this science we develop solutions that prevent pandemics and promote conservation.*

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**From:** Anita Wynn [mailto:awynn@aaas.org]
**Sent:** Thursday, February 1, 2018 10:17 AM
**To:** 'Carlos Morel'
**Cc:** Nathan Wolfe; Dennis Carroll; Subhash (FAORAP) Morzaria [redacted]; Oyewale Tomori; Jonna Mazet; Ariel Pablos-Mendez; Peter Daszak; George F Gao (gaof@im.ac.cn); brad Wible
**Subject:** RE: Authorship Form for your Science Manuscript aap7463

Dear Dr. Morel,

The correct email for Dr. Gao has been added. All authors please be advised that we are moving to the production phase of this paper but need all author forms completed in order to proceed. If you are experiencing any problems with the site, I have attached pdfs of the forms that you can complete and return to me when ready.

Thank you,

Anita Wynn
Editorial Coordinator/INSIGHTS
Science Magazine
Washington, DC USA

**From:** Carlos Morel [mailto:[redacted]
**Sent:** Wednesday, January 31, 2018 4:50 PM
**To:** Anita Wynn <awynn@aaas.org>

**Cc:** Nathan Wolfe <nwolfe@metabiota.com>; Dennis Carroll <dcarroll@usaid.gov>; Subhash (FAORAP) Morzaria [redacted]; Oyewale Tomori [redacted]; Jonna Mazet [redacted]; Ariel Pablos-Mendez [redacted]; Peter Daszak <daszak@ecohealthalliance.org>; faof@im.ac.cn; George F Gao (gaof@im.ac.cn) <gaof@im.ac.cn>
**Subject:** Re: Authorship Form for your Science Manuscript

Please note that the email of Prof. George Fu Gao is wrong, my reply copied to all came back informing this. His correct email is: gaof@im.ac.cn

Sincerely,

Carlos Morel

2018-01-31 17:38 GMT+02:00 Anita Wynn <science_editors@aaas.org>:

Dear Author of Manuscript aap7463:

Please fill out the Authorship, Conflict of Interest and License to Publish forms for Manuscript Number aap7463 The Global Virome Project.. Navigate to the forms as detailed below and hit the save and submit? button at the end of the form, the completed forms will then be accessible to your editor. DO NOT click submit on the Submit Revision tab unless you are submitting the completed revision.

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EACH AUTHOR MUST COMPLETE RELEVANT FORMS BEFORE THE MANUSCRIPT CAN BE ACCEPTED. Below is a list of the email account we have associated with each author on this manuscript, and is the one that must be used as the username to register/login. If this email address is incorrect, please contact us at submit_help@aaas.org.

Nathan Wolfe - nwolfe@metabiota.com
Dennis Carroll - dcarroll@usaid.gov
Subhash Morzaria - Subhash.Morzaria@fao.org
Oyewale Tomori - [redacted]
Jonna A. K. Mazet - [redacted]
Carlos Morel - [redacted]
Ariel Pablos-Mendéz - [redacted]
Peter Daszak - daszak@ecohealthalliance.org
George Gao - faof@im.ac.cn

Thank you for your attention.

Sincerely,

The Editors
Science

--

--

Carlos M. Morel MD DSc

Director

National Institute of Science and Technology for Innovation in Neglected Diseases (INCT-IDN)

Centre for Technological Development in Health (CDTS)

Oswaldo Cruz Foundation (Fiocruz)



**From:** Amalhin Shek <ashek@usaid.gov>
**Sent:** Fri, 9 Feb 2018 15:12:17 -0500
**Subject:** Re: Question regarding obligation of non-Ebola funding for PREDICT
**To:** Andrew Clements <aclements@usaid.gov>
**Cc:** Elizabeth Leasure <ealeasure@ucdavis.edu>, Jonna Mazet <jkmazet@ucdavis.edu>, David John Wolking <djwolking@ucdavis.edu>, Predict inbox <predict@ucdavis.edu>

Hi everyone,

You are correct. My budget table says $13.9175 for obligating and I mistakenly swapped numbers in my e-mail to the program folks for the $13.197. Apologies for our not catching this while it moved through the approvals processes. I'll put in a request for an incremental funding of $520,000 to put us at the full $16.5M for the year.

Thanks in advance for your understanding,

Amalhin Shek | Budget & Communications
Emerging Threats Division, Office of Infectious Disease
USAID/Washington, Bureau for Global Health
Phone: 202-216-3541(o) | REDACTED | 888-3.6.056
Subscribe to our Newsletter!

USAID-MECFAA, VP of Community Engagement

On Fri, Feb 9, 2018 at 2:27 PM, Andrew Clements <aclements@usaid.gov> wrote:

Over to Amalhin....

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

On Feb 9, 2018, at 8:14 PM, Elizabeth Leasure <ealeasure@ucdavis.edu> wrote:

Hi Andrew. In reviewing the most recent mods received to obligate the non-Ebola Year 4 funding, I discovered that we have received $15.98M to date ($2.5825M mod 9 plus $13.3975M mod 11), not the $16.5M that was included in the approved Year 4 budget ($15.1M core PREDICT, $1.4M GVP) per your guidance back in September. Is this perhaps a mathematical error or is there another modification forthcoming to obligate the remaining $520K to fully-fund us for our Year 4 activities as described in our approved work plan? Please advise.

Thank you!

Liz

*Elizabeth Leasure*

*Financial Operations Manager*

*One Health Institute*

REDACTED *(cell)*

530-754-9054 *(office)*

Skype: oilossvr

**Sent:** Fri, 16 Mar 2018 11:22:15 -0700
**Subject:** Re: [whc-seniorstaff] Senior staff meeting
**From:** Jonna Mazet <jkmazet@ucdavis.edu>
**To:** "whc-seniorstaff@ucdavis.edu" <whc-seniorstaff@ucdavis.edu>
Science GVP 2018.pdf
Science GVP Supplementary 2018-Carroll-SM.pdf

Science paper on Global Virome Project.
Have a nice weekend,
Jonna

On Fri, Mar 16, 2018 at 10:30 AM, Matthew Blake <mblake@ucdavis.edu> wrote:

Hi Team,

Normal agenda attached for today's senior staff meeting. For our zoomers:

Topic: Senior Staff

Time: Mar 16, 2018 11:00 AM Pacific Time (US and Canada)

Every month on the Third Fri, 14 occurrence(s)

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POLICY FORUM

Scientists prepare to collect a blood sample from a Rousettus sp. fruit bat in Thailand to test for novel viruses. The Global Virome Project aims to identify and characterize the majority of currently unknown viruses in key wildlife groups, including rodents, nonhuman primates, and bats.

INFECTIOUS DISEASES

# The Global Virome Project

## Expanded viral discovery can improve mitigation

By **Dennis Carroll, Peter Daszak, Nathan D. Wolfe, George F. Gao, Carlos M. Morel, Subhash Morzaria, Ariel Pablos-Méndez, Oyewale Tomori, Jonna A. K. Mazet**

Outbreaks of novel and deadly viruses highlight global vulnerability to emerging diseases, with many having massive health and economic impacts. Our adaptive toolkit—based largely on vaccines and therapeutics—is often ineffective because countermeasure development can be outpaced by the speed of novel viral emergence and spread. Following each outbreak, the public health community bemoans a lack of prescience, but after decades of reacting to each event with little focus on mitigation, we remain only marginally better protected against the next epidemic. Our ability to mitigate disease emergence is undermined by our poor understanding of the diversity and ecology of viral threats, and of the drivers of their emergence. We describe a Global Virome Project (GVP) aimed to launch in 2018 that will help identify the bulk of this viral threat and provide timely data for public health interventions against future pandemics.

Nearly all recent pandemics have a viral etiology with animal origins, and with their intrinsic capacity for interspecies transmission, viral zoonoses are prime candidates for causing the next great pandemic (*1*, *2*). However, if these viruses are our enemy, we do not yet know our enemy very well. Around 263 viruses from 25 viral families are known to infect humans (*3*) (see the figure), and given the rate of discovery following identification of the first human virus (yellow fever virus in 1901), it is likely many more will emerge in the future (*4*). We estimate, from analysis of recent viral discovery data (*5*), that ~1.67 million yet-to-be-discovered viral species from key zoonotic viral families exist in mammal and bird hosts—the most important reservoirs for viral zoonoses (supplementary text).

By analyzing all known viral-host relationships (*3*, *6*), the history of viral zoonoses (*7*), and patterns of viral emergence (*2*), we can reasonably expect that between 631,000 and 827,000 of these unknown viruses have zoonotic potential (supplementary text). We have no readily available technological countermeasures to these as-yet-undiscovered viruses. Furthermore, the rate of zoonotic viral spillover into people is accelerating, mirroring the expansion of our global footprint and travel networks (*1*, *8*), leading to a nonlinear rise in pandemic risk and an exponential growth in their economic impacts (*8*).

### PROMISING PILOT, CHALLENGING SCALE

Since 2009, the U.S. Agency for International Development (USAID) has conducted a large-scale pilot project, spanning more than 35 countries over 6 years at a cost of around $170 million, to evaluate the feasibility of preemptively mitigating pandemic threats. Other previous studies had begun to conduct targeted viral discovery in wildlife (*9*), and develop mitigation strategies for the emergence of avian flu, for example. However, the USAID Emerging Pandemic Threats (EPT) PREDICT project is the first global-scale coordinated program designed to conduct viral discovery in wildlife reservoir hosts, and characterize ecological and socioeconomic factors that drive their risk of spillover, to mitigate their emergence in people (*10*).

Working with local partners and governments, wildlife and domestic animals and at-risk human populations in geographic hotspots of disease emergence (*2*) are sampled, and viral discovery conducted. A strategy to identify which novel viruses are most at risk of spillover has been developed (*11*), and further work is conducted on these to characterize them prior to, or in the early stages of, spillover. Metadata on the ecology of wildlife–livestock–human transmission interfaces, and on human behavioral patterns in communities, are concurrently analyzed so that strategies to reduce spillover can be developed (supplementary text). To date, EPT PREDICT has discovered more than 1000 viruses from viral families that contain zoonoses, including viruses involved in recent outbreaks (*12*), and others of ongoing public health concern (*13*). The focus of EPT PREDICT on capacity building, infrastructure support, training, and epidemiological analysis differs substantially from the GVP's emphasis on large-scale sampling and viral discovery. However, to discover the bulk of the projected remaining 1.67 million unknown viruses in animal reservoirs and characterize the majority of 631,000 to 827,000 viruses of highest zoonotic potential requires overcoming some challenges of scale.

The first challenge is cost. To estimate this, we analyzed data on field sampling and laboratory expenditures for viral discovery from (*5*, *10*), and estimates of unknown viral diversity in mammalian and avian hosts (supplementary text). We estimate that discovery of all viral threats and characterization of their risk for spillover, using currently available technologies and protocols, would be extremely costly at over $7 billion (supplementary text). However, previous work shows that viral discovery rates are vastly higher in the early stages of a sampling program, and that discovering the last few, rare, viruses is extremely costly and time-consuming owing to the number of samples required to find

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them (3) (supplementary text). We used data on rates of viral discovery (3) to estimate that the substantial majority of the viral diversity from our target zoonotic reservoirs could be discovered, characterized, and assessed for viral ecology within a 10-year time frame for ~$1.2 billion (16% of total costs for 75% of the virome, considering some fixed costs) (fig. S1). Those viruses remaining undiscovered will, by the nature of sampling bias toward more common host species, represent the rarest viruses with least opportunity for spillover, and therefore reduced public health risk. Their discovery would require exponentially greater sampling effort and funding that could be better spent on countermeasures for the more likely threats (supplementary text).

Stakeholders from Asia, Africa, the Americas, and Europe, spanning industry, academia, intergovernmental agencies, nongovernmental organizations (NGOs), and the private sector, began meeting in 2016 to design a framework for the governance, management, technical operation, and scope of the GVP. Key efforts include developing finance streams; establishing a transparent, equitable implementation strategy; designing data- and sample-sharing protocols; developing laboratory and metadata platforms; targeting of host taxa and sampling sites; analyzing return on investment; forming collaborative field and laboratory networks; developing risk characterization frameworks for viruses discovered; designing a strategy to assess and mitigate risk behaviors that facilitate viral emergence; and planning in-country capacity building for sustainable threat mitigation. Funding has been identified to support an initial administrative hub, and fieldwork is planned to begin in the first two countries, China and Thailand, during 2018.

With outputs intended to serve the global public good, the GVP is developing a transparent and equitable strategy to share data, viral samples, and their likely products, including benefits derived from future development of medical countermeasures. These build on the Nagoya Protocol to the Convention on Biological Diversity and the Pandemic Influenza Preparedness Framework, negotiated by the World Health Organization (WHO). The international collaborative nature and global ownership of the project should help leverage funding from diverse international donors, including government agencies focused on national virome projects or on international development projects in other countries, and private-sector philanthropic donors focused on technology and big science.

The diversity of tasks required to conduct the GVP should reduce the potential for it to divert funds from current public health programs. For example, discrete work streams on targeted sampling of wildlife, on bioinformatics, and on behavioral risk analysis fall within the focus of current scientific research programs in a range of donor agencies. Governments and corporations with specific results and geographic responsibilities have been approached to finance subprojects relevant to their sectors (e.g., capacity development, surveillance of specific taxa, geographically focused activities, medical countermeasure development, training, surveillance, and technological platforms). In addition, leaders in China and a number of countries have begun developing national virome projects as part of the GVP, leveraging current research funding to include GVP sites.

Technological challenges include safe field sampling in remote locations and cost-effective laboratory platforms that can be standardized in low-income settings. To achieve these goals, existing national, regional, and international networks will need to be enhanced and expanded within standardized sampling and testing frameworks. Existing networks of field biologists from environment ministries, academic institutions, and conservation and health NGOs may assist in surveillance. National science and technology agencies, regional One Health platforms, transboundary disease surveillance networks, Institut Pasteur laboratories, WHO, United Nations Food and Agricultural Organization, and the World Organization for Animal Health collaborating and reference centers and viral discovery laboratories, including USAID EPT PREDICT, are currently involved in planning these activities around a decade-long sampling and testing time frame. A monitoring and evaluation strategy is being developed based on analysis of viral discovery rates against predicted viral diversity, to identify when to halt surveillance and testing as the GVP progresses. Stakeholders will also tackle the challenge of how to decide when enough potentially dangerous viruses have been discovered in a host species or region to call for action to reduce underlying drivers of emergence (e.g., hunting and trading of a wildlife reservoir).

> ***"...the GVP goals...improve capacity to detect, diagnose, and discover viruses in vulnerable populations..."***

Laboratory platforms developed by USAID EPT PREDICT have proven capacity to identify novel viruses and are relatively inexpensive and reliable, being based on polymerase chain reaction using degenerate primers that target a range of viral families of known zoonotic potential. However, scaling up to a full global virome project will require discovery of three orders of magnitude more viruses in a similar time frame. Technological solutions will be needed to increase the speed and efficiency, and reduce the cost, of sequence generation. These will likely include next-generation sequencing and other unbiased approaches to identify evolutionarily distinct viral clades.

A key challenge is how to assess the potential for novel viruses to infect people or become pandemic (*14*). The EPT PREDICT project (*11*) and others (*2*, *6*) have developed preliminary zoonotic risk characterization frameworks based on viral and host traits and the ecological and demographic characteristics of the sampling site. These approaches will be used in the GVP to triage novel viruses for further characterization to assess their zoonotic capacity (supplementary text). In vitro receptor binding analyses coupled with in vivo models have proven useful in this capacity for some viral families [e.g., coronaviruses (*15*)]. Although this is not yet feasible for all potentially zoonotic viral clades, applying these techniques to a larger viral data set as the GVP progresses will allow validation of risk frameworks and may increase our capacity to predict zoonotic potential. However, advancing these goals will require new collaboration among lab virologists, epidemiologists, and modelers, innovative approaches to field-testing the boundaries of virus-host relationships, and support across agencies that often fund separate virology, public health, evolutionary biology, and biodiversity modeling initiatives.

## INVESTMENTS, RETURNS

The cost of the GVP represents a sizable investment and, even if a large number of potential zoonoses are discovered, only a minority is likely to have the potential to cause large-scale outbreaks and mortality in people (*1*, *2*, *7*). However, given the high cost of single epidemic events, data produced by the GVP may provide substantial return on investment by enhancing diagnostic capacity in the early stages of a new disease outbreak or by rapidly identifying spillover hosts, for example. Recent analysis of the exponentially rising economic damages from increasing rates of zoonotic disease emergence suggests that strategies to mitigate pandemics would provide a 30:1 return on investment (*2*, *8*). Even small reductions in the estimated costs of a future influenza pandemic (hundreds of billions of dollars) or of the previous SARS (severe acute respiratory syndrome) epidemic ($10 billion to $30 billion) could be substantial. The goal of the GVP is to improve efficiency in the face of these increasing viral

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spillover rates by enhancing (not replacing) current pandemic surveillance, prevention, and control strategies. If we were to invest only in surveillance for known pathogens (our current business-as-usual strategy), our calculations suggest we would protect ourselves against less than 0.1% of those viruses that could conceivably infect people, even using the lower bounds of our uncertainty for our viral estimates (i.e., 203 viruses known from humans out of 263,824 unknown potential zoonoses; supplementary text).

The potential benefits of the GVP may be enhanced to maximize public health benefits (supplementary text) by (i) optimizing sampling to target species most likely to harbor "missing zoonoses" (6), or to target emerging disease hotspot regions most likely to propagate major disease outbreaks (7); (ii) using human and livestock syndromic surveillance to identify regions for wildlife sampling proximal to repeated outbreaks of severe influenza-like-illnesses, fevers of unknown origin, encephalitides, livestock "abortion storms," and other potential emerging disease events; (iii) initially targeting RNA viruses, which caused 94% of the zoonoses documented from 1960 to 2010; and (iv) fostering economies of scale and adoption of technological innovation as the GVP ramps up. This includes use of laboratories that can facilitate regional sample processing, development of centralized bioinformatics platforms, and improved logistics for sample collection and transport. We also expect the cost of testing and sequencing to decrease as technology is enhanced, much as the development of next-generation sequencing reduced genetic sequencing costs by up to four orders of magnitude in a decade.

The accelerated pace of viral discovery under the GVP will make the virological, phylogenetic, and modeling approaches used in pandemic preparedness more data-rich, and likely more effective. For example, having the sequence data for thousands, rather than a few, viruses from a single family could extend vaccine, therapeutic, or drug development to a wider range of targets, leading to broad-spectrum vaccines and other countermeasures. Identification of novel viruses may be useful to programs like the Coalition for Epidemic Preparedness Innovations (CEPI) in assessing the breadth of action of candidate vaccines and therapeutics, and in expanding their efficacy. More broad-scale prevention approaches could provide immediate return on investment prior to vaccine and countermeasure development, which would require substantial investment and time. For example, metadata on viral reservoir host identity, geography, seasonality, proximity to people, and drivers of emergence will refine our mechanistic understanding of spillover and enhance published models of emerging infectious diseases risk (3, 6). Identification of novel viruses in hunted, traded, or farmed wildlife species could be used to enhance biosecurity in markets and farming systems, reducing public health risk, increasing food security, and assisting in conservation of hunted species. The presence of hosts harboring high-risk novel viruses in proximity to human populations may allow targeted follow-up to examine evidence of spillover and design intervention strategies (supplementary text). Ultimately, the benefits of the GVP may include enhancing our understanding of viral biology, such as drivers of competition or cooperation among viruses within hosts, genomic underpinnings of host-virus coevolution, processes underlying deep evolution of viral clades, and the identification of novel viral groups (15).

The regions targeted by the GVP are largely highly biodiverse, rapidly developing countries in the tropics, which often have low capacity to deal with public health crises (1). The expanded laboratory capacity, field sampling, and data generation intrinsic to the GVP goals will therefore improve capacity to detect, diagnose, and discover viruses in vulnerable populations within regions most critical to preventing future pandemics. This enhanced capacity may also help improve diagnosis and control for endemic diseases, as well as the portion of the virome that remains undiscovered.

The Human Genome Project in the 1990s catalyzed technological innovation that dramatically shortened the time and cost for its completion, and ushered in the era of personalized genomics and precision medicine. The GVP will likely accelerate development of pathogen discovery technology, diagnostic tests, and science-based mitigation strategies, which may also provide unexpected benefits. Like the Human Genome Project, the GVP will provide a wealth of publicly accessible data, potentially leading to discoveries that are hard to anticipate, perhaps viruses that cause cancers and chronic physiological, mental health, or behavioral disorders. It will provide orders-of-magnitude more information about future threats to global health and biosecurity, improve our ability to identify vulnerable populations, and enable us to more precisely target mitigation and control measures to foster an era of global pandemic prevention. ■

## GVP targeting strategy

The project will capitalize on economies of scale in viral testing, systematically sampling mammals and birds to identify currently unknown, potentially zoonotic viruses that they carry.





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### SUPPLEMENTARY MATERIALS

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# Supplementary Materials for

## The Global Virome Project

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**This PDF file includes:**

List of Author Affiliations
Supplementary Text
Fig. S1
References

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**Supplementary Text**

The steps taken to estimate the global number of mammalian and avian viruses are detailed below. Data and code necessary to reproduce the analysis are available at **http://www.github.com/ecohealthalliance/GVP_Science**.

Estimating viral diversity in wildlife hosts of zoonotic relevance

To estimate the diversity of viruses that threaten to emerge in people we extrapolated from estimates derived from two mammalian wildlife hosts, a bat species and a primate species, representing the only published estimates of unknown viral diversity in vertebrate hosts *(7, 16)*. Mammals represent the most important hosts for emerging viral zoonoses, with ~88% (69/78) of emerging viral zoonoses with a confirmed reservoir host in a published database of emerging infectious disease events originating in non-human mammals *(3)*, and ~99% in non-human mammals or in birds (69 from mammals, 8 from birds). These include viruses that originate in, or have genes that originate in, these classes of vertebrates or that are transmitted by them at some stage in their emergence. In many biological studies, estimates of diversity include the number of species or other taxonomic units in a region (the species richness), as well as the variability within species, among species, and across landscapes, i.e. the degree of difference among organisms *(17)*. For the purposes of this paper, we follow previous work *(5, 16)* and use the phrase 'viral diversity' to denote the species richness of viruses, i.e. the number of species of viruses in a given host, group of hosts or geographic region. Estimates of viral diversity for the bat *Pteropus giganteus* are based on repeated sampling of individuals of this species and viral discovery using PCR with degenerate family-level primers targeting 9 viral genera or families, all known to contain zoonoses *(5)*. Estimates of viral diversity for the rhesus macaque *Macaca mulatta* targeted 21 viral families by PCR, as well as high-throughput sequencing (HTS) *(16)*. For each host species, we obtained raw test data from *(5, 16)* ((https://github.com/ecohealthalliance/GVP_Science/blob/master/data/macaque_data.xlsx), (https://github.com/ecohealthalliance/GVP_Science/blob/master/data/pteropus_data.csv)) and repeated the analysis of unknown viral diversity for each set of viral family-level tests to estimate the expected number of viral species and standard error for all known and expected unknown viruses from each of the 30 viral family test protocols conducted (Code available at https://github.com/ecohealthalliance/GVP_Science/blob/master/R/pteropus_validation_anthony_2013.R and https://github.com/ecohealthalliance/GVP_Science/blob/master/R/macaque_validation_anthony_2015.R, respectively). This gave an average of 11.58 viruses per family (standard error 6.74), indicating that the average viral family has between 4.84 and 18.32 viral species. However, this mean was heavily skewed by the 120 discovered and 200.83 estimated Picobirnaviruses in *M. mulatta*. The median number of viral species per viral family was 2.5, indicating that many viral families have only a few viral species in a given host, but rare families can have many more. For the purposes of the Global Virome Project (GVP), the mean is a more useful metric so that costs are not underestimated. The likely variability in viral diversity among mammalian species and viral families highlights the need for a strategy to monitor sampling and test results in real time to guide per-species sampling as the GVP proceeds (see below).

To decide which viral families to include in GVP testing protocols, we used the stringent database from *(6)* that requires PCR evidence of viral sharing among humans and other animals, and is derived from *(3)*. All 21 viral families targeted in *(5, 16)* contain known zoonoses, based on PCR reports in the database from *(6)*, but neither study covered the Hepeviridae, which also contains zoonoses, so this was included. The Arteriviridae contains a species pathogenic in primates and none that are known from humans, but could reasonably be considered a risk for future zoonotic viral emergence from either known or unknown viral *Arterivirus* species, given close evolutionary relationships between humans and other primates. The Bornaviridae was not included because the evidence for its zoonotic origin is unclear, and most reports of animal



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infections are from livestock, not wildlife (*18, 19*). The Hepadnaviridae was included because there is PCR and *in vitro* infection evidence of viral origin in wildlife species that are known high zoonotic risk reservoirs, suggesting high likelihood of related novel viruses capable of spilling over into people (*20*). We therefore multiply the per-viral family mean of 11.58 species by 25 (see specific viral families listed below) to give an estimate of the total viral diversity within all 25 viral families that have high zoonotic potential as 289.5 (se 121.0 - 458.0) for each mammalian host species. Given that there are 5,291 known mammal species (*21*) (excluding marine mammals which have limited contact with humans relative to terrestrial and volant mammals) we estimate global mammalian viral richness in our 25 target viral families at 1,531,745 (se 640,211 - 2,423,278). In addition, influenza viruses derived from mammals and birds represent a significant public health threat globally. Therefore, we used the mean viral diversity per viral family in mammal hosts (11.58), and assumed that this may also represent the average per-host species viral diversity for influenza viruses (Orthomyxoviridae) in each of the 11,862 known bird species bird species (*22*). This gives an estimated avian influenza viral richness of 137,362.96 (se 57,412 - 217,312), and a total global richness of viral species from families with high zoonotic potential of around 1,669,106 (se 697,623 - 2,640,590).

The viral families to be targeted by the GVP include 16 families of RNA viruses known to infect people: Arenaviridae, Astroviridae, Bunyaviridae, Caliciviridae, Coronaviridae, Filoviridae, Flaviviridae, Hepeviridae, Orthomyxoviridae, Paramyxoviridae, Picobirnaviridae, Picornaviridae, Reoviridae, Retroviridae, Rhabdoviridae, and Togaviridae; an additional RNA viral family (Arteriviridae) that infects non-human primates will be included, as explained above; and an additional 8 families of DNA viruses which contain known zoonoses (Adenoviridae, Anelloviridae, Hepadnaviridae, Herpesviridae, Papillomaviridae, Parvoviridae, Polyomaviridae, Poxviridae), bringing the total to 25 viral families.

There are a number of assumptions in this approach that need to be considered. Firstly, viruses, and RNA viruses in particular, have remarkable potential for evolution which suggests that estimates of viral diversity may not remain static over the period of the GVP. However, the large standard error around the GVP estimates of viral diversity suggests that they err on the side of over-estimation of viral diversity by using the mean per-family value. Therefore, the evolution of novel viral lineages during the GVP is unlikely to significantly alter total diversity discovered. Furthermore, the work on which these estimates are based used a conservative approach to the definition of a viral species, and this has been followed in the current calculations (*5, 16*). It is also likely that viral evolution is more constrained in reservoir hosts (the subject of the GVP sampling and testing) than in spillover hosts (e.g. humans, the subject of many studies of RNA viral evolution, e.g. (*23*), which may further reduce the impact of viral evolution on these estimates. Secondly, the estimates of viral diversity are based on two species, the macaque and the giant fruit bat, which may not be representative of all mammalian or avian species in that they are both mammals, both social, the former is widely distributed and the latter lives in dense colonies and is volant. These and other factors (e.g. overlapping host species ranges resulting in viral sharing, long evolutionary distance



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from related host species resulting in diversification of viral lineages) suggest that our estimates of global viral diversity may be lower or higher than stated. Some of these have been discussed in (*5, 16*), and given the large standard errors presented here for our estimates of viral diversity, seem unlikely to suggest a significant disparity (e.g. by orders of magnitude) between the estimated viral diversity and that which would eventually be discovered. However, to deal with potential disparities, we propose that the testing results from the GVP should be analyzed routinely as the project progresses, to monitor and evaluate progress relative to initial estimates and assumptions. Specifically, the same algorithms used in (*5, 16*) could be applied to viral family test results per host species, family, order, and geographical sampling region to ascertain whether the standard error around estimated total viral diversity reduces as the project progresses. A reduction in these standard errors would denote a gain in accuracy of estimates, and if these suggest some viral families are far more (or less) speciose than assumed, or some species or taxa have a much greater or lesser viral species richness than assumed, the strategic targeting of the GVP could be altered accordingly to maximize discovery, by expanding, reducing or halting sampling and testing.

Estimating the number of potentially zoonotic unknown viruses

To estimate the number of wild mammal viruses and bird influenzas with the potential to infect people, (i.e. the species richness of unknown viral zoonoses), we used data from (*3, 6*) on the host species range for all known mammalian viruses and the proportion of those viruses that can infect humans. We found that, of 580 known mammalian viruses in the 25 viral families targeted by the GVP, 261 (45.0%) infect humans (2 other viruses are not within these families: the unassigned Hepatitis delta virus, and Borna disease virus-1; bringing the total known human viruses from (*3, 6*) to 263). (https://github.com/ecohealthalliance/HP3/blob/master/data/viruses.csv) As evidence for a mammalian viral species' capacity to infect people, we used data from the less stringent database in (*6*), which includes those with either PCR or serology evidence of infection. This reduces the likelihood of underestimating zoonotic potential, and reflects the large number of studies of spillover potential that use serological surveys of exposed people. We did not include Hepatitis delta virus, in our calculations because this is considered an RNA viroid, requires hepatitis B virus (HBV) as a 'helper virus' for its replication and transmission, and is only known in nature from HBV-infected humans (*24-26*). Furthermore, it has not been categorized into a viral family by the ICTV. Of the 580 known mammalian viruses in the 25 viral families targeted by the GVP, 74 are thought to be exclusively human and 187 are zoonotic (32.2% of the known mammalian viruses in the targeted families). Considering evidence that most exclusively human viruses appear to have originated in animals (*7*), we assume that between 493,856 (se 206,412 - 781,298) (32.2%) and 689,285 (se 288,095 - 1,090,475) (45.0%) of the total unknown mammalian viruses have potential to infect humans. Because influenza viruses have exceptional capacity for genetic recombination, we made the conservative assumption that all strains of influenza virus in birds are likely capable of zoonotic transmission. Our best estimate of the total number of potential zoonoses globally is therefore between 631,218 (se 263,824 – 998,610) and 826,647 (se 345,507 - 1,307,787). It is possible that as-yet-undiscovered viruses harbor a lower proportion with zoonotic potential than those already known, given our long history of interaction with wildlife on



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the planet, and our likely skewed surveillance of hosts known to harbor zoonoses (*6*). However, data show that the rate of disease emergence is increasing after correcting for reporting bias, with zoonotic pathogens originating in wildlife increasing significantly as a proportion of all emerging pathogens (*1, 8*). This suggests that any reduced potential for zoonotic emergence in the undiscovered pool may be far less important in driving risk than the very large number of pathogens to which humans have not yet been significantly exposed, or the exponentially increasing drivers of high-risk contact with wildlife that leads to disease emergence (*1, 27*). Furthermore, the identification of a pathogen as zoonotic requires that it infects people and is then clinically observed. Capacity to conduct disease detection and viral discovery in people, livestock and wildlife is likely lowest in countries with the highest mammalian biodiversity (and therefore viral diversity), so that many viruses may remain undiscovered, even if they have already emerged repeatedly into human populations in these regions. This hypothesis is supported by the apparent repeated spillover of HIV-1 progenitors prior to its emergence (*28*), and PCR evidence of simian foamy virus infections in three bushmeat hunters in Cameroon in a survey of 1099 individuals, ten of which had serological evidence of exposure (*29*). In addition, analysis of ICTV data and the literature (*6*) suggests that prior surveillance studies have not skewed to hosts with higher proportions of zoonoses due to research focused on identifying reservoirs of zoonotic pathogens. For example, this work shows that bats have a statistically significant higher proportion of zoonoses than any other mammalian order, even though bat viruses are not historically well-studied relative to other mammalian host groups (*21*). Indeed, other factors may determine the selection of hosts for surveillance, not least of all convenience. For example, historical surveys of mammals are often based on ease of capture, and therefore have focused more on diurnal terrestrial species (e.g. rodents, primates) than nocturnal volant species (e.g. bats). Finally, the standard error for our estimates of the number of viruses with zoonotic potential is quite large, but still results in a minimum expectation of >220,000 viruses of zoonotic potential. Given the high, and growing, public health impact and economic costs of EID outbreaks (*8*), it seems that this lower number would still provide adequate economic and public health rationale for a large project like the GVP.

Targeting the Global Virome Project to maximize discovery of zoonoses

We propose that work conducted by the Global Virome Project (GVP) should be streamlined to discover those viruses with the highest zoonotic potential by targeting host taxa which have historically harbored the majority of zoonoses. Mammalian taxa sampled could reasonably exclude marine mammals, which have a reduced likelihood of contact with people relative to terrestrial and volant mammals, and have not been the primary reservoir from which any prior EIDs have originated (*1*). Target mammalian species primarily would be wildlife because 91% of zoonoses reported between 1990 and 2010 involved a wildlife host, with some of those also implicating a domestic animal host for the same virus etiology (*30*). For avian influenza viruses, the GVP could reasonably target only water birds (Anatidae, Laridae, Charadriiformes and others, with a global species richness of 871) which harbor a wide diversity of known zoonotic avian influenzas, and include species that are closely related to widely-domesticated species, and that are hunted extensively (*22*). Some recent emerging diseases have been caused by viruses transmitted to people from wildlife via domestic animal reservoirs (e.g. Nipah



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virus and pigs, MERS coronavirus and camels). The GVP could sample a small number of livestock and poultry species (n=10) in regions that are known emerging disease hotspots (*1, 27*). Because these species are abundant and widely distributed, sampling in 5 regions globally would not be logistically difficult, and would increase the target by an equivalent of 50 species.

Estimating the cost of a Global Virome Project

To estimate the cost of sampling and discovering unknown viruses, we used cost data derived from the USAID EPT/PREDICT project, which has a goal of conducting zoonotic viral discovery in wildlife to identify potentially zoonotic pathogens and build capacity to reduce the risk of pandemics (*10, 11*). This project has been operating in over 25 developing countries, in emerging disease hotspots, for just over 8 years. This project has set up field teams in each country, captured and sampled over 80,000 wildlife and domestic animals, designed and operated diagnostic platforms in-country, and conducted over 400,000 viral discovery tests. The USAID EPT/PREDICT project conducted the work in (*5, 16*). The cost of estimating the viral diversity of *P. giganteus*, collecting metadata, conducting risk assessment and partially characterizing some of the viruses discovered was $1.2 million. The bulk of these costs were in sample collection, setting up laboratory testing platforms, and conducting sample preparation. Considering that the cost of adding primers to PCR reactions once samples are prepared for analysis, including HTS, is relatively insignificant, we estimate the cost of taking the Global Virome Project to scale is approximately $6.3492 billion (the $1.2 million cost of the *P. giganteus* work multiplied by the number of extant terrestrial and volant mammals) for 100% of the estimated unknown 1,531,745 mammalian viruses (excluding marine mammals). Because the bulk of these costs comprise the logistics of fieldwork, sample collection and cold chain management, they are therefore driven largely by host species considerations and relatively unaffected by the uncertainty in viral diversity estimates. The GVP would require an additional $1.1052 billion to sample water bird species (n=871) for influenza, and to conduct limited domestic animal sampling (n=50, as described in the SM, above). This would bring the total costs of the GVP to $7.454 billion, which, if annualized over a decade would cost around $745 million per year to discover virtually 100% of the viral zoonotic threats to our species.
(https://github.com/ecohealthalliance/GVP_Science/blob/master/data/GVP_costs_from_anthony2013.xlsx)

However, because the viral discovery curves reported in (*5, 16*) are asymptotic, marginal returns (i.e. rates of new virus discovery) diminish rapidly as the number of samples collected increases. Using the discovery rates and total costs from (*5*), and assuming a linear relationship between samples collected, we examined the relationship between total project costs and the percentage of the undiscovered global virome found. (Fig. S1). Based on these calculations, we estimate that 97.4% of targeted viral diversity would be discovered with half of the sampling and testing effort ($3.73 billion), 85% of targeted viral diversity would be discovered with only 23% of the costs ($1.69 billion), and 71% diversity with only 16% of the costs ($1.2 billion, considering some fixed costs). Neither start-up infrastructure costs nor cost savings from economies of scale are included in this model, both of which may reduce the steepness of the curve shown in Fig. S1, but this simple model is included to demonstrate the decreasing rate of discovery after an initial sampling phase. This model suggests that a GVP costing $1.2 billion could discover a substantial majority (71%) of unknown viral diversity in non-marine mammals and of the zoonotic influenza risk from water birds, with some limited domestic animal sampling. GVP costs likely would not be significantly increased if estimates of viral diversity prove to be low due to, for example, the discovery of a very diverse new viral family, or greater diversity within a known family. The increased number of viruses discovered would not be linearly translated into increased costs of the project, because



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the bulk of the costs are in the collection of field samples rather than sequencing a larger number of PCR products.

Further strategic targeting to increase return-on-investment

Further targeting strategies are proposed in the main text to increase return-on-investment from the GVP, and deliver public health value as rapidly as possible: *1) Optimizing sampling to target host species and regions with the highest number of 'missing zoonoses', or hosts otherwise more likely to be involved in viral spillover.* It is logical that some host species, genera or orders may have a higher risk than others of harboring zoonoses, or of their viral fauna spilling over to people. This may be due to their higher contact with people (e.g. through a propensity to live in human-dominated habitat, or their involvement in the wildlife trade etc.); due to intrinsic biological factors that lead to them harboring a higher number of viruses, or likely zoonotic viruses; or because they are more abundant or have a wider geographic or ecosystem range, and therefore increased potential for direct viral spillover or via domestic animals to humans. Recent analyses suggest that species which have greater contact with humans (*31*), and are more closely related phylogenetically (*32, 33*) are more likely to harbor viruses with the potential to be zoonotic. Analysis of data on all mammalian host-virus relationships in (*3*), after controlling for reporting effort, demonstrates that both the total number of viruses that infect a given species, and the proportion likely to be zoonotic are predictable (*6*). The proportion of viral species that are zoonotic in mammalian hosts is predicted by phylogenetic relatedness to humans, host taxonomy, and human population within a species range (a proxy for human-wildlife contact). By setting reporting bias in to the maximum known for any wild mammal, it is possible to identify geographic regions with the largest estimated number of 'missing viruses' and proportion of 'missing zoonoses' (*6*). Prioritizing sampling of these species and regions would therefore provide the highest rate of zoonotic viral discovery for the GVP. *2) Targeting EID hotspots.* Analysis of all infectious diseases reported as emerging in humans since 1960 shows that, when corrected for reporting bias, their geographic origins are correlated with wildlife biodiversity and human population density (*1*). The spatial distribution of these correlated drivers provides a geographic map of EID hotspots which represent the most likely regions for future spillover events. This analysis has been revised significantly, with a new database, new analytical approach, new measures of reporting effort, new validation methods, and specifically targeting zoonotic EIDs (*27*). The results demonstrate that, after accounting for reporting effort, zoonotic EID risk is elevated in forested tropical regions experiencing land-use changes and where wildlife biodiversity (mammal species richness), and human population density, are high. Apart from the correlation with mammal species richness which is already accounted for in the GVP targeting, these results could be used to identify initial GVP sampling sites. Novel viruses identified in wildlife at these sites would have the highest relative propensity to emerge, other traits being equal. *3) Syndromic surveillance at wildlife-livestock-human interfaces.* Targeting GVP sampling of wildlife to sites with repeated reports of undiagnosed outbreaks in humans or livestock may increase the probability of identifying causative agents of these outbreaks. For example, there are substantial available data on undiagnosed case clusters and outbreaks of encephalitis and other discrete syndromes with potential infectious etiology from the literature and from internet-based reporting. During the late 1990s,



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analyses of these reports for South Asia suggested that some outbreaks may be caused by Nipah virus – at the time not known in the region. This provided the rationale for a survey of fruit bats in Northern India (the reservoirs for Nipah virus elsewhere), which led to the first report of Nipah virus in bats in India (*34*). Syndromic surveillance allowed identification *post hoc*, of the causative agent of outbreaks in South Asia (*35, 36*). Similarly, syndromic surveillance of livestock has been used to identify diseases of significance to livestock production or public health (*37-40*). Data on undiagnosed clusters of potential infectious etiology in livestock could be used to target the planned livestock sampling in the GVP. These approaches may provide more direct benefits from the GVP for public health and food security. *4) Initial targeting of RNA viruses.* RNA viruses have caused 94% of the zoonoses documented from 1990 to 2010, 28 times higher than the proportion of RNA viruses detected among all vertebrate viruses (*30*). Therefore, to maximize the early detection of likely zoonotic viruses, GVP testing could target RNA viral families, including retroviruses. Alternatively, following testing for all 24 viral families, novel viruses could be triaged initially for further characterization based on their RNA vs. DNA genome. *5) Economies of scale.* Economies of scale would potentially reduce the cost of the GVP, providing that issues of access to sampling sites, sample movement and intellectual property are negotiated equitably. For example, modeling could be used to identify the maximum return (i.e. number of unique viruses identified from wildlife species, or number of unique wildlife species adequately sampled) on investment (number of sampling sites and cost) per country. In regions with discrete pockets of biodiversity, algorithms used to identify sites for protected areas could be modified to increase GVP site selection efficiency (*41-43*). At a national scale, the presence of biodiversity hotspots across country boundaries could lead to repetitive sampling over two adjacent countries if targeting is based on country-by-country analyses. A regional (multinational) approach may reduce costs significantly while giving the same species coverage, and would allow for decisions on logistical efficiencies to drive sample site choice. Testing of samples in laboratories that already have a regional remit may increase efficiency and reduce costs of laboratory capacity building. Similarly, regional bioinformatics platforms could be used that would not only increase the capacity for analysis of sequence data, but also provide training in bioinformatics for scientists across a region. *6) Technological innovation.* The decade-long timescale of the GVP may allow for technological innovation to significantly reduce testing and bioinformatics costs and therefore to increase efficiencies. As an extreme example, the cost of sequencing a human genome fell from $100,000,000 to around $10,000 in 10 years (2002-2012), i.e. 4 orders of magnitude, exceeding projected increased efficiency by Moore's Law (*44*). Technological advances continue in biased and unbiased viral discovery technology (*45*), and are likely to increase testing efficiency and reduce costs (*46*).

Potential direct benefits of the GVP to reducing risk of zoonotic viral emergence

The GVP's goal of identifying the bulk of currently-unknown viruses with zoonotic potential from wildlife reservoirs will have substantial potential for preventing and controlling zoonotic viral emergence in the future. However, the development of biomedical countermeasures (therapeutic drugs or vaccines) would require significant financial investment beyond that costed out for the GVP, and significant time following discovery (*47-49*). For example, substantial research on influenza viruses over the past



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few decades has yielded a wealth of data on virology, immunology, pathology and epidemiology. This has led to strategies to predict the emergence of seasonal flu strains and to develop vaccines for them in advance of their emergence. However, their efficacy appears to be variable (*50*), and vaccine development to the recently emerging H1N1 pandemic strain lagged its global spread, albeit that speed of production was greatly enhanced (*51, 52*).

Despite the challenges of countermeasure development, there are a number of ways that the GVP could rapidly and feasibly improve efforts to pre-empt zoonotic viral emergence, more rapidly diagnose cases, and intervene earlier in outbreaks: *1) Greater diversity of viral reagents for countermeasure development.* Having the sequence data for thousands, rather than a few, viruses from a single family could enhance our understanding of the efficacy of novel therapeutics, vaccines or other countermeasures to a wider range of targets. For example, following the emergence of SARS-CoV, a large number of diverse related coronaviruses has been discovered from bats, including a group closely related to SARS - the bat SARS-like coronaviruses (SL-CoVs). The spike proteins of a number of recently-discovered SL-CoVs have ability to bind to the human receptor for SARS-CoV, and to infect and replicate SARS-like disease in mice when inserted into a mouse-adapted SARS-CoV backbone (*13, 53*). However, both a vaccine and monoclonal therapy that reduces SARS-CoV infection in this model failed to neutralize and protect from infection with the SL-CoV chimera (*54*). Thus, expanding our knowledge of the diversity of related SL-CoVs under a GVP program may provide more effective testing protocols for SARS therapeutics and prophylactics; *2) Capacity building.* To facilitate the scaling up of current surveillance and viral discovery programs, the GVP would necessarily require training of One Health teams in regions most likely to experience novel outbreaks of emerging diseases. In the USAID EPT/PREDICT project, teams of trained wildlife biologists capable of safely sampling wildlife during outbreak conditions have assisted in outbreaks of yellow fever in Africa, Ebola virus disease in West Africa, Nipah virus in Bangladesh and a range of others (*55*). Scaling up of in-country One Health capacity would help more rapidly identify the reservoirs of known or novel viruses causing outbreaks in EID hotspots, and identify exclusion measures or other strategies to reduce risk of further spillover; *3) Enhancing rapid diagnosis during outbreaks.* The identification of relatives of known zoonotic viruses in new regions may enhance the speed and capacity to diagnose at-risk populations. For example, the identification of novel and distinct henipaviruses in bats in Africa has led to testing for, and evidence of, their transmission to pigs and humans in the region (*56-58*). This group of viruses can now be included in investigation of future outbreaks of Nipah- or Hendra-like disease in livestock in the region. *4) Designing risk mitigation policies.* The metadata collected by the GVP on viral-host ecology, viral distribution, seasonal dynamics, proximity to dense human populations and travel centers, and to communities with cultural practices that increase risk of spillover, can be used to enhance public health. Sequence data from new relatives of known agents can be used to increase the breadth of coverage of PCR-based diagnostic tests. Ecological and human behavioral data collected in the GVP will help refine our mechanistic understanding of spillover, and can be used to develop novel interventions. For example, the USAID EPT/PREDICT has identified sites in Yunnan Province, China where cave-dwelling bats harbor a high diversity of



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novel SARS-like coronaviruses, including some capable of infecting human cells and causing illness in humanized mice (*13, 54, 59*). Ecological data collected during site evaluation prior to wildlife sampling, and human behavioral data collected routinely in the USAID EPT/PREDICT project identified human communities with significant exposure to bats from these caves. Targeting these communities for serological surveillance to SARS-like coronaviruses may help identify early evidence of spillover prior to full-scale emergence. Identification of potential zoonoses in hunted, traded and consumed wildlife species may provide a public health rationale for interventions (e.g. public education programs, enhanced biosecurity in farming systems and markets, policy interventions in wildlife trade) to reduce the risk of spillover. These mitigation strategies may also help prevent spillover of yet-to-be identified viruses within the same risk pathway or interface. The GVP metadata will also allow refinement of predictive models of zoonotic disease emergence, and viral host ranges (*1, 6, 11, 27*). For most of these, gaps in globally relevant datasets lower their predictive capacity, something that would be addressed by ground-truthing with much-expanded data on viral-host relationships and geographical distribution. *5) Strategies to triage potentially pandemic viruses for enhanced characterization and risk mitigation policies.* It would not be feasible to design and target control and intervention programs against all novel viruses identified by the GVP, and strategies to distinguish which novel viruses have true pandemic potential are rudimentary at present (*14*). Knowledge of influenza diversity and evolution has led to seasonal vaccine development based partly on predictive modeling of next year's dominant strain, but this is enhanced by a great deal of data on influenza viruses recently and currently circulating in people. To begin to address this issue, the USAID EPT/PREDICT project has developed an approach that characterizes the relative importance of newly-discovered viruses based on viral-dependent traits (e.g. proportion of known zoonoses per viral family, phylogenetic relatedness of known zoonoses, host breadth/plasticity,) and viral-independent traits (e.g. host species geographic range, abundance and proximity to people; viral prevalence in host; location of host in an EID hotspot) (*11*). Some of these approaches have been shown to predict zoonotic potential from large databases of virus-host relationships (*6, 30*). In the USAID EPT/PREDICT project, this strategy is used to identify which viruses are most likely to be potentially zoonotic, and to allocate resources for further in-depth characterization (*11, 55*). This approach was used successfully to further characterize the spike proteins of SARS-like coronaviruses discovered in this project, assess their capacity to bind to human cells, and conduct behavioral and serological surveys to assess the potential that spillover has occurred into the human population (*54, 59*). We propose that if this triage approach is used in the GVP, it will not only provide a preliminary framework for risk assessment, but will ultimately involve orders magnitude more data on viral sequence, geographic and host distribution, human behavioral and ecological risk and other parameters. This significant scaling up of available data will underpin a strategy to produce more realistic projections of zoonotic and pandemic potential.



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**Fig. S1.** Cost estimates of the GVP compared to the percentage of the targeted global virome discovered. The targeted global virome includes sampling from all 5,291 terrestrial mammal species and testing for 25 viral families of zoonotic potential, 871 species of water birds tested for influenza viruses, and limited (n=50) sampling of domestic animals and testing for 25 viral families.



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UCDUSR0003163

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UCDUSR0003164

**From:** Andrew Clements <aclements@usaid.gov>
**Sent:** Thu, 22 Mar 2018 03:52:05 -0700
**To:** predict@ucdavis.edu
**Subject:** [predict] Fwd: Emerging Pandemic Threat Program Evaluation report posted on DEC

FYI

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email:* aclements@usaid.gov

Begin forwarded message:

**From:** Ashna Kibria <akibria@usaid.gov>
**Date:** March 20, 2018 at 9:21:03 PM GMT+1
**To:** ETD Global <ghsdglobal@usaid.gov>, "Mahanna, Paul (GH/OHA)" <pmahanna@usaid.gov>, Christina Chappell <cchappell@usaid.gov>, Megan Fotheringham <mfotheringham@usaid.gov>, Anne Palaia <apalaia@usaid.gov>, Marc Cunningham <mcunningham@usaid.gov>
**Subject: Re: Emerging Pandemic Threat Program Evaluation report posted on DEC**

Hello everyone:
We experienced some technical difficulties the last couple of days with some of you not being able to access the evaluation report. The problem was just fixed, and everyone should now be able to visit the DEC website and download the report. Please do try again -thank you!

Best,
Ashna

On Mon, Mar 19, 2018 at 12:52 PM, Ashna Kibria <akibria@usaid.gov> wrote:

Dear all:
The USAID Emerging Threats Program (EPT2) evaluation report is now publicly available on the DEC, and can be accessed here. The external evaluation team worked on this program evaluation since June 2017, and was led by Dr. Constance Carrino, with Dr. Daniel Lucey and Dr. Marguerite Pappaioanou.

Please feel free to share with anyone you think may be interested!

Warm regards,
Ashna

--
**Ashna Kibria, MPH**
Public Health Advisor
Emerging Threats Division
USAID/Washington, Bureau for Global Health
Phone: 571.551.7451 (office) REDACTED (cell)
Email: akibria@usaid.gov

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**Ashna Kibria, MPH**
Public Health Advisor
Emerging Threats Division

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You received this message because you are subscribed to the Google Groups "ETD Global" group.
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**From:** Dennis Carroll <dcarroll@usaid.gov>
**Sent:** Fri, 6 Apr 2018 11:50:50 -0700
**Subject:** Re: April 9
**To:** [redacted]
**Cc:** Cara Chrisman <cchrisman@usaid.gov>, Cassandra Louis Duthil <clouisduthil@usaid.gov>, Jonna Mazet <jkmazet@ucdavis.edu>

Thanks [redacted] Agree, no agenda. I need to bring everyone up to speed on multiple moving parts that are currently in play and brainstorm a way forward
Thanks

d

Sent from my iPhone

On Apr 6, 2018, at 1:14 PM, [redacted] wrote:

> Hi Dennis,
>
> The meeting will be at 1089 Veterinary Medicine Drive, Davis, CA. We will be in Room 1001, which is on the first floor of building "VM3B" at the above address. When you enter the building, it will be on the left hand side, past the gorilla statue.
>
> Do you think an agenda is necessary? We didn't think so, but please let me know.
>
> Thanks,
>
> [redacted]
>
> **From:** Dennis Carroll [mailto:dcarroll@usaid.gov]
> **Sent:** Friday, April 06, 2018 10:04 AM
> **To:** [redacted]
> **Cc:** Cara Chrisman <cchrisman@usaid.gov>; Cassandra Louis Duthil <clouisduthil@usaid.gov>; Jonna Mazet <jkmazet@ucdavis.edu>
> **Subject:** Re: April 9
>
> [redacted] any guidance on where I should go for our meeting on Monday? I will be flying into SFO on Sunday - grab a rental and head up to Davis. Will be staying at the Best Western. I return to DC early Tuesday
>
> thanks
>
> d
>
> Dr. Dennis Carroll
> Director, Emerging Threats Program
> Bureau for Global Health
> U.S. Agency for International Development
>
> Office: 571-551-7109
> Mobile [redacted]
>
> On Tue, Mar 27, 2018 at 6:10 PM [redacted] wrote:
> Hi Cara,
>
> Thank you for confirming Dennis's travel, and letting me know about your plans.
> I have also cc'ed Katie Leasure (kaleasure@ucdavis.edu), our travel expert, to this conversation.

Best wishes,

REDACTED

Fellow
One Health Institute
School of Veterinary Medicine
University of California, Davis

**From:** Cara Chrisman [mailto:cchrisman@usaid.gov]
**Sent:** Tuesday, March 27, 2018 12:19 PM
**To:** REDACTED; Cassandra Louis Duthil <clouisduthil@usaid.gov>; Jonna Mazet <jkmazet@ucdavis.edu>
**Cc:** Dennis Carroll <dcarroll@usaid.gov>
**Subject:** Re: April 9

Hi [redacted],

Thanks again for your patience as we worked through a few things on our end. Dennis is back in the office today and we were able to confirm that he will be coming out on April 9th (I'm not planning to join this time).
Cassandra, cc'ed, will be booking his travel in case you need additional information. I believe the plan is to head out there on the 8th.

Best,
Cara

Cara J. Chrisman, PhD
Senior Infectious Diseases Technical Advisor
Emerging Threats Division
Office of Infectious Disease
Bureau for Global Health
U.S. Agency for International Development (USAID)

Desk: (571) 551-7413
Cell: REDACTED
E-mail: cchrisman@usaid.gov

On Thu, Mar 22, 2018 at 6:19 PM, REDACTED> wrote:
Hi Cara and Dennis,

What are your travel plans for the April 9 meeting? I'm just checking in because we are two and a half weeks away.

Best,
[redacted]

**From:** Dennis Carroll <dcarroll@usaid.gov>
**Sent:** Wed, 18 Apr 2018 08:55:37 -0400
**Subject:** Japan
**To:** [redacted] Latoya Armstrong <laarmstrong@usaid.gov>, Jonna Mazet <jkmazet@ucdavis.edu>, Cara Chrisman <cchrisman@usaid.gov>

[redacted] and LaToya - want to to introduce you to each other. [redacted] LaToya is leading our engagement with Japan; LaToya, [redacted] is an enthusiastic Japanophile who has much to offer to this process.

d

Dr. Dennis Carroll
Director, Emerging Threats Program
Bureau for Global Health
U.S. Agency for International Development

Office: 571-551-7109
Mobile: [redacted]

**From:** Andrew Clements <aclements@usaid.gov>
**Sent:** Fri, 15 Jun 2018 06:37:29 -0400
**Subject:** Hottest AI hot spot?
**To:** ghsdunitmaillistusaid@usaid.gov, mfotheringham@usaid.gov, pmahanna@usaid.gov, "Lisa Kramer (Nairobi/EA/RHH)" <lkramer@usaid.gov>, "Daniel Schar (RDMA/OPH)" <dSchar@usaid.gov>, "Sudarat Damrongwatanapokin (RDMA/OPH)" <sDamrongwatanapokin@usaid.gov>, ajatapai@usaid.gov, moleary@usaid.gov, "Oanh Kim Thuy (HANOI/OH)" <okim@usaid.gov>, "Timothy Meinke (HANOI/OH)" <tmeinke@usaid.gov>, Jonna Mazet <jkmazet@ucdavis.edu>, William Karesh <Karesh@ecohealthalliance.org>, daszak@ecohealthalliance.org, samaang@who.int, zhangw@who.int, Elizabeth Mumford <mumforde@who.int>, "Subhash Morzaria (FAORAP)" <Subhash.Morzaria@fao.org>, Yilma.Makonnen@fao.org, "Juan (AGAH) [redacted] Lubroth" [redacted], "Wantanee (FAORAP) Kalpravidh" [redacted] "Filip Claes (AGAH)" [redacted] djwolking@ucdavis.edu, Christine Kreuder Johnson <ckjohnson@ucdavis.edu>, bhbird@ucdavis.edu
Attachment
Did you know--hottest AI hot spot.pptx

How would you characterize an avian influenza "hot spot"? A large number of AI outbreaks in birds? A large number of birds affected? Many AI sub-types (including some known to be zoonotic) detected? Simultaneous circulation of multiple AI sub-types?
Between January 2010 and May 2018, one location met all of these criteria. It has 23.5 million people and 101.6 million poultry concentrated in about 14,000 square miles (roughly the combined size of the U.S. states of Maryland and Delaware) and 78% of people live in urban areas.

Can you guess where it is? (See attached for the answer.)

Sources: FAO, OIE, CIA World Fact Book.

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

## *Did you know?*

**Taiwan reported 1,289 bird outbreaks^ with 11 distinct HPAI and LPAI sub-types* between Jan 2010 and May 2018 with 9.8 million birds affected**

## *Significance:*

- Taiwan accounted for 86% of AI bird outbreaks and 64% of AI bird deaths in all of China during that time period
- Only Egypt and Indonesia recorded more AI outbreaks during this time period
- In Taiwan between Jan 2015 and May 2018:
  - AI bird outbreaks reported in 40 of 41 months
  - Between 2 and 4 distinct HPAI and LPAI sub-types co-circulating during 61% of months, providing opportunities for viral evolution

Source: FAO, OIE. ^ 48% of outbreaks involved ducks or geese. * [illegible] HPAI, [illegible] HPAI, [illegible] LPAI, [illegible] HPAI, [illegible] LPAI, [illegible] HPAI, [illegible] HPAI, [illegible] LPAI, [illegible] HPAI, [illegible] HPAI, [illegible] LPAI, [illegible] HPAI, [illegible] LPAI. HPAI = High Pathogenicity Avian Influenza. LPAI = Low Pathogenicity Avian Influenza. Sub-types known to be zoonotic are shown in red.

**From:** Peter Bogner <peter@gisaid.org>
**To:** Peter Daszak <daszak@ecohealthalliance.org>
**CC:** Dennis Carroll <DCarroll@usaid.gov>; Jonna Mazet <jkmazet@ucdavis.edu>
**Sent:** 6/21/2018 2:47:46 PM
**Subject:** Re: Eddie Holmes talk at Inst Pasteur

Good morning Peter

I will actually not be attending the symposium at the Crick. However, but much of GISAID's scientific rank & file will be present at the event, with plenty opportunities to ask EH and AR what were they thinking when suggesting bits & bites of data not cases sequenced allow them to make the claim when suggesting "more (genome sequence) data were obtained for the 2013–16 Ebola epidemic than for any other single disease outbreak". Surely the 2009 outbreak of the H1N1p by far dwarfs the number of Ebola cases and data. But to sneakily imply the amount of storage space for data it required during the Ebola outbreak, without making it clear that that one was NGS vs. consensus data count ... well I let you be the judge.

In any event, quantitative comparisons in the argument they wish to make are silly buggers, taking argument down the wrong path. I would have thought the bioinformatics community would be thrilled to get a much bigger picture of what else is out there in the ecosystem and the enriching information GVP could yield for research.

We are concerned that opinion pieces like these get published containing certain fundamental misstatements and omissions that make them dangerously misleading. Sadly, three are more out there practicing this art of deceit and journals like Nature appear oblivious to this fact.

Peter

On 6/21/18, 06:51, "Peter Daszak" wrote:

Just gave my talk at this Pasteur meeting and eddie is up now. He only showed one slide critiquing the GVP and he seems to have a misconception that the GVP is just sequence data - doesn't realize that there will be ecological and human behavioral data too.

Peter - he will be at the crick institute meeting just FYI.

Cheers,

Peter

Peter Daszak
(Sent from my iPhone)

President
EcoHealth Alliance

460 West 34th Street, New York, NY10001, USA

www.EcoHealthAlliance.org

On Jun 21, 2018, at 3:10 AM, Peter Daszak wrote:

Peter – Jonna mentioned you are going to the Crick Institute for a 1918 centenary mtg where you'll see Andrew Rambaut and wanted to get the talking points re. their critique of the GVP and our response.

I've attached the draft response so you can read our direct responses to their basic criticisms – that it's not possible to accurately predict emergence (which they assume is a key goal of the GVP – it isn't), and that the cost of the GVP is too high. They use a figure that compares the GVP budget ($1.2 bn) to the annual budget of NIAID ($4.8bn). That's misleading – the GVP is a 10 year budget (and a program that ends), and NIAID is just one country's program. We correct this in the attached pdf figure by using a 10-yr NIAID budget and pro-rating this by other country's GDPs to give a 'globalized' cost that shows the GVP is a relatively small expenditure.

Hope you're able to have a good and diplomatic debate, and thanks for supporting the mission!

Cheers,

Peter

**Peter Daszak**
*President*

EcoHealth Alliance
460 West 34th Street – 17th Floor
New York, NY 10001

Tel. +1 212-380-4474
www.ecohealthalliance.org
@PeterDaszak
@EcoHealthNYC

*EcoHealth Alliance leads cutting-edge research into the critical connections between human and wildlife health and delicate ecosystems. With this science we develop solutions that prevent pandemics and promote conservation.*

**Sent:** Fri, 22 Jun 2018 22:57:17 -0700
**Subject:** Stuck en route
**From:** Jonna Mazet <jkmazet@ucdavis.edu>
**To:** John Mackenzie <J.Mackenzie@curtin.edu.au>, Ab Osterhaus <a.osterhaus@onehealthplatform.com>, Ab Osterhaus <albert.osterhaus@tiho-hannover.de>, David De Pooter <d.depooter@onehealthplatform.com>, Chris Vanlangendonck <c.vanlangendonck@onehealthplatform.com>
**Cc:** Tracey Goldstein <tgoldstein@ucdavis.edu>, Peter Daszak <daszak@ecohealthalliance.org>, [redacted], [redacted], Brooke Genovese <bgenovese@ucdavis.edu>, Melinda Rostal <rostal@ecohealthalliance.org>, Billy Karesh <karesh@ecohealthalliance.org>

Dear John, Ab, David & Chris,
It seems to me that the world is conspiring against conference participation this time.

I am stuck at the Minneapolis airport. First flight was weather delayed and, though I made it in time to watch my flight to Saskatoon sit on the tarmac in front of the window for 30 minutes without me on it, they would not let me on.

Unfortunately, the very limited flight availability in to Sakatoon means that I now can not get there until the conference is close to over. So I am afraid that I am re-routing back home.

As I believe you know Ariful Islam, who was in two of my sessions, did not receive his visa back from the Canadian government in time to fly.

Also James Bangura, who we sent to another country for several days just to get an appointment months ago with a Canadian embassy was also refused a visa as a stay risk, despite bank statements, letters of employment, etc.

So it looks like we are a little lean.

I will miss our meeting Sunday morning, but I have the session tomorrow all squared away. Tracey Goldstein and Peter Daszak will step in for my sections and also cover Arif's material.

For Monday's OHS 2 -- Infectious Disease from an ecohealth perspective 2, Tracey Goldstein (South African-American virologist) and [redacted] (Japanese vet & public health specialist) will co-moderate for me & James. I am hoping that Mindy Rostal will step-in for Arif's talk.

For the special breakfast plenary that morning (Monday), I did not want to presume to offer the honor of that invitation for moderating. I'm sure Tracey or Billy would gladly step-in, but you may have someone else in mind or want to do it yourselves. Please advise if you would like me to arrange.

With sincere regrets (stranded in Minneapolis),
Jonna

Jonna AK Mazet, DVM, MPVM, PhD
Professor of Epidemiology & Disease Ecology
Executive Director, One Health Institute
Global Director, PREDICT Project of USAID Emerging Pandemic Threats Program

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For scheduling and logistical issues, please contact:
Ms. Brooke Genovese
bgenovese@ucdavis.edu
+1-530-752-3630

**From:** "Tammie O'Rourke" <torourke@metabiota.com>
**Sent:** Fri, 21 Sep 2018 11:11:15 -0700
**Subject:** Re: Public Site
**To:** David Wolking <djwolking@ucdavis.edu>
**Cc:** jkmazet [REDACTED], Karen Saylors <ksaylors@metabiota.com>, "Johnson, Christine Kreuder" <ckjohnson@ucdavis.edu>, "Goldstein, Tracey" <tgoldstein@ucdavis.edu>
Analytics healthmap.org Pages 20150101-20180920 by Country.pdf

Hi all,
I have attached an analytics report of how many hits our public site gets and the location of where the hits come from. In short, the public site is hit an average of approximately 250 times/month, mostly by folks in the US. There many different reports we can pull from Google Analytics, so if there is anything else you would like to know, please let me know!
Tammie

On Fri, Sep 21, 2018 at 9:36 AM David J Wolking <djwolking@ucdavis.edu> wrote:

> Thanks Tammie, the pop up is a good temp solution. I think we can go that route for now. I don't think we need to share widely if it's going to be fixed soon.
> Any idea how many visits that site gets daily/weekly? Would be curious to see some of their analytics at some point.
>
> Thanks!
>
> David
>
> On Fri, Sep 21, 2018 at 8:46 AM Tammie O'Rourke <torourke@metabiota.com> wrote:
>
> > Hi Jonna & team,
> >
> > Hope your travels are going well.
> >
> > I just wanted to give you a heads up that the public site is down. The page loads, but the data is not displaying. The problem is on the healthmap side and according to the folks there, their cloud server was compromised and they are in the process of rebuilding a new one. They anticipate the site will be up again by the end of next week. In the meantime, I have asked them popup a message indicating the site is temporarily down, rather than just showing a blank map.
> >
> > Is there anyone else I should be contacting about this and/or any other action I should take?
> >
> > Thanks,
> > Tammie
> >
> > --
> > Tammie O'Rourke
> > Metabiota
> > Senior Information Management Developer
> > Emerging Pandemic Threats - PREDICT Program
> > tel: +1-250-618-2460
>
> --
> Tammie O'Rourke
> Metabiota
> Senior Information Management Developer
> Emerging Pandemic Threats - PREDICT Program

tel: +1-250-618-2460

http://healthmap.org
healthmap.org

GO TO REPORT

## Pages

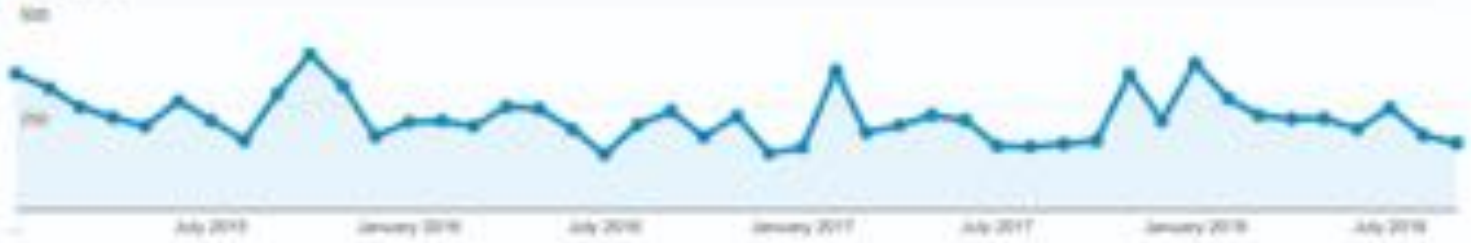
ALL + PAGE /predict/

Jan 1, 2015 - Sep 20, 2018

All Users
0.22% Pageviews

Explorer

Pageviews



| Page | Country | Pageviews | Unique Pageviews | Avg. Time on Page | Entrances | Bounce Rate | % Exit | Page Value |
|---|---|---|---|---|---|---|---|---|
| | | 5,683<br>% of Total:<br>0.13%<br>(4,439,780) | 4,779<br>% of Total:<br>0.12%<br>(3,875,685) | 00:07:03<br>Avg for View:<br>00:03:13<br>(119.02%) | 4,367<br>% of Total:<br>0.13%<br>(3,409,067) | 73.03%<br>Avg for View:<br>80.37%<br>(-9.13%) | 77.91%<br>Avg for View:<br>73.85%<br>(5.51%) | $0.00<br>% of Total:<br>0.00%<br>($0.00) |
| 1. /predict/ | United States | 3,134<br>(56.18%) | 2,589<br>(54.04%) | 00:06:31 | 2,351<br>(53.84%) | 72.91% | 75.59% | $0.00<br>(0.00%) |
| 2. /predict/ | Canada | 545<br>(9.94%) | 423<br>(8.84%) | 00:09:00 | 364<br>(8.34%) | 60.93% | 69.91% | $0.00<br>(0.00%) |
| 3. /predict/ | United Kingdom | 209<br>(3.68%) | 167<br>(3.50%) | 00:01:52 | 167<br>(3.82%) | 73.53% | 78.47% | $0.00<br>(0.00%) |
| 4. /predict/ | France | 167<br>(2.94%) | 143<br>(2.99%) | 00:07:55 | 134<br>(3.07%) | 70.90% | 76.65% | $0.00<br>(0.00%) |
| 5. /predict/ | Mexico | 146<br>(2.57%) | 131<br>(2.74%) | 00:03:51 | 128<br>(2.93%) | 85.94% | 87.67% | $0.00<br>(0.00%) |
| 6. /predict/ | Thailand | 89<br>(1.57%) | 80<br>(1.68%) | 00:17:15 | 80<br>(1.83%) | 83.13% | 89.89% | $0.00<br>(0.00%) |
| 7. /predict/ | India | 86<br>(1.51%) | 77<br>(1.61%) | 00:05:50 | 63<br>(1.44%) | 66.67% | 76.74% | $0.00<br>(0.00%) |
| 8. /predict/ | Australia | 83<br>(1.46%) | 74<br>(1.55%) | 00:07:20 | 72<br>(1.65%) | 70.83% | 86.75% | $0.00<br>(0.00%) |
| 9. /predict/ | Senegal | 63<br>(1.11%) | 63<br>(1.32%) | 00:00:00 | 60<br>(1.37%) | 95.71% | 100.00% | $0.00<br>(0.00%) |
| 10. /predict/ | Indonesia | 57<br>(1.00%) | 45<br>(0.94%) | 00:06:33 | 45<br>(1.03%) | 46.67% | 78.68% | $0.00<br>(0.00%) |
| 11. /predict/ | Cameroon | 54<br>(0.95%) | 42<br>(0.88%) | 00:10:10 | 39<br>(0.89%) | 71.43% | 77.78% | $0.00<br>(0.00%) |
| 12. /predict/ | Malaysia | 54<br>(0.95%) | 45<br>(0.94%) | 00:28:24 | 42<br>(0.96%) | 78.57% | 77.78% | $0.00<br>(0.00%) |
| 13. /predict/ | Nepal | 54<br>(0.95%) | 48<br>(1.01%) | 00:05:02 | 48<br>(1.10%) | 68.75% | 83.33% | $0.00<br>(0.00%) |
| 14. /predict/ | Italy | 48<br>(0.84%) | 45<br>(0.94%) | 00:05:33 | 45<br>(1.03%) | 75.00% | 93.75% | $0.00<br>(0.00%) |
| 15. /predict/ | Belgium | 45<br>(0.79%) | 42<br>(0.88%) | 00:02:07 | 42<br>(0.96%) | 85.71% | 93.33% | $0.00<br>(0.00%) |
| 16. /predict/ | Brazil | 42<br>(0.74%) | 29<br>(0.61%) | 00:21:09 | 39<br>(0.89%) | 76.92% | 92.86% | $0.00<br>(0.00%) |
| 17. /predict/ | Switzerland | 39<br>(0.69%) | 36<br>(0.75%) | 00:04:46 | 36<br>(0.82%) | 75.00% | 92.31% | $0.00<br>(0.00%) |
| 18. /predict/ | Germany | 39<br>(0.69%) | 33<br>(0.69%) | 00:08:34 | 30<br>(0.69%) | 60.00% | 84.62% | $0.00<br>(0.00%) |
| 19. /predict/ | Kenya | 33<br>(0.58%) | 24<br>(0.50%) | 00:02:28 | 24<br>(0.55%) | 62.50% | 72.73% | $0.00<br>(0.00%) |

UCDUSR0003177

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 20. | /predict/ | South Korea | 44 | AV | 00:06:22 | 41 | 87.50% | 72.73% | AV |
| 21. | /predict/ | Japan | 30 | 30 | 00:00:00 | 27 | 100.00% | 100.00% | $0.30 |
| 22. | /predict/ | Vietnam | 30 | 30 | 00:00:00 | 30 | 90.00% | 100.00% | $0.30 |
| 23. | /predict/ | Bangladesh | 27 | 24 | 00:01:13 | 24 | 87.50% | 88.89% | $0.30 |
| 24. | /predict/ | Spain | 27 | 24 | 00:03:43 | 24 | 75.00% | 88.89% | $0.30 |
| 25. | /predict/ | Sweden | 27 | 24 | 00:15:36 | 21 | 42.86% | 77.78% | $0.30 |
| 26. | /predict/ | Singapore | 24 | 21 | 00:06:04 | 18 | 42.86% | 87.50% | $0.30 |
| 27. | /predict/ | Argentina | 21 | 21 | 00:00:00 | 15 | 100.00% | 100.00% | $0.30 |
| 28. | /predict/ | Chile | 21 | 15 | 00:17:14 | 15 | 60.00% | 71.43% | $0.30 |
| 29. | /predict/ | Colombia | 21 | 21 | 00:02:15 | 15 | 80.00% | 85.71% | $0.30 |
| 30. | /predict/ | Netherlands | 21 | 15 | 00:08:04 | 12 | 75.00% | 71.43% | $0.30 |
| 31. | /predict/ | Tanzania | 21 | 15 | 00:05:39 | 12 | 75.00% | 71.43% | $0.30 |
| 32. | /predict/ | South Africa | 21 | 21 | 00:07:27 | 18 | 100.00% | 85.71% | $0.30 |
| 33. | /predict/ | Egypt | 18 | 15 | 00:02:27 | 15 | 80.00% | 83.33% | $0.30 |
| 34. | /predict/ | Myanmar (Burma) | 18 | 12 | 00:00:28 | 12 | 60.00% | 66.67% | $0.30 |
| 35. | /predict/ | Taiwan | 18 | 18 | 00:02:42 | 18 | 50.00% | 66.67% | $0.30 |
| 36. | /predict/ | Jordan | 15 | 9 | 00:04:31 | 9 | 66.67% | 60.00% | $0.30 |
| 37. | /predict/ | Saudi Arabia | 15 | 9 | 00:12:00 | 6 | 50.00% | 60.00% | $0.30 |
| 38. | /predict/ | Congo - Kinshasa | 12 | 6 | 00:09:27 | 6 | 50.00% | 50.00% | $0.30 |
| 39. | /predict/ | China | 12 | 12 | 00:00:00 | 12 | 75.00% | 100.00% | $0.30 |
| 40. | /predict/ | Ghana | 12 | 12 | 00:00:00 | 12 | 100.00% | 100.00% | $0.30 |
| 41. | /predict/ | Norway | 12 | 12 | 00:00:00 | 9 | 100.00% | 100.00% | $0.30 |
| 42. | /predict/ | Philippines | 12 | 9 | 00:35:11 | 9 | 66.67% | 75.00% | $0.30 |
| 43. | /predict/ | Portugal | 12 | 12 | 00:00:30 | 12 | 75.00% | 75.00% | $0.30 |
| 44. | /predict/ | Romania | 12 | 12 | 00:00:00 | 12 | 100.00% | 100.00% | $0.30 |
| 45. | /predict/ | Russia | 12 | 9 | 00:00:28 | 9 | 66.67% | 75.00% | $0.30 |
| 46. | /predict/ | Denmark | 9 | 9 | 00:00:00 | 9 | 100.00% | 100.00% | $0.30 |
| 47. | /predict/ | Cambodia | 9 | 9 | 00:00:00 | 9 | 100.00% | 100.00% | $0.30 |
| 48. | /predict/ | Pakistan | 9 | 9 | 00:00:00 | 6 | 100.00% | 100.00% | $0.30 |
| 49. | /predict/ | Rwanda | 9 | 9 | 00:00:00 | 9 | 66.67% | 100.00% | $0.30 |
| 50. | /predict/ | Uganda | 9 | 9 | 00:00:00 | 9 | 100.00% | 100.00% | $0.30 |
| 51. | /predict/ | (not set) | 9 | 9 | 00:00:00 | 9 | 50.00% | 100.00% | $0.30 |
| 52. | /predict/ | Austria | 6 | 6 | 00:00:00 | 6 | 100.00% | 100.00% | $0.30 |
| 53. | /predict/ | Côte d'Ivoire | 6 | 6 | 00:00:00 | 6 | 50.00% | 100.00% | $0.30 |
| 54. | /predict/ | Costa Rica | 6 | 6 | 00:00:00 | 6 | 100.00% | 100.00% | $0.30 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 55. | /predict/ | Ethiopia | 6 (6.11%) | 6 (0.12%) | 00:00:00 | 6 (0.14%) | 50.00% | 100.00% | $0.30 (0.00%) |
| 56. | /predict/ | Hungary | 6 (6.11%) | 6 (0.12%) | 00:00:00 | 3 (0.07%) | 100.00% | 100.00% | $0.30 (0.00%) |
| 57. | /predict/ | Israel | 6 (6.11%) | 6 (0.12%) | 00:00:00 | 6 (0.14%) | 100.00% | 100.00% | $0.30 (0.00%) |
| 58. | /predict/ | Iran | 6 (6.11%) | 6 (0.12%) | 00:01:35 | 6 (0.14%) | 50.00% | 50.00% | $0.30 (0.00%) |
| 59. | /predict/ | Poland | 6 (6.11%) | 6 (0.12%) | 00:00:00 | 3 (0.07%) | 100.00% | 100.00% | $0.30 (0.00%) |
| 60. | /predict/ | Serbia | 6 (6.11%) | 3 (0.06%) | 00:10:09 | 3 (0.07%) | 0.00% | 50.00% | $0.30 (0.00%) |
| 61. | /predict/ | Slovenia | 6 (6.11%) | 6 (0.12%) | 00:00:00 | 0 (0.00%) | 0.00% | 100.00% | $0.30 (0.00%) |
| 62. | /predict/ | United Arab Emirates | 3 (3.05%) | 3 (0.06%) | 00:00:00 | 0 (0.00%) | 0.00% | 100.00% | $0.30 (0.00%) |
| 63. | /predict/ | Afghanistan | 3 (3.05%) | 3 (0.06%) | 00:00:00 | 3 (0.07%) | 100.00% | 100.00% | $0.30 (0.00%) |
| 64. | /predict/ | Bahamas | 3 (3.05%) | 3 (0.06%) | 00:00:00 | 3 (0.07%) | 100.00% | 100.00% | $0.30 (0.00%) |
| 65. | /predict/ | Cuba | 3 (3.05%) | 3 (0.06%) | 00:01:17 | 0 (0.00%) | 0.00% | 0.00% | $0.30 (0.00%) |
| 66. | /predict/ | Czechia | 3 (3.05%) | 3 (0.06%) | 00:00:00 | 3 (0.07%) | 100.00% | 100.00% | $0.30 (0.00%) |
| 67. | /predict/ | Ecuador | 3 (3.05%) | 3 (0.06%) | 00:00:02 | 0 (0.00%) | 0.00% | 0.00% | $0.30 (0.00%) |
| 68. | /predict/ | Georgia | 3 (3.05%) | 3 (0.06%) | 00:00:53 | 3 (0.07%) | 0.00% | 0.00% | $0.30 (0.00%) |
| 69. | /predict/ | French Guiana | 3 (3.05%) | 3 (0.06%) | 00:00:00 | 3 (0.07%) | 100.00% | 100.00% | $0.30 (0.00%) |
| 70. | /predict/ | Hong Kong | 3 (3.05%) | 3 (0.06%) | 00:00:00 | 3 (0.07%) | 100.00% | 100.00% | $0.30 (0.00%) |
| 71. | /predict/ | Kazakhstan | 3 (3.05%) | 3 (0.06%) | 00:00:00 | 3 (0.07%) | 100.00% | 100.00% | $0.30 (0.00%) |
| 72. | /predict/ | Laos | 3 (3.05%) | 3 (0.06%) | 00:00:00 | 3 (0.07%) | 100.00% | 100.00% | $0.30 (0.00%) |
| 73. | /predict/ | Sri Lanka | 3 (3.05%) | 3 (0.06%) | 00:00:00 | 3 (0.07%) | 100.00% | 100.00% | $0.30 (0.00%) |
| 74. | /predict/ | Liberia | 3 (3.05%) | 3 (0.06%) | 00:00:00 | 3 (0.07%) | 100.00% | 100.00% | $0.30 (0.00%) |
| 75. | /predict/ | Lithuania | 3 (3.05%) | 3 (0.06%) | 00:00:00 | 3 (0.07%) | 100.00% | 100.00% | $0.30 (0.00%) |
| 76. | /predict/ | Macedonia (FYROM) | 3 (3.05%) | 3 (0.06%) | 00:00:00 | 3 (0.07%) | 100.00% | 100.00% | $0.30 (0.00%) |
| 77. | /predict/ | Mongolia | 3 (3.05%) | 3 (0.06%) | 00:00:00 | 3 (0.07%) | 100.00% | 100.00% | $0.30 (0.00%) |
| 78. | /predict/ | Nigeria | 3 (3.05%) | 3 (0.06%) | 00:00:00 | 3 (0.07%) | 100.00% | 100.00% | $0.30 (0.00%) |
| 79. | /predict/ | New Zealand | 3 (3.05%) | 3 (0.06%) | 00:09:19 | 0 (0.00%) | 0.00% | 0.00% | $0.30 (0.00%) |
| 80. | /predict/ | Panama | 3 (3.05%) | 3 (0.06%) | 00:00:00 | 3 (0.07%) | 100.00% | 100.00% | $0.30 (0.00%) |
| 81. | /predict/ | Peru | 3 (3.05%) | 3 (0.06%) | 00:00:00 | 3 (0.07%) | 100.00% | 100.00% | $0.30 (0.00%) |
| 82. | /predict/ | Sudan | 3 (3.05%) | 3 (0.06%) | 00:00:00 | 3 (0.07%) | 100.00% | 100.00% | $0.30 (0.00%) |
| 83. | /predict/ | Sierra Leone | 3 (3.05%) | 3 (0.06%) | 00:00:00 | 3 (0.07%) | 100.00% | 100.00% | $0.30 (0.00%) |
| 84. | /predict/ | Tunisia | 3 (3.05%) | 3 (0.06%) | 00:00:00 | 3 (0.07%) | 100.00% | 100.00% | $0.30 (0.00%) |
| 85. | /predict/ | Trinidad & Tobago | 3 (3.05%) | 3 (0.06%) | 00:00:00 | 3 (0.07%) | 0.00% | 100.00% | $0.30 (0.00%) |
| 86. | /predict/ | Ukraine | 3 (3.05%) | 3 (0.06%) | 00:00:00 | 3 (0.07%) | 100.00% | 100.00% | $0.30 (0.00%) |
| 87. | /predict/ | Venezuela | 3 (3.05%) | 3 (0.06%) | 00:00:00 | 3 (0.07%) | 100.00% | 100.00% | $0.30 (0.00%) |

Rows 1 - 87 of 87

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UCDUSP00031180

**From:** Jonna Mazet <jkmazet@ucdavis.edu>
**To:** AOTR/Grant Manager Andrew Clements <AClements@usaid.gov>
**Sent:** 12/13/2018 10:07:15 PM
**Subject:** Fwd: Memo

Just in case you didn't get this link separately.
J

---------- Forwarded message ---------
From: **David J Wolking** <djwolking@ucdavis.edu>
Date: Thu, Dec 13, 2018 at 12:24 PM
Subject: Re: Memo
To: Anthony, Simon J. <sja2127@cumc.columbia.edu>, Jon Epstein <epstein@ecohealthalliance.org>, James Desmond <desmond@ecohealthalliance.org>
Cc: Prof. Jonna Mazet <jkmazet@ucdavis.edu>

Hello,

We've posted what we believe are the most essential and useful materials. Brian kindly provided comments and notes for context around each document and file. You can access them in Box with this password protected link.

Link: https://ucdavis.box.com REDACTED
Password: REDACTED

Let us know if you have any questions.

David

**From:** Andrew Clements <aclements@usaid.gov>
**To:** Jonna Mazet <jkmazet@ucdavis.edu>
**CC:** Tracey Goldstein <tgoldstein@ucdavis.edu>;Brian Bird <bhbird@ucdavis.edu>;David J Wolking <djwolking@ucdavis.edu>;PREDICTMGT <predictmgt@usaid.gov>
**Sent:** 12/20/2018 5:57:58 PM
**Subject:** Re: Marburg - Press

Sorry, had only looked at the first couple of paragraphs where CDC and UCD were mentioned.

Andrew Clements, Ph.D.
Senior Scientific Advisor
Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health
U.S. Agency for International Development
Mobile phone: 1-571-345-4733
E-mail: aclements@usaid.gov

*For more information on USAID's Emerging Pandemic Threats program, see: http://www.usaid.gov/ept2*

On Thu, Dec 20, 2018 at 7:28 PM Jonna Mazet <jkmazet@ucdavis.edu> wrote:
Also, just as a follow-up, I have just read the CDC press release from your link, and USAID is most certainly mentioned.
Seems the journalist took it out and has removed all reference to "US", so maybe that is part of the problem.
Jonna

On Thu, Dec 20, 2018 at 10:25 AM Jonna Mazet <jkmazet@ucdavis.edu> wrote:
Yes, Mission has expressed discontent to Brian, and he is trying to get the WaPo to add USAID to the article online -- this is a huge lift and ask by us to that level of paper., but we'll see. Can't speak to CDC press release, except to say that last time we saw a draft, both were in. Our team has been working incredibly hard, as you know to manage this whole thing peacefully & it has come off with very little drama. Note that we put USAID everywhere and logo'ed everything. Brian says he mentioned 50 times in his interview with WaPo.

As a note, would be nice to first hear some praise for those efforts from the Mission and for not letting this thing go off the rails, before complaints especially since we are all so wiped out by this stuff at this busy time of the year. Oh well. Newspapers often don't list funders or even institutions. I get in trouble all of the time for not being shown to be affiliated with UCD because the journalists choose to leave it off. Bummer on this one is that it appears that the other organizations, including CDC are mentioned, so just USAID seems to have been dropped. We'll see what we can do, but....

CONGRATULATIONS TO ALL OF US FOR PULLING OFF SMOOTH COMMUNICATIONS SO FAR WITH THE GOVERNMENT WITHOUT VIOLENCE, PANIC, OR THREATS! YOU ALL HAVE DONE A GREAT JOB, INCLUDING ANDREW, IN TRYING TO MAKE ALL SECTORS HAPPY AND INFORMED WHILE NOT RELEASING INFO IN ADVANCE OF THE GOVERNMENT AND APPROPRIATE CHANNELS.

Even got some press ;) Great job, all!
Jonna

On Thu, Dec 20, 2018 at 10:09 AM Andrew Clements <aclements@usaid.gov> wrote:
FYI. USAID is not mentioned in the CDC press release which seems to be the basis for the WaPo and Reuters articles which also do not mention USAID. Mission not thrilled.

https://www.cdc.gov/media/releases/2018/p1220-marburg-found-in-bats.html

https://www.reuters.com/article/us-leone-health/sierra-leone-fruit-bats-infected-with-ebola-like-marburg-virus-idUSKCN1OJ23C

https://www.washingtonpost.com/health/2018/12/20/deadly-marburg-virus-found-bats-sierra-leone/?utm_term=.60cad50f7ec8

**From:** Peter Daszak <daszak@ecohealthalliance.org>
**To:** Jonna Mazet <jkmazet@ucdavis.edu>;Anthony Ramos <ramos@ecohealthalliance.org>
**Sent:** 3/28/2019 4:24:28 PM
**Subject:** June 13th - cosmos club?

Hi Jonna – do you think you'll be able to make it to the June 13th Cosmos Club event (10th anniversary of the NAM report "Sustaining Global Surveillance and Response to Emerging Zoonotic Diseases")?

I'm going to start working on the agenda with Anthony and it would be good if you can do it, but don't want to ruin your travel plans for what might not be the most high-impact meeting this summer (!)…

Cheers,

Peter

**Peter Daszak**
*President*

EcoHealth Alliance
460 West 34th Street – 17th Floor
New York, NY 10001

Tel. +1 212-380-4474
Website: www.ecohealthalliance.org
Twitter: @PeterDaszak

*EcoHealth Alliance leads cutting-edge research into the critical connections between human and wildlife health and delicate ecosystems. With this science we develop solutions that prevent pandemics and promote conservation.*

**From:** "William B. Karesh" <karesh@ecohealthalliance.org>
**To:** Jonna Mazet <jkmazet@ucdavis.edu>
**Subject:** Re: PREDICT update: Bangladesh
**Sent:** Tue, 3 Sep 2019 23:35:52 +0000

Thanks.
It's ironic that DC used to really be in to the project and the Missions were blahse, now it seems reversed. I guess we impressed the people that actually do the work on the ground.

Sent from my iPhone
**William B. Karesh, D.V.M**
*Executive Vice President for Health and Policy*

EcoHealth Alliance
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President, OIE Working Group on Wildlife

Co-chair, IUCN Species Survival Commission - Wildlife Health Specialist Group

EPT Partners Liaison, USAID Emerging Pandemic Threats - PREDICT-2 Program

***EcoHealth Alliance leads cutting-edge research into the critical connections between human and wildlife health and delicate ecosystems. With this science we develop solutions that promote conservation and prevent pandemics.***

On Sep 3, 2019, at 6:48 PM, Jonna Mazet <jkmazet@ucdavis.edu> wrote:

> Hi Andrew,
> Received., thanks. Based on your email, I am still a bit confused, as we hadn't made a distinction between Aug-Sept activities and the economic analyses. I do not believe that I have FY18 money left at EHA to pay Aug-October invoices for anything in Bangladesh, including the closeout, as well as the economic analyses unless we move money from other countries. Perhaps you were planning for that in this communication, but I just want to make sure that you are aware that all work has stopped in Bangladesh pending movement of funds or your advice otherwise.
> Just clarifying,
> Jonna

On Tue, Sep 3, 2019 at 5:46 AM Andrew Clements <aclements@usaid.gov> wrote:

> See request below on notifying GOB.

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

Begin forwarded message:

**From:** Ariella Camera <acamera@usaid.gov>
**Date:** September 3, 2019 at 2:02:15 PM GMT+2
**To:** Andrew Clements <aclements@usaid.gov>
**Cc:** Angela Wang <awang@usaid.gov>, PREDICTMGT <predictmgt@usaid.gov>, "Md. Abul Kalam" <mdkalam@usaid.gov>
**Subject: Re: PREDICT update: Bangladesh**

Ok, I would prefer for us to do it together. Thank you.

Sent from my iPhone

On Sep 3, 2019, at 5:58 PM, Andrew Clements <aclements@usaid.gov> wrote:

> My assumption is that the PREDICT country team will discuss with the GOB. This is very recent news so they may not have done it yet. Please don't raise with GOB until PREDICT has had a chance to do it first.

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

On Sep 3, 2019, at 11:26 AM, Ariella Camera <acamera@usaid.gov> wrote:

> Hi Andrew,
> Thank you for the update. It is unfortunate since the economic analysis would have been informative for policy discussions and thinking about self-reliance. Regarding these updates will you and the PREDICT team be communicating this to our key government counterparts? I think it will be a tough discussion and we are happy to be present for it if needed.

If there is anything you need from us on this end let me know.

Have a good day,

**Ariella Camera**
Deputy Director
Health Systems Strengthening Pillar
Office of Population, Health, Nutrition, and Education
USAID/Bangladesh

Tel: REDACTED
Cell:
Email: acamera@usaid.gov

**Bangladesh is 10 hours ahead of Washington, D.C., and +6 GMT. Our work week is Sunday through Thursday.*

On Tue, Sep 3, 2019 at 2:08 PM Andrew Clements <aclements@usaid.gov> wrote:

> Hi Ariella,

I will be sending out an update on PREDICT later today, but wanted to give you a heads up, specifically on Bangladesh issues.

Regarding completion of **year 5 activities** (final year of PREDICT), which were supposed to be finished by 9/30/19 but were delayed because of funding arriving late and not being the full amount (including $1.1 million less for Bangladesh), I have had to instruct PREDICT to stop all activities in Bangladesh because of insufficient funds. I've had to pull funding from somewhere else in the project just to cover bills from Bangladesh that will arrive in August and September. I've been told by PREDICT that the close-out of the project and sharing of initial results will still take place. However, the OH economic analysis will not be possible (at this point, in-country data has been collected, but PREDICT can't move forward without additional funds). I will try again in a couple of weeks to see if additional year 5 money can be obligated for Bangladesh, but I have no idea whether it will happen or not since, unfortunately, others in OH are making that decision.

In addition to the year 5 budget shortfall, we haven't been allowed to obligate funds for the PREDICT **year 6 extension** and I'm skeptical that it can be done after FY19 closes on 9/30/19. As a result, we will not be pursuing these additional activities in any of the countries we had originally proposed, including Bangladesh.

Sorry that I don't have better news. Please know that the PREDICT staff and I feel terrible that the project is not being permitted to complete the work in Bangladesh.

Andrew

Andrew Cunningham, Ph.D.
Senior Scientific Advisor
Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health
U.S. Agency for International Development
Mobile phone: 1-571-345-4253
E-mail: acunningham@usaid.gov

*For more information on USAID's Emerging Pandemic Threats program, see:* http://www.usaid.gov/ept2

**From:** Andrew Clements <aclements@usaid.gov>
**Sent:** Tue, 22 Oct 2019 07:53:31 -0700
**Subject:** EPT-2 data sharing meeting, March/April 2020?
**To:** "Wantanee (FAORAP) Kalpravidh" [redacted], Jonna Mazet <jkmazet@ucdavis.edu>, Christine Kreuder Johnson <ckjohnson@ucdavis.edu> [redacted] zhangw@who.int, moena@who.int, chadwickc@who.int, vankerkhovem@who.int, cchrisman@usaid.gov, "Filip Claes (AGAH)" [redacted], shindon@who.int, William Karesh <Karesh@ecohealthalliance.org>, daszak@ecohealthalliance.org
**Cc:** predictmgt@usaid.gov, faomgt@usaid.gov, whomgt@usaid.gov

Hi everyone,
With the Predict-2 project ending March 31, 2020, I wanted to get your thoughts on the utility of having a final EPT-2 data sharing meeting sometime around then. This could include not only EPT-2 partners, but others (e.g. CDC, NIH, DTRA, etc.) who would likely be interested in the findings.

Besides making sure the results get shared among the emerging threats community, this gathering could also serve to allow a bunch of smart people to talk about how these findings can be used going forward and identify/highlight/prioritize remaining gaps.

With that background in mind, two questions for you:

1. Do you think this would be useful?

And

2) would your organization be available to participate in a 2-day discussion around March/April of 2020? (For now, let's assume the location would be Washington, DC.)

Thanks!

Andrew

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

| | |
|---|---|
| **From:** | Andrew Clements <aclements@usaid.gov> |
| **To:** | Alisa Pereira <apereira@usaid.gov> |
| **CC:** | Elizabeth Leasure <ealeasure@ucdavis.edu>;David J Wolking <djwolking@ucdavis.edu>;Cara Chrisman <cchrisman@usaid.gov>;Jonna Mazet <jkmazet@ucdavis.edu>;Christine Kreuder Johnson <ckjohnson@ucdavis.edu>;Amalhin Shek <ashek@usaid.gov>;PREDICTMGT <predictmgt@usaid.gov>;Predict inbox <predict@ucdavis.edu> |
| **Sent:** | 11/26/2019 2:18:36 PM |
| **Subject:** | Re: update on disposition plan process |

Hi all,

Please see below for the GC interpretation Alisa previously referenced.

First of all, a UC Davis' public-facing webpage (written by its own counsel no less) states that UC Davis is a state institution and therefore subject to state law such as CPRA (this is California's version of federal FOIA public disclosure law). Couple that inferential observation with a closer look at CFR's definitions. Specifically, 2 CFR 200.90 talks about a "state" obviously being a US state or US-held territorial possession but goes on to say that this includes "any agency or instrumentality thereof". This language encompasses quite a broad swath of possible organizations that operate under a state's umbrella. I don't see anything outwardly obvious that disqualifies a state university from that definition. Unless this part of UC Davis (with whom the Agency has formed an assistance agreement) is explicitly holding itself out as some kind of independent or quasi-independent component of UC Davis (exempting it from state public law), then I would think that this entity may reasonably be considered a "state" entity for CFR compliance purposes.

As I stated earlier, CFR 200.313 states that even though the property is vested with the partner, this is conditional and after the property is no longer needed to the project, the disposition of property is approved by the AO with preference first to another project funded by the awarding agency and second to another Federal agency. However, in the case of awards made to state entities, the disposition is governed by state law. So UC Davis is correct that AO approval is not needed for disposition of the property, but for a different reason. Because UC Davis is a state institution the disposition of property is governed by California state law. We should however, request the UC Davis provide with their disposition plan and the California state authorities that govern this disposition.

ACTION ITEM: for our files, I am requesting that you submit your disposition plan for the property and what state-imposed authorities you are invoking to justify the actions you are taking under the plan.

Thanks!

Andrew

Andrew Clements, Ph.D.
Senior Scientific Advisor
Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health
U.S. Agency for International Development
Mobile phone: 1-571-345-4215
E-mail: aclements@usaid.gov

*For more information on USAID's Emerging Pandemic Threats program, see: http://www.usaid.gov/ept2*

On Fri, Nov 22, 2019 at 10:01 PM Alisa Pereira <apereira@usaid.gov> wrote:
Dear All

I had another discussion with OAA about this issue. Patricia, brought the issue to GC. GC's interpretation actually had nothing to do with the CFR versus the CA, but rather UC Davis' status as a State institution. Since Davis is considered a State institution, the process will be for you all to send us a copy of your disposition plan along with the authorities under the State of California that you use for disposition. You, at that point, will not be seeking approval from USAID, but rather documenting the process and authority granted to you by the State of California.

I have asked for the actual language from GC so you can have it for your records, and have the precise language. Please consider this message just a heads up.

Thanks
Alisa

**Alisa Pereira, Senior Public Health Advisor**
USAID, Contractor
Bureau for Global Health, Office of Infectious Disease, Emerging Threats Division
Phone:202-997-9966
Email: apereira@usaid.gov

*GHSI-III - Social Solutions International, Inc. prime contractor*

**Sent:** Fri, 31 Jan 2020 16:58:36 -0800
**Subject:** Re: URGENT - PREDICT Briefing
**From:** Jonna Mazet <jkmazet@ucdavis.edu>
**To:** Cara Chrisman <cchrisman@usaid.gov>
**Cc:** Christine Kreuder Johnson <ckjohnson@ucdavis.edu>, Peter Daszak <daszak@ecohealthalliance.org>, David J Wolking <djwolking@ucdavis.edu>, Predict inbox <predict@ucdavis.edu>, Padmaja Shetty <pshetty@usaid.gov>, Andrew Clements <aclements@usaid.gov>, Alisa Pereira <apereira@usaid.gov>, Amalhin Shek <ashek@usaid.gov>, PREDICTMGT <predictmgt@usaid.gov>

Hi,
I'll be in town anyway & could take a break on the 12th from my other meeting. If others are available or want a different time, also fine with me.
Just let me know,
Jonna

On Fri, Jan 31, 2020 at 3:58 PM Cara Chrisman <cchrisman@usaid.gov> wrote:

> Hi PREDICT-2 Team,
> I hope you're all doing well! As of about an hour ago, we have an urgent request for a presentation by the PREDICT team. The USAID Chief of Staff would like to highlight our investments over the years in the project by hosting a public briefing. The details are still evolving, but one option is on the Hill and either way there is interest in inviting staffers as well as having it open to the public.
>
> The suggestion was ASAP, but we're pushing back to see if it would be possible the week of Feb. 10th. The 13th has been suggested, but I know many of you have commitments the 12th and 13th. Would anyone be able to come early or stay late?
>
> The proposed format is 1.5 hours long, starting with a USAID presentation of our global health security investments, then a P2 presentation of your work over the years, then a Q & A period.
>
> I realize this is last minute and asking a lot, especially as the project is wrapping up, but is this something that some members of the team would be able to do?
>
> Best,
> Cara

Cara J. Chrisman, PhD
Deputy Division Chief
Emerging Threats Division
Office of Infectious Disease, Bureau for Global Health
U.S. Agency for International Development (USAID)
Desk: (202) 916-2065
Cell: REDACTED
E-mail: cchrisman@usaid.gov

**From:** Peter Daszak <daszak@ecohealthalliance.org>
**To:** Cara Chrisman <cchrisman@usaid.gov>, Christine Kreuder Johnson <ckjohnson@ucdavis.edu>, Jonna Mazet <jkmazet@ucdavis.edu>, David J Wolking <djwolking@ucdavis.edu>, Predict inbox <predict@ucdavis.edu>
**Cc:** Padmaja Shetty <pshetty@usaid.gov>, Andrew Clements <aclements@usaid.gov>, Alisa Pereira <apereira@usaid.gov>, Amalhin Shek <ashek@usaid.gov>, PREDICTMGT <predictmgt@usaid.gov>
**Subject:** RE: URGENT - PREDICT Briefing
**Sent:** Sat, 1 Feb 2020 01:08:08 +0000

Can only do the 14th. I've now got to go to WHO for a 2019nCoV meeting, then have a meeting on 13th...

Cheers,

Peter

**Peter Daszak**
*President*

EcoHealth Alliance
460 West 34th Street – 17th Floor
New York, NY 10001

Tel. +1 212-380-4474
Website: www.ecohealthalliance.org
Twitter: @PeterDaszak

*EcoHealth Alliance leads cutting-edge research into the critical connections between human and wildlife health and delicate ecosystems. With this science we develop solutions that prevent pandemics and promote conservation.*

**From:** Cara Chrisman [mailto:cchrisman@usaid.gov]
**Sent:** Friday, January 31, 2020 6:59 PM
**To:** Christine Kreuder Johnson; Jonna Mazet; Peter Daszak; David J Wolking; Predict inbox
**Cc:** Padmaja Shetty; Andrew Clements; Alisa Pereira; Amalhin Shek; PREDICTMGT
**Subject:** URGENT - PREDICT Briefing

Hi PREDICT-2 Team,

I hope you're all doing well! As of about an hour ago, we have an urgent request for a presentation by the PREDICT team. The USAID Chief of Staff would like to highlight our investments over the years in the project by hosting a public briefing. The details are still evolving, but one option is on the Hill and either way there is interest in inviting staffers as well as having it open to the public.

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The proposed format is 1.5 hours long, starting with a USAID presentation of our global health security investments, then a P2 presentation of your work over the years, then a Q & A period.

I realize this is last minute and asking a lot, especially as the project is wrapping up, but is this something that some members of the team would be able to do?

Best,
Cara

Cara J. Chrisman, PhD
Deputy Division Chief
Emerging Threats Division
Office of Infectious Disease, Bureau for Global Health
U.S. Agency for International Development (USAID)
Desk: (202) 916-2065
Cell: REDACTED
E-mail: cchrisman@usaid.gov

**From:** Andrew Clements <aclements@usaid.gov>
**Sent:** Mon, 10 Feb 2020 10:37:24 +0100
**Subject:** Re: pirease review
**To:** Christine Kreuder Johnson <ckjohnson@ucdavis.edu>
**Cc:** Cara Chrisman <cchrisman@usaid.gov>, "Pereira, Alisa (GH/HIDN)" <apereira@usaid.gov>, Amalhin Shek <ashek@usaid.gov>, Jonna Mazet <jkmazet@ucdavis.edu>, Tracey Goldstein <tgoldstein@ucdavis.edu>, David John Wolking <djwolking@ucdavis.edu>, Elizabeth Leasure <eaileasure@ucdavis.edu>

Couple of other questions:
1. How are you proposing to do the serology? Do you already have access to antibodies generated against nCoV? Can you do serology on animal samples as well?

2. What did you have in mind for further characterization? NGS? Receptor binding studies?

Thanks!

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

On Feb 9, 2020, at 1:54 AM, Christine Kreuder Johnson <ckjohnson@ucdavis.edu> wrote:

> That is a great question; agree that identifying all intermediate hosts would greatly help understand risk of ongoing spillover transmission to more people, especially if the virus infects domesticated species or wildlife that are common in trade. We would need to determine how practical that might be in China right now though. There still remains potential for direct spillover from the reservoir host in more rural settings (where spillover happens but is not as likely to be recognized). Our P2 data from China and nearby countries suggest that contact with the suspected bat reservoir hosts was common in rural settings. This is of course a rapidly changing situation and we'll review phylogenetic and epidemiologic information as available to adapt our plan. We will also be tapping into the breadth of expertise across our consortium.
> In terms of priorities for the next 6 months, we would like to offer assistance to China and neighboring countries in evaluation of suspect intermediate hosts and reservoirs to inform on public health risk. We also have a range of species sampled in P1/P2 that should be re-evaluated for coronaviruses in neighboring countries with similar epidemiologic risk.
> If sustained human-to-human transmission starts occurring outside of China over the next few months, we recognize that the majority of our assistance will need to be placed in helping to identify human cases (Objective 1), and then we can re-prioritize identifying animal hosts once the outbreak is under control.
> Hope that helps answer your question in some small way.
> /ckj
>
> **From:** Andrew Clements <aclements@usaid.gov>
> **Date:** Saturday, February 8, 2020 at 12:58 AM
> **To:** Christine Kreuder Johnson <ckjohnson@UCDAVIS.EDU>
> **Cc:** Cara Chrisman <cchrisman@usaid.gov>, Alisa Pereira <apereira@usaid.gov>, Amalhin Shek <ashek@usaid.gov>, Jonna Mazet <jkmazet@ucdavis.edu>, Tracey Goldstein <tgoldstein@ucdavis.edu>, David John Wolking <djwolking@ucdavis.edu>, Elizabeth Leasure <eaileasure@UCDAVIS.EDU>
> **Subject:** Re: pirease review
>
> Thanks, Chris.
>
> Quick follow up question: what are you thoughts on the relative levels of effort to definitively identify the bat host(s) vs. identifying intermediate host(s) which may have greater contact with people and therefore more spillover potential?

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email:* aclements@usaid.gov
**On Feb 8, 2020, at 2:03 AM, Christine Kreuder Johnson <ckjohnson@ucdavis.edu> wrote:**

Andrew,
The extended scope looks great to us all. We have a few edits tracked in attached for you to consider.
For Objective 1, we would prioritize outbreak assistance to the 28 countries in Asia and Africa. We think this could be most feasibly done by sending an outbreak kit of primers and probes that could test 300 or so samples from suspect human cases. We will also need to provide test confirmation support/expertise.
For Objective 2, an initial plan would involve 1) retesting samples from suspected bat reservoirs with the more sensitive PCR assay, 2) testing sympatric hosts in market and trade settings that could be intermediate host(s), 3) looking for serologic evidence in people at high-risk of exposure, and 4) further characterization of high priority coronaviruses we've detected. As we all discuss more with partners, we would be keen to update this plan with the latest insights from you and the team.
We would propose retesting approximately 500 animals by PCR and 400 people by serology in Asia and Southeast Asia countries.
From our quick look at the P1 and P2 archive, we have plenty of animals and people sampled at relevant interfaces in prioritized countries. We also have about 250 *Rhinolophus affinis* sampled, which is the bat species with the closest genetic relative to nCoV, and we have about 2,000 other *Rhinolophus* species sampled in the region (as cross-species transmission among co-occurring bats of the same spp is likely).
As you noted, we will need to sort out TVPA permissions, etc and determine which Asia and Southeast Asia countries will be most feasible in this v short timeline.
Hoping we can propose up to the $4.3M ceiling, with draft estimates as follows:
Salaries and wages: $467,403
Fringe benefits: $211,666
Travel: $64,400
Contractual: $746,271
Supplies: $1,521,480
Other costs: $7,000
Indirect costs: $1,295,068
We will need a little more time to come up with budget estimates by country but we could expect about 1/3 of effort/activities to go toward countries needing assistance under Objective 1 (28 countries), and 2/3 toward the ~ 8 countries neighboring China and/or within epizone of the suspected reservoir species.
Please let us know what additional information you need from us to get this going.
Many thanks,
Chris

---

**From:** Andrew Clements <aclements@usaid.gov>
**Date:** Tuesday, February 4, 2020 at 10:03 AM
**To:** Jonna Mazet <jkmazet@ucdavis.edu>, Christine Kreuder Johnson <ckjohnson@UCDAVIS.EDU>
**Cc:** Cara Chrisman <cchrisman@usaid.gov>, David John Wolking <djwolking@ucdavis.edu>, Elizabeth Leasure <ealeasure@UCDAVIS.EDU>, Alisa Pereira <apereira@usaid.gov>, Amalhin Shek <ashek@usaid.gov>
**Subject:** please review

Here's a first draft. Feel free to add specificity and add numbers of countries and samples that could be tested. Please also include a budget estimate against the usual sorts of categories used under Predict-2.

If you can get back to us by the end of the week, that would be great. It doesn't need to be voluminous or costed out to the penny so don't go too crazy!

Thanks!

Andrew

P.S. As usual, this is not a commitment of funding by USAID.

Andrew Clements, Ph.D.
Senior Scientific Advisor
Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health
U.S. Agency for International Development
Mobile phone: 1-571-345-4153
E-mail: aclements@usaid.gov

*For more information on USAID's Emerging Pandemic Threats program, see:* http://www.usaid.gov/ept2

<PREDICT nCoV extended scope 2-4-20 [UCD].docx>

**From:** Andrew Clements <aclements@usaid.gov>
**To:** Katherine Leasure <kaleasure@ucdavis.edu>
**CC:** PREDICTMGT <predictmgt@usaid.gov>;Predict inbox <predict@ucdavis.edu>;Jonna Mazet <Jkmazet@ucdavis.edu>
**Sent:** 3/16/2020 8:20:14 PM
**Subject:** Re: Cancelled - O'Rourke (USA) Travel

Thanks

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

On Mar 16, 2020, at 9:12 PM, Katherine Leasure <kaleasure@ucdavis.edu> wrote:

Hi Andrew. This trip has been cancelled; a new ITA will be submitted if/when it is rescheduled. Thanks!

Metabiota would like to request travel approval for Tammie O'Rourke to travel from Nanaimo, British Columbia, Canada to Davis, California, USA from March 23-27, 2020 to meet with the UC Davis global team.

**Trip purpose:** Ms. O'Rourke will meet with the UC Davis PREDICT global team to discuss EIDITH data progress and final submissions to the USAID Data Development Library (DDL).

--
**Katherine Leasure**
HR/Payroll/Financial Assistant
One Health Institute
530-752-7526

--
You received this message because you are subscribed to the Google Groups "PREDICTMGT" group.
To unsubscribe from this group and stop receiving emails from it, send an email to predictmgt+unsubscribe@usaid.gov.
To view this discussion on the web visit https://groups.google.com/a/usaid.gov/d/msgid/predictmgt/CAD6-xMK%3D66Rg1FbXnhnq_Zs0Lfi5HBtQdck1Ap1whEPHzgvxsA%40mail.gmail.com.

**From:** Andrew Clements <aclements@usaid.gov>
**To:** David J Wolking <djwolking@ucdavis.edu>
**CC:** Cara J. Chrisman <cchrisman@usaid.gov>;Amathin Shek <ashek@usaid.gov>;Alisa Pereira Emerging Threats Division <apereira@usaid.gov> predict@ucdavis.edu <predict@ucdavis.edu>;Christine Kreuder Johnson <ckjohnson@ucdavis.edu>
**Sent:** 3/30/2020 6:39:44 PM
**Subject:** [predict] Re: Review: Draft press release and communications for PREDICT COVID-19 Support

I need to check to see if we are going to issue a press release and if we want to provide a quote. Might be more complicated/time consuming to do those two things.

*Andrew P. Clements, Ph.D.*
*Senior Scientific Advisor*
*Emerging Threats Division/Office of Infectious Diseases/Bureau for Global Health*
*U.S. Agency for International Development*
*Mobile phone: 1-571-345-4253*
*Email: aclements@usaid.gov*

On Mar 27, 2020, at 11:04 PM, David J Wolking <djwolking@ucdavis.edu> wrote:

Andrew and team,

Attaching the draft press release here for your review in addition to the general communication for our network (see below). We'd love your feedback and to hear if USAID is planning any press or if UCD should go ahead with our one version vs. a joint release as done in the past.

Enjoy the weekend,

David

On Thu, Mar 26, 2020 at 3:38 PM David J Wolking <djwolking@ucdavis.edu> wrote:
Hi Andrew and team,

Any feedback on this message below? After our talk yesterday it likely needs some edits but if the overall tone is acceptable we'll move forward with it in some form.

Also - on the topic of a press release which would be sent around the same time, would USAID want to do a joint release or should UC Davis proceed independently (with your review of content and blessing of course) since you've already notified the missions and field offices?

Thanks!

David

On Wed, Mar 25, 2020 at 10:04 AM David J Wolking <djwolking@ucdavis.edu> wrote:

Hi Andrew,

This is a message we are planning to share with our global network and with you for distribution about the 6-month extension.

Let us know what you think, we are hoping go get this out into the universe this week if possible.

David
---------- Forwarded message ---------
From: **PREDICT Consortium** <predict@ucdavis.edu>
Date: Wed, Mar 25, 2020 at 9:21 AM
Subject: [TEST] PREDICT: COVID-19 Support
To: <djwolk@gmail.com>

**preview email**



# PREDICT

The emergence of COVID-19 highlights the critical importance of strengthening capabilities in surveillance, detection, and characterization of zoonotic threats, especially viruses that can be transmitted between animals and people. Since 2009, **PREDICT** has empowered partners in over 30 countries to deploy a One Health approach for zoonotic disease prevention, detection, and response. Our teams have collected and tested samples from over 164,000 animals and people and detected almost 1,200 potentially zoonotic viruses, among them 160 novel coronaviruses, including multiple SARS- and MERS-like coronaviruses.

In the earliest phase of the current COVID-19 outbreak, several of our laboratories in the South and Southeast Asia region were called into action to support early detection of the novel coronavirus now known as SARS-CoV-2 in patients. Using PREDICT's pathogen detection and discovery strategy, which uses broad-spectrum tools to detect viruses and

their novel near neighbors. these labs independently detected the new virus before the availability of specific tests and supported national outbreak response plans. Additionally, through the network catalyzed by PREDICT, these colleagues continue to share information and data and work together to optimize detection and diagnostics, as cases in the region and across the globe continue to rise.

PREDICT's work illuminate both the threat that emerging viruses pose to us, as well as the impact that strategic investments in strengthening pre-emptive capacity for virus surveillance can have on rapid disease detection and response.

Building on these successes, the United States Agency for International Development (USAID) has granted PREDICT an extension to continue working with our collaborating laboratories and global network to provide emergency support and short-term assistance during the pandemic. During this extension (through September 30, 2020), PREDICT will provide technical assistance with detection and characterization of human and animal SARS CoV-2 cases and general support for the COVID-19 public health response in partner countries. Additionally, PREDICT plans to continue investigations into the animal source(s) of this virus and other potential transmission hosts to help develop strategies aimed at reducing the risk of future spillovers of SARS CoV-2 and other yet-to-be identified viruses.

For questions on PREDICT's extension and plans for COVID-19 support, please contact **predict@ucdavis.edu**

To learn more about our work please visit: **www.p2.predict.global**

# IN THE NEWS



Simon Anthony, author of our landmark coronavirus diversity study, addresses concerns regarding the current novel coronavirus epidemic in China. Read more **here**.



There are about 1.67 million unknown viruses of the type that have previously emerged in people. Discovering and sequencing them should be a priority. Read more **here**

Additional resources:

- **Pandemic: How to Prevent an Outbreak (Netflix)**
- **Amid coronavirus outbreak, China bans consumption of wild animals (WION)**
- **Experts available to discuss new coronavirus outbreak (UC Davis)**
- **PREDICT special feature: COVID-19 (PDF available for download)**

***PREDICT was initiated in 2009 to strengthen global capacity for detection and discovery of viruses with pandemic potential that can move between animals and people. Learn more at p2.predict.global.***





UCDUSR0003201

UCDUSR0003202

**From:** David J Wolking <djwolking@ucdavis.edu>
**Sent:** Fri, 10 Apr 2020 13:50:19 -0700
**Subject:** Re: Reminder: PREDICT EB Call - MONDAY April 13 @ 11AM Pacific
**To:** Amanda Fine <afine@wcs.org>, Brian Bird <bhbird@ucdavis.edu>, Peter Daszak <daszak@ecohealthalliance.org>, "Prof. Jonna Mazet" <jkmazet@ucdavis.edu>, Kevin Olival <Olival@ecohealthalliance.org>, Dawn Zimmerman <ZimmermanD@si.edu>, Christine Kreuder Johnson <ckjohnson@ucdavis.edu>, "Murray, Suzan" <MurrayS@si.edu>, Simon Anthony <sja2127@columbia.edu>, Sarah Olson <REDACTED> Elizabeth Leasure <ealeasure@ucdavis.edu>, Jon Epstein <epstein@ecohealthalliance.org>, Tracey Goldstein <tgoldstein@ucdavis.edu>, "Tammie O'Rourke" <torourke@metabiota.com>, Carolina Chrurchill <REDACTED> "William B. Karesh" <karesh@ecohealthalliance.org>, Corina Grigorescu Monagin <cgmonagin@ucdavis.edu>, Kaireh Saylors <REDACTED>, "Prof. Woutrina Smith" <wasmith@ucdavis.edu>
**Cc:** Aleksei Chmura <chmura@ecohealthalliance.org>, Alison Andre <andre@ecohealthalliance.org>, Ava Sullivan <sullivan@ecohealthalliance.org>, "predict@ucdavis.edu" <predict@ucdavis.edu>, Nicole Gardner <nrgardner@ucdavis.edu>
Human Data Guidance (EB).docx
PREDICT COVID-19 Workplan (EB).docx

Hi there,
Below is the agenda and Zoom info for Monday's EB call.

Enjoy the weekend staycation...

David

**PREDICT Executive Board Meeting**
Monday, April 13, 2020
11:00AM-12:00PM PDT/2:00-3:00pm EDT
Zoom link: https://onehealth.zoom.us/j/ REDACTED
*Additional Zoom info below agenda*

**1. USAID updates**

**2. Extension workplan - messaging and moving to implementation (see attachment)**

**3. COVID-19 global network calls - Wednesday (Asia) and Thursday (Africa)**

**4. Human data rules (attachment)**

**5. Data sharing and DDL demo (Tammie)**

Standing items (as time allows)

6. Close-out - standing item
*On supplies/equipment and mission communications...*
*On finances and subawards...*
*On government approvals and data...*

7. Final Report (as time allows)...
*Vol 2 - Country reports - status check*
*Vol 1 - Global report - status check*

8. Consortium author list - P2 author list
   - Here's a link to the Google Sheet...

9. Publication, media, and conference updates
   - *On Publications...*

**Zoom Call-in info**

Topic: PREDICT EB Call
Join Zoom Meeting: https://onehealth.zoom.us/j/ REDACTED

**Meeting ID:** REDACTED

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+1 646 876 9923 US (New York)
**Meeting ID:** REDACTED

On Wed, Apr 8, 2020 at 3:51 PM David J Wolking <djwolking@ucdavis.edu> wrote:

Hi EB,
Just a reminder that we have temporarily rescheduled our EB calls for Mondays at 11AM Pacific starting next week.

I'll follow up with an agenda and Zoom details tomorrow or early Friday.

--
David J. Wolking
Senior Manager, Global Programs, One Health Institute
Global Operations Officer, PREDICT Project of USAID Emerging Threats Division
Senior Manager, PREEMPT Project
School of Veterinary Medicine
University of California, Davis

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David J. Wolking
Senior Manager, Global Programs, One Health Institute
Global Operations Officer, PREDICT Project of USAID Emerging Threats Division
Senior Manager, PREEMPT Project
School of Veterinary Medicine
University of California, Davis

**From:** David J Wolking <djwolking@ucdavis.edu>
**Sent:** Mon, 13 Apr 2020 11:36:25 -0700
**Subject:** Re: Reminder: PREDICT EB Call - MONDAY April 13 @ 11AM Pacific
**To:** David J Wolking <djwolking@ucdavis.edu>
**Cc:** Amanda Fine <afine@wcs.org>, Brian Bird <bhbird@ucdavis.edu>, Peter Daszak <daszak@ecohealthalliance.org>, "Prof. Jonna Mazet" <jkmazet@ucdavis.edu>, Kevin Olival <Olival@ecohealthalliance.org>, Dawn Zimmerman <ZimmermanD@si.edu>, Christine Kreuder Johnson <ckjohnson@ucdavis.edu>, "Murray, Suzan" <MurrayS@si.edu>, Simon Anthony <sja2127@columbia.edu>, Sarah Olson <solson@wcs.org>, Elizabeth Leasure <ealeasure@ucdavis.edu>, Jon Epstein <epstein@ecohealthalliance.org>, Tracey Goldstein <tgoldstein@ucdavis.edu>, "Tammie O'Rourke" <torourke@metabiota.com>, Carolina Churchill <cchurchill@wcs.org>, "William B. Karesh" <karesh@ecohealthalliance.org>, Corina Grigorescu Monagin <cgmonagin@ucdavis.edu>, Karen Saylors <ksaylors@labyrinthgh.com>, "Prof. Woutrina Smith" <wasmith@ucdavis.edu>, Aleksei Chmura <chmura@ecohealthalliance.org>, Alison Andre <andre@ecohealthalliance.org>, Ava Sullivan <sullivan@ecohealthalliance.org>, "predict@ucdavis.edu" <predict@ucdavis.edu>, Nicole Gardner <nrgardner@ucdavis.edu>

Hi EB,

Here's the news blast we shared last week with our network informing them of the extension and the next round of calls/updates for the Asia and Africa regions.

David

**********

Hi PREDICT team,

Please join us next week if you can for another round of updates/discussion on plans for supporting COVID-19 detection and response during our 6 month extension. We will be holding separate Africa and Asia network calls via Zoom, details are provided below. This is an internal call intended for just our PREDICT partners and network, it is not a public webinar so there is no need to RSVP.

We hope you'll join us and we look forward to connecting again during these troubled times.

Stay well and best wishes from lockdown in California,

David

--

David J. Wolking
Senior Manager, Global Programs, One Health Institute
Global Operations Officer, PREDICT Project of USAID Emerging Threats Division
Senior Manager, PREEMPT Project
School of Veterinary Medicine
University of California, Davis





# PREDICT UPDATE

PROVIDING EMERGENCY SUPPORT FOR COVID-19 RESPONSE

Join us next week for updates and a discussion on the newly awarded PREDICT extension in support of initial detection of SARS CoV-2 to inform public health response plans.

- **Asia network call**: Wednesday, April 15 at 6:00 pm PDT
- **Africa network call**: Thursday, April 16 at 8:00 am PDT

Both events will be on Zoom, details below.

Join Zoom Meeting

https://onehealth.zoom. REDACTED

Meeting ID REDACTED

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Meeting ID REDACTED

Find your local number: https://onehealth.zoom. REDACTED

# LATEST NEWS



## PREDICT Receives Extension for COVID-19 Pandemic Emergency Response

PREDICT will provide emergency support to other countries for outbreak response including technical support for early detection of SARS CoV-2, the virus that causes the disease COVID-19, through a six-month extension from the U.S. Agency for International Development, or USAID, effective April 1. Read more here.



## The Link Between Virus Spillover, Wildlife Extinction and the Environment

As COVID-19 spreads across the globe, a common question is, can infectious diseases be connected to environmental change? Yes, indicates a study published today from the University of California, Davis' One Health Institute. Read more here.

**RESOURCES**

- Publication in Proceedings of the Royal Society B
- The Royal Society Blog authored by Lead Author Christine Kreuder Johnson



## Sustainable Development Must Account for Pandemic Risk

Currently, 65 countries are engaged in the Global Health Security Agenda (GHSA) and are finalizing a strategic plan for the next five years (the GHSA 2024 Roadmap) to better prevent, detect, and respond to infectious disease outbreaks in alignment with SDGs 2 and 3 on food security and human health. Read more here.



## Escaping Pandora's Box–Another Novel Coronavirus

We should remember the 1918 pandemic as we deal with yet another infectious-disease

emergency: the growing epidemic of novel coronavirus infectious disease (Covid-19), which is caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). This virus has been spreading throughout China for at least 2 months, has been exported to at least 36 other countries, and has been seeding more than two secondary cases for every primary case. Read more here.

---

***PREDICT was initiated in 2009 to strengthen global capacity for detection and discovery of viruses with pandemic potential that can move between animals and people. Learn more at p2.predict.global.***

---




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On Fri, Apr 10, 2020 at 1:50 PM David J Wolking <djwolking@ucdavis.edu> wrote:

Hi there,
Below is the agenda and Zoom info for Monday's EB call.

Enjoy the weekend staycation...

David

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Monday, April 13, 2020
11:00AM-12:00PM PDT/2:00-3:00pm EDT
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9. Publication, media, and conference updates
- *On Publications...*

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Topic: PREDICT EB Call
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I'll follow up with an agenda and Zoom details tomorrow or early Friday.

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David J. Wolking
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--

David J. Wolking
Senior Manager, Global Programs, One Health Institute
Global Operations Officer, PREDICT Project of USAID Emerging Threats Division
Senior Manager, PREEMPT Project
School of Veterinary Medicine
University of California, Davis

**From:** Jonna Mazet <jkmazet@ucdavis.edu>
**To:** William B. Karesh <karesh@ecohealthalliance.org>
**CC:** Peter Daszak <daszak@ecohealthalliance.org>;David Wolking <djwolking@ucdavis.edu>;Chris Johnson <ckjohnson@ucdavis.edu>
**Sent:** 6/17/2020 2:37:54 AM
**Subject:** Re: P2 Final Report - Check-in on Global & Country Sections...

Great -- thanks,
J

On Tue, Jun 16, 2020 at 5:06 AM William B. Karesh <karesh@ecohealthalliance.org> wrote:
No problem from my end, Catherine already packaged up the info in the final report earlier this year so most if it can be cut and pasted into the new outline and we can smooth out the seams.

BK

**William B. Karesh, D.V.M**
*Executive Vice President for Health and Policy*

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President, OIE Working Group on Wildlife

Co-chair, IUCN Species Survival Commission - Wildlife Health Specialist Group

EPT Partners Liaison, USAID Emerging Pandemic Threats - PREDICT-2 Program

***EcoHealth Alliance develops science-based solutions to prevent pandemics and promote conservation.***

On Jun 15, 2020, at 9:00 PM, Jonna Mazet <jkmazet@ucdavis.edu> wrote:

Hi Peter & Billy,
I just want to make sure that you have seen the ask for the report chapters, as they are evolving (strawperson outline discussed on Zooms attached). Ava is responding nicely, but I know she will need help and content from others on your team. To that end, I'm just reaching out to reconfirm your commitment to the products (no doubt there) and the timeline (drafts by end of July). I believe much of your team is already off of Predict funding, so please let me know if a small amount of salary funding for report writing for key people might be helpful to bring Predict to a strong, successful conclusion.
Thanks in advance,
Jonna

On Mon, Jun 15, 2020 at 11:41 AM Ava Sullivan <sullivan@ecohealthalliance.org> wrote:
Hi UCD team,

Looks like Friday at 11AM PST/2PM EST is good for us.

Looking forward,
Ava

On Jun 12, 2020, at 6:08 PM, David J Wolking <djwolking@ucdavis.edu> wrote:

Hi Peter, Billy, and EHA team,

I've had a few quick calls this week with Ava and Catherine to connect on the P2 final report (country chapters and the new ideas for the global report). As you're aware we're pushing to have all the country reports completed and with USAID by the middle of July. For the global volume, we're going to be hard pressed to get drafts complete by the end of July at the latest.

With this timeline, we wanted to schedule a call next week if we can to find out how to program and manage the work, what personnel and resources are available at EHA and how we can work together to get this done and deliver a beautiful product.

Chris and I have 11AM Pacific free almost every day next week, just let us know a good time.

Enjoy the weekend,

David

--
David J. Wolking
Senior Manager, Global Programs, One Health Institute
Global Operations Officer, PREDICT Project at USAID Emerging Threats Division
Senior Manager, PREEMPT Project
School of Veterinary Medicine
University of California, Davis

**Sent:** Thu, 3 Sep 2020 11:06:50 -0700
**Subject:** Re: OHAC Call #23
**From:** Jonna Mazet <jkmazet@ucdavis.edu>
**To:** "Anderson, Kevin" <Kevin.Anderson@hq.dhs.gov>

Thanks, Kevin!
Sorry we couldn't get your audio.
Have a safe trip,
Jonna

On Thu, Sep 3, 2020 at 11:04 AM Anderson, Kevin <Kevin.Anderson@hq.dhs.gov> wrote:

> Thank you, Jonna! Have a great weekend! Kevin
>
> Get Outlook for iOS

---

**From:** Jonna Mazet <jkmazet@ucdavis.edu>
**Sent:** Thursday, September 3, 2020 1:51:47 PM
**To:** Minicucci, Charles <CMinicucci@nas.edu>
**Cc:** Amy Pruden <apruden@vt.edu>; andre@ecohealthalliance.org <andre@ecohealthalliance.org>; Barton Behravesh, Casey (CDC/OID/NCEZID) <dx9@cdc.gov>; daszak@ecohealthalliance.org <daszak@ecohealthalliance.org>; David Rizzo <dmrizzo@ucdavis.edu>; [redacted]; Geraldine Neville <gneville@tulane.edu>; Hermsen, Elizabeth D <elizabeth.hermsen@merck.com>; Hughes, James M <jmhughe@emory.edu>; John Parrish-Sprowl <johparri@iupui.edu>; Anderson, Kevin <Kevin.Anderson@HQ.DHS.GOV>; Mary Radford <maradford@ucdavis.edu>; Mary Wilson <mary_wilson@harvard.edu>; mewilson@hsph.harvard.edu <mewilson@hsph.harvard.edu>; Miller, Sally <miller.769@osu.edu>; mlichtve@tulane.edu <mlichtve@tulane.edu>; MUMFORD, Elizabeth <mumforde@who.int>; Rushton, Jonathan <J.Rushton@liverpool.ac.uk>; Pavlin, Julie <JPavlin@nas.edu>; Thevenon, Audrey <AThevenon@nas.edu>; Goodtree, Hannah <HGoodtree@nas.edu>; Berger, Kavita <KBerger@nas.edu>; Sylvina, Teresa <TSylvina@nas.edu>
**Subject:** Re: OHAC Call #23

CAUTION: This email originated from outside of DHS. DO NOT click links or open attachments unless you recognize and/or trust the sender. Contact your component SOC with questions or concerns.

Thanks for the call today,
Next FMT workshop scope attached.
Have a nice day,
Jonna

On Thu, Aug 27, 2020 at 6:37 AM Minicucci, Charles <CMinicucci@nas.edu> wrote:

> Hello all,
>
> Please find attached to this calendar update the agenda for the call and some results illustrations from the One Health workers survey, which Jonna will discuss during the meeting. We will also be joined by three prospective collaborators from other areas of NASEM: Kavita Berger, the new director of the Board on Life Sciences; Teresa Sylvina, the director of the Strategic Initiatives for Animal Research; and Audrey Thevenon, who is heading up a new rapid strategic science initiative for COVID-19 response.
>
> See you all next week! Thanks,
>
> Charlie

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**From:** "William B. Karesh" <karesh@ecohealthalliance.org>
**To:** David Wolking <djwolking@ucdavis.edu>
**Cc:** Aleksei Chmura <chmura@ecohealthalliance.org>, Alison Andre <andre@ecohealthalliance.org>, Amanda Fine [redacted], Ava Sullivan <sullivan@ecohealthalliance.org>, Brian Bird <bhbird@ucdavis.edu>, "Carolina Chrurchill" [redacted], Chris Johnson <ckjohnson@ucdavis.edu>, Corina Grigorescu Monagin <cgmonagin@ucdavis.edu>, Dawn Zimmerman <Zimmermand@si.edu>, Elizabeth Leasure <ealeasure@ucdavis.edu>, Jon Epstein <epstein@ecohealthalliance.org>, Karen Saylors [redacted], Kevin Olival <olival@ecohealthalliance.org>, Suzan Murray <MurrayS@si.edu>, Nicole Gardner <nrgardner@ucdavis.edu>, Peter Daszak <daszak@ecohealthalliance.org>, "predict@ucdavis.edu" <predict@ucdavis.edu>, Jonna Mazet <jkmazet@ucdavis.edu>, "Prof. Woutrina Smith" <wasmith@ucdavis.edu>, Sarah Olson [redacted], "Dr. Simon Anthony" <sja2127@columbia.edu>, Tammie O'Rourke [redacted], "Tracey Goldstein" <tgoldstein@ucdavis.edu>
**Subject:** Re: Scheduling change - Next week's EB Call (Sept 28th @ 2 or 3PM Pacific?)
**Sent:** Wed, 23 Sep 2020 00:52:31 +0000

I can make the later time David.
BK

On Sep 22, 2020, at 7:41 PM, David J Wolking <djwolking@ucdavis.edu> wrote:

Hi P2 Executive Board,
Next week Monday September 28th is our last biweekly call. For some of you, these calls have been held for 11 years! That's a huge chunk of your life, ~13+ 40 hour work weeks just for EB calls. Wow.

We were wondering if we could reschedule the call time from 11AM Pacific to later in the day, 2 or 3PM Pacific. That way we can connect on pending items but also hold a celebration of your efforts, dedication, service, and friendship. If that later time works, it would be more EB happy hour, a send off that we all deserve and hopefully with a sneak peak at the nearly complete Legacy Book.

Please just let me know if these times DON'T WORK for you, a no response means you're in.

Thanks in advance,

David

--

David J. Wolking
Senior Manager, Global Programs, One Health Institute
Global Operations Officer, PREDICT Project of USAID Emerging Threats Division
Senior Manager, PREEMPT Project
School of Veterinary Medicine
University of California, Davis