

AFRICA

CAMEROON

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Signed a Memorandum of Understanding with the Ministry of Livestock, Fishery and Animal Industries (MINEPIA).
 - b) **Laboratory System Improvements**
 - Trained local commercial contractors in operation and basic maintenance of the liquid nitrogen production plant.
 - Trained lab technicians on: DNA/RNA extractions from tissues; use of pestle and QiaShredder for tissue disruption and tissue homogenization prior to nucleic acid extraction; PCR purification methods for gene sequencing for confirmation of positive PCR results and phylogenetic analysis.
 - Attended a training led by Minister of Public Health and funded by US Department of State (BioEngagement Program), organized by PREDICT partners; training covered laboratory bio-risk management, and was attended by participants from multiple countries in Central Africa including Democratic Republic of the Congo, Central Africa Republic, Chad, Republic of Congo, Gabon and Cameroon.
 - Participated in a three-day workshop organized by UC Los Angeles/CTR and Sandia labs on biosafety risk assessment, biosafety risk mitigation, PPE and biological waste disposal.
 - Trained six Master's degree students from the Higher Institute of Medical Technology (ISTM), Yaoundé, on viral zoonoses of non-human primates, PCR, waste management, facilities and equipment maintenance, commercial ELISA, One Health approach, PPE, and sample storage.
 - Introduced PCR/gel purification methods to support amplicon sequencing for confirmation of

positive PCR results.

- Implemented a new protocol for tissue disruption and homogenization using motorized pestle and QiaShredder homogenization columns.

- **Activity 1.2: Surveillance**

- Sub-activity 1.2.1: **Highlights Surveillance Activities Completed in Current Quarter**

- Collected samples from 20 primates at Limbe Wildlife Sanctuary, Mvog-Beti Zoo and Mefou National Park, yielding 62 samples.
- Collected samples from 256 animals in Ngoila, East Region, where there are high levels of hunting and population movements related to iron ore exploration.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

Cameroon	# of Animals sampled	# of Samples collected by active surveillance	# of Samples collected by opportunistic surveillance	# of Samples collected by syndromic surveillance or outbreak response	# of Animals with at least one final test result	# of Samples with at least one final test result	# of Samples with at least one final test result approved for release	Total # of diagnostic tests run
Bats								
Free-ranging	333	3045	0	0	131	140	7	567
Hunter	289	1000	0	0	218	238	27	589
Other High Risk Interfaces	6	9	0	0	5	5	0	13
Rodents								
Free-ranging	108	992	0	0	56	56	0	172
Hunter	846	1220	0	0	102	102	0	144
Primates								
Free-ranging	141	8	134	0	0	0	0	0
Hunter	696	1021	0	0	28	28	3	71
Sanctuary	884	4519	0	0	550	630	120	2763
Other taxa (including humans)								

Free-ranging	128	458	0	0	3	3	0	3
Hunter	2368	2625	0	0	65	65	0	128
Sanctuary	67	250	0	0	30	30	0	30
Other High Risk Interfaces	1	9	0	0	0	0	0	0
TOTALS	5867	15156	134	0	1188	1297	157	4480

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - **Sub-activity 1.3.1: Introduction of New Technologies**
 - Acquired a satellite Internet terminal for field work and outbreak investigations; field tested the terminal and trained two additional staff members on its use.
 - **Sub-activity 1.3.2: Pathogen detection and discovery (Year 3 Quarter 3):**
 - Extracted 1,700 samples.
 - Ran a total of 3,740 PCR reactions.
 - Obtained sequence results for putative positive samples to confirm positive results; interpretation for these samples is complete, and some of the material will now be used to characterize new viral strains, work that is currently in progress in collaboration with US CDC.

PREDICT Findings (Y3Q3):

# Samples submitted (by taxa)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Bats (490)	Predict/GVF Cameroon	PCR (predict primers)	Coronavirus (430) Filovirus (432) Hantavirus (510) Paramyxovirus (504)	Hantavirus (14 presumptive positive and 8 indeterminate) Paramyxovirus (7 indeterminate)	Sequence underway	Cameroon	No
Primates (116)	Predict/GVF Cameroon	PCR (predict primers)	Bocavirus (93), Filovirus (24), Paramyxovirus (24)	Negative	-	Cameroon	No

Rodents (64)	Predict/GVF Cameroon	PCR (predict primers)	Alphavirus (63) Arenavirus (64) Hantavirus 60	Negative	-	Cameroon	No
Shrews (17)	Predict/GVF Cameroon	PCR (predict primers)	Alphavirus (17) Arenavirus (17) Hantavirus (16)	Negative	-	Cameroon	No

- **Activity 1.4: Sample Tracking and Information Management**
 - Sub-activity 1.4.1: **Surveillance Data Management**
 - Completed updates in GAINS to PCR positive results where samples have been sent for sequencing and verification results received.
- **Activity 1.5 Program Management**
 - Sub-activity 1.5.2: **Communication**
 - Attended a two-day workshop organized by IDENTIFY (FAO) on the prevention and control of rabies in Cameroon; participants included those working in both public health and livestock; objective was to improve collaboration between key partners in the prevention and management of zoonotic diseases; findings and recommendations were shared with the Ministry of Public Health and MINEPIA
 - Held a meeting with the Memvele Hydro Project management team; this team oversees the contract with Sinohydro Corporation Limited to construct a 200MW hydropower plant; PREDICT discussed potential for collaborations at the project site for sample collection.

LOW 3: Outbreak Response Capacity Building

Trained staff on Zoonotic Disease Outbreaks using the PREDICT Guide for Providing Assistance During a Zoonotic Disease Outbreak.

DEMOCRATIC REPUBLIC OF CONGO

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - b) **Laboratory System Improvements**
 - Performed optimization of PREDICT viral family PCR methods and tested samples according to PREDICT protocols.
 - Drafted clear protocols in French specific for reagents and equipment present in the DRC laboratory.
 - Trained two laboratory technicians, one PREDICT staff and one from the INRB in molecular biology techniques, including preparation of PCR mix, preparation of template DNA/RNA, programming of PCR machines for performing conventional RT-PCR and PCR amplifications.
 - Completed simultaneous DNA and RNA extractions from tissue samples using AllPrep DNA/RNA Mini Kit.
 - Developed plans for an electrical back-up system to protect equipment from electrical failure.
- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights Surveillance Activities Completed in Current Quarter**
 - Incorporated 3 new sites into our wildlife surveillance plan, in cooperation with the Institut Congolais pour la Conservation de la Nature (ICCN): Central Zoo of Kinshasa, N'Sele Park, and Mona Paradis Touristic Site.
 - Signed a MOU with the University of Kisangani, to add Kisangani in the Oriental Province and Lubumbashi in the Katanga Province as sample collection sites.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

DRC	# of Animals sampled	# of Samples collected by active surveillance	# of Samples collected by opportunistic surveillance	# of Samples collected by syndromic surveillance or outbreak response	# of Animals with at least one final test result	# of Samples with at least one final test result	# of Samples with at least one final test result approved for release	Total # of diagnostic tests run
Bats								
Free-ranging	69	671	0	0	43	178		178
Hunter	9	0	50	0	0	0	0	0
Other High Risk Interfaces	29	160	0	152	0	0	0	0
Rodents								
Free-ranging	5	94	0	0	0	0	0	0
Hunter	775	0	2446	0	4	4	0	9
Primates								
Free-ranging	4	74	0	0	0	0	0	0
Hunter	594	0	1045	0	257	257	0	745
Sanctuary	94	575	0	217	39	39	0	107
Other High Risk Interfaces	28	290	0	0	0	0	0	0
Other taxa (including humans)								
Free-ranging	3	59	0	0	0	0	0	0
Hunter	633	0	863	0	7	7	0	23
Other High Risk Interfaces	4	41	0	0	0	0	0	0
TOTALS	2247	1964	4404	369	350	485	0	1062

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - **Sub-activity 1.3.2: Pathogen detection and discovery (Year 3 Quarter 3):**

PREDICT Findings (Y3Q3):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release (yes or no)
Bats (43)	INRB/PREDICT	Conventional RT-PCR	Arenavirus	Negative	---	DRC	No
Bats (43)	INRB/PREDICT	Conventional RT-PCR	Coronavirus	Negative	---	DRC	No
Bats (43)	INRB/PREDICT	Conventional RT-PCR	Flavivirus	Negative	---	DRC	No
Bats (43)	INRB/PREDICT	Conventional RT-PCR	Filovirus	Negative	---	DRC	No
Bonobo (1)	INRB/PREDICT	Immunodiffusion	Alphavirus	Presumptive positive	---	DRC	No
Papio cynocephalus (1)	INRB/PREDICT	Immunodiffusion	Retrovirus	Presumptive positive	---	DRC	No

- **Activity 1.5 Program Management**

- Sub-activity 1.5.2: **Communication**

- Participated in monthly meetings with EPT partners (RESPOND and WHO) and other partner organizations (CDC and USAID health projects) to discuss ways to improve coordination, and maximize opportunities between projects.
 - Obtained exemption documents for taxes, customs, etc. with help from the USAID Mission.

LOW 3: Outbreak Response Capacity Building

Assisted the Lola ya Bonobo sanctuary in the investigation of an outbreak of an unidentified illness that was responsible for the death of 4 bonobos (*Pan Paniscus*) in the sanctuary nursery over a 3-month period; worked collaboratively with local veterinarians from RESPOND and the local INRB to assess the situation, and at the request of the sanctuary Director, worked with PREDICT Republic of Congo to evaluate the sick and deceased bonobos, collect biological samples and arrange for permits, shipping, and testing at two collaborative laboratories to determine the cause of the outbreak with

advanced pathogen discovery techniques at CIRMF in Gabon and Columbia University (USA);final results are pending.

GABON

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **Laboratory System Improvements**
 - Trained two laboratory scientists on rodent capture and sampling, isolation of viral RNA and DNA, and RT-PCR analysis.
- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights Surveillance Activities Completed in Current Quarter**
 - Expanded wildlife sampling to an area of new road incursion into a forested area.
 - Assisted the Ministry of Health (MoH) with data collection from provinces and district health officers, serving as a reference center and supporting diagnostics on collected samples.
 -

Summary of Surveillance Activities and Testing by Country in GAINS to date:

Gabon	# of Animals sampled	# of Samples collected by active surveillance	# of Samples collected by opportunistic surveillance	# of Samples collected by syndromic surveillance or outbreak response	# of Animals with at least one final test result	# of Samples with at least one final test result	# of Samples with at least one final test result approved for release	Total # of diagnostic tests run
Bats								
Free ranging	1293	7612	0	0	1834	7093	0	18806

Rodents								
Free ranging	193	20	0	0	189	220	0	517
Other high risk interface	122	610	0	0	0	0	0	0
Primates								
Other high risk interface	3	15	0	0	0	0	0	0
Other taxa (including humans)								
Free ranging	372	370	0	0	372	372	0	374
Other high risk interface	19	95	0	0	0	0	0	0
TOTALS	2002	8722	0	0	2395	7685	0	19697

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Year 3 Quarter 3):**
 - Extracted more than 300 samples
 - Ran a total of 1,366 PCR reactions.
 - Identified specific samples for further pathogen discovery by pyrosequencing.

# Samples submitted (by taxa)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Primates (4)	PREDICT Gabon/CIRMF	PCR (virus genus level primers)	Coronaviruses, Enteroviruses, Paramyxoviruses, Orthopoxviruses, Adenoviruses, Picornaviruses, Reoviruses, Calciviruses, Astroviruses, Filoviruses, Arenaviruses, Flaviviruses	All Negative	Sent for deep-sequencing	Gabon	No
Rodents (262)	PREDICT Gabon/CIRMF	PCR (virus genus level primers)	Astroviruses, Adenoviruses, Reoviruses, Calciviruses, Enteroviruses	All Negative	-	Gabon	No

- **Activity 1.5 Program Management**
 - Sub-activity 1.5.2: **Communication**
 - Presented PREDICT project and its practical implications to the Governor and the Mayor of Makokou, and participated in radio and journal interviews to raise local awareness for the project.

LOW 3: Outbreak Response Capacity Building

Supported diagnostic testing during an outbreak at the Lola ya Bonobo sanctuary in Kinshasa, Democratic Republic of the Congo: screened samples for 35 different priority viral families and known zoonotic viruses; all samples tested negative except for one fecal sample positive for a virus not likely to be causative of observed clinical signs.

REPUBLIC OF CONGO

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Extended the cold chain system for samples collected at hunter and free-ranging interfaces to the national level, including improved transport allowing RNALater™-preserved samples to reach -80 storage within 2-7 days of collection.
 - Attended the signing of an MOU at the invitation of the Congolese General Directorate of Scientific and Technical Research (DGRST) and U.S. National Institutes of Health, National Institutes of Allergic and Infectious Diseases (NIH/NIAID); which will facilitate stronger collaboration, including support for PREDICT in-country laboratory capacity development.
 - b) **Laboratory System Improvements**
 - Trained laboratory technician in tissue and serum RNA extraction and cold chain

- management.
- Improved coordination of PREDICT sample shipment between DRC and RoC.

- Activity 1.2: Surveillance**

- Sub-activity 1.2.1: **Highlights Surveillance Activities Completed in Current Quarter**
 - Collected 1,898 samples from 158 bats and 468 samples from 45 rodents.
 - Collected 749 samples from 80 free-ranging primates, rodents and other wildlife at the hunter interface.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

Republic of Congo	# of Animals sampled	# of Samples collected by active surveillance	# of Samples collected by opportunistic surveillance	# of Samples collected by syndromic surveillance or outbreak response	# of Animals with at least one final test result	# of Samples with at least one final test result	# of Samples with at least one final test result approved for release	Total # of diagnostic tests run
Bats								
Free-ranging	294	1769	55	0	13	19	0	76
Other high-risk interfaces	11	0	3	0	0	0	0	0
Rodents								
Free-ranging	103	0	158	0	5	17	0	76
Hunter	29	174	0	0	0	0	0	0
Market	6	51	0	0	0	0	0	0
Other high-risk interfaces	33	0	1	0	0	0	0	0
Unclassified	17	0	101	0	0	0	0	0
Primates								
Free-ranging	168	172	14	0	166	166	0	1018

Hunter	63	248	61	0	0	0	0	0
Market	30	278	0	0	0	0	0	0
Other taxa (including humans)								
Free-ranging	38	0	106	0	12	57	0	238
Hunter	184	893	79	0	12	16	0	64
Market	108	946	0	0	0	0	0	0
Other high-risk interfaces	13	0	15	0	0	0	0	0
Unclassified	1	0	6	0	0	0	0	0
TOTALS	1098	4531	599	0	208	275	0	1472

- **Activity 1.4: Sample Tracking and Information Management**
 - Sub-activity 1.4.1: **Surveillance Data Management**
 - Improved in-country sample data management systems, including sample location mapping and revised data entry protocols.
 - Trained laboratory manager and staff members on data management, sample storage and tracking.
- **Activity 1.5 Program Management**
 - Sub-activity 1.5.2: **Communication**
 - Instituted weekly meetings to review progress on sample collection and testing, cold-chain and sample management, and any potential challenges to PREDICT activities.

LOW 3: Outbreak Response Capacity Building

Provided assistance to PREDICT Democratic Republic of the Congo (DRC) in the investigation of a disease outbreak among captive wild bonobos (*Pan paniscus*) and their close human contacts in Kinshasa, DRC. Facilitated rapid export of bonobo samples to Columbia University laboratory for molecular diagnostics under WCS CITES and PHS (CDC) import permits.

RWANDA

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) National or Regional Surveillance System Improvements**
 - Continued close coordination with Rwanda Development Board, Kigali city authorities and park concessionaires to incorporate zoonotic pathogen surveillance into planned primate (baboon, vervet) depredation and bat sampling.
 - Trained Umutara Polytechnic University senior-year veterinary students on primate sampling protocols; opened discussions with veterinary school dean to incorporate One Health principles and surveillance protocols into senior-year veterinary curriculum.
 - b) Laboratory System Improvements**
 - Wildlife virology laboratory technician continued to practice diagnostic testing protocols.
 - Established procurement process for successful acquisition of laboratory supplies from a regional supplier.
 - Tested protocol and equipment for transferring wildlife samples across the Uganda /Rwanda border for viral family testing at regional laboratory (Makerere University Walter Reed Project) in Kampala, Uganda.
 - Received laboratory supplies from USAID/DELIVER.
- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights Surveillance Activities Completed in Current Quarter**
 - Obtained samples from 14 baboons at high-risk interfaces (crop-raiding; proximity to/entrance of human dwellings) outside Akagera National Park.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# of Animals sampled	# of Samples collected by active surveillance	# of Samples collected by opportunistic surveillance	# of Samples collected by syndromic surveillance or outbreak response	# of Animals with at least one final test result	# of Samples with at least one final test result	# of Samples with at least one final test result approved for release	Total # of diagnostic tests run
Rwanda								
Bats								
Hunted	3	6	0	0	3	6	0	42
Other high risk	80	368	0	0	0	0	0	0
Rodents								
Other high risk	264	0	437	0	0	0	0	0
Primates								
Free-ranging	46	0	337	0	29	60	0	383
Hunted	10	44	0	0	10	44	0	309
Other high risk	50	118	281	0	8	18	0	72
Sanctuary	2	39	0	0	1	4	0	16
Other taxa (including humans)								
Free-ranging	2	0	4	0	1	2	0	14
Hunted	2	8	0	0	1	2	0	14
Other high risk	122	106	103	0	0	0	0	0
TOTALS	581	689	1,162	0	53	136	0	850

- Activity 1.3: Technology Development and Pathogen Detection and Discovery:**

PREDICT Findings (Y3Q3):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Non-human primate (47)	California National Primate Research Center	Serology	Measles Virus	10 positive	-	Rwanda	Y

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Non-human primate (47)	California National Primate Research Center	Serology	Simian Foamy Virus	3 positive	-	Rwanda	Y
Non-human primate (47)	California National Primate Research Center	Serology	Lymphocryptovirus	47 positive	-	Rwanda	Y
Non-human primate (47)	California National Primate Research Center	Serology	Human T-lymphotropic Virus	2 positive	-	Rwanda	Y
Non-human primate (47)	California National Primate Research Center	Serology	Simian Retrovirus	1 positive	-	Rwanda	Y
Non-human primate (47)	California National Primate Research Center	Serology	Simian Immunodeficiency Virus	Negative	-	Rwanda	Y
Non-human primate (47)	California National Primate Research Center	Serology	Rhesus Rhadinovirus	1 positive	-	Rwanda	Y
Non-human primate (47)	California National Primate Research Center	Serology	Varicella	Negative	-	Rwanda	Y
Non-human primate (47)	Focus Diagnostics, Inc. (Cypress, CA)	Serology	Dengue Fever Virus	4 positive	-	Rwanda	Y
Non-human primate (47)	Focus Diagnostics, Inc. (Cypress, CA)	Serology	West Nile Virus	5 positive	-	Rwanda	Y

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Non-human primate (47)	Focus Diagnostics, Inc. (Cypress, CA)	Serology	Hantavirus	1 positive	-	Rwanda	Y
Non-human primate (47)	Focus Diagnostics, Inc. (Cypress, CA)	Serology	Parainfluenza 1,2, & 3	Negative		Rwanda	Y
Non-human primate (47)	Focus Diagnostics, Inc. (Cypress, CA)	Serology	Influenza A & B	Negative		Rwanda	Y
Non-human primate (47)	Focus Diagnostics, Inc. (Cypress, CA)	Serology	Respiratory Syncytial Virus	Negative		Rwanda	Y

TANZANIA

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Discussed potential collaborations between PREDICT and CDC Global Disease Detection division in current and Y4 active surveillance activities in meetings in Dar es Salaam, Tanzania and Nairobi, Kenya.
 - Met with Ruaha National Park warden to strengthen collaboration between PREDICT and Tanzania National Parks to enhance wildlife surveillance.
 - Obtained training for staff in safe capture, handling, and sampling of non-human primates with the PREDICT Rwanda team.
 - Trained staff in Good Clinical Practices for Research at the National Institute for Medical

- Research (NIMR).
- Developed a primate training guide and training videos for non-human primate capture and sampling.

b) Laboratory System Improvements

- Continued training and mentorship laboratory personnel on lab safety, specimen transport, nucleic acid extraction techniques, and arenavirus testing.

- Activity 1.2: Surveillance**

- Sub-activity 1.2.1: **Highlights Surveillance Activities Completed in Current Quarter**
 - Filed application for wildlife sampling permit renewal from Tanzania Wildlife Research Institute.
 - Sampled 69 bats and 102 rodents in the Ruaha ecosystem.
 - Collected bushmeat samples from 27 animals in villages surrounding Ruaha ecosystem and prioritized specimens for viral family level testing
 - Generated a country-wide surveillance planning map to identify remaining critical interfaces for Y3 and Y4 active surveillance.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

Tanzania	# of Animals sampled	# of Samples collected by active surveillance	# of Samples collected by opportunistic surveillance	# of Samples collected by syndromic surveillance or outbreak response	# of Animals with at least one final test result	# of Samples with at least one final test result	# of Samples with at least one final test result approved for release	Total # of diagnostic tests run
Bats								
Other high risk interface	80	454	0	0	0	0	0	11
Rodents								
Hunter	6	0	36	0	0	0	0	0
Other high risk interfaces	312	1842	0	0	0	0	0	127

Primates								
Hunter	16	0	81	0	0	0	0	0
Other taxa (including humans)								
-Hunter	214	0	1106	0	0	0	0	0
Other high risk interfaces	5	23	0	0	0	0	0	2
TOTALS	633	2319	1223	0	0	0	0	138

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Year 3 Quarter 3):**
 - Conducted PCR testing for arenaviruses on oropharyngeal swabs from 217 rodents sampled during dry season; initiated RNA extractions from oropharyngeal and rectal swabs from rodents sampled during the wet season.
 - Initiated a pilot study comparing viruses detected in rectal and oropharyngeal swab specimens from a subset of rodents captured at the peri-domestic interface.
 - Shipped 100 bat and rodent oropharyngeal swab specimens to the Makerere University Walter Reed Project laboratory in Uganda for viral family-level testing and repeat testing for arenaviruses for laboratory quality control purposes.
 - Transported post-PCR products from 5 arenavirus presumptive positive specimens (rodent oropharyngeal swabs) to the UC Davis laboratory for confirmatory testing.

PREDICT Findings (Y3Q3):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Rodents (140)	Sokoine University of Agriculture	Conventional PCR	Arenaviruses	Presumptive positives for arenavirus	Sequence confirmation pending	Tanzania	No

- **Activity 1.4: Sample Tracking and Information Management**
 - Sub-activity 1.4.1: **Surveillance Data Management**
 - Improved in-country sample tracking and management system between the field and lab teams through use of standardized priority specimen tracking forms shared through DropBox.
 - Tested the GAINS results template to refine the laboratory reporting system.
- **Activity 1.5 Program Management**
 - Sub-activity 1.5.2: **Communication**
 - Hosted CDC Tanzania at Sokoine University of Agriculture; the team toured the laboratory facility to evaluate capacity for future collaborations.

UGANDA

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **International, National or Regional Surveillance System Improvements**
 - Helped conduct the first dry-run test of methods for shipping extracted wildlife samples from Tanzania for viral family testing at Makerere University Walter Reed Project (MUWRP) Laboratory, to establish MUWRP as regional diagnostic laboratory for emerging wildlife pathogen testing; then received first shipment of samples from Tanzania.
 - Co-located laboratory and office in the Wild Animal Resource Management unit of Makerere University's School of Veterinary Medicine in Uganda.
 - b) **Laboratory System Improvements**
 - Worked with MUWRP to identify a high-volume supplier of laboratory supplies to reduce

costs and improve MUWRP's efficiency for high-volume through-put of samples.

- **Activity 1.2: Surveillance**

- Sub-activity 1.2.1: **Highlights Surveillance Activities Completed in Current Quarter**

- Conducted site selection and started wildlife sampling activities for the Deep Forest pathogen emergence modeling project in Bwindi –Mgahina Conservation Area: sampled 80 rodents and collected 662 samples.
- Obtained 510 specimens from 34 fruit bats at a high-risk interface (peridomestic) in Kampala.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# of Animals sampled	# of Samples collected by active surveillance	# of Samples collected by opportunistic surveillance	# of Samples collected by syndromic surveillance or outbreak response	# of Animals with at least one final test result	# of Samples with at least one final test result	# of Samples with at least one final test result approved for release	Total # of diagnostic tests run
Uganda								
Bats								
Other high risk interface	30	446	0	0	0	0	0	0
Rodents								
Hunted	13	0	0	207	0	0	0	0
Other high risk interface	61	224	0	0	0	0	0	0
Primates								
Free-ranging	10	0	71	0	4	7	0	45
Other high risk interface	319	36	357	0	3	8	0	56
Other taxa (including humans)								
Free-ranging	38	303	0	0	0	0	0	0
Hunted	19	0	6	74	0	0	0	0
Other high risk interface	22	144	18	0	0	0	0	0
TOTALS	512	1,153	452	281	7	15	0	101

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.1: **Introduction of New Technologies**
 - Continued deployment of cell-phone based Animal Mortality Monitoring Program at 20 outposts both inside Queen Elizabeth National Park and at outposts in park border communities: 96 mortality events reported including 13 bats, 5 non-human primates, 2 rodents, and 72 other animals.

SOUTHEAST ASIA

CAMBODIA

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **International, National or Regional Surveillance System Improvements**
 - One NaVRI technical staff member joined PREDICT for wildlife surveillance work in the field.
 - Three NaVRI staff members participated in PREDICT-PREVENT training in quantitative surveys of wild meat consumption; surveys to inform future animal sampling work.
 - Trained four forestry rangers in Mondulkiri Province in sample collection, zoonoses and PPE protocols.
 - b) **Laboratory System Improvements**
 - In-country partner Institut Pasteur du Cambodia (IPC) trained two laboratory technicians from NaVRI on viral family screening of PREDICT samples with the goal to transfer a portion of viral family screening to NaVRI in Year 4.
 - Installed Roche™ 454 sequencer at IPC; scheduled Roche training for next quarter.
- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights Surveillance Activities Completed in Current Quarter**
 - Obtained approval from six village chiefs to sample hunted wildlife in protected area in Northern Cambodia.
 - Obtained approval from commune leaders and village chiefs in Preah Vihear and Banteay Meanchey Province to conduct future surveys and sample collection from wildlife hunted by their communities.

- Identified consumer and hunting households in three Phnong ethnic minority villages in protected area in Mondulkiri Province through quantitative surveys, and obtained approval from these households for future sampling of wildlife hunted for consumption.
- Conducted sampling of bats at local restaurants selling large numbers of bats for human consumption daily.
- Conducted sampling of primates being traded for food and medicinal purposes at local markets.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

Cambodia	# of Animals sampled	# of Samples collected by active surveillance	# of Samples collected by opportunistic surveillance	# of Samples collected by syndromic surveillance or outbreak response	# of Animals with at least one final test result	# of Samples with at least one final test result	# of Samples with at least one final test result approved for release	Total # of diagnostic tests run
Bats								
Free-ranging	237	237	0	0	0	0	0	0
Hunter	698	345	1438	0	0	0	0	0
Other High Risk Interfaces	347	0	595	0	0	0	0	0
Rodents								
Free-ranging	10	10	0	0	0	0	0	0
Hunter	94	0	541	0	0	0	0	0
Primates								
Hunter	14	0	27	0	0	0	0	0
Market	12	0	12	0	0	0	0	0
Sanctuary	8	0	51	0	0	0	0	0
Other taxa (including humans)								
Hunter	349	0	708	0	327	654	0	654
Market	2	0	2	0	0	0	0	0
TOTALS	1771	592	3374	0	327	654	0	654

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Year 3 Quarter 3):**

PREDICT Findings (Y3Q3):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Bats (29)	Institute Pasteur Cambodia	Sequencing	Coronavirus, Astroviruses, Lyssaviruses, Paramyxoviruses	Pending		Cambodia	NO

INDONESIA

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Presented at the joint conference of Asia-Pacific Bio-safety Association and Indonesian Bio-Risk Association in Nusa Dua, Bali, on “Bio-Safety Issues in Field Research Related to Pathogen Surveillance and Identification.”
 - Presented seminar at Virology Laboratory Workshop at Eijkman Institute for Molecular Biology, Jakarta, on “Zoonoses of Bats, Rodents and Primates.”

b) **Laboratory Improvements**

- Obtained reagents and supplies to perform viral family-level PCR protocols at Institut Pertanian Bogor Primate Research Center (PRC-IPB).
- Propagated the PREDICT Universal Positive Control into plasmid system.
- Optimized the laboratory PCR system virus family-level testing using 27 primers for amplification of five virus families; validated PCR assays with propagated PREDICT Universal Positive Control.
- Finalized strategy and identified high-quality archived samples from nonhuman primates from Bali to be screened for priority viral families.
- Procured reagents and consumables for the testing of specimens collected from humans with undiagnosed febrile illness from Bandung, Indonesia using viral family-level PCR protocols for flaviruses, alphaviruses, coronaviruses, henipaviruses, filoviruses.
- Conducted hands-on training on molecular, serologic, and virus isolation techniques at the Eijkman Institute in collaboration with CDC; training was attended by 24 laboratory technicians from all over Indonesia.
- Obtained personal protective equipment (PPE) and other supplies through DELIVER.

• **Activity 1.2: Surveillance**

• Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**

- Finalized strategy and obtained permission from LIPI, for collecting urine, fecal, and dropped food samples from bats roosting in trees within the Bogor Botanical Garden.
- Finalized logistics for collecting bat and rodent specimens from Tinjil Island.
- Performed exploratory site visit to Tangerang Provincial Hospital to meet with the Chief of the Hospital Laboratory with CDC staff to discuss potential collaboration on human fever studies (fever with rash, hemorrhagic manifestations, or encephalitis) to obtain samples from individuals with elevated risk of zoonotic infections for viral family testing.

• **Activity 1.3: Technology Development and Pathogen Detection and Discovery**

• Sub-activity 1.3.1: **Introduction of New Technologies**

- Shared first generation Universal Positive Control with Eijkman Institute.

LAOS

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Conducted training workshop on “Surveillance for Emerging Zoonotic Diseases” for provincial forestry and agriculture staff government staff.
 - Trained two National Animal Health Centre (NAHC) staff on biosecurity, sample collection, sample storage in liquid nitrogen, data entry and wildlife species identification.
 - b) **Laboratory Improvements**
 - Sent three National Animal Health Centre (NAHC) laboratory staff for training at Institut Pasteur Cambodia on viral family PCR testing protocols.
 - Made arrangements for NAHC laboratory staff member to attend a Biological Safety Cabinet and Laboratory Fume Hood training.
- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**
 - Sampled wildlife at 11 markets in seven provinces.
 - Trained two NAHC staff members on survey techniques to assess wildlife-human interfaces in villages.
 - Conducted sample collection from subsistence hunted animals in an ethnic village.
 - Sampled a total of 416 animals.

Summary of Surveillance Activities and Testing in GAINS to date:

	# of Animals sampled	# of Samples collected by active surveillance	# of Samples collected by opportunistic surveillance	# of Samples collected by syndromic surveillance or outbreak response	# of Animals with at least one final test result	# of Samples with at least one final test result	# of Samples with at least one final test result approved for release	Total # of diagnostic tests run
Laos								
Bats								
Hunter	110	0	271	0	0	0	0	0
Market	632	216	2325	0	0	0	0	0
Other High Risk Interfaces	6	0	26	0	0	0	0	0
Rodents								
Hunter	377	0	1475	0	0	0	0	0
Market	701	385	2480	0	0	0	0	0
Other High Risk Interfaces	3	0	18	0	0	0	0	0
Primates								
Market	6	7	16	0	0	0	0	0
Other taxa (including humans)								
Hunter	56	0	149	0	0	0	0	0
Market	115	135	339	0	0	0	0	0
Other High Risk Interfaces	1	0	2	0	0	0	0	0
TOTALS	2007	743	7101	0	0	0	0	0

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Year 3 Quarter 3):**
 - Transferred 630 wildlife samples to Institut Pasteur Cambodia (IPC) for viral family screening.
 - Shipped 44 bat samples to IPC for sequencing to confirm samples testing PCR positive for priority viral families.

PREDICT Findings (Y3Q3):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release (yes or no)
Bats (Chiroptera) (44)	Institut Pasteur du Cambodge Institut Pasteur du Cambodia	Sequence confirmation	Coronaviruses, Astroviruses	Pending		Laos, Country of testing - Cambodia	NA

MALAYSIA

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Conducted two training sessions in Sabah for 33 participants including staff from Sabah Wildlife Department (SWD), Wildlife Rescue Unit, WWF Malaysia, Danau Girang Field Centre and Institute for Tropical Biodiversity and Conservation, University of Malaysia Sabah on PREDICT protocols for Bio-safety and Animal Capture.
 - Continued discussions with Universiti Kebangsaan Malaysia, a participant in the RESPOND One Health Network, regarding training students from the Faculty of Health Sciences at NPHL or VRI.
 - b) **Laboratory System Improvements**
 - Finalized agreement and Standard Operating Procedures (SOPs) with PERHILITAN and DVS for transfer of wildlife samples from PERHILITAN to VRI for screening.
 - Assisted VRI to set up BSL-2 laboratory for sample preparation, extraction and testing of

- wildlife samples.
 - Continued developing protocols for managing laboratory, samples and work flow at PERHILITAN and VRI.
 - Conducted a second training session for 8 technicians on using the EasyMAG™ extraction robot at VRI.
 - Modified lab plan for SWD with input from IDENTIFY.
- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights Surveillance Activities Completed in Current Quarter**
 - Finalized field plans for Sabah Wildlife Health Unit
 - Began advertising to fill microbiologist and veterinarian positions.
 - Performed site visits and began selecting sites for Deep Forest Project along the Kinabatangan River and at the Tabin Forest Reserve in Sabah.
 - Began sampling primates at sites along the Kinabatangan River.
 - Received IRB approval for amendments and modifications made to consent forms and protocols for human sampling; carried out first site visit to six villages in Orang Asli Communities in Kula Kangsar Perak, PREDICT team was well received by village elders and the community.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# of Animals sampled	# of Samples collected by active surveillance	# of Samples collected by opportunistic surveillance	# of Samples collected by syndromic surveillance or outbreak response	# of Animals with at least one final test result	# of Samples with at least one final test result	# of Samples with at least one final test result approved for release	Total # of diagnostic tests run
Malaysia								
Bats								
Free-ranging	19	199	0	0	0	0	0	0
Other High Risk	113	582	681	0	0	0	0	0

Interfaces								
Rodents								
Free-ranging	63	171	558	0	0	0	0	0
Other High Risk Interfaces	46	373	147	0	0	0	0	0
Sanctuary	4	0	38	0	0	0	0	0
Unclassified	2	0	28	0	0	0	0	0
Primates								
Free-ranging	29	0	460	0	15	25	0	0
Other High Risk Interfaces	362	44	6593	0	25	38	0	0
Sanctuary	5	28	0	0	0	0	0	0
Unclassified	104	0	1810	0	0	0	0	0
Other taxa (including humans)								
Free-ranging	8	17	92	0	0	0	0	0
Other High Risk Interfaces	396	45	3881	0	0	0	0	0
Sanctuary	12	0	115	0	0	0	0	0
Unclassified	25	0	16	0	23	40	0	0
TOTALS	1188	1459	14419	0	63	103	0	0

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.1: **Introduction of New Technologies**
 - Provided PREDICT Universal Positive Control to VRI.
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Year 3 Quarter 3):**
 - Transferred first set of wildlife samples and PREDICT Universal Control from PERHILITAN to VRI; samples currently being screened jointly by PREDICT and PERHILITAN personnel.
 - Extracted 1500 urine, throat and rectal samples using the EasyMAG extraction robot to be screened for priority viral families
- **Activity 1.4: Sample Tracking and Information Management**

- Sub-activity 1.4.1: **Surveillance Data Management**
 - Entered samples collected and tested into GAINS database.
- **Activity 1.5 Program Management**
 - Sub-activity 1.5.2: **Communication**
 - Informed Department of Health Sabah (DOHS) of planned PREDICT and PREVENT activities in Sabah; DOHS agreed to provide assistance with the DFHC survey.
 - Communicated with RESPOND to discuss PREDICT/RESPOND collaborations in Malaysia to provide epidemiology and outbreak response training to staff from MOH, DVS and PERHILITAN.
 - Continued communication and coordination with Zoonosis Technical Working Committee covering all activities on Peninsular Malaysia.

THAILAND

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Participated in “Second Regional Workshop on Collaboration Between Human and Animal Health Sectors on Zoonoses Prevention and Control” in Chiang Mai, organized by FAO/OIE/WHO.
 - Presented on “Bat urine collection in the field” for veterinarians during the “Veterinary Field Epidemiology in Action” workshop organized by DLD/FAO/OIE/USAID.
 - Presented “Climate Change and Health Impacts” and “Zoonoses of Concern in the Region – Panel of experts: Rabies and Nipah Viruses” in “Training Workshops on Zoonoses and Public Health Response in Savannakhet, Lao PDR”, organized by Kenan Institute Asia and USAID.

b) Laboratory Improvements

- Presented training lecture on Lyssavirus Diagnostics to the Ministry of Public Health.

- **Activity 1.2 Surveillance**

Summary of Surveillance Activities and Testing in GAINS to date:

Thailand	Total # of Animals sampled	# of Samples collected by active surveillance	# of Samples collected by opportunistic surveillance	# of Samples collected by syndromic surveillance or outbreak response	# of Animals with at least one final test result	# of Samples with at least one final test result	# of Samples with at least one final test result approved for release	Total # of diagnostic tests run
Bats								
Free-ranging	36	36	0	0	22	22	0	22
Ecotourism	146	146	0	0	0	0	0	0
Rodents								
Free-ranging	3	3	0	0	3	3	0	3
Ecotourism	4	4	0	0	0	0	0	0
Primates								
N/A	0	0	0	0	0	0	0	0
Other taxa								
Free-ranging	1	1	0	0	1	1	0	1
TOTALS	190	190	0	0	26	26	0	26

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**

- Sub-activity 1.3.2: **Pathogen detection and discovery (Year 3 Quarter 3):**

- Performed PCR screening for coronaviruses on archived specimens.
- Performed nucleic acid library preparation on wildlife specimens using Roche 454 Jr. to optimize protocols for viral discovery using next-generation sequencing.

- Continued to optimize viral family-level PCR protocols, specifically comparing three coronavirus PCR protocols, to improve the sensitivity and specificity of these assays on wildlife specimens.

PREDICT Findings (Y3Q3):

# Samples submitted	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release (yes or no)
Bat (69)	WHO-CC Chula	PCR	Coronaviruses	Confirmation of Results Pending	-	Thailand	No

- Activity 1.5 Program Management**

- Sub-activity 1.5.2: **Communication**
 - Presented on “Climate change and emerging infectious diseases” at Thai Red Cross Society Nurse College in Bangkok.
 - Presented on “Emerging infectious diseases from flood water” at Ministry of Science Thailand in Bangkok.
 - Attended “Inception Workshop on Partnership of Global Animal Health and Biosecurity Initiatives” in Bangkok organized by FAO and Department of Agriculture, Fisheries and Forestry, Australia.
 - Attended International Conference for Veterinary Services 2010: Asia Web for World Food Security in Bangkok organized by FAO and ASEAN. and presented "One Health in Motion: Models for One Health Practices"
 - Attended Second Thailand National One Health Forum “Strengthen the network and let’s move forward” organized by RESPOND.

VIETNAM

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **International, National or Regional Surveillance System Improvements**
 - Presented on One Health concept, human health risks of the wildlife trade as a significant wildlife/human interface in Vietnam, and PREDICT surveillance to 38 government staff from nine governmental departments (Customs, Environmental Police, Market Control, Legislative department, Nature Conservation, Forest Protection, Border Security, Mobile Rangers, and National Parks of Ha Tinh and Quang Binh Provinces, Central Vietnam).
 - Continued negotiations on partnership with Wellcome Trust-funded 'Vietnam Initiative on Zoonotic Infections' program, implemented with University of Edinburgh, and Wellcome Trust Sanger Institute (WTSI): PREDICT to sample wildlife in high risk cohorts and provide information on risk interfaces in six provinces as part of the collaboration.
 - b) **Laboratory System Improvements**
 - Collaborated with IDENTIFY-funded Laboratory Biosafety consultant for Hanoi University of Agriculture (HUA) Central Veterinary Laboratory, to ensure that PREDICT biosafety needs were addressed during initial scoping visit.
 - Co-hosted "*Laboratory Biosafety for Wildlife Diagnostics*" workshop with HUA Faculty of Veterinary Medicine for 16 laboratory and faculty members from HUA, and 2 laboratory staff each from National Centre for Veterinary Diagnostics (NCVD), Regional Animal Health Office No. 6 (RAHO6) and Oxford University Clinical Research Unit (OUCRU), and one laboratory expert from FAO.
 - Implemented PREDICT freezer sample management system for ultralow freezers in RAHO6 and HUA Central Veterinary Laboratory.
 - Developed draft PREDICT Workplan Agreement for implementation of PREDICT activities with Department of Animal Health (DAH) laboratories; document provided to central DAH for comment; awaiting final approval.

- Obtained approval from HUA Central Veterinary Laboratory to host PREDICT molecular diagnostics training for laboratory technicians from HUA, NCVD and RAHO6 in September 2012.
 - Continued negotiations for MOU with OUCRU Ho Chi Minh City, for training and advanced diagnostics.
- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights Surveillance Activities Completed in Current Quarter**
 - Obtained Province-level permission for PREDICT sampling of wildlife transferred from wildlife restaurants to temporary holding facilities by the Forest Protection Department of Lam Dong Province.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# of Animals sampled	# of Samples collected by active surveillance	# of Samples collected by opportunistic surveillance	# of Samples collected by syndromic surveillance or outbreak response	# of Animals with at least one final test result	# of Samples with at least one final test result	# of Samples with at least one final test result approved for release	Total # of diagnostic tests run
Vietnam								
Rodents								
Other High Risk Interfaces	31	3	111	0	23	51	0	51
Other taxa (including humans)								
Other High Risk Interfaces	99	3	241	0	14	31	0	61
Sanctuary	42	0	50	0	42	50	0	200
TOTALS	172	6	402	0	79	132	0	312

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Year 3 Quarter 3):**

- Obtained official documentation and shipped cDNA from HUA Central Veterinary Laboratory Vietnam to WCS Wildlife Health Centre Molecular Laboratory, New York, for confirmatory testing and further characterization (via sequencing) of positive results.

PREDICT Findings (Y3Q3):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Birds (11)	Hanoi University of Agriculture	Conventional PCR	Arenavirus, Flavivirus	Negative		Vietnam	No
Rodents (23)	Hanoi University of Agriculture	PCR	Arenavirus, Flavivirus	Negative		Vietnam	No
Other mammals (42 Asiatic black bears from Rescue Centre, 3 common palm civets)	Hanoi University of Agriculture, WCS Pathology lab	Conventional PCR,	Arenavirus, Coronavirus, Flavivirus, Herpesvirus, Paramyxovirus	All negative for Arenavirus, Coronavirus, Flavivirus, Paramyxovirus; Presumptive positives from Asiatic black bears and civets for Herpesvirus	Sequence results pending for presumptive herpesvirus positives	Vietnam	No

- **Activity 1.5 Program Management**
 - Sub-activity 1.5.1: **Significant Change in Project Management**
 - (b)(6)
 - Sub-activity 1.5.2: **Communication**
 - Produced PREDICT Priority Species poster, providing photographs, scientific name, English and Vietnamese common names, at request of laboratory partner RAHO6. Poster has been distributed to all government partners in Vietnam, and will be provided to future trainees to help identification of priority species for surveillance.

ASIA

BANGLADESH

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Invited to give a presentation at the Wildlife Protection and Conservation Training Program organized by the Bangladesh Forest Department.
 - Helped teach a workshop at the National Rabies Control Program in Bangladesh, organized by Ministry of Health and Family Welfare of Bangladesh.
 - Participated in and delivered a lecture at the EcoHealthNet Workshop 2012 held at the University of Wisconsin, and the National Wildlife Health Center of USGS.
 - Participated in the Bangladesh USAID EPT planning meeting and discussed collaboration among EPT partners.
 - Participated in the Annual General Meeting of the One Health Bangladesh Initiative.
 - b) **Laboratory System Improvements**
 - Discussed plans for the development of the Forest Department's new wildlife forensic and diagnostic laboratory.
 - Participated in workshop on the institutionalization of a laboratory network in Bangladesh organized by FAO.
- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights Surveillance Activities Completed in Current Quarter.**
 - Identified new areas with wildlife-human interfaces, including areas with heavy hunting activity and/or wildlife consumption, and developed surveillance strategies for these areas.

- Sampled 104 fruit bats, and 10 rodents, yielding 1780 samples.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# of Animals sampled	# of Samples collected by active surveillance	# of Samples collected by opportunistic surveillance	# of Samples collected by syndromic surveillance or outbreak response	# of Animals with at least one final test result	# of Samples with at least one final test result	# of Samples with at least one final test result approved for release	Total # of diagnostic tests run
Bangladesh								
Bats								
Hunter	137	1781	0	0	0	0	0	0
Free-ranging	816	12203	0	0	0	0	0	0
Rodents								
Other High Risk Interfaces	15	221	0	0	0	0	0	0
Free-ranging	138	1836	0	0	0	0	0	0
Primates								
Other High Risk Interfaces	4	60	0	0	0	0	0	0
Other taxa (including humans)								
Other High Risk Interfaces	4	60	0	0	0	0	0	0
Free-ranging	451	3401	0	0	0	0	0	0
TOTALS	1565	19562	0	0	0	0	0	0

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.1: **Introduction of New Technologies:**
 - Received the PREDICT viral-family PCR protocols and PREDICT Universal Control.
 - Received the hantavirus primer and preparing to begin hantavirus PCR at the ICDDR,B lab.
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Year 3 Quarter 3):**
 - Processed samples for shipping to the Center for Infection and Immunity, Columbia University, New York, for pathogen detection.

CHINA

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Met with CDC–Shanghai to discuss possible collaboration and participation in a One Health workshop being planned jointly by both groups.
 - Held initial discussions with Yunnan Institute of Endemic Diseases Control and Prevention and Yunnan CDC.
 - b) **Laboratory System Improvements**
 - Installed -80C freezer in the Zhanjiang Institute for Plague Control and Prevention in Guangdong Province for storage of wildlife samples.
 - Held PREDICT technique training for staff at Wuhan Virology Institute.
- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights Surveillance Activities Completed in Current Quarter**
 - Sampled 11 bats from two sites in Yunnan Province.
 - Continued to build relationships with animal market vendors to allow wildlife sampling.
 - Met with head of wildlife farming association in Guilin regarding upcoming fieldwork.
 - Met with Yunnan Institute of Endemic Diseases Control and Prevention and Yunnan CDC regarding potential collaboration for wildlife surveillance (especially markets) in Yunnan Province.
 - Established partnership with Zhanjiang Institute for Plague Control and Prevention in Guangdong Province in order to access to rodent samples collected under normal surveillance activities.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# of Animals sampled	# of Samples collected by active surveillance	# of Samples collected by opportunistic surveillance	# of Samples collected by syndromic surveillance or outbreak response	# of Animals with at least one final test result	# of Samples with at least one final test result	# of Samples with at least one final test result approved for release	Total # of diagnostic tests run
China								
Bats								
Free-ranging	369	738	0	0	0	0	0	0
Ecotourism	83	166	0	0	0	0	0	0
Other high risk interfaces	36	72		0	0	0	0	0
Rodents								
Other high risk interfaces	362	513	0	0	0	0	0	501
Other taxa (including humans)								
Carnivores								
Other high risk interfaces	6	12	0	0	0	0	0	0
TOTALS	856	1501	0	0	00	0	0	501

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.1: **Introduction of New Technologies**
 - Provided Universal Control to collaborating laboratory partners.
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Year 3 Quarter 3):**
 - Screened samples from wet market workers for Coronavirus, Filovirus, Bunyavirus, and Hantavirus; awaiting for approval from country Government for release.
 - Initiated zoonotic pathogen surveillance in collaboration with CDC China's hospital-based syndromic surveillance for Encephalitis and Hemorrhagic Fever of Unknown Origin in Guangdong Province program: identified high-risk samples from initial cohort study for further pathogen detection using the PREDICT Universal Control.

PREDICT Findings (Y3Q3):

# Samples submitted	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Rodents (10 Malayan Porcupines) - pooled anal & oral swabs	Wuhan Institute of Virology	SuperScript III one-step RT-PCR kit with Pt Taq DNA Polymerase (Invitrogen)	Astroviridae	Negative		China	No
Rodents (55 Chinese Bamboo rats)	Wuhan Institute of Virology	SuperScript III one-step RT-PCR kit with Pt Taq DNA Polymerase (Invitrogen)	Astroviridae	Negative		China	No
Rodents (112 Chinese Bamboo rats)	Wuhan Institute of Virology	SuperScript III one-step RT-PCR kit with Pt Taq DNA Polymerase (Invitrogen)	Coronaviridae Paramyxoviridae	Negative		China	No
Carnivores (6 Masked palm civets)	Wuhan Institute of Virology	SuperScript III one-step RT-PCR kit with Pt Taq DNA Polymerase (Invitrogen)	Coronaviridae Paramyxoviridae	Negative		China	No
Rodents (39 Malayan Porcupines)	Wuhan Institute of Virology	SuperScript III one-step RT-PCR kit with Pt Taq DNA Polymerase (Invitrogen)	Coronaviridae Paramyxoviridae	Negative		China	No

- **Activity 1.5 Program Management**
 - Sub-activity 1.5.1: **Significant Change in Project Management**
 - Hired Program Assistant to manage wildlife sampling, GAINS data input, and assist the Country Coordinator with reporting.

LATIN AMERICA

BOLIVIA

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **International, National or Regional Surveillance System Improvements**
 - Confirmed Yellow fever as the cause of death in primates in Santa Cruz by PREDICT-funded lab and strengthened linkages among the Bolivian government (Ministry of Public Health; National Veterinary Service-SENASAG), the local USAID mission, and PAHO Bolivia for outbreak response; implementation of vaccination and education campaigns was effective in preventing infections in humans in affected areas.
 - Trained 11 PREDICT staff and technicians from the Institute of Molecular Biology (IBMB-UMSA laboratory) in Occupational Health and Biosafety for laboratory operations at University of San Andres.
 - Trained 28 veterinarians and animal keepers from the National Veterinary Service (SENASAG) and wildlife rescue centers and zoos from Cochabamba, Oruro, Santa Cruz and La Paz, on “Methods for Wildlife Disease Surveillance;” the course was requested and funded by the General Directorate of Biodiversity (DGB).
 - b) **Laboratory System Improvements**
 - Prioritized select wildlife samples for viral family screening.
 - Established relationship with the Police Institute for Technical and Scientific Research (IITCUP, Police University) for cloning and sequencing PCR positive products in-country; first collaborations with IITCUP enabled PREDICT to characterize two (2) Yellow fever viral strains (TN-96 NS5 and TVP11767) from primate flavivirus positive samples obtained during the recent mortality event in Santa Cruz.
 - Planned with country partners to support training of IBMB laboratory staff at an advanced

- lab in the US (i.e., Columbia University/UC Davis).
- Successfully standardized and validated all protocols for the 7 viral families initially targeted (universal control 1) at IBMB.
 - Hired a full time laboratory technician and a part time laboratory assistant to maximize PREDICT diagnostic capacity at IBMB.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# of Animals sampled	# of Samples collected by active surveillance	# of Samples collected by opportunistic surveillance	# of Samples collected by syndromic surveillance or outbreak response	# of Animals with at least one final test result	# of Samples with at least one final test result	# of Samples with at least one final test result approved for release	Total # of diagnostic tests run
BOLIVIA								
Bats								
Free-ranging	323	1032	178	0	0	0	0	0
Other High Risk Interfaces	2	0	62	0	0	0	0	0
Rodents								
Free-ranging	11	0	190	0	0	0	0	0
Hunter	44	0	868	0	11	11	0	16
Other High Risk Interfaces	137	2115	299	0	0	0	0	0
Primates								
Free-ranging	3	0	125	0	0	0	0	0
Hunter	45	0	844	0	27	31	0	113
Market	6	0	78	0	6	8	0	21
Other High Risk Interfaces	8	0	105	0	1	1	0	1
Sanctuary	36	0	438	0	13	14	0	46
Other taxa (including humans)								
Free-ranging	6	11	0	0	0	0	0	0
Hunter	219	0	3672	0	53	56	0	93
Market	109	0	1435	0	62	103	0	315
Other High Risk	124	1037	483	0	11	18	0	48

Interfaces								
Sanctuary	43	0	213	0	14	17	0	54
TOTALS	1116	4195	8990	0	198	259	0	707

- Sub-activity 1.3.2: **Pathogen detection and discovery (Year 3 Quarter 3):**

PREDICT Findings (Y3Q3):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Bats (78)	IBMB-UMSA	Conventional and nested RT-PCR	Flavivirus, Coronavirus, Arenavirus, Filovirus	Pending	Pending	Bolivia	No
Monkeys (180)	IBMB-UMSA	Conventional and nested RT-PCR	Filovirus, Paramyxovirus, Arenavirus, Flavivirus, Coronavirus	Pending	Pending	Bolivia	No
Rodents (526)	IBMB-UMSA	Conventional and nested RT-PCR	Hantavirus, Arenavirus, Alphavirus, Flavivirus	Pending	Pending	Bolivia	No
Primates (59)	IBMB-UMSA	Conventional and nested RT-PCR	Arenavirus	Presumptively positive to Arenavirus	Pending	Bolivia	No
Bats (45)	IBMB-UMSA	Conventional and nested RT-PCR	Coronavirus	Pending	Pending	Bolivia	No
Rodents (84)	IBMB-UMSA	Conventional and nested RT-PCR	Alphavirus, Arenavirus, Flavivirus, and Hantavirus	Presumptively positive to Alphavirus	Pending	Bolivia	No

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Monkeys (2)	IBMB-UMSA	Conventional RT-PCR	Flavivirus and Arenavirus	Presumptive positive to Flavivirus	Sequence results pending of presumptive positives	Bolivia	No

- **Activity 1.4: Sample Tracking and Information Management**
 - Sub-activity 1.4.1: **Surveillance Data**
 - Reviewed procedures for improving data management, sample labeling, and use of web-based tools available in GAINS.
- **Activity 1.5 Program Management**
 - Sub-activity 1.5.1: **Significant Change in Project Management**
 - Hired a consultant to help prepare formal reports to Bolivian government agencies.
 - Sub-activity 1.5.2: **Communication**
 - Made agreement with Director of Epidemiology, National Veterinary Service-SENASAG, to receive official epidemiologic reports on a weekly basis, to facilitate tracking of disease events in domestic animals and evaluate potential wildlife origin of zoonotic pathogens.
 - Compiled preliminary disease surveillance results from hunted wildlife (subsistence) to indigenous leaders and community members in San Jose de Uchupiamonas

BRAZIL

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **International, National or Regional Surveillance System Improvements**
 - Conducted target taxa surveillance with the cooperation of Jungle Warfare Training Center of the Brazilian Army (CIGS), and with representatives of a new partner, the Manaus Center of Zoonosis Control (CCZ), working jointly with our team.
 - b) **Laboratory System Improvements**
 - Filed essential paperwork for importation of MiniMag Extractor from France.
 - Developed a subcontract with the University of Sao Paulo (UCB II) for viral family testing of PREDICT samples.
- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights Surveillance Activities Completed in Current Quarter**
 - Sampled 103 bats, 8 rodents and 5 primates from a highly human-disturbed site at the CIGS, yielding 380 samples.
 - Completed the last expedition trip to remote sites of the Amazon (Santa Izabel do Rio Negro, State of Amazonas, northwestern Brazil), in conjunction with the National Research Institute of Amazonia (INPA) and the Federal University of Amazonia (UFAM) and sampled 8 rodents, 43 bats, 3 primates and 6 marsupials, yielding 540 specimens.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# of Animals sampled	# of Samples collected by active surveillance	# of Samples collected by opportunistic surveillance	# of Samples collected by syndromic surveillance or outbreak response	# of Animals with at least one final test result	# of Samples with at least one final test result	# of Samples with at least one final test result approved for release	Total # of diagnostic tests run
Brazil								
Bats								
Free-ranging	33	137	0	0	0	0	0	0
Other High Risk Interfaces	548	2444	0	0	0	0	0	0
Rodents								
Free-ranging	12	65	0	0	0	0	0	0
Other High Risk Interfaces	44	119	0	0	0	0	0	0
Primates								
Free-ranging	5	18	0	0	0	0	0	0
Other High Risk Interfaces	32	139	0	0	0	0	0	0
Other taxa (including humans)								
Free-ranging	7	30	0	0	0	0	0	0
Other High Risk Interfaces	186	972	0	0	0	0	0	0
TOTALS	867	3924	0	0	0	0	0	0

- **Activity 1.5 Program Management**
 - Sub-activity 1.5.1: **Significant Change in Project Management**
 - Hired a bat taxonomist.
 - Sub-activity 1.5.2: **Communication**
 - Updated the Health Program coordinator at USAID Mission on current PREDICT activities and Y4 work plan.

COLOMBIA

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **International, National or Regional Surveillance System Improvements**
 - Discussed terms and budget for cooperation with government to establish an inter-ministerial alliance for wildlife disease surveillance in Colombia; PREDICT and the Ministries of Environment, Health, and Agriculture, with assistance from the local Association of Wildlife Veterinarians (AVVS), will define conditions and timelines for work, and expected products.
 - Assisted by AVVS, finalized “Current knowledge and management of wildlife diseases in Colombia”, a report summarizing current regulations and research focused on wildlife diseases; a Spanish version is currently available upon request.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# of Animals sampled	# of Samples collected by active surveillance	# of Samples collected by opportunistic surveillance	# of Samples collected by syndromic surveillance or outbreak response	# of Animals with at least one final test result	# of Samples with at least one final test result	# of Samples with at least one final test result approved for release	Total # of diagnostic tests run
COLOMBIA								
Rodents								
Unclassified	1	0	6	0	0	0	0	0
Primates								
Hunter	17	0	132	0	0	0	0	0
Unclassified	5	0	33	0	0	0	0	0
Other taxa								
Hunter	38	0	237	0	0	0	0	0

Unclassified	54	0	368	0	0	0	0	0
TOTALS	115	0	776	0	0	0	0	0

MEXICO

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - b) **Laboratory System Improvements**
 - Laboratory reagents and PCR primers were purchased and shipped to IMSS (*Instituto Mexicano del Seguro Social*).
- **Activity 1.2: Surveillance**

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# of Animals sampled	# of Samples collected by active surveillance	# of Samples collected by opportunistic surveillance	# of Samples collected by syndromic surveillance or outbreak response	# of Animals with at least one final test result	# of Samples with at least one final test result	# of Samples with at least one final test result approved for release	Total # of diagnostic tests run
Mexico								
Bats								
Free-ranging	1497	6872	88	0	0	0	0	0
Other High Risk Interfaces	31	0	122	0	0	0	0	0
Rodents								
Free-ranging	32	119	5	0	0	0	0	0
Other taxa (including humans)								

Free-ranging	16	63	10	0	0	0	0	0
TOTALS	1576	7054	225	0	0	0	0	0

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**

- Sub-activity 1.3.2: **Pathogen detection and discovery (Year 3 Quarter 3):**

PREDICT Findings (Y3Q3):

# Samples submitted	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Bats	Laboratorio de Inmunovirología	PCR	Flavivirus	Presumptive positives	Sequence results pending of presumptive positives	Mexico	Pending

PERU

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**

- Sub-activity 1.1.1: **Operationalizing One Health**

- a) **International, National or Regional Surveillance System Improvements**

- Signed cooperative agreement with Peruvian Institute of Health (INS) enabling PREDICT involvement in field investigations and outbreak response activities in country, and granting access to INS' samples (bats and rodents) for comprehensive pathogen testing.
 - Discussed collaborations with the Lima Administration of Forestry and Wildlife (ATFFS

- Lima) to provide assistance in case of disease outbreak investigations.
- Explored opportunities and mechanisms for improving reporting of wildlife disease events to Peruvian Veterinary Service-SENASA with the Peruvian Association of Wildlife Veterinarians (APEVEFAS).
 - Built capacity for a national wildlife disease surveillance system with the Peruvian Veterinary Service (SENASA) and the USDA-APHIS Wildlife Disease Program by co-organizing a workshop on wildlife disease surveillance for 115 key government staff and partners in Lima and Iquitos.
 - Trained four staff in “Preventive measures against transmissible diseases that spread among animals and humans”, by the Peruvian Institute of Health
 - Six staff passed the web-based course on “Social & Behavioral Research”, (CITI Collaborative Institutional Training Initiative). The course is required for staff involved in market surveys.
 - Discussed cooperation for training students at two universities (Peruvian University Cayetano Heredia, and Major University of San Marcos), to improve knowledge and skills of veterinarians for wildlife disease surveillance.
 - Presented “Risks associated with the Wildlife Trade” at a training seminar on that topic organized by the General Directorate of Forestry and Wildlife (DGFFS) for enforcement officers (Ecologic Police”).

b) Laboratory System Improvements

- Prioritized select wildlife samples for viral family screening.
- Began to incorporate new molecular protocols for additional viral families in universal control 2 when they become available.
- Hired a full time laboratory technician to conduct PREDICT diagnostics at INS.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# of Animals sampled	# of Samples collected by active surveillance	# of Samples collected by opportunistic surveillance	# of Samples collected by syndromic surveillance or outbreak response	# of Animals with at least one final test result	# of Samples with at least one final test result	# of Samples with at least one final test result approved for release	Total # of diagnostic tests run
PERU								
Bats								
Free-ranging	70	283	0	0	0	0	0	0
Hunter	1	0	0	0	0	0	0	0
Rodents								
Free-ranging	1	8	0	0	0	0	0	0
Hunter	190	42	0	0	0	0	0	0
Market	28	241	0	0	0	0	0	0
Other High Risk Interfaces	62	29	0	900	0	0	0	0
Unclassified	3	14	0	0	0	0	0	0
Primates								
Hunter	133	60	0	0	0	0	0	0
Market	103	553	20	0	0	0	0	0
Other High Risk Interfaces	204	923	1496	0	0	0	0	0
Sanctuary	55	0	248	0	0	0	0	0
Unclassified	4	63	0	0	0	0	0	0
Other taxa (including humans)								
Free-ranging	1	4	0	0	0	0	0	0
Hunter	411	169	0	0	0	0	0	0
Market	259	851	11	0	0	0	0	0
Other High Risk Interfaces	40	96	34	18	0	0	0	0
Unclassified	58	315	0	0	0	0	0	0
TOTALS	1623	3692	1768	918	0	0	0	0

- Sub-activity 1.3.2: **Pathogen detection and discovery (Year 3 Quarter 3):**

PREDICT Findings (Y3Q3) (Y3Q3):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Primates	NAMRU-6; UNMSM	Conventional and nested RT-PCR	Flavivirus; Arenavirus; Filovirus; Coronavirus	Negative	None	Peru	No

- **Activity 1.4: Sample Tracking and Information Management**

- Sub-activity 1.4.1: **Surveillance Data Management**
 - Reviewed procedures for improving data management, sample labeling, and use of web-based tools available in GAINS with Peru team.

- **Activity 1.5 Program Management**

- Sub-activity 1.5.1: **Significant Change in Project Management**
 - Hired a part-time consultant to support reporting and follow-up on diagnostics.
- Sub-activity 1.5.2: **Communication**
 - With the General Directorate of Biodiversity (Ministry of Environment), reviewed procedures for public release of data, to be agreed with the Ministry of Public Health next quarter.

LOW 2: Risk Determination

- **Activity 2.2 Optimize models for diversity of disease emergence**

- Designed survey plan to be implemented at wet markets across northern and central Peru to help characterize human behaviors and risk factors that could influence emergence of zoonotic diseases in the wildlife trade; survey under review by NAMRU-6 IRB committee.

PREDICT Quarter 4 Year 3 Reporting

GLOBAL - US, Africa, Southeast Asia, Asia & Latin America

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**

- Sub-activity 1.1.1: **Operationalizing One Health**

- a) **International, National, or Regional Surveillance System Improvements**

- Hosted a workshop with Peru Veterinary service (USDA APHIS-sponsored), involving 90 government staff and partners (park rangers, public health ministry, environment ministry, and veterinary service) to review bat and rodent capture and sampling, necropsy techniques, biosafety, waste disposal, and outbreak investigation.
 - In Lao PDR, collaborated, with National Animal Health Center (NAHC) to develop a mobile response team for wildlife disease outbreaks and formulate guidelines for outbreak investigations including priority samples and PPE. Linked in RESPOND initiatives to train rangers on when to report disease outbreaks and arranged meetings with district/provincial livestock and human health staff around National Protected Areas to identify reporting mechanisms in case of wildlife disease outbreak.
 - Sponsored and participated in the Wildlife Disease Association-European Wildlife Disease Association Workshop on Capacity Development for Wildlife Health Management in Low and Middle Income Countries. Several partners from member countries were in attendance.
 - Presented on PREDICT activities at an FAO workshop in Bangladesh involving district Forestry, Agriculture and Medical officers as part of a wildlife disease surveillance training program.
 - In Indonesia, participated in Eijkman Institute biosecurity training, and the National Coordination Meeting for Zoonosis Control organized by the Coordinating Ministry for People's Welfare.

- In Thailand, met with the Director of Wildlife Research Division, Wildlife Conservation Office National Park, Wildlife and Plant Conservation Department (DNP) and DNP veterinarians to facilitate new wildlife surveillance project initiated by DNP that incorporates PREDICT protocols.
- Presented results from sampling efforts to indigenous leaders in Bolivia.
- In China, signed a new agreement with the Guangdong Institute of Public Health; the agreement also includes the Centers of Disease Control and Prevention of Guangdong Province as a partner, and stipulates collaboration on two human studies. Also delivered training for several organizational representatives for a hospital-based study of highly exposed individuals.
- In Gabon and in coordination with RESPOND, helped design and deliver a One Health training module for master students in the FOREST-MENTOR program at L'Ecole Nationale des Eaux et Forêts in Libreville.
- Consulted with Japanese, European, and American zoonotic disease experts through the Global Center of Excellence Program on Zoonotic Control's international conference at Hokkaido University.
- Through the IUCN SSC Wildlife Health Specialist Group, provided wildlife mortality event summaries as requested by WHO and IUCN.
- Through the OIE Working Group on Wildlife Diseases, provided recommendations on integration of wildlife disease capacity into the OIE Performance of Veterinary Services tool.

b) Laboratory System Improvements

- Began to implement and/or optimize viral family-level PCR protocols at additional laboratories including at the Institute of Biomedical Sciences – University of Sao Paulo (Brazil), Zoonotic Disease Lab IMSS, and Lab of Instituto Politecnico Nacional (Mexico).
- Makerere University Walter Reed Project animal virology laboratory became fully operational as PREDICT's regional testing center for east-central Africa receiving samples from Uganda, Rwanda, and Tanzania.
- Expanded viral testing to include additional protocols at CHP (Cameroon), INRB (DRC), HUA (Vietnam), IBMB (Bolivia), and INS (Peru).
- Continued to provide training and support to laboratory technicians including staff travelling to HUA (Vietnam – training also included technicians from NCVD and RAHO6), NAHC (Lao

PDR), and INRB (DRC) for extensive on-site training; laboratory technicians travelling to CII from Mexico and to UC Davis from Uganda and Nepal for extensive on-site training; training of lab technicians at CHP and the Cameroonian High Institute of Medical Technology (Cameroon) and NaVRI by IPC staff (Cambodia); trainings included sample extraction, PCR analysis, preparation of samples for sequencing, data management including storage and tracking of samples, protocols for deep sequencing at CII, and Roche™ 454 sequencer training at IPC.

- Provided equipment for surveillance and laboratory diagnostics to additional labs including cold chain equipment and electrical back-up system at INRB (DRC) and thermal cycler to Makerere University (Uganda).
- Assisted with renovations (completion expected by December 2012) and received reagents at the Eijkman Emerging Virus Laboratory (Indonesia) to begin testing undiagnosed febrile human samples with PREDICT protocols.
- Assisted with and consulted on laboratory design and equipment set up for the new laboratories at NAHC (Lao PDR) and the Department of Forestry (Bangladesh) for testing of samples from wildlife.
- Mobilized and refined use of outbreak equipment including mobile biosafety tent, BGAN satellite Internet terminal, Smartcycler, and PAPR respirators during the Ebola outbreak response in Isiro (DRC).
- Coordinated with other EPT partners including with DELIVER to replace the damaged part for the liquid nitrogen generator (DRC) and participated with IDENTIFY (FAO, OIE) at the Regional Animal Health Laboratory Technical Advisory Group Meeting in Bangkok (Thailand) and collaborated with IDENTIFY to perform Bio-Safety Risk Assessments at collaborating laboratories at PERHILITAN, VRI, and SWD (Malaysia).
- Continued refining real-time, on-line test result tracking in GAINS to streamline reporting of test findings to in-country government, obtaining government approvals for release of data and movement of data to become available to partners and the public on HealthMap.
- Continued negotiation with reagent supply companies (Life Technologies, Qiagen, Biomerieux) to develop sustainable pricing and supply chains for collaborating laboratories.

Table 1: Labs Receiving Assistance from PREDICT to date

	# of labs targeted for screening with desired viral families	# of labs receiving training in preparation for screening of desired viral families	# of labs that have initiated work that will eventually lead to screening desired viral families (labs with partial capacity)
Africa	6	6	5
Asia / SE Asia	19	16	9
Latin America	8	6	6
Totals	33	28	20

- **Sub-activity 1.1.2: Capacity Assessment and Tracking of Development Progress**
 - Completed the Y3 Rapid Survey Update Tool using a two part format to allow for 1) tracking progress and changes in capacity to conduct wildlife surveillance for zoonotic pathogens in all countries, and 2) obtaining external perspectives from wildlife officials to better understand how the PREDICT project is viewed, how it has made progress, and how capacity can be improved in the future.
 - Analyzed Y2 capacity data to identify trends in baseline country capacity, potential for linkages across regional infrastructure to improve training and lab capacities, and gaps for which PREDICT is well positioned to make strategic improvements in capacity to conduct wildlife surveillance for zoonotic pathogens. Preliminary analyses indicated that the majority of countries reported improvements in human capacity, laboratory capacity, and overall zoonotic pathogen surveillance capabilities in wildlife since the start of the project. Priority actions identified by country coordinators to further improve wildlife surveillance included establishing sustainable funding/resources, increasing human capacity to conduct surveillance activities, and engaging governments and communities to educate them about zoonotic pathogens and the importance of surveillance for early detection.
 - Designated a local media surveillance evaluation program to standardize data collection and build local surveillance capacity in participating countries with appropriate staff

available to screen local newspapers as a way to extend the reach of global digital surveillance for health events of potential zoonotic importance. This extends the initial local media surveillance program that was piloted in Tanzania and that shows promise.

Table 2: PREDICT Training

Country		# Women	Trainings covered various combinations of the following topics:
Asia:			
Bangladesh	5	0	Lab techniques in BSL2 lab & lab diagnostics; epidemiology and outbreak investigation; capture and sampling of rodents & bats; sample collection and GAINS system; use of GIS.
Cambodia	71	12	Core safety, animal capture, & sampling skills and protocols; data collection & management; rodent and primate ID & primate and rodent sampling; respirator fit testing.
China	3	2	Core safety, animal capture & sampling skills and protocols; sample collection, handling, and transport; wildlife restraint & anesthesia; human & animal safety; bat, rodent, and primate sampling.
India	18	2	Core safety, animal capture & sampling; laboratory safety protocols; zoonoses; surveillance and sampling protocols; bar-coding and data management; animal necropsies.
Indonesia	23	10	Modeling behind the PREDICT project; zoonotic diseases of bats and rodents; human and animal safety during capture; laboratory safety & PPE use; sample collection; set up for sampling bats and rodents.
Lao PDR	65	17	Core safety, animal capture, & sampling skills and protocols; data collection; PPE use; bar-coding & data management; animal necropsies; surveillance & sampling; laboratory molecular techniques.
Malaysia	69	15	Core safety protocols; PPE and biosafety, animal capture & sampling skills and protocols; bat and rodent capture, handling & sampling; laboratory skills; packing and shipping samples & cold chain; sampling strategy & data collection; bat, rodent & macaque sampling; collection of trigeminal nerve root ganglia from macaques for Herpes testing; virus extraction; bat & rodent capture; rodent retro-orbital bleed; primate sampling & human and animal safety; PRC & cloning.
Thailand	26	15	Lab and bioinformatics training; animal capture; laboratory safety; animal sampling protocols; zoonotic diseases.
Vietnam	285	100	Core safety, animal capture & sampling skills and protocols; packing & shipping samples; barcode system; animal pathology; sample collection & data management & use of GAINS; surveillance; filter paper blood spot sampling; lab diagnostic protocols, virus family level protocols; one health & sampling strategy; sample transport & lab methods; wildlife pathology; First Aid; respirator fit testing.
Africa:			
Cameroon	77	23	Core safety, animal capture & sampling skills and protocols; specialized field sampling and laboratory skills; packing & shipping samples to reference lab; PPE use; bushmeat policy and wildlife ethics; extraction, RT-PCR, ELISA and other lab methods; lab systems; immunology and serology; ethics; pan-viral protocols; emergency preparedness and management; outbreak response training; bio-risk management; use of satellite phones; molecular biology and conventional PCR; respirator fit testing.
DRC	18	3	Core safety, animal capture & sampling skills and protocols; specialized field sampling and

			laboratory skills; RT-PCR, ELISA; administration and reporting; Monkeypox surveillance; sample tracking & GAINS system; ethical issues; blood spot sampling; DNA & RNA extraction from animal samples; respirator fit testing.
Gabon	5	2	Bushmeat sampling; packing & shipping samples; PPE use and biosafety; lab safety; animal capture; bat & rodent sampling; sampling for AI; animal sample collection; cold chain; lab methods, DNA extraction, PCR; sample prioritization; safe handling of liquid nitrogen; sequencing; virus isolation; RNA & RT-PCR; GAINS system & data management.
Republic of Congo	13	2	Core safety, PPE and biosafety; safe animal capture, & sampling skills and protocols; bat, rodent, and primate sampling; laboratory safety & skills; data collection; cold chain; protecting human subjects in research; virology laboratory methods; respirator fit testing.
Rwanda	185	19	Core safety, animal capture & sampling skills and protocols; PPE use and biosafety; bat, rodent, and primate capture, handling, and sampling; zoonoses; ethics and responsibilities; wildlife pathology & necropsy; sample collection & preservation; packing & shipping samples; tracking primates & health monitoring; lab personnel safety; PCR protocols & sample processing; bushmeat handling.
Tanzania	40	7	Core safety, animal capture & sampling skills and protocols; bat and rodent capture, handling & sampling; data management; laboratory safety; surveillance; information management and GAINS system; wildlife capture & restraint; emergency preparedness; ethics, cultural sensitivity & SHP; pathogen detection; extraction and PCR & protocols; cold chain; respirator fit testing.
Uganda	29	9	Core safety, animal capture & sampling skills and protocols; PPE & biosafety; laboratory safety; packing & shipping samples; bushmeat sampling; cold chain; GPS; Animal Mortality Monitoring Study; bat capture, handling & sampling; PPE & biosafety to handle dead animals.
Latin America:			
Bolivia	162	73	Core safety, animal capture, laboratory & sampling skills and protocols and zoonotic diseases; bat, rodent, and primate sampling; bushmeat sampling; molecular and parasite diagnostic methods; lab safety and methods; packing and shipping samples; wildlife management and disease management; work ethics, cultural sensitivity & SHP; managing livestock & poultry diseases; detecting zoonoses; sample collection and storage; methods of detecting Salmonella in wildlife; biostatistics; respirator fit testing.
Brazil	32	17	Core safety, animal capture, handling & sampling skills and protocols; PPE use & biosafety; bat and rodent sampling; bushmeat sampling; packing and shipping samples; cold chain; surveillance, ethics, and responsibilities; primate sampling.
Colombia	54	29	Core safety, animal capture & sampling skills and protocols; lab safety & methods; One Health; Conservation Medicine; GAINS system and data management.
Mexico	24	12	Core safety, animal capture, handling & sampling skills and protocols; lab safety & methods; PPE use & biosafety; disease modeling; animal care and use protocols; lab diagnostic techniques.
Peru	242	132	Core safety, animal capture & sampling skills and protocols; PPE use & biosafety; surveillance; zoonotic disease risks from wildlife trade and consumption; wildlife regulations, wildlife management and disease monitoring; sample collection & storage; species ID & health risks; emergency management of spider bites; safe transport of confiscated animals; respirator fit testing.
Total Trained	1,446	501	

- **Activity 1.2: Surveillance**

- Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**

- Conducted surveillance activities in Bolivia, Brazil, Peru, Mexico, Bangladesh, Cambodia, China, Lao PDR, Malaysia, Indonesia, Thailand, Vietnam, Cameroon, DRC, Gabon, Republic of Congo, Rwanda, Tanzania, and Uganda.
- Collected samples from animals at high-risk interfaces and in areas with ongoing anthropogenic activities known to drive disease emergence.
- Cell phone-based surveyor tool in Uganda's Animal Mortality Monitoring Program yielded reports on 212 animals (including 51 non-human primates, 36 bats, and 2 rodents). The mobile phone data format was redesigned to emphasize target species and high-risk interfaces and allow for input of a probable cause of death and GPS coordinates. The first official disease outbreak (in primates) was reported from Queen Elizabeth National Park through the program.
- Continued to identify areas and interfaces for new sampling opportunities in Year 4, such as markets along wildlife trade routes and rodents collected as part of rodent control measures in China and hotspots for bushmeat hunting and primate and rodent consumption in Tanzania.
- In Cambodia, completed surveys on wildlife hunting and consumption in three villages in Banteay Meanchey Province to inform future surveillance activities.
- Responded to requests to investigate primate morbidity and mortality events in Peru and Republic of Congo.
- Provided outbreak response support and follow-up human disease outbreaks occurring in Uganda, DRC, and Cambodia. In Uganda, PREDICT was invited to attend National Task Force meetings and participate as part of the Ecological Surveillance Subcommittee (third time this year that PREDICT has been asked to participate in an outbreak response in Uganda). A survey was administered to households as part of the outbreak investigation to assess human contact with wildlife in the outbreak area. In DRC, the Country Coordinator was appointed to be Secretary of the Commission in charge for laboratory and research under the supervision of the National Task Force for the Ebola outbreak. Conducted animal

sampling activities and coordinated efforts with partners from the Ministry of Health, WHO, RESPOND, and other organizations and ensured sufficient equipment and supplies. Deployed staff from Cameroon to DRC to assist at the Ebola outbreak site.

Table 3: PREDICT Global Surveillance Summary by Region, Taxa and Primary Risk Interface in GAINS (to date):

	# of Animals sampled in Y3Q4	# of Animals sampled to date	# of Samples collected to date	# of Samples collected with at least one final test result	Total # of diagnostic tests run to date
Africa					
Bats	124	3925	19444	7475	19922
Rodents	311	3446	12154	503	1064
Non-human Primates	43	3257	10791	1285	5861
Other taxa	1089	4346	8625	554	888
Asia and Southeast Asia					
Bats	179	4272	32559	0	0
Rodents	280	709	4413	322	483
Non-human Primates	0	4	60	0	0
Other taxa	101	689	4654	12	18
Latin America					
Bats	28	2996	15618	230	364
Rodents	12	761	7028	272	868
Non-human Primates	23	868	6759	703	1912
Other taxa	56	1733	9704	237	704
Primary Interface (all regions)					
Hunted	1337	11012	25464	2202	6504
For sale (sml market <5 vendors)	0	188	1600	9	29
For sale (med market 5-20 vendors)	94	552	2440	192	573
For sale (lgr market >20 vendors)	149	1421	5516	93	296
For sale (market size unknown)	0	681	4644	794	2070
For sale (restaurant)	139	602	1231	82	112
Temporary holding facility (wildlife trade transport)	12	660	6191	310	836
Peri-domestic/in or near human dwelling(s)	440	1869	18293	245	482

Preying on livestock or their food	3	18	311	0	0
Private wildlife collection or pet	0	29	315	18	126
Public safety hazard (e.g. threat to humans)	0	240	3594	221	692
Raiding crops	66	210	1314	58	60
Rehabilitation center	0	137	854	92	368
Sanctuary	3	1182	6337	714	2992
Wild animal farm	66	253	536	334	501
Zoo	0	300	1886	127	310
Contact with park personnel/intensive wildlife management	11	319	1238	179	218
contact with tourists/ecotourism	8	1030	1884	21	90
Free-ranging	0	766	4715	92	551
Free-ranging/contact with domestic animals/humans not likely	350	11645	68538	8508	23911
Other	101	1063	5656	266	432
TOTALS	2779	34177	162557	14557	41153

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - **Sub-activity 1.3.1: Introduction of new technologies:**
 - Tested the mobile biosafety tents in DRC during the Ebola outbreak;
 - Tested the satellite internet terminal in an actual outbreak scenario in Central Africa.
 - Expanded nucleotide assay techniques in various sites, including implementing the QIAshredder assay for homogenization of animal tissue samples before extraction of nucleic acids and extraction of swabs directly from RNAlater.
 - **Sub-activity 1.3.2: Pathogen detection and discovery (Year 3 Quarter 4):**
 - Selected sample sets from various countries for advanced pathogen detection and discovery utilizing Illumina deep-sequencing and 454 pyrosequencing, allowing comparison of pathogen discovery efficacy.
 - Expanded the number of PREDICT viral genera currently being tested in most PREDICT laboratories.

a) Africa

- Sent additional nucleic acid from high-risk human and wildlife samples (over 500) to the US for advance pathogen discovery.
- Published the discovery of the Bas-Congo virus, of the Rhabdovirus family, associated with a viral hemorrhagic fever death in DRC.
- Began assessing sample repositories for acute human specimens with unknown disease etiology and from high-risk populations for the Deep Freeze project.
- Initiated testing of wildlife and market samples collected during the Ebola outbreak in Isiro and surrounding regions of DRC.

b) Asia

- Chinese partners approved limited human surveillance data release to PREDICT partners.
- Archival (both wildlife and human specimens) sample sets have bolstered the diversity and range of samples for PREDICT testing.

c) Latin America

- Discovered 13 new genotypes of coronaviruses in neotropical bats; this allowed us to demonstrate that CoVs cluster very strongly based on host family, which in turn provided data for the proposal of the likely reservoir species for the new Saudi Arabian CoV that recently emerged. A nice example of where PREDICT discovery work allowed us to provide assistance to another government during an outbreak situation.

Table 4: PREDICT Test Findings (Y3Q4; see additional data in country reports below):

# Samples submitted (by taxa)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release (yes or no)
Bats (712)	Predict/GVF Cameroon	PCR	Corona, Filo, Hanta, Paramyxo, Arena, Flavi viruses	Presumptive positives for Filo, Flavi virus	Sequence confirmation ongoing	Cameroon	No

# Samples submitted (by taxa)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release (yes or no)
Primates (175)	Predict/GVF Cameroon	PCR	Boca, Herpes, Pox, Retro, Flavi viruses	Presumptive positives for Boca, Retro virus	Some sequences confirmed, Interpretation ongoing; Additional Sequence confirmation ongoing	Cameroon	No
Rodents (196)	Predict/GVF Cameroon	PCR	Pox, Arena, Hanta, Corona, Filo, Flavi, Paramyxo viruses	Presumptive Poxvirus positives	One sequence confirmed, interpretation ongoing, additional sequencing ongoing	Cameroon	No
Rodents (166)	CIRMF	PCR	Paramyxo, Alpha, Flavi, Lyssa viruses	Presumptive positives for Paramyxo, Lyssa virus	Sequence confirmation ongoing	Gabon	No
Bats (962)	CIRMF	PCR	Adeno, Astro, Sapo, Entero viruses	Presumptive enterovirus positives	Sequence confirmation ongoing	Gabon	No
Primates (34)	CII, Mailman School of Public Health, Columbia University	PCR	Corona, Filo, Astro, Paramyxo, Flavi, Phlebo, Herpes, Polyoma, Adeno, Entero, Pox viruses	Presumptive positives for Herpes, Polyoma, Adeno, Entero virus	Sequences confirmed, Interpretation ongoing	Rwanda	No
Primates (39)	UC Davis Wildlife Diagnostic Lab	PCR	Corona, Retro, Influenza virus	Presumptive positives for Corona, Retro, Influenza, Polyoma, Adeno	Some sequences confirmed, interpretation ongoing; Additional sequence confirmation ongoing	Rwanda	No
Rodents (108)	Makerere University Water Reed project	PCR	Arena, Hanta, Alpha, Flavi viruses	Presumptive positives for alphaviruses	Sequence confirmation ongoing	Tanzania	No
Domestic livestock (28)	Makerere University Walter Reed Project	PCR	Alpha, Flavi, Filo, Paramyxo, Corona viruses	Presumptive positives for Alpha, Arena, Hanta virus	Sequence confirmation to be performed	Uganda	No

# Samples submitted (by taxa)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release (yes or no)
Rodents (42)	Makerere University Walter Reed Project	PCR	Alpha, Arena, Hanta, Flavi, Filo, Paramyxo, Corona viruses	Presumptive positives for Alpha, Arena, Hanta virus	Sequence confirmation to be performed	Uganda	No
Primates (30)	Makerere University Walter Reed Project	PCR	Alpha, Arena, Hanta, Flavi, Filo, Paramyxo, Corona viruses	Presumptive positives for Hanta, Filo virus	Sequence confirmation to be performed	Uganda	No
Bats (29 samples)	Institute Pasteur Cambodia	Sequencing	Corona, Astro, Paramyxo viruses	Presumptive positives for Paramyxo, Astro virus	Roche™ 454 sequencer Next Generation Sequencing planned	Cambodia	No
Bats (559 samples, 263 animals)	Institute Pasteur Cambodia	PCR	Corona, Astro, Lyssa, Paramyxo, Orthoreo, Filo viruses	Presumptive positives for Corona, Astro, Reo, Paramyxo, virus	Roche™ 454 sequencer Next Generation Sequencing planned	Cambodia	No
Rodents (44 animals/ samples)	Institute Pasteur Cambodia	PCR and Sequencing	Paramyxovirus	Presumptive Positives	Roche™ 454 sequencer Next Generation Sequencing planned	Cambodia	No
Bats (173)	Institut Pasteur du Cambodge	RT-PCR	Corona, Astro, Filo, Henipa viruses	Presumptive positives for Corona, Astro virus	Sequence confirmation ongoing	Cambodia (country of testing)	No
Bats (332 Pooled Samples Throat, Urine and Rectal Swab)	VRI	Consensus PCR	Henipa, Paramyxo, Corona, Filo, Arena, Flavi viruses	Presumptive positives for Arena, Corona, Filo, Paramyxo viruses	Sequence confirmation ongoing	Malaysia	No
Rodents (415 Pooled Samples Throat, Urine and Rectal Swab)	VRI	Consensus PCR	Arena, Hanta, Flavi, Alpha viruses	Presumptive positives for Flavi, Hanta, Alpha viruses	Sequence confirmation ongoing	Malaysia	No
Bat (69)	WHO-CC Chula	PCR	Coronaviruses	Presumptive positives	Sequences confirmed, Interpretation ongoing	Thailand	Pending, the approval was sent to the government in July 2012

# Samples submitted (by taxa)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release (yes or no)
Bat (200)	WHO-CC Chula	PCR	Corona, Paramyxoviruses	Presumptive positives	Sequence confirmation ongoing	Thailand	No
Malayan porcupine (5)	WIV	PCR and Sequencing	Astroviridae	Presumptive positives	Some sequence confirmed, additional viral identification ongoing	China	No
Bat samples	GDEI/WIV	Genome sequencing	Hantavirus	Presumptive positives	Some sequence confirmed, additional viral identification ongoing	China	No
Rat samples	GDEI/WIV	Genome sequencing	Hantavirus	Presumptive positives	Some sequence confirmed, Virus identification ongoing	China	No
1301 human sera	GDCDC	serology	Bunyavirus	Presumptive positives	-	China	No
Bats (148 samples from 26 individuals) (oral/rectal swabs; urine)	IBMB-UMSA	Conventional and nested RT-PCR	Flavi, Corona, Arena, Filo viruses	Presumptive positives for Flavi, Corona, Filo virus	Sequence confirmation ongoing	Bolivia	No
Monkeys (597 samples from 57 individuals) (oral/rectal swabs; urine)	IBMB-UMSA	Conventional and nested RT-PCR	Filo, Paramyxovirus, Arena, Flavi, Corona viruses	Presumptive positives for Arena, Corona, Filo virus	Sequence confirmation ongoing	Bolivia	No
Rodents (1128 samples from 93 individuals) (oral/rectal swabs; urine)	IBMB-UMSA	Conventional and nested RT-PCR	Hanta, Arena, Alpha, Flavi viruses	Presumptive positives for Arena, Flavi, hanta, alpha virus	Sequence confirmation ongoing	Bolivia	No
Bats (39 oral swabs, rectal swabs, serum and red blood cell clots were pooled by animal)	ICB II	PCR	Alpha, Arena, Boca, Filo, Corona, Flavi, Hanta, Nipah, Paramyxovirus, Seadornaviruses	Presumptive Adenovirus positive	Sequence confirmation ongoing	Brazil	No
Bats (346 serum)	CENID-Microbiología, INIFAP	ELISA	Lyssavirus (Rabies)	78 Seropositives		Mexico	Approved
Bats	Laboratorio de Inmunovirología	PCR	Corona and Paramyxoviruses	Presumptive positives	Sequence confirmation ongoing	Mexico	Pending

# Samples submitted (by taxa)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release (yes or no)
Bats	Laboratorio de Inmunovirología	PCR	Flavivirus	Presumptive positives	Sequence confirmation ongoing	Mexico	Pending
Primates (38) (FTA cards)	CDC Atlanta (collaborative work with NAMRU-6)	Conventional RT-PCR	Retrovirus	Presumptive positives	Sequence confirmation ongoing	Peru	No

- **Activity 1.4: Sample Tracking and Information Management**

- Sub-activity 1.4.1: **Optimize surveillance data management system**

Ongoing improvements to and optimization of GAINS.org including:

- Improved test result entry and editing functions
- Improved workflow processes to ensure data quality
- Developed system for ensuring complete datasets for priority data
- Refined Primary Interface options
- Separated domestic animals into individual choices so that multiple domestic animals can be reported

- Sub-activity 1.4.2: **Establish global open access to database and procedure for dissemination of knowledge**

- Set up server for Geneious, a bioinformatic software program, that will be used to archive and analyze nucleic acid and protein sequences, to be used internally to manage associated data for produced globally.

- **Activity 1.5 Program Management**

- Sub-activity 1.5.2: **Communication and inform and integrate other relevant agencies about PREDICT strategies and successes:**

- Attended Wildlife Disease Association/European Wildlife Disease Association conference in Lyon, France, and co-sponsored the meeting's workshop on "Capacity Development for

Wildlife Health Management in Low and Middle Income Countries” with partners from OIE and OIE’s Working Group on Wildlife Diseases; IUCN SCC Wildlife Health Specialist Group and RESPOND in attendance.

- Presented at One Health Alliance of South Asia meeting in Delhi, India to help support and strengthen regional gains in cross-ministerial infrastructure zoonotic disease prediction, prevention, and control.
- Met with USAID DC Global Health staff to discuss evolving priority for disease surveillance and risk modeling and mapping efforts to inform upcoming and future potential activities.
- Attended EPT Africa and Asia Regional meeting and provided update on surveillance activities, including background and progress report on the Deep Forest Project and collaborative activities with RESPOND and PREVENT.
- Attended Africa and Asia Regional meeting for Regional and Country Coordinators Y4 planning, GAINS updates
- Attended the International Conference on Health and Security and presented information on global surveillance for emerging infectious diseases to participants from Department of State, Department of Defense, Federal Bureau of Investigations, Department of Health and Human Services, Office of Science and Technology, Interpol, and European CDC among others.
- Discussed PREDICT related to capacity building, disease surveillance, monitoring and control systems, and cross ministry collaboration at One Health meeting in the Middle East; discussed ideas for expanding disease surveillance efforts to support One Health in Israel.
- Presented at the Conference on Conservation Medicine and Presentation of the Book “*New Directions in Conservation Medicine: Applied Cases of Ecological Health*” in Mexico.

LOW 2: Risk Determination

- **Activity 2.1: Develop risk filter strategy**
 - Sub-activity 2.1.1: **Develop a conceptual and structural framework for Extractive Industry work:**
 - Continued collaborating with the Extractive Industry Working Group (EIWG) to plan the strategy for rolling out the risk screening and mitigation tools for zoonotic diseases (the

Planning Tool and the Audit Tool). Both tools were introduced to an international audience of risk assessors, governments, and industry representatives (IPIECA – the global oil and gas industry association for environmental and social issues, ICMM – the international Council of Materials and Mining, and several international conferences in Republic of Congo and Kenya).

- In collaboration with the working group began coordinating with Chatham House to develop a round table to facilitate interaction between the extractive industry and international development and finance institutions, national government stakeholders and science leaders to address the challenge of assessing and managing risk around the extractive industry interface. Through the EIWG and Chatham House, a new initiative was launched – Extractive Industries Infectious Disease Risk Assessment and Management (IDRAM), and the round table was scheduled for November 2012.
 - Began planning to introduce the EIWG tools and strategy to the US Embassy, USAID Uganda, the Government of Uganda, and extractive industry operating or planning operations in the Albertine Rift to support an integrated strategy of risk assessment, prevention, and mitigation as plans materialize for further oil exploration and production into Y4.
 - Made significant progress to complete a beta version of the PREDICT Hazard Assessment Tool (PHAT) – a desktop and field applicable screening tool to strengthen and improve the risk science foundation and address current gaps in identifying zoonotic infectious disease risks from wildlife at the extractive industry interface. This tool supports qualified ranking of hazards from emerging infectious diseases (emphasis on wildlife zoonoses) and will enable users to target site and context-specific risk factors for monitoring and risk mitigation planning using the completed EIWG Audit and Planning Tools.
- **Activity 2.2 Optimize models for diversity of disease emergence**
 - Sub-activity 2.2.1: **Refine and test geographical and temporal 'hotspot' models**
 - Continued exploratory analysis of alternate proxies for reporting bias in EID data for model inputs (e.g. health services, surrogate disease emergence/outbreak events as background data).
 - Sub-activity 2.2.2: **Iteratively improve datasets**

- Continued compilation of gridded data, particularly for datasets related to extractive industries (e.g. mines, oil and timber concessions).
 - Refined mammal species richness data, focusing on integrating land-use data as a proxy for available suitable habitat.
 - Added mapping functionality for each EID event in SICKI (peer review web application), integrated collaborative reference management for citations, and developed new event database for cataloging historic EID events.
 - Gathered new data characterizing specific disease transmission interfaces involved in reported spillover events for known zoonotic viruses and mapped current geographic distribution of priority pathogens.
- Sub-activity 2.2.3: **Design a 'Global Vulnerability' modeling strategy**
Identified key viruses of interest for scenario building, including Chikungunya, Dengue, Mayaro, and Crimean Congo hemorrhagic fever, selected key cities or urban areas, and started building out concept models of spread for specific diseases.
 - Piloted 50 household surveys in Brazil and currently analyzing preliminary data to inform DFHC survey. Developed surveys to characterize human-animal contact and anthropogenic activities at Deep Forest sites in Uganda, translated into Rufumbria and Runyankore-Rukiga.
 - Expanded Land-use Development Index analysis of Deep Forest sites to better characterize gradients and inform study design and site selection.
 - Devised key analytical steps and data needed to link surveillance data to EID modeling activities.

LOW 3: Outbreak Response Capacity Building

- Provided assistance and follow up field investigations at high-risk interfaces in areas with ongoing Ebola hemorrhagic fever outbreaks in people. See summary reports below and detailed timelines for outbreak response activities in Appendix.

Ebola outbreak in Isiro, Haut-Uele District, Oriental Province, DRC August – October 2012

Summary Information to Report	Report below:
1. Working Name of the Outbreak	EBOLA Hemorrhagic Fever in Isiro, DRC
2. Date of last update of this form	10/9/2012
3. Inclusive dates	6/25 - 10/9/2012
4. Date of first notification of PREDICT	8/16/2012 by a message from our field staff about strange deaths
5. Date of request of support from PREDICT (Number of days from notification to request)	8/17/2012 (1 day)
6. Date of initiation of response by PREDICT (Number of days from request to response)	8/17/2012 (1 day)
7. Briefly describe the outbreak.	<p>Human outbreak of viral hemorrhagic fever: presenting with fever, bleedings at injection sites, bloody diarrhea, vomiting, severe dehydration, hemorrhages (nose, throat, eyes, ears, mouth etc.), and headache.</p> <p>73 cumulative cases, 31 lab confirmed, 35 deaths, 8 health professionals confirmed out of 13 suspected, last confirmed case on 9/27/2012</p>
8. What type of assistance did PREDICT provide?	<p>Technical assistance to prepare plan of response (country coordinator); work with MoH for the inventory of available supplies and list of needs (country coordinator); identification and provision of PPE supplies (country coordinator); technical assistance to prepare the contingency plan and appointed secretary for the "Laboratory and Research Commission" of the national taskforce (country coordinator); plan wildlife sample collection in ISIRO and surrounding areas; Team of 7 staff (country coordinator, 2 staff from Cameroon, 1 staff from the HQ, and 2 staff from the INRB) in the field from 9/25 – 10/10/12: trapped bats and rodents and collected samples from hunted animals and non-human primates kept as pets. A total of 80 animals sampled.</p>
9. Description of how first noticed & date	<p>8/7/12 - PREDICT country coordinator called other EPT partners (WHO focal point and RESPOND regional director). Held an EPT meeting.</p> <p>8/9/12 - First report of suspected cases of VHF in Isiro, DRC. The information came during the disease surveillance meeting.</p> <p>8/16/2012 - PREDICT proposed to help with PPE if needed.</p> <p>8/17/2012 - First 2 cases confirmed by laboratory testing in Uganda.</p> <p>8/17/2012 - DRC Minister of Health officially announced the Ebola outbreak (PREDICT, CDC, and WHO included in process).</p> <p>8/20/2012 - Provision of PPE, lab supplies and technical assistance to the stakeholder taskforce.</p> <p>9/25/2012 - Arrival of the PREDICT team in Isiro for ecological surveillance (capture-release of bats and rodents, intention to sample carcasses from wild animals, if found)</p>
10. Comments on where it started, speed and extent of geographic spread	<p>Until now, not sure where exactly the outbreak started, however 7 health zones were involved (Isiro, Viadana, Pawa, Gombari, Dungu, Faradje and Rungu).</p>
11. If a lab diagnosis and confirmation has been obtained give details, including species, sample type and dates.	<p>A total of 126 human samples have been collected from suspected patients, with 29 positive results (samples were first sent to Uganda, they are now tested in Isiro at a mobile lab set up by the CDC).</p>

	3 days between initiation of response and lab confirmation of diagnosis.
12. Were other EPT partners involved in the response (which ones and how)?	RESPOND became member of the "communication and information" technical group, provided PPEs; WHO provided surveillance supplies and equipment and trained field staff.
Summary of the Outcome:	
13. Did people die? How many?	35 known deaths to date
14. Did animals die? What species & how many?	Rumors of dead animals in the forest in the region of Rungu, involving antelopes, Gambian rats, serpents, and also domestic animals (goats, sheep and pigs).
15. Was there a relationship between animals & humans in the disease or its transmission (state suspected or confirmed)?	Suspected that the index case brought a dead animal at home from the forest.

Ebola hemorrhagic fever outbreak in Kibaale, Uganda July-August 2012

Summary Information to Report	Report:
1. Working Name of the Outbreak	Ebola hemorrhagic fever outbreak in Kibaale Uganda/July – August 2012
2. Date of last update of this form	5 October 2012
3. Inclusive dates	7/2/- 8/17/12 (First human death occurred on 2 nd July)
4. Date of first notification of PREDICT	7/26/12 – Unofficial reports of mystery illness in Uganda 7/28/12 – Official notification
5. Date of request of support from PREDICT (Number of days from notification to request)	7/31/12 (3 days)
6. Date of initiation of response by PREDICT (Number of days from request to response)	7/28/12 – Involved in National Task Force (NTF) planning (3 days) 8/12/12 – Mobilization to field (12 days due to NTF approval-time for mobilization)
7. Briefly describe the outbreak.	Confirmed Sudan virus (SUDV) outbreak causing Ebola virus disease (EVD) in humans: 10/4/12 - NTF report on 24 probable and confirmed human cases including 17 deaths. 11 human cases were laboratory confirmed by the Uganda Virus Research Institute (UVRI). 8/3/12 - Last case was confirmed 8/24/12 - Discharged
8. What type of assistance did PREDICT provide?	Assistance: <ul style="list-style-type: none"> - Wildlife surveillance in outbreak area - Human-wildlife interaction household surveys in outbreak area and data summaries - Primate, bat, and rodent sampling - Field supplies for NTF Ecological Studies team PREDICT In-country Personnel:

	(b)(6)
	<p>Inclusive dates: 7/28 – 10/4/12 - Planning & Consultation 8/12 – 8/26/12 - Field</p>
9. Description of how first noticed & date	<p>7/26/12 - Outbreak was first reported in local media as an unknown disease; initially thought by locals to be due to witchcraft because of the large number of deaths (9) in one family. News of the death of a medical person who treated some of the earlier patients filtered through to Kampala, and the Government sent in a team to investigate. 7/26/12 - Response was initiated by the Ministry of Health (MOH) supported by WHO, CDC, and AFENET. 7/28/12 - Outbreak was formally announced by the MOH after Sudan virus was laboratory confirmed by UVRI supported by CDC; the NTF was put in charge of national response and activities proposed by the Ecological Studies subcommittee, which included PREDICT.</p>
10. Comments on where it started, speed and extent of geographic spread	<p>The disease was first noticed in 1 family in Kibaale District and all cases occurred within the district. Only 1 case of medical personnel was recorded outside of Kibaale District. She got sick after treating family, travelled, and was admitted to a referral hospital in Kampala where she died. This medical officer's 3 month old child also died in the outbreak district.</p>
11. If a lab diagnosis and confirmation has been obtained give details, including species, sample type and dates.	<p>Lab confirmation was made by UVRI, supported by CDC within 48 hours of receipt of samples collected by the Central Public Health Laboratory of the MOH, which collected the first samples in the investigation.</p>
12. Were other EPT partners involved in the response (which ones and how)?	<p>RESPOND was asked and accepted to support Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) involvement in the Ecological Studies investigations. CDC, WHO, etc. described above.</p>
Summary of the Outcome:	
13. Did people die? How many?	24 likely cases with 17 probable and confirmed deaths
14. Did animals die? What species & how many?	No evidence of animal deaths
15. Was there a relationship between animals & humans in the disease or its transmission?	Suspected, due to our current understanding of Ebolavirus epidemiology

PREDICT Quarter 4 Year 3 Reporting

AFRICA

CAMEROON

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Attended the USAID EPT Regional Meeting in Uganda from 18-20th July.
 - Travelled to DRC (23rd September) to assist team in wildlife sampling at the site of the Ebola outbreak (see Appendix 1).
 - Trained 2 researchers from the High Institute of Medical Technology (ISTM) on the One Health Approach, an EPT Overview, and zoonoses of bats and rodents.
 - Received field assistance from 4 MINFOF and 2 MINEPIA staff members during sampling of bats and hunted animals.
 - Travelled to Gabon to assist RESPOND and AU/IBAR in a five-day training on One Health for middle and senior staff from the Ministries of Health, Livestock and Environment; training sessions covered wildlife diseases, wildlife capture, and ecology.
 - Assisted in fit test training for government staff from Institute National de Recherche Biomedicale (DRC).
 - Attended a one-week training (13-18th August) on using GIS (Geographical Information System) tools, such as Maxent and ArcGIS for modeling disease spread.
 - b) **Laboratory System Improvements**
 - Trained a new member of the lab team on lab techniques processing animal samples (RNA extractions, cDNA synthesis, PCR using PREDICT protocols, electrophoresis).

- Travelled to DRC (16–28th September) for capacity building of the DRC laboratory team, provided training to increase throughput for PCR, implement PREDICT bocavirus and poxvirus PCR assays, optimize assays to control for quality of extracted nucleic acids, and improved laboratory systems
 - Trained 2 researchers from the High Institute of Medical Technology (ISTM) on gel purification of PCR products, application of commercial ELISA, collection management, PPE, and molecular screening (RT PCR, Nested PCR).
 - Conducted maintenance on airflow and freezers in the lab.
 - Decontaminated and certified laboratory hoods.
 - Trained staff on fit test for N95 masks.
 - Refined SOPs for the use of the field ready Smartcycler, mobile biosafety tent and BGAN satellite Internet terminal.
 - Installed new icemaker to assist with laboratory cold chain.
- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**
 - Trained a visiting staff member based in Okoroba (near the border with Nigeria) at the Yaoundé PREDICT laboratory on sample sorting and quality using 946 samples he collected in the Okoroba area from hunted animals through passive sample collections.
 - Participated in three surveillance trips to areas with high levels of hunting (Moloundou in East Region, Akam in the South, and Akonolinga in the Centre). Collected samples from peridomestic bats and hunted wild animals; collected swabs and tissue samples from 79 freshly hunted animals including hunted bats, rodents, primates, carnivores and animals from other different taxa.
 - Visited Limbe Wildlife Sanctuary to collect blood samples from wild primates (samples from non-human primates during active surveillance and animal health checks/treatments and quarantines in Limbe Wildlife Sanctuary, Mvog-Beti Zoo and Mefou National Park).

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
CAMEROON					
Bats					
free-ranging; contact with domestic animals or humans not likely	0	462	3670	135	550
hunted	0	289	892	198	429
peri-domestic/in or near human dwelling(s)	0	188	203	5	13
Rodents					
free-ranging; contact with domestic animals or humans not likely	0	138	1250	55	171
hunted	0	852	949	32	74
peri-domestic/in or near human dwelling(s)	0	23	36	0	0
Non-human Primates					
free-ranging; contact with domestic animals or humans not likely	0	141	142	0	0
hunted	0	708	1057	28	72
sanctuary	0	945	4816	653	2878
Other taxa					
free-ranging; contact with domestic animals or humans not likely	0	138	478	3	3
hunted	963	3333	3590	63	126
peri-domestic/in or near human dwelling(s)	0	7	7	0	0
sanctuary	0	19	50	5	5
TOTALS	963	7243	17140	1177	4321

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.1: **Introduction of New Technologies**
 - Tested the mobile biosafety tents and deployed them to DRC for use during the Ebola outbreak.
 - Tested the satellite Internet terminal and trained two additional staff in its use for use in the Ebola outbreak response effort.
 - Established and implemented PCR assays for PTLV.
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Year 3 Quarter 4):**
 - Extracted 500 bat oral swabs for RNA and synthesized cDNA.

- Found presumptive positives by PCR using PREDICT protocols for flavi, filo (bat), pox, boca, hanta, and retro viruses.
- Completed a total of 4,350 PCR reactions this quarter.
- Sent additional high-risk human and wildlife samples (~500) to the US for advance pathogen discovery techniques.

PREDICT Test Findings (Y3Q4):

# Samples submitted (by taxa)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Bats (712)	Predict/GVF Cameroon	PCR	Coronavirus (570) Filovirus (562) Hantavirus (560) Paramyxovirus (557) Arenavirus (753) Flavivirus (885) GBV NS3 (1)	Presumptive positives for Filo Hanta Paramyxo and Flavi virus	Samples sent for sequencing	Cameroon	No
Primates (175)	Predict/GVF Cameroon	PCR	Bocavirus (25) Herpesvirus (25) Poxvirus (25) SIV (149) Flavivirus (1)	Presumptive positives for Boca and retro viruses	Some sequences confirmed, Interpretation ongoing; Additional Sequence confirmation ongoing	Cameroon	No
Rodents (196)	Predict/GVF Cameroon	PCR	Poxvirus (164) Arenavirus (5) Hantavirus (4) Coronavirus (4) Filovirus (1) Flavivirus (25) Paramyxovirus (1)	Presumptive Poxvirus positive	One sequence confirmed, interpretation ongoing, additional sequencing ongoing	Cameroon	No
Pholidota (1)	Predict/GVF Cameroon	PCR	Flavivirus (1)	Negative	-	Cameroon	No
Shrews (28)	Predict/GVF Cameroon	PCR	Flavivirus (4) Poxvirus (28)	Negative	-	Cameroon	No

- **Activity 1.4: Sample Tracking and Information Management**
 - Sub-activity 1.4.1: **Surveillance Data Management**
 - Converted all sample collection data to fit the new template format produced by GAINS management team.
- **Activity 1.5 Program Management**
 - Sub-activity 1.5.2: **Communication**
 - Hosted the Minister of Livestock, Fisheries & Animal Industries (MINEPIA) at the GVFI Laboratory September 28th as part of World Rabies Day; the Minister toured the facilities and met the technical and management staff in the facility and discussed ongoing and planned work including PREDICT work being undertaken in the site.
 - Held weekly team leader meetings with management staff in Cameroon.

LOW 3: Outbreak Response Capacity Building

- Updated and prepared kits (equipment and supplies for animal capture, sample collection, communications and biohazard waste) for outbreak response.
- Participated in a training on Zoonotic Disease Outbreaks using the PREDICT Guide for Providing Assistance During a Zoonotic Disease Outbreak.
- Travelled to DRC with equipment and supplies to assist in animal reservoir research at the Ebola outbreak site in September.

DEMOCRATIC REPUBLIC OF CONGO

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Renewed the scientific permit for wildlife capture and sampling, including capture and sampling of protected species.
 - Included scientists from the Haut-Uele District Livestock and Environment services in the ecological study in response to the Ebola outbreak in Isiro, Oriental Province.
 - Improved field biosafety through the use of advanced PPE (Tyvek and PAPR respirators) during the Ebola outbreak in Isiro.
 - Trained Livestock and Environment District Services scientists of Haut-Uele in disease surveillance techniques at the human-wildlife-livestock interface, including sample collection, safety and personal protection, animal capture and release, animal ethics and protection, safe hunting practices, sample conditioning and shipment.
 - Coordinated with the University of Kisangani, Center of Biodiversity Surveillance (CSB) to put a team in place for wildlife sample collection.
 - b) **Laboratory System Improvements**
 - Performed optimization of viral family PCR protocols and tested samples; all protocols are now running.
 - Extracted RNA from oral swabs collected from wild animals.
 - Set up a new electric backup system in the lab at INRB, including a battery run system with inverters, solving the problem of frequent disruption of activity and reducing the use of the power generator.
 - Utilized the satellite internet (BGAN) and satellite spot in the field during outbreak response of Ebola in Isiro.
 - Procured the damaged part for the liquid nitrogen generator and shipping logistics are being finalized.

- **Activity 1.2: Surveillance**

- Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**

- Focused surveillance activities primarily in two Health Zones, Kole and Tshudi Loto, within the Sankuru District, Kasai Oriental Province.
- Received a request from the head of the Tourist Site (b)(6) to perform sampling of bats.
- Received guidance during the EPT Regional Meeting in Kampala on refining sampling strategy.
- Received information from Wamba Luadi, Bandundu province about the presence of a large colony of frugivorous bats, which are captured and sold as food in the nearby markets; this locality will be added to the surveillance system network.
- Collected samples collected 4 human-habituated Grauer's gorilla (*Gorilla beringei graueri*): 2 treated for snare entanglement in Kahuzi-Biega National Park, and 2 rescued by Congolese wildlife authority from poachers; and from one dead mountain gorilla juvenile in long-term holding facility inside Virunga National Park.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
DEMOCRATIC REPUBLIC OF CONGO					
Bats					
contact with tourists/ecotourism	7	10	118	0	0
for sale in small market (< 5 vendors)	0	6	114	0	0
free-ranging	0	49	519	3	3
hunted	0	7	42	0	0
sanctuary	0	20	152	0	0
other high risk interface	47	47	202	0	0
Rodents					
free-ranging	0	5	94	15	15
hunted	6	730	1710	387	398
other high risk interface r	0	1	44	1	1
Non-human Primates					

contact with park personnel/intensive wildlife management area	2	2	28	0	0
contact with tourists/ecotourism	0	13	139	0	0
free-ranging	0	14	106	12	84
hunted	4	569	833	265	801
private wildlife collection or pet	0	9	54	10	70
raiding crops	0	1	18	0	0
sanctuary	1	49	246	5	26
temporary holding facility	0	1	7	0	0
temporary holding facility/wildlife trade transport	0	2	16	0	0
zoo	0	21	211	0	0
Other taxa					
free-ranging	0	4	61	2	14
hunted	3	625	869	4	10
private wildlife collection or pet	0	3	8	8	56
TOTALS	70	2188	5591	712	1478

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - **Sub-activity 1.3.1: Introduction of New Technologies**
 - Implemented QIAshredder to assist with homogenization of animal tissue samples before extraction of nucleic acids.
 - **Sub-activity 1.3.2: Pathogen detection and discovery (Year 3 Quarter4):**
 - Extracted RNA and/or DNA from over 320 samples to enable rapid PCR testing beginning next quarter;
 - Halted lab work for the installation of the power back-up system (~3 weeks) and again for response to the Ebola outbreak (~3 weeks).
 - Received and released the test results of bonobo samples from the CIRMF in Gabon to the sanctuary officials. The cause of death in 4 bonobos turned out to be bacterial, not viral.

PREDICT Test Findings (Y3Q4):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release (yes or no)
Rodents (45)	INRB	PCR	Orthopoxvirus	Negative	-	DRC	No
Humans (Ebola outbreak - 81)	INRB	PCR	Filovirus	Negative	-	DRC	No
Pigs (Ebola outbreak -12)	INRB	PCR	Filovirus	Negative	-	DRC	No

- **Activity 1.5 Program Management**
 - Sub-activity 1.5.1: **Significant Changes to Administrative Management**
 - Ended subcontract with UCLA for field management.
 - Sub-activity 1.5.2: **Communication**
 - Published the discovery of the Bas-Congo virus, a member of the Rhabdovirus family that caused a viral hemorrhagic fever outbreak in DRC.

LOW 3: Outbreak Response Capacity Building

- Participated in the response to the Ebola outbreak in Isiro, Haut-Uele District, Oriental Province. See Appendix 1.

GABON

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Provided support (technical and diagnostic) for the Ebola outbreak response effort in DRC.
 - b) **Laboratory System Improvements**
 - Performed optimization of all viral family PCR methods and tested samples according to PREDICT protocols; all protocols are now running.
 - Began training of a new laboratory coordinator.
- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**
 - Focused wildlife and bushmeat sample collection in markets and rural areas surrounding Franceville and Makokou.
 - Assisted the Ministry of Health (MoH) in collecting data from provinces and district health officers, acting as a reference center, and aiding in analyzing diagnostic samples.
 - Expanded surveillance to disturbed areas of Gamba and collected rodent samples for pathogen discovery.
 - Received guidance during the EPT Regional Meeting in Kampala on refining sampling strategy.
 - Provided coordination with partners regarding public health partnerships to facilitate paired human-wildlife sampling strategy.

Summary of Surveillance Activities and Testing by Country in GAINS to date (from start of project):

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
GABON					
Bats					
free-ranging; contact with domestic animals or humans not likely	0	2193	9473	7093	18806
Rodents					
free-ranging; contact with domestic animals or humans not likely	127	462	2312	220	517
peri-domestic/in or near human dwelling(s)	20	20	73	0	0
other high risk interface	0	146	873	0	0
Non-human Primates					
other high risk interface	0	3	15	0	0
Other taxa					
contact with park personnel/intensive wildlife management area	0	30	30	30	30
free-ranging; contact with domestic animals or humans not likely	2	346	368	342	344
other high risk interface	0	19	95	0	0
TOTALS	149	3219	13239	7685	19697

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.1: **Introduction of New Technologies**
 - Identifying samples for further pathogen discovery by pyrosequencing in the US.
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Year 3 Quarter 4):**
 - Focused isolation of nucleic acids for pathogen testing of bat and rodent samples.
 - Experienced a disruption in lab work due to a strike at the beginning of the quarter, which caused power outages and supply chain stoppages; lab delays were also attributed to the French holiday schedule, with minimal work occurring during the month of August.

PREDICT Test Findings (Y3Q4):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release (yes or no)
Rodents (166)	CIRMF	PCR	Paramyxoviruses Alphaviruses Flaviviruses Lyssaviruses	Presumptive positive Lyssa, paramyxo viruses	Sent for sequencing	Gabon	No
Bats (962)	CIRMF	PCR	Adenoviruses Astroviruses Sapoviruses Enteroviruses	Presumptive positive enterovirus	Sent for sequencing	Gabon	No

REPUBLIC OF CONGO

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - b) **Laboratory System Improvements**
 - Shipped 82 samples from 150 primates to UC Davis for family-level screening.
 - Finalized preparations for second shipment of wildlife samples to UC Davis for testing and to WCS for archiving.

- **Activity 1.2: Surveillance**

- Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**

- Collected 566 samples from 70 free ranging bats.
- Collected samples from free-ranging primates, samples from rodents and samples from other wildlife at the hunter interface.
- Collected 5 samples from the carcass of a juvenile female gorilla near Odzala-Kokoua National Park, historically the Ebola "hotspot" for Congo. The carcass was discovered by a hunter on August 14, reported to PREDICT staff on the 15th, sampled by PREDICT staff on the 16th and delivered to PREDICT lab on August 27th. One sample tested negative for EBOV by RT-PCR in the WCS laboratory on August 28th. This result has been reported to our government partners.
- Collected 8 samples from the carcass of an adult chimpanzee near Odzala-Kokoua National Park; national authorities were on high alert as an Ebola outbreak was ongoing in neighboring Democratic Republic of Congo. The carcass was discovered by a hunter on September 11th, reported to PREDICT staff on the 12th, sampled by PREDICT staff on the 13th, and tested in the PREDICT lab on September 14th. One sample tested negative for EBOV by RT-PCR. This result has been reported to our government partners.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
REPUBLIC OF CONGO					
Bats					
free-ranging; contact with domestic animals or humans not likely	15	324	2094	19	76
hunted	54	54	336	0	0
peri-domestic/in or near human dwelling(s)	1	1	17	0	0
other high risk interface	0	11	3	11	34
Rodents					
for sale in small market (< 5 vendors)	0	6	51	0	0
free-ranging	0	17	101	0	0
free-ranging; contact with domestic animals or humans not likely	0	123	198	17	76
hunted	5	34	217	0	0
peri-domestic/in or near human dwelling(s)	0	14	0	0	0

other high risk interface	0	19	1	12	48
Non-human Primates					
for sale in small market (< 5 vendors)	0	30	278	0	0
free-ranging	0	1	6	1	3
free-ranging; contact with domestic animals or humans not likely	1	168	185	166	1018
hunted	24	86	523	0	0
Other taxa					
for sale in small market (< 5 vendors)	0	108	946	0	0
free-ranging	0	1	6	0	0
free-ranging; contact with domestic animals or humans not likely	0	53	106	57	238
hunted	66	241	1454	19	76
other high risk interface	0	13	15	2	8
TOTALS	166	1304	6537	304	1577

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**

PREDICT Test Findings (Y3Q4):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Primates (2)	WCS Brazzaville (WDDL)	RT-PCR	Ebola Virus	Negative		Republic of Congo	No

- **Activity 1.4: Sample Tracking and Information Management**

- Sub-activity 1.4.1: **Surveillance Data Management**

- Improved in-country sample data management systems, including sample location mapping and revised data entry protocols.
- Trained laboratory manager and staff members on data management, sample storage and tracking.

RWANDA

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) National or Regional Surveillance System Improvements**
 - Participated in a cross-sectoral governmental meeting involving representatives from the Rwanda Development Board, the Rwandan military, the Kigali City Veterinary Department, the Western Province Veterinary Department, and the Huye City Veterinary Department on One Health implications of vermin primates (vervet monkeys) and bats to discuss strategies for sampling for viral family screening.
 - Trained Umutara Polytechnic University senior-year veterinary students and wildlife students on standard PREDICT protocols and discussed further and future collaborations with Dean of Umutara for One Health training.
 - b) Laboratory System Improvements**
 - Successfully processed and submitted 69 extracted wildlife samples (cDNA) to Makerere University Walter Reed Project (MUWRP) for viral family testing.
 - Improved cold-chain through the procurement and installation of an automatic switch for the laboratory generator to ensure consistent power supply to -80 freezers.
 - Identified and obtained essential laboratory supplies from a regional supplier in Kampala, Uganda.
- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**
 - Sampled bats (multiple species) at high-risk interfaces (proximity to/entrance of human dwellings, ecotourism) in Kigali and on Lake Kivu islands.
 - Sampled non-human primates (vervet monkeys) at high-risk interfaces (proximity to/entrance of human dwellings, crop raiding) in Kigali suburbs and in Huye district.

- Sampled rodents (Gambian rats) at high-risk interfaces (hunted for consumption) in the Rangiro sector of the greater Nyungwe National Park area.

Summary of Surveillance Activities and Testing by Country in GAINS to date (from start of project):

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
RWANDA					
Bats					
contact with tourists/ecotourism	0	45	193	0	0
free-ranging	0	44	6	0	0
peri-domestic/in or near human dwelling(s)	0	54	275	0	0
Rodents					
peri-domestic/in or near human dwelling(s)	0	58	159	0	0
other high risk interface	0	35	70	0	0
Non-human Primates					
contact with park personnel/intensive wildlife management area	8	9	112	0	0
contact with tourists/ecotourism	0	20	142	7	88
free-ranging	0	72	642	75	579
free-ranging; contact with domestic animals or humans not likely	0	1	10	1	14
hunted	0	9	38	38	267
peri-domestic/in or near human dwelling(s)	0	1	11	0	0
raiding crops	1	3	11	0	0
sanctuary	0	2	39	6	44
temporary holding facility	0	16	232	25	180
temporary holding facility/wildlife trade transport	0	3	21	8	56
Other taxa					
free-ranging	0	1	2	0	0
hunted	0	3	10	4	28
peri-domestic/in or near human dwelling(s)	0	40	78	0	0
temporary holding facility/wildlife trade transport	0	1	2	2	14
other high risk interface	0	6	12	0	0
TOTALS	9	423	2065	166	1270

PREDICT Test Findings (Y3Q4):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Primates (34)	Mailman School of Public Health, Columbia University	PCR	Astrovirus	Negative	-	Rwanda	No
Primates (34)	Mailman School of Public Health, Columbia University	PCR	Coronavirus	Negative	-	Rwanda	No
Primates (34)	Mailman School of Public Health, Columbia University	PCR	Filovirus	Negative	-	Rwanda	No
Primates (34)	Mailman School of Public Health, Columbia University	PCR	Flavivirus	Negative	-	Rwanda	No
Primates (34)	Mailman School of Public Health, Columbia University	PCR	Herpesvirus	Presumptive positives	Sequences confirmed, interpretation ongoing	Rwanda	No
Primates (34)	Mailman School of Public Health, Columbia University	PCR	Bocavirus	Negative	-	Rwanda	No
Primates (34)	Mailman School of Public Health, Columbia University	PCR	Polyomavirus	Presumptive positives	Sequences confirmed, interpretation ongoing	Rwanda	No
Primates (34)	Mailman School of Public Health, Columbia University	PCR	Adenovirus	Presumptive positives	Sequences confirmed, interpretation ongoing	Rwanda	No

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Primates (34)	Mailman School of Public Health, Columbia University	PCR	Enterovirus	Presumptive positives	Sequences confirmed, interpretation ongoing	Rwanda	No
Primates (34)	Mailman School of Public Health, Columbia University	PCR	Phlebovirus	Negative	-	Rwanda	No
Primates (34)	Mailman School of Public Health, Columbia University	PCR	Poxvirus	Negative	-	Rwanda	No
Primates (34)	Mailman School of Public Health, Columbia University	PCR	Paramyxovirus	Negative	-	Rwanda	No
Primates (34)	Mailman School of Public Health, Columbia University	PCR	Astrovirus	Negative	-	Rwanda	No
Primates (39)	UC Davis Wildlife Diagnostic Lab	PCR	Filovirus	Negative	-	Rwanda	No
Primates (39)	UC Davis Wildlife Diagnostic Lab	PCR	Coronavirus	Presumptive positives)	Sequences confirmation ongoing	Rwanda	No
Primates (39)	UC Davis Wildlife Diagnostic Lab	PCR	Paramyxovirus	Negative	-	Rwanda	No
Primates (39)	UC Davis Wildlife Diagnostic Lab	PCR	Flavivirus	Negative	-	Rwanda	No
Primates (39)	UC Davis Wildlife Diagnostic Lab	PCR	Alphavirus	Negative	-	Rwanda	No
Primates (39)	UC Davis Wildlife Diagnostic Lab	PCR	Astrovirus	Negative	-	Rwanda	No
Primates (39)	UC Davis Wildlife Diagnostic Lab	PCR	Arenavirus	Negative	-	Rwanda	No
Primates (39)	UC Davis Wildlife Diagnostic Lab	PCR	Retrovirus	Presumptive positives	Sequences confirmation ongoing	Rwanda	No
Primates (39)	UC Davis Wildlife Diagnostic Lab	PCR	Influenza virus	Presumptive positives	Sequences confirmation ongoing	Rwanda	No

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Primates (39)	UC Davis Wildlife Diagnostic Lab	PCR	Rhabdovirus	Negative	-	Rwanda	No
Primates (39)	UC Davis Wildlife Diagnostic Lab	PCR	Herpesvirus	Presumptive positives	Sequences confirmed, interpretation ongoing	Rwanda	No
Primates (39)	UC Davis Wildlife Diagnostic Lab	PCR	Polyomavirus	Presumptive positives	Sequences confirmation ongoing	Rwanda	No
Primates (39)	UC Davis Wildlife Diagnostic Lab	PCR	Adenovirus	Presumptive positives)	Sequences confirmation ongoing	Rwanda	No
Primates (39)	UC Davis Wildlife Diagnostic Lab	PCR	Parapoxvirus	Negative	-	Rwanda	No
Primates (39)	UC Davis Wildlife Diagnostic Lab	PCR	Orthopoxvirus	Negative	-	Rwanda	No
Primates (39)	UC Davis Wildlife Diagnostic Lab	PCR	Bocavirus	Negative	-	Rwanda	No

Low 3: Outbreak Response Capacity Building

- Invited to participate in a meeting of the Rwandan government's National Task Force with Ministry of Health, Rwanda Agricultural Board, and Rwanda Development Board to discuss potential governmental response mechanisms and readiness for an Ebola virus outbreak, in light of the Ebola virus outbreak in Uganda in July/August.

TANZANIA

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Attended the EPT Regional Meeting in Kampala, Uganda to discuss progress and plan wildlife surveillance activities and pathogen testing for year 4.
 - Completed Rapid Survey Tool update at request of capacity building team.
 - Finalized context specific guides and videos for safe capture, handling, and sampling of East African non-human primates (e.g. vervets and baboons) with assistance from Rwanda team.
 - Conducted respirator fit tests to ensure that all field team respirators were functioning appropriately as a biosafety measure.
 - b) **Laboratory System Improvements**
 - Received laboratory and field supplies from UC Davis to support field activities, nucleic acid extractions, and family level testing.
 - Attended Good Clinical Practice and Good Laboratory Practice trainings through the National Institute of Medical Research in Dar es Salaam.
- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**
 - Renewed research permits for wildlife surveillance through the Tanzania Commission for Science and Technology (COSTECH) and the Tanzania Wildlife Research Institute (TAWIRI).
 - Completed sampling of rodents and bats in the Ruaha ecosystem: rodents were sampled at the peri-domestic and crop raiding interfaces.
 - Continued to implement the bushmeat surveillance program; collected samples from wild

- animals in villages surrounding the Ruaha National Park and protected areas.
- Developed a plan to prioritize bushmeat specimens for viral family level testing in collaboration with UC Davis, focusing on high-risk taxa and anticipated transmission pathways through hunting, butchering, and handling.
- Initiated active sampling of rodents, bats and non-human primates beginning with site characterization and interface assessments, and procurement of required local operating permits in the Ruvuma and Mbeya regions (Southern Tanzania).

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
TANZANIA					
Bats					
peri-domestic/in or near human dwelling(s)	0	80	454	11	11
Rodents					
hunted	1	8	39	0	0
peri-domestic/in or near human dwelling(s)	41	223	1312	64	67
raiding crops	58	190	1129	58	60
Non-human Primates					
hunted	0	13	75	0	0
raiding crops	0	5	10	0	0
Other taxa					
hunted	41	277	1228	0	0
peri-domestic/in or near human dwelling(s)	8	11	71	2	2
preying on livestock or their food	3	7	12	0	0
raiding crops	3	3	14	0	0
TOTALS	155	817	4344	135	140

- Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Year 3 Quarter 4):**
 - Submitted samples for viral family level testing at the regional laboratory in Uganda (Makerere University Walter Reed Project – MUWRP).

- Obtained results from MUWRP for 108 rodent samples tested for Arenaviruses, Hantaviruses, Alphaviruses and Flaviviruses and from 9 bat samples tested for Arenaviruses, Coronaviruses, Flaviviruses and Filoviruses; presumptive positives for alphaviruses.
- Tested 10 samples from unknown species (an issue with laboratory communication, specimen shipment and intake in the pilot between MUWRP and the Tanzania lab) for Arenaviruses, Alphaviruses, Hantaviruses, Coronaviruses, Flaviviruses and Filoviruses (all results negative).
- Submitted 6 presumptive positive specimens (rodent oropharyngeal swabs collected earlier in year 3) for cloning and sequencing to UC Davis.

PREDICT Test Findings (Y3Q4):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Rodents (108)	Makerere University Water Reed project	Conventional PCR	Arenaviruses, Hantaviruses, Alphaviruses, Flaviviruses	Presumptive positives for alphaviruses	Sequence confirmation pending	Tanzania	No
Bats (08)	Makerere University Water Reed project	Conventional PCR	Arenaviruses, Corona, Flaviviruses, Filoviruses	Negative	-	Tanzania	No

- **Activity 1.4: Sample Tracking and Information Management**
 - Sub-activity 1.4.1: **Surveillance Data Management**
 - Improved in-country sample tracking and management systems between the field and lab teams through use of standardized priority specimen tracking forms shared through DropBox.
 - Tested the GAINS results template to refine the laboratory reporting system.

- **Activity 1.5 Program Management**
 - Sub-activity 1.5.1: **Significant Changes to Administrative Management**
 - Transferred project management and coordination from UC Davis to the Tanzania team; this transfer represents the culmination of capacity building and professional development activities as the in-country team is now equipped to conduct all administrative, technical, and management requirements for PREDICT including communications independently of UC Davis. UC Davis will continue to provide technical and administrative support as needed.
 - Sub-activity 1.5.2: **Communication**
 - Worked closely on inter-agency communication between Sokoine University of Agriculture, TAWIRI, and COSTECH to both renew existing project operational permits and expand project activities and scope to the national level and targeted high-risk interfaces included in year 4 surveillance planning.
 - Interviewed the Iringa District Game Officer (Ruaha ecosystem area) on disease surveillance infrastructure, capacity, gaps, and recent improvements as part of Rapid Survey Tool update.

UGANDA

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Facilitated the shipment of extracted wildlife samples from Tanzania and Rwanda to Uganda for viral family testing at Makerere University Walter Reed Project Laboratory (MUWRP), the regional diagnostic laboratory for emerging wildlife pathogen testing.

b) **Laboratory System Improvements**

- Provided two weeks of training to the MUWRP Laboratory Manager on standard and Deep Forest project viral family testing protocols at UC Davis in August.
 - Provided essential laboratory supplies to enhance MUWRP 's capacity for applying viral family testing protocols on submitted samples.
 - Worked with MUWRP to identify a high-volume supplier of laboratory supplies to reduce costs and improve MUWRP's efficiency for high-volume through-put of samples.
- Sub-activity 1.1.2: **Capacity Assessment and Tracking of Development Progress**
 - Completed the Rapid Survey Tool to assess progress in wildlife pathogen surveillance in Uganda since project inception.
- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**
 - Conducted wildlife sampling for Deep Forest project in pristine sites inside Bwindi Impenetrable National Park (BINP) and in intermediately-disturbed habitat sites (recently deforested for subsistence agriculture) outside the park: caught 49 rodents and collected 242 specimens.
 - Obtained 15 specimens from 1 dead human-habituated wild mountain gorilla in BINP.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
UGANDA					
Bats					
contact with tourists/ecotourism	0	3	36	0	0
protected area management	0	8	199	0	0
public safety hazard (e.g. threat to human)	0	30	446	0	0
Rodents					
contact with tourists/ecotourism	1	1	7	0	0

free-ranging; contact with domestic animals or humans not likely	18	105	632	0	0
peri-domestic/in or near human dwelling(s)	34	64	664	0	0
protected area management	0	1	25	0	0
Non-human Primates					
contact with park personnel/intensive wildlife management area	1	1	15	0	0
contact with tourists/ecotourism	0	313	373	8	56
free-ranging	0	5	26	7	45
free-ranging; contact with domestic animals or humans not likely	0	3	38	0	0
protected area management	0	15	254	0	0
raiding crops	1	4	72	0	0
Other taxa					
free-ranging; contact with domestic animals or humans not likely	0	34	268	0	0
hunted	0	2	6	0	0
peri-domestic/in or near human dwelling(s)	0	9	94	0	0
raiding crops	0	1	15	0	0
other high risk interface	0	17	50	0	0
TOTALS	55	616	3220	15	101

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - **Sub-activity 1.3.1: Introduction of New Technologies**
 - Continued deployment and utilization of cellphone-based Animal Mortality Monitoring Program (AMMP) at 23 ranger outposts inside Queen Elizabeth National Park and in surrounding communities:
 - Received reports of 109 sick and 122 dead animals, including 38 bats (36 sick and 2 dead), 52 non-human primates (41 sick and 11 dead), and 2 rodents (1 sick and 1 dead).
 - Initiated field investigation with Uganda Wildlife Authority of reports of sick and dead primates received in late August (investigation concluded in October; see Appendix 3: report to UWA), and updated protocols for relaying AMMP reports to UWA.
 - Trained more than 80 rangers on use of a new AMMP mobile data form revised and introduced this quarter. The new form allows for capture of more detailed information

on observed animal morbidity/mortality events by asking rangers “What is the probable cause of sickness/death: suspected disease, suspected poisoning, predation, road kill, poaching, or unknown?”

- Sub-activity 1.3.2: **Pathogen detection and discovery (Year 3 Quarter 4):**

PREDICT Test Findings (Y3Q4):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Domestic livestock (28)	Makerere University Walter Reed Project	PCR	Alphavirus	Presumptive positives	Sequence confirmation pending	Uganda	No
Domestic livestock (28)	Makerere University Walter Reed Project	PCR	Arenavirus	Presumptive positives	Sequence confirmation pending	Uganda	No
Domestic livestock (28)	Makerere University Walter Reed Project	PCR	Hantavirus	Presumptive positives	Sequence confirmation pending	Uganda	No
Domestic livestock (28)	Makerere University Walter Reed Project	PCR	Flavivirus	Negative	-	Uganda	No
Domestic livestock (28)	Makerere University Walter Reed Project	PCR	Filovirus	Negative	-	Uganda	No
Domestic livestock (28)	Makerere University Walter Reed Project	PCR	Paramyxovirus	Negative	-	Uganda	No
Domestic livestock (28)	Makerere University Walter Reed Project	PCR	Coronavirus	Negative	-	Uganda	No
Rodents (42)	Makerere University Walter Reed Project	PCR	Alphavirus	Presumptive positives	Sequence confirmation pending	Uganda	No
Rodents (42)	Makerere University Walter Reed Project	PCR	Arenavirus	Presumptive positives	Sequence confirmation pending	Uganda	No

Rodents (42)	Makerere University Walter Reed Project	PCR	Hantavirus	Presumptive positives	Sequence confirmation pending	Uganda	No
Rodents (42)	Makerere University Walter Reed Project	PCR	Flavivirus	Negative	-	Uganda	No
Rodents (42)	Makerere University Walter Reed Project	PCR	Filovirus	Negative	-	Uganda	No
Rodents (42)	Makerere University Walter Reed Project	PCR	Paramyxovirus	Negative	-	Uganda	No
Rodents (42)	Makerere University Walter Reed Project	PCR	Coronavirus	Negative	-	Uganda	No
Primates (30)	Makerere University Walter Reed Project	PCR	Alphavirus	Negative	-	Uganda	No
Primates (30)	Makerere University Walter Reed Project	PCR	Arenavirus	Presumptive positives	Sequence confirmation pending	Uganda	No
Primates (30)	Makerere University Walter Reed Project	PCR	Hantavirus	Presumptive positives	Sequence confirmation pending	Uganda	No
Primates (30)	Makerere University Walter Reed Project	PCR	Flavivirus	Negative	-	Uganda	No
Primates (30)	Makerere University Walter Reed Project	PCR	Filovirus	Presumptive positives	Sequence confirmation pending	Uganda	No
Primates (30)	Makerere University Walter Reed Project	PCR	Paramyxovirus	Negative	-	Uganda	No
Primates (30)	Makerere University Walter Reed Project	PCR	Coronavirus	Negative	-	Uganda	No
Other wildlife (Kob - 3)	Makerere University Walter Reed Project	PCR	Alphavirus	Negative	-	Uganda	No
Other wildlife (Kob - 3)	Makerere University Walter Reed Project	PCR	Arenavirus	Negative	-	Uganda	No

Other wildlife (Kob - 3)	Makerere University Walter Reed Project	PCR	Hantavirus	Negative	-	Uganda	No
Other wildlife (Kob - 3)	Makerere University Walter Reed Project	PCR	Flavivirus	Negative	-	Uganda	No
Other wildlife (Kob - 3)	Makerere University Walter Reed Project	PCR	Filovirus	Negative	-	Uganda	No
Other wildlife (Kob - 3)	Makerere University Walter Reed Project	PCR	Paramyxovirus	Negative	-	Uganda	No
Other wildlife (Kob - 3)	Makerere University Walter Reed Project	PCR	Coronavirus	Negative	-	Uganda	No

LOW 2: Risk Determination

- Continued field work to contribute to PREDICT-wide Deep Forest project, investigating the relationship between host and viral biodiversity across gradients of land use in Uganda, Brazil, and Malaysia; continued to coordinate with Deep Forest team to optimize and apply study design and sampling protocols; trained laboratory technician on PCR protocols to apply to Deep Forest samples; designed a human-animal contact questionnaire designed to assess zoonoses transmission risk and obtained Uganda National Institute for Science and Technology and UC Davis Institutional Review Board approvals for its utilization in the field in communities surrounding Bwindi Impenetrable National Park.

Low 3: Outbreak Response Capacity Building

- Invited by Uganda Government to serve on its National Task Force on Epidemic Preparedness and Response for the development and implementation of a National Response Plan for the July-August Ebola Virus Disease outbreak in Kibale District (see Appendix 2)
- Served on the wildlife surveillance team of the Ecological Investigations Subcommittee in cooperation with UWA representatives, conducted wildlife sampling in outbreak area, and conducted 54 household surveys to assess human-wildlife interactions in the outbreak area (see Appendix 3)

SOUTHEAST ASIA

CAMBODIA

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - 2 NaVRI technical staff members joined PREDICT for wildlife surveillance work in the field.
 - 4 veterinary students from Royal University of Agriculture (RUA) and three students from Royal University of Phnom Penh (RUPP) joined PREDICT for wildlife surveillance work in the field.
 - b) **Laboratory System Improvements**
 - In-country partner Institut Pasteur du Cambodia (IPC) trained two laboratory technicians from NaVRI on viral family screening of PREDICT samples with the goal to transfer a portion of viral family screening to NaVRI.
 - Conducted Roche™ 454 sequencer training at IPC.
- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**
 - Conducted sampling of hunted wildlife in four ethnic Khmer villages within protected areas in Preah Vihear Province and three Phnong ethnic minority villages in Mondulkiri Province.
 - Conducted sampling of wild caught rodents being traded in large numbers from Cambodia to Vietnam.
 - Conducted sampling of primates being hunted both for food and for sale to primate farms.
 - Conducted sampling of fruit bats being hunted for local consumption.
 - Conducted sampling of wildlife in markets in two Northeastern provinces.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
CAMBODIA					
Bats					
for sale in restaurant	0	347	595	0	0
free-ranging; contact with domestic animals or humans not likely	0	239	239	238	1903
hunted	7	704	1823	547	3188
Rodents					
for sale in large market (> 20 vendors)	6	6	6	0	0
free-ranging; contact with domestic animals or humans not likely	0	16	16	16	48
hunted	64	156	811	2	12
other high risk interface	54	82	297	28	84
Non-human Primates					
for sale in large market (> 20 vendors)	9	21	25	0	0
for sale in medium market (5-20 vendors)	1	1	1	0	0
hunted	11	25	44	0	0
sanctuary	0	8	51	0	0
Other taxa					
for sale in large market (> 20 vendors)	31	33	40	0	0
for sale in medium market (5-20 vendors)	93	93	93	0	0
hunted	11	363	739	654	654
TOTALS	287	2094	4780	1485	5889

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Year 3 Quarter 4):**
 - Completed PCR screening for 5 viral families on 559 bat samples from 263 bats: presumptive positives obtained for Corona, Astro, Paramyxo and Reo viruses. Roche™ 454 sequencer Next Generation Sequencing pending.
 - Completed PCR screening for Paramyxoviruses on 44 rodent samples, sequencing pending of presumptive positives.

PREDICT Test Findings (Y3Q4):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Bats (29 samples)	Institute Pasteur Cambodia	Sequencing	Coronavirus, Astroviruses, Paramyxoviruses	Presumptive positives confirmed, interpretation pending	Roche™ 454 sequencer Next Generation Sequencing planned	Cambodia	No
Bats (559 samples, 263 animals)	Institute Pasteur Cambodia	PCR	Coronavirus, Astroviruses, Lyssaviruses, Paramyxoviruses, Orthoreovirus, Filoviruses	Presumptive positives for Corona, Astro, Paramyxo and Reo viruses	Roche™ 454 sequencer Next Generation Sequencing planned to confirm results and obtain additional sequence	Cambodia	No
Rodents (44 animals/ samples)	Institute Pasteur Cambodia	PCR and Sequencing	Paramyxovirus	Presumptive Positives	Roche™ 454 sequencer Next Generation Sequencing planned to obtain additional sequence	Cambodia	No

Activity 1.4: Sample Tracking and Information Management

- Sub-activity 1.4.1: **Surveillance Data Management**
 - Entered PCR testing results for 542 animals (bats and rodents) into GAINS

INDONESIA

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Participated in meeting organized by Ministry of Forestry on the recent publication on Ebolavirus antibodies detected in orangutans: PREDICT was requested to assist the Government of Indonesia if further analysis to confirm or characterize these findings is needed.
 - US-based CDC team and USAID Indonesia Mission representative visited PRC-IPB and Eijkman Institute for Molecular Biology.
 - Attended and participated in the National Coordination Meeting for Zoonosis Control organized by the National Committee on Zoonosis Control, Coordinating Ministry for People's Welfare in Denpasar, Bali.
 - Invited by Deputy Minister for Health, Population and Family Planning of the Coordinating Ministry for People's Welfare to a Technical Coordination Meeting on Protection of Indonesian wildlife from EID threats.
 - b) **Laboratory Improvements**
 - Procured reagents and consumables for the testing of undiagnosed febrile human specimens from Bandung, Indonesia.
- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**
 - Captured and sampled *Cynopterus brachyotis*, *Myotis sp.* and *Rattus tanezumi* from Tinjil Island; specimens stored at the Primate Research Center of Bogor Agricultural University.
 - Initiated plans to expand human surveillance to Papua, Sumba, and Kalimantan from archived specimens; research proposal development in process.

Summary of Surveillance Activities and Testing in GAINS to date:

INDONESIA	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
Non-human Primates					
contact with tourists/ecotourism	0	100	100	0	0
TOTALS	0	100	100	0	0

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.1: **Introduction of New Technologies**
 - Optimized primers for all universal control 1 associated virus family protocols.
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Year 3 Quarter 4):**
 - 100 archived-samples from Bali PBMC specimens (96 from long-tailed macaques obtained from 7 sites, and 4 from gibbons) were extracted for RNA and analyzed by PCR with 14 sets of primers for 5 virus families.
 - Preparation of PCR products for confirmation of presumptive positives by sequencing is ongoing.
 - Finalized strategy for testing and prepared 100 archived-fecal specimens from black Sulawesi macaques for testing.
 - Transferred 59 human archived specimens to EIMB and optimized testing for 7 viral families, including flaviruses, alphaviruses, bunyaviruses, coronaviruses, filoviruses, paramyxoviruses, arenaviruses, seadornaviruses, hantaviruses, and bocaviruses; testing to begin next quarter once study agreements are in place.

PREDICT Test Findings (Y3Q4):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
96 Macaques (100 samples)	IPB	PCR	Flavi, Corona, Arena, Filo Paramyxoviruses	Presumptive positives	Sequence confirmation ongoing	Indonesia	No

- **Activity 1.5 Program Management**
 - Sub-activity 1.5.2: **Communication**
 - Increased communication within the region and with PREDICT partners in Africa in order to facilitate use of the Universal Control 1 and assist with problem solving.

New Partners: PREDICT Cameroon.

LAOS

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Trained two National Animal Health Centre (NAHC) staff in field surveillance, biosecurity measures, sample collection, storage in liquid nitrogen, data entry, and wildlife species identification.
 - Prepared a presentation for government counterpart to deliver at a One Health Meeting in Vientiane, provided feedback on reports on wildlife-human interfaces in subsistence hunting villages prepared by students of the National University of Laos, and met with

district/provincial livestock and human health staff around National Protected Areas to discuss reporting mechanisms for wildlife disease outbreaks.

- Compiled final reports on hunting and consumption of priority PREDICT species in subsistence hunting villages.

b) Laboratory Improvements

- Provided month-long training on viral family PCR screening at NAHC for four NAHC laboratory staff.
- Assisted with set-up of diagnostic equipment in wildlife diagnostics area at new NAHC lab.

- **Activity 1.2: Surveillance**

- Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**

- Sampled wildlife at 3 market interfaces in two provinces.
- Collected 406 samples from 102 animals (39 bats, 60 rodents and 1 civet)

Summary of Surveillance Activities and Testing in GAINS to date:

LAO PDR	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
Bats					
for sale in large market (> 20 vendors)	39	371	1483	0	0
for sale in market	0	338	1366	550	1662
hunted	0	110	271	101	306
other high risk interface	0	6	26	0	0
Rodents					
for sale in large market (> 20 vendors)	61	597	2402	0	0
for sale in medium market (5-20 vendors)	0	24	94	0	0
for sale in small market (< 5 vendors)	0	29	117	0	0
for sale in market	0	156	670	160	168
hunted	0	377	1475	98	100
other high risk interface	0	3	18	0	0
Non-human Primates					

for sale in large market (> 20 vendors)	0	5	19	0	0
for sale in medium market (5-20 vendors)	0	1	4	0	0
Other taxa					
for sale in large market (> 20 vendors)	2	101	414	0	0
for sale in medium market (5-20 vendors)	0	5	20	0	0
for sale in small market (< 5 vendors)	0	1	5	0	0
for sale in market	0	18	75	8	8
hunted	0	56	149	26	26
other high risk interface	0	1	2	0	0
TOTALS	102	2199	8610	943	2270

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Year 3 Quarter 4):**
 - Completed PCR screening of samples from 173 bats and 456 rodents by Institut Pasteur Cambodia, sequencing of presumptive positives is ongoing.
 - Conducted PCR for coronaviridae and rhabdoviridae on 20 rodent samples during training at NAHC – results pending

PREDICT Test Findings (Y3Q4):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release (yes or no)
Bats (173)	Institut Pasteur du Cambodge	RT-PCR	Corona, Astro, Lyssa, Filov, Henipa viruses	Presumptive positives for corona and astro viruses,, lyssa virus results pending	Sequencing pending	Cambodia (country of testing)	No
Rodents and Shrews (456)	Institut Pasteur du Cambodge	RT-PCR	Hanta, Arena viruses	All negative	-	Cambodia (country of testing)	No

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release (yes or no)
Rodents (20)	NAHC	RT-PCR	Corona, Rhabdo viruses	Results pending	-	Laos	No

Activity 1.4: Sample Tracking and Information Management

- Sub-activity 1.4.1: **Surveillance Data Management**
 - Entered PCR testing results for 477 animals into GAINS
 - Trained NAHC staff members on data entry for tracking samples and PCR diagnostics at NAHC

LOW 3: Outbreak Response Capacity Building

- Formulated agreement with NAHC for 2 staff members to be designated to a wildlife disease outbreak mobile response unit. This unit is coordinated with RESPOND training of rangers to record and report wildlife disease outbreaks in 2 National Protected Areas.

MALAYSIA

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - PERHILITAN received funding from the Ministry of Natural Resources and Environment for laboratory development and additional staff to increase zoonotic surveillance efforts in response to results from PREDICT.

- PERHILITAN established its own Wildlife Disease Surveillance Program; PREDICT will continue to be part of this effort; PERHILITAN has taken on more responsibility for organizing and coordinating sampling trips, an important step in setting-up a sustainable surveillance network that continues to function after EPT program ends.
- Performed sampling and epidemiologic study with MOH, DVS, and PERHILITAN on Tioman Island to investigate a Sarcocystis outbreak; it is the first time that the three government departments worked together in the field since the Nipah outbreak.

b) Laboratory System Improvements

- Arranged for IDENTIFY to perform a Bio-safety Risk Assessment at collaborating BSL-2 laboratories at PERHILITAN, VRI, and SWD.
- Found the laboratories at VRI and PERHILITAN to be largely compliant with only minor deficiencies that are being addressed; the laboratory at SWD was also with minor modifications and suggestions.
- Provided -80 freezer to NPHL for storage of human samples.

- **Activity 1.2: Surveillance**

- Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**

- Began conducting interviews to fill microbiologist and veterinarian positions at Sabah Wildlife Health Unit.
- Performed additional site visits for Deep Forest Project along the Kinabatangan River in Sabah.
- Continued sampling primates at sites along the Kinabatangan River.
- PERHILITAN sampling team performed 8 sampling trips across Peninsular Malaysia for their Wildlife Disease Surveillance Program, collecting 3955 samples from 385 individuals (bats, rodents and primates; data not in GAINS due to ongoing security discussions); aliquots of all samples will be made available for screening with PREDICT universal control.
- MOH ethical review board approved modified consent forms and protocols that received IRB approval in Y3Q3; Malay and Chinese versions being updated accordingly.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
MALAYSIA					
Bats					
free-ranging	0	40	421	0	0
free-ranging; contact with domestic animals or humans not likely	0	29	300	0	0
peri-domestic/in or near human dwelling(s)	0	61	720	0	0
Rodents					
free-ranging	0	14	137	0	0
free-ranging; contact with domestic animals or humans not likely	0	65	760	0	0
peri-domestic/in or near human dwelling(s)	0	7	122	0	0
rehabilitation center	0	4	38	0	0
Non-human Primates					
contact with tourists/ecotourism	0	4	44	0	0
free-ranging; contact with domestic animals or humans not likely	0	29	460	25	30
peri-domestic/in or near human dwelling(s)	0	352	6464	82	107
private wildlife collection or pet	0	5	121	0	0
raiding crops	3	3	45	0	0
sanctuary	2	7	54	0	0
temporary holding facility	0	1	8	0	0
other high risk interface	0	26	468	0	0
Other taxa					
free-ranging	0	1	12	0	0
free-ranging; contact with domestic animals or humans not likely	0	8	112	0	0
peri-domestic/in or near human dwelling(s)	0	20	269	0	0
private wildlife collection or pet	0	12	132	0	0
rehabilitation center	0	12	115	0	0
temporary holding facility	0	359	3485	0	0
zoo	0	2	8	0	0
other high risk interface	0	24	48	40	47
TOTALS	5	1085	14343	147	184

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Year 3 Quarter 4):**
 - 1500 urine, throat, and rectal samples screened for priority viral families.
 - 171 presumptive PCR positive samples cloned to be sent for sequencing.

PREDICT Test Findings (Y3Q4):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
332 Bats Pooled Samples Throat, Urine and Rectal Swab	VRI	Consensus PCR	Henipavirus Paramyxoviruses Coronaviruses Filoviruses Arenavirus Flaviviruses	Presumptive positives for Arena, corona, Filo and Paramyxo viruses	Sequence confirmation ongoing	Malaysia	No
415 Rodents Pooled Samples Throat, Urine and Rectal Swab	VRI	Consensus PCR	Arenavirus Hantavirus Flaviviruses Alphaviruses	Presumptive positives for Flavi, Hanta, Alpha viruses	Sequence confirmation ongoing	Malaysia	No

- **Activity 1.4: Sample Tracking and Information Management**
 - Sub-activity 1.4.1: **Surveillance Data Management**
 - Collected samples entered into GAINS except those collected by PERHILITAN for their Wildlife Disease Surveillance Program.

- **Activity 1.5 Program Management**
 - Sub-activity 1.5.2: **Communication**
 - Scheduled meeting with Department of Health Sabah (DOHS) in Y4Q1 to discuss planned PREDICT and PREVENT activities in Sabah.
 - USAID Global Health Bureau Deputy Director and RDMA Advisor visited PREDICT labs at PERHILITAN, VRI, and SWD, as well as sampling sites on Peninsular Malaysia and Sabah.
 - Continued communication with RESPOND on collaborations to provide epidemiology and outbreak response training to staff from MOH, DVS and PERHILITAN.
 - Continued communication with IDENTIFY on bio-safety issues, training and providing lab equipment for the Wildlife Health Unit at SWD.
 - Continued communication with PREVENT on DFHC survey.
 - Continued communication and coordination with collaborators for activities on Peninsular Malaysia and in Sabah.

THAILAND

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Participated in EPT Asia Regional Meeting in Bangkok.
 - Participated in the Southeast Asia Encephalitis project in Bangkok, organized by the SEAE Consortium.
 - Co-organized the World Rabies Day activity in Bangkok.
 - Participated in meeting with RESPOND and Department of National Parks (DNP), provided input to DNP on pathogen surveillance projects in nonhuman primates.

b) Laboratory System Improvements

- Presented on “The new technology for diagnosis of encephalitis and new pathogen detection” at Infectious Unit, Faculty of Medicine, Chulalongkorn University.
- Presented on “Laboratory Diagnosis for Rabies: Basic and Clinical Aspects” in National Seminar in Commemoration of 90th Anniversary of Queen Savabha Memorial Institute Establishment “Legend and Trends of rabies”, organized by Queen Savabha Memorial Institute.
- Participated in the “Regional Animal Health Laboratory Technical Advisory Group Meeting” in Bangkok, organized by FAO and OIE.

- **Activity 1.2 Surveillance**

Summary of Surveillance Activities and Testing in GAINS to date:

THAILAND	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
Bats					
contact with park personnel/intensive wildlife management area	0	253	575	149	188
contact with tourists/ecotourism	0	8	8	8	22
sanctuary	0	28	28	16	36
other high risk interface	0	82	218	88	91
Rodents					
contact with tourists/ecotourism	0	3	3	3	6
other high risk interface	0	8	21	4	4
Other taxa					
contact with tourists/ecotourism	0	1	1	1	2
TOTALS	0	383	854	269	349

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**

- Sub-activity 1.3.2: **Pathogen detection and discovery (Year 3 Quarter 4):**
 - Performed PCR screening for coronaviruses on 200 bat rectal swab/feces specimens.

- Performed PCR screening for corona, filo, flavi, paramyxo and seadona viruses on 200 pool specimens.
- Performed sequencing on the presumptive PCR positive specimens and analysis of sequencing data.

PREDICT Test Findings (Y3Q4):

# Samples submitted	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results (no. of positive PCR)	Pathogen discovery	Country	Approved by Government for release (yes or no)
Bat (69)	WHO-CC Chula	PCR	Coronaviruses	Presumptive positives	Sequencing Completed, Interpretation ongoing	Thailand	Pending, the approval was sent to the government in July 2012
Bat (200)	WHO-CC Chula	PCR	Coronaviruses, Paramyxoviruses	Presumptive positives for corona and paramyxo virus	Confirmation of Results Pending	Thailand	No

VIETNAM

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - b) **Laboratory System Improvements**
 - Provided two-week long molecular training for staff of the National Centre for Veterinary Diagnostics, the Regional Animal Health Centre (RAHO6), and the Hanoi University of Agriculture, Faculty of Veterinary Medicine at Hanoi University of Agriculture, including

training in extraction of RNA from different sample types; transcription of cDNA, β -actin sample quality control PCR; transformation of Universal control 1 plasmid; family level virus screening for Flavi, Paramyxo and Arena viruses.

- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**
 - Collected 208 samples from 92 rodents that were for sale in restaurants in Lam Dong.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
VIETNAM					
Rodents					
for sale in restaurant	92	123	322	51	51
Other taxa					
for sale in restaurant	47	132	314	31	61
rehabilitation center	0	42	50	50	200
wild animal farm	0	14	42	0	0
TOTALS	139	311	728	132	312

- **Activity 1.5 Program Management**
 - Sub-activity 1.5.1: **Significant Change in Project Management**
 - Began interviewing for new Country Coordinator.

ASIA

BANGLADESH

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Presented at One Health training program organized by FAO.
 - Participated in the India Regional Consultation on 'One Health' in South Asia meeting organized by One Health Alliance of South Asia (OHASA).
 - Participated in the Asia Regional USAID EPT planning meeting and discussed collaboration with EPT partners.
 - Participated in the Validation Workshop on Strategic Framework for a One Health Approach.
 - b) **Laboratory System Improvements**
 - Prepared logistics with Forestry personnel for wildlife diagnostic laboratory.
 - Participated in laboratory capacity building workshop organized by FAO.
- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter.**
 - Continued to identify new areas with wildlife-human interfaces, including areas with heavy hunting activity and/or wildlife consumption, and developed surveillance strategies for these areas.
 - Sampled hundreds of bats and rodents, yielding 4358 samples.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
BANGLADESH					
Bats					
free-ranging	0	60	832	0	0
free-ranging; contact with domestic animals or humans not likely	0	2964	24447	0	0
hunted	0	137	1781	0	0
peri-domestic/in or near human dwelling(s)	179	179	2594	0	0
Rodents					
free-ranging; contact with domestic animals or humans not likely	0	189	2549	0	0
peri-domestic/in or near human dwelling(s)	53	53	803	0	0
zoo	0	15	221	0	0
Non-human Primates					
zoo	0	4	60	0	0
Other taxa					
free-ranging; contact with domestic animals or humans not likely	0	451	3401	0	0
peri-domestic/in or near human dwelling(s)	75	75	1002	0	0
zoo	0	4	60	0	0
TOTALS	307	4131	37750	0	0

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.1: **Introduction of New Technologies:**
 - Received PREDICT viral-family PCR protocols and PREDICT Universal Control.
 - Received PREDICT primers; in discussion to begin hanta, arena and paramyxo virus PCR at the ICDDR,B lab.
- **Activity 1.4: Sample Tracking and Information Management**
 - Sub-activity 1.4.1: **Surveillance Data Management**
 - Reported updated field activities to the Forestry Department.

- **Activity 1.5 Program Management**
 - Sub-activity 1.5.2: **Communication**
 - Held in-person meetings and telephone communications with Forestry Department, Ministry of Health, and Department of Livestock Services.

CHINA

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Established partnership with Yunnan Institute of Endemic Disease Control and Prevention (YIEDCP) regarding collaborative fieldwork in Yunnan Province.
 - Held two trainings: first with 16 local hospitals and China’s CDC on syndromic surveillance and pathogen detection for encephalitis/meningitis and hemorrhagic fever of unknown origin in Guangdong Province, which is linked with China’s hospital-based surveillance system; the second training included 12 representative’s from the local China CDC office on follow-up of high risk cohort study on core safety, human sampling and follow-up sampling for highly exposed cohort (informing participants of results; enrollment and consent of participant into follow-up study; enrollment of contact participants).
 - Held PREDICT sample collection training for YIEDCP field staff.
 - Met with FAO representatives from Beijing to discuss activities in Guangdong Province and overall FAO objectives in China.
 - Participated in FAO “Launching Ceremony of a Newly Built Vehicle Cleaning & Disinfection Station in the Jiangcun Poultry Wholesale Market” in Guangzhou.
 - b) **Laboratory System Improvements**
 - Continued recruitment for laboratory researcher to be based at both GDCDC and Metabiota Guangzhou office.

- **Activity 1.2: Surveillance**

- Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**

- Sampled rodents from two sites in Nujiang Prefecture in Yunnan Province.
- Began wildlife market sampling in local markets in Yunnan Province.
- Continued sampling farmed wildlife in Guilin Prefecture, Guangxi Province; 66 animals (132 samples) collected from farmed Chinese bamboo rats.
- Ongoing collection of rodent samples in Zhanjiang County, Guangdong Province.
- Confirmed participants to be included in highly exposed human study for re-sampling in follow-up study (approximately 103 participants from the original 1301, with between 1 and 4 close contacts sampled for each participant).

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
CHINA					
Bats					
contact with tourists/ecotourism	0	294	377	0	0
free-ranging	0	271	542	0	0
free-ranging; contact with domestic animals or humans not likely	0	98	196	0	0
other high risk interface	0	36	72	0	0
Rodents					
for sale in large market (> 20 vendors)	0	64	64	0	0
free-ranging; contact with domestic animals or humans not likely	161	161	322	0	0
wild animal farm	66	227	454	322	483
Other taxa					
for sale in large market (> 20 vendors)	0	127	127	0	0
free-ranging; contact with domestic animals or humans not likely	26	26	52	0	0
wild animal farm	0	6	12	12	18
TOTALS	253	1310	2218	334	501

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.1: **Introduction of New Technologies**
 - Shared Universal Control among PREDICT partners in country.
 - Designed and used 14 primer pairs for Hantavirus.
 - GDCDC began optimizing PREDICT Universal Control and primer panels.
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Year 3 Quarter 4):**
 - Chinese partners approved limited release of test results from human surveillance to PREDICT partners.

PREDICT Test Findings (Y3Q4):

# Samples submitted	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
5 samples (Malayan porcupine)	WIV	Genome sequencing by PCR using primers designed by multiple alignments of related AstV genomes	Astroviridae	Some sequence obtained	Virus identification ongoing	China	No
Bat samples	GDEI/WIV	Genome sequencing	Hantavirus	Some sequence obtained	Virus identification ongoing	China	No
Rat samples	GDEI/WIV	Genome sequencing	Hantavirus	Some sequence obtained	Virus identification ongoing	China	No
1301 human sera	GDCDC	serology	Bunyavirus	Presumptive Positives	-	China	No
1301 human sera	GDCDC	serology	Filovirus (Ebola)	Negative	-	China	No

- **Activity 1.4: Sample Tracking and Information Management**
 - Sub-activity 1.4.1: **Surveillance Data Management**
 - Linked serology results to behavioral information in database.
 - Began discussions with Yale group on behavioral data analysis.

NEPAL

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Selected a Country Coordinator following the initial planning visit in March 2012.
 - Initiated planning for field surveillance and pathogen testing by the implementing partner, Center for Molecular Dynamics – Nepal (CMDN).
 - Participated in the One Health Alliance South Asia (OHASA) Nepal Chapter Initiative meeting that included government ministries, NGOs, academia, and private sector research groups.
 - Trained Country Coordinator at UC Davis on project administration, protocols and guides, interagency and USAID communications, surveillance, and pathogen testing, and conducted in-depth field surveillance training (rodent capture, handling and sampling) with UC Davis veterinarians.
 - Completed the Rapid Survey Tool to establish the baseline for zoonotic pathogen surveillance in wildlife and produced country maps to identify high risk interfaces and infrastructure to conduct wildlife surveillance.
 - b) **Laboratory System Improvements**
 - Conducted assessment of CMDN laboratory to identify supply consumables and reagents needs to rapidly scale up for viral family/genus screening.

- Initiated laboratory procurement submitting requests for quotations for cold chain equipment and other laboratory infrastructure needs.
- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**
 - Developed and submitted project proposal for wildlife sampling permits and permissions through the Department of National Parks and Wildlife Conservation (DNPWC). Began to develop surveillance plans for year 4 in Kathmandu including rodent sampling at four urban unplanned settlements; non-invasive bat sampling at an urban site and non-invasive non-human primate sampling at urban temple sites.
- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.1: **Introduction of New Technologies**
 - Received the Universal Control 1.
- **Activity 1.4: Sample Tracking and Information Management**
 - Sub-activity 1.4.1: **Surveillance Data Management**
 - Trained the Country Coordinator on data entry into GAINS and project data management.
- **Activity 1.5 Program Management**
 - Sub-activity 1.5.1: **Significant Change in Project Management**
 - Initiated biweekly management and coordination calls and identified points of contact through CMDN for overall project coordination, administration, finance, field surveillance, and laboratory management.
 - Established the Basecamp site for project management among all partners.

LATIN AMERICA

BOLIVIA

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Used PREDICT Capacity Rapid Survey Tool to interview key government counterparts from the National Veterinary Service (Epidemiology Unit, SENASAG) and General Directorate of Biodiversity (DGB) and obtained valuable information about improvements and needs for implementing wildlife disease surveillance.
 - b) **Laboratory System Improvements**
 - Purchased laboratory supplies locally and in the US to expand viral family testing at IBMB laboratory, and to develop capacity for DNA cloning and sequencing.
 - Prepared guidelines on Biosafety procedures for laboratory operations for specific use by partner/collaborating laboratories to process and test PREDICT samples (available only in Spanish version).

Activity 1.2: Surveillance

- Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**
 - Seven PREDICT staff and collaborators successfully passed face-mask fit tests to ensure safe use of protective respirator masks during surveillance activities.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
BOLIVIA					
Bats					
free-ranging; contact with domestic animals or humans not likely	0	365	2187	0	0
peri-domestic/in or near human dwelling(s)	0	173	1003	33	132
other high risk interface	0	2	62	4	16
Rodents					
for sale in market	0	36	739	41	136
free-ranging; contact with domestic animals or humans not likely	0	11	190	2	8
hunted	0	8	129	0	0
peri-domestic/in or near human dwelling(s)	0	13	331	8	32
preying on livestock or their food	0	11	299	0	0
public safety hazard (e.g. threat to human)	0	210	3148	221	692
Non-human Primates					
for sale in large market (> 20 vendors)	0	1	10	3	7
for sale in medium market (5-20 vendors)	0	1	11	1	2
for sale in small market (< 5 vendors)	0	4	57	5	16
for sale in market	0	4	152	10	43
free-ranging; contact with domestic animals or humans not likely	0	3	125	3	6
hunted	0	68	1115	53	250
rehabilitation center	0	36	438	25	114
temporary holding facility	7	19	234	5	19
Other taxa					
for sale in large market (> 20 vendors)	1	49	794	82	273
for sale in medium market (5-20 vendors)	0	57	627	50	189
for sale in small market (< 5 vendors)	0	4	32	4	13
for sale in market	0	54	1431	25	53
free-ranging; contact with domestic animals or humans not likely	0	1	0	0	0
hunted	0	167	2249	31	40
peri-domestic/in or near human dwelling(s)	0	1	32	0	0
temporary holding facility	3	44	376	25	74
rehabilitation center	0	43	213	17	54
other high risk interface	0	5	166	0	0
TOTALS	11	1390	16150	648	2169

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.1: **Introduction of New Technologies**
 - Delivered a barcode scanner sent to IBMB laboratory to assist with sample tracking.
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Year 3 Quarter 4):**

PREDICT Test Findings (Y3Q4):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Bats (148 samples from 26 individuals) (oral/rectal swabs; urine)	IBMB-UMSA	Conventional and nested RT-PCR	Flavi, Corona, Arena, Filo viruses	Presumptive positives for flavi, corona, filo virus	Sequence Confirmation Pending	Bolivia	No
Monkeys (597 samples from 57 individuals) (oral/rectal swabs; urine)	IBMB-UMSA	Conventional and nested RT-PCR	Filo, Paramyxo, Arena, Flavi, Corona viruses	Presumptive positives for arena, corona, filo virus	Sequence Confirmation Pending	Bolivia	No
Rodents (1128 samples from 93 individuals) (oral/rectal swabs; urine)	IBMB-UMSA	Conventional and nested RT-PCR	Hanta, Arena, Alpha, Flavi virus	Presumptive positives for arena, flavi, hanta, alpha virus	Sequence Confirmation Pending	Bolivia	No

- **Activity 1.4: Sample Tracking and Information Management**
 - Sub-activity 1.4.1: **Surveillance Data**
 - Revised data in GAINS to ensure accuracy.
- **Activity 1.5 Program Management**
 - Sub-activity 1.5.1: **Significant Change in Project Management**
 - Reduced in-country staff and reorganized tasks according to year 4 work plan and budget.

- Sub-activity 1.5.2: **Communication**
 - Presented results from surveillance efforts at the 61st International Conference of the Wildlife Disease Association (Lyon, France).

BRAZIL

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Presented and made new contacts at Convention on Biological Diversity Regional Workshop on the Inter-Linkages between Human Health and Biodiversity in the Americas hosted by Brazilian Ministry of Health.
 - b) **Laboratory System Improvements**
 - Received all reagents and primers at ICB II.
 - Initiated PREDICT sample analysis.
 - Formalized a subcontract with the Institute of Biomedical Sciences (ICB II-USP) to secure viral family testing on all samples.
 - Made arrangements for ICB II to purchase laboratory reagents at discounted price from Life Technologies.
- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**
 - Sampled bats from a pristine site at the UFAM farm, yielding 357 samples.
 - Sampled primates from Parque do Mindu, a highly urbanized area, yielding 25 samples.
 - Adjusted sampling sites and methodology to better fit the objectives of Deep Forest Project.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
BRAZIL					
Bats					
free-ranging; contact with domestic animals or humans not likely	0	467	2502	0	0
peri-domestic/in or near human dwelling(s)	28	36	190	0	0
zoo	0	103	335	0	0
other high risk interface	0	181	1275	76	99
Rodents					
free-ranging; contact with domestic animals or humans not likely	0	48	433	0	0
peri-domestic/in or near human dwelling(s)	0	6	21	0	0
other high risk interface	0	22	68	0	0
Non-human Primates					
free-ranging; contact with domestic animals or humans not likely	0	13	93	0	0
peri-domestic/in or near human dwelling(s)	0	11	59	0	0
wild animal farm	0	6	28	0	0
other high risk interface	0	15	52	0	0
Other taxa					
free-ranging; contact with domestic animals or humans not likely	0	31	282	0	0
peri-domestic/in or near human dwelling(s)	1	12	36	0	0
other high risk interface	0	170	914	0	0
TOTALS	29	1121	6288	76	99

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Year 3 Quarter 4):**
 - Completed validating PREDICT protocols for the lab.
 - Confirmed functionality of the hantavirus primers using known positive controls.
 - Conducted separate manual nucleic acid extraction for bat samples.
 - Conducted PCR screening according to Deep Forest Project procedures.
 - Purified PCR products to conduct sequencing.

PREDICT Test Findings (Y3Q4):

# Samples submitted	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
39 oral swabs, rectal swabs, serum and red blood cell clots from bats were pooled by animal	ICB II	PCR	Alphaviruses Arenaviruses Bocaviruses Coronaviruses Filoviruses Flaviviruses Hantaviruses Nipah viruses Paramyxoviruses Seadornaviruses	Presumptive arena positive	Sequence Confirmation Pending	Brazil	No

COLOMBIA

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Planned a workshop for government staff and partners involved in wildlife conservation and health with the Ministry of Environment and the local Association of Wildlife Veterinarians (AVVS). This workshop will be held in the city of Bogotá on October 16-18th 2012, and will aim to promote an inter-ministerial alliance for wildlife disease surveillance in Colombia.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
COLOMBIA					
Rodents					
free-ranging; contact with domestic animals or humans not likely	0	1	21	0	0
other high risk interface	0	1	6	0	0
Non-human Primates					
other high risk interface	0	11	84	0	0
Other taxa					
other high risk interface	0	70	467	0	0
TOTALS	0	83	578	0	0

MEXICO

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Organized the Conservation Medicine Symposium to improve the understanding of One Health.
 - Completed Y3 Rapid Survey Tool.
 - b) **Laboratory System Improvements**
 - Validated corona, filo, flavi and paramyxo virus protocols.
 - Secured new laboratory partner, Conservation Medicine Laboratory of Instituto Politecnico Nacional (IPN), to ensure more rapid completion of diagnostic tests.
 - Trained 1 IMSS lab staff in diagnostic protocols for deep sequencing at CII, Columbia University.
 - Conducted facemask (respirator) fit test for 5 field team members.

- **Activity 1.2: Surveillance**

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
MEXICO					
Bats					
contact with tourists/ecotourism	0	31	122	0	0
free-ranging; contact with domestic animals or humans not likely	0	1579	7716	117	117
sanctuary	0	26	128	0	0
Rodents					
free-ranging; contact with domestic animals or humans not likely	0	36	176	0	0
sanctuary	0	1	5	0	0
Other taxa					
free-ranging; contact with domestic animals or humans not likely	0	28	44	0	0
TOTALS	0	1701	8191	117	117

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**

- Sub-activity 1.3.2: **Pathogen detection and discovery (Year 3 Quarter 4):**
 - Tested samples for corona, filov, flavi and paramyxo viral families.
 - Conducted additional tests for rabies and West Nile virus.

PREDICT Test Findings (Y3Q4):

# Samples submitted	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Bats (346 serum samples)	CENID-Microbiología, INIFAP	ELISA	Lyssavirus (Rabies)	70 Seropositives	-	Mexico	Approved
Bats	Laboratorio de Inmunovirología	PCR	Corona, Paramyxoviruses	Presumptive positives	Sequence results pending of presumptive positives	Mexico	Pending
Bats	Laboratorio de Inmunovirología	PCR	Flavivirus	Presumptive positives	Sequence results pending of presumptive positives	Mexico	Pending

PERU

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Discussed opportunities for improving capacity for testing wildlife diseases with the Dean of Veterinary Medicine from the Peruvian University Cayetano Heredia (UPCH).
 - Provided guidance for planning rodent captures and sampling in areas affected by Plague (Departments of Cajamarca and La Libertad, northwestern Peru), as requested by the Peruvian Institute of Health (INS).
 - Used PREDICT Capacity Rapid Survey Tool to interview key government counterparts from the Ministry of Public Health (Zoonoses Unit and Laboratory Services-INS) and obtained valuable information about improvements and needs for implementing wildlife disease surveillance.

- Discussed progress with the Coordinator of the Zoonoses Unit (General Directorate of Epidemiology, Ministry of Public Health) after three years of project, and evaluated possibilities for further cooperation in year four.
- As requested by the Lima Administration of Forestry and Wildlife (ATFFS Lima), facilitated communications and liaison with the US NAMRU laboratory to test primates from rescue centers for Herpes virus infections.

b) Laboratory System Improvements

- Optimized molecular protocols underway at the Peruvian Institute of Health (INS Lima laboratory) to better understand sensitivity and specificity of tests. UC Davis Diagnostic lead proposed adjustments to ensure reliability of results. Purchased laboratory supplies locally and in the US for testing at INS Laboratory.
 - Identified additional needs for expanding viral family screening and DNA sequencing at INS laboratory.
 - One additional technician was hired to conduct PREDICT diagnostics at INS.
- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**
 - Trained seven staff and collaborators in methods for conducting market surveys. This activity is part of a PREDICT-related study that aims to characterize human behaviors and risk factors in the wildlife trade.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

PERU	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
Bats					
free-ranging	0	12	78	0	0
free-ranging; contact with domestic animals or humans not likely	0	58	205	0	0
Rodents					
for sale in medium market (5-20 vendors)	0	28	241	0	0
free-ranging; contact with domestic animals or humans not likely	0	1	8	0	0
hunted	12	263	264	0	0
peri-domestic/in or near human dwelling(s)	0	50	900	0	0
temporary holding facility	0	2	16	0	0
temporary holding facility/wildlife trade transport	0	3	14	0	0
zoo	0	12	29	0	0
Non-human Primates					
for sale in large market (> 20 vendors)	0	6	42	8	16
for sale in medium market (5-20 vendors)	0	111	586	138	374
hunted	14	207	208	0	0
peri-domestic/in or near human dwelling(s)	0	26	275	40	118
sanctuary	0	77	768	31	31
temporary holding facility	2	149	1567	253	605
zoo	0	79	843	127	310
other high risk interface	0	1	12	1	1
Other taxa					
for sale in large market (> 20 vendors)	0	40	90	0	0
for sale in medium market (5-20 vendors)	0	231	763	3	8
for sale in market	0	75	211	0	0
free-ranging; contact with domestic animals or humans not likely	0	1	4	0	0
hunted	51	531	540	0	0
peri-domestic/in or near human dwelling(s)	0	1	18	0	0
temporary holding facility	0	50	180	0	0
temporary holding facility/wildlife trade transport	0	10	33	0	0
zoo	0	60	119	0	0
TOTALS	79	2084	8014	601	1463

- Sub-activity 1.3.2: **Pathogen detection and discovery (Year 3 Quarter 4):**

PREDICT Test Findings (Y3Q4):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Primates (38) <i>(FTA cards)</i>	CDC Atlanta (collaborative work with NAMRU-6)	Conventional RT-PCR	Retrovirus	Presumptive positives	Sequence Confirmation Pending	Peru	No

- **Activity 1.4: Sample Tracking and Information Management**
 - Sub-activity 1.4.1: **Surveillance Data Management**
 - Revised data to ensure accuracy of the information uploaded into GAINS.
- **Activity 1.5 Program Management**
 - Sub-activity 1.5.1: **Significant Change in Project Management**
 - Reduced in-country staff and reorganized tasks according to year 4 work plan and budget.
 - Reviewed and audited financial management of laboratory analyses that were executed through a sub-award with the University of San Marcos.
 - Sub-activity 1.5.2: **Communication**
 - Discussed procedures for disease reporting and public release of data with the Coordinator of Zoonoses Unit (General Directorate of Epidemiology, Ministry of Health).
 - Presented results from surveillance efforts at the 61st International Conference of the Wildlife Disease Association (Lyon, France).
 - Presented preliminary results to collaborating wildlife rescue centers on the detection of entero-pathogenic bacteria and parasites in captive primates (tests covered by non-PREDICT funds).

LOW 2: Risk Determination

- **Activity 2.2 Optimize models for diversity of disease emergence**
 - Refined methods and tools for a market survey to be conducted in northern and central Peru, which aims to describe human behaviors and risk factors that could influence emergence of zoonotic diseases in the wildlife trade, as requested by NAMRU's IRB Committee.

PREDICT Quarter 1 Year 4 Reporting

GLOBAL - US, Africa, Southeast Asia, Asia & Latin America

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**

- Sub-activity 1.1.1: **Operationalizing One Health Highlights**

- **a) International, National, or Regional Surveillance System Improvements**

- Uganda Country Coordinator was asked to join Ecological Investigation arm of the National Task Force and participated in developing a plan for the investigation of Ebola cases in the area where the single case was reported last year.
- Completed training with Ministry of Environment in Cameroon on zoonotic diseases and PPE.
- Completed training for three National Animal Health Center (NAHC) staff in Laos on PREDICT viral family-level screening and wrote strategic plan on behalf of NAHC to outline lab capacity and set goals for PREDICT diagnostics in next year. Elements of this plan presented by head of NAHC at an EPT meeting in Vientiane.
- Organized a workshop with the Ministry of Environment and partners in Bogotá, Colombia at the end of October to engage government agencies, universities and NGOs in an inter-institutional alliance for monitoring of wildlife diseases in the country after PREDICT.
- Conducted meetings in Thailand with Director of Wildlife Research Division, Wildlife Conservation Office - National Parks, Wildlife and Plant Conservation Department (DNP), DNP veterinarians, USAID officials, and a representative from Chulalongkorn University.
- Indonesia partner lab member attended AFRIMS training in Bangkok on advanced PCR techniques and sequencing techniques, as well as project and repository management.
- Co-organized the training workshop “Strengthening Capacity on Bat Ecology Study” with Faculty of Forestry, Kasetsart University and FAO in Thailand.
- Attended the Zoonotic Technical Working Group Meeting in Cambodia and gave an update on surveillance and the PREDICT-PREVENT joint surveys on human-animal exposure, identifying the hunting population and highest consumers of wildlife in rural villages.

- Attended a meeting in Indonesia with representation from Ministry of Forestry (MoF), Ministry of Health, USAID Indonesia, and the Expert Panel of the National Committee on Zoonoses Control regarding (external) findings published about antibodies to Ebola in Orangutans. Appointed by the MoF to sit on the Task Force for Confiscation of the associated specimens, conduct specimen transfer and verification and follow-up analyses.
- Presented on “Wildlife and Environment” at The Third Regional Workshop on Multi-Sectoral Collaboration on Zoonoses Prevention and Control: Leading the Way on One Health, Bali, Indonesia.

b) Laboratory System Improvements

- Implemented and optimized viral family-level PCR protocols at additional laboratories including ICDDR,B (Bangladesh) and the Conservation Medicine Laboratory of Instituto Politecnico Nacional (Mexico).
- Continued to provide training and support to laboratory technicians including on PCR gel purification, sample management, data entry and Research Management at CHP (Cameroon); continued to train two laboratory technicians from NaVRI at Institut Pasteur du Cambodia (Cambodia) on viral family screening of PREDICT samples with the goal to transfer a portion of viral family screening to NaVRI; completed one month training on PREDICT PCR diagnostics at NAHC from mid-September to mid-October by UC Davis personnel (Lao PDR) - four NAHC personnel are now extracting RNA, producing cDNA and running PCR; twelve staff and collaborators trained on biosafety methods for laboratory operations at IBMB (Bolivia); and two staff trained in diagnostic protocols for corona-, filo-, flavi- and paramyxoviruses at IPN (Mexico) for sustainability.
- Held a two-day joint lab-based training with IDENTIFY on biosafety and sample handling (participants from VRI, PERHILITAN, SWD in Malaysia).
- Provided equipment/supplies for surveillance and laboratory diagnostics to additional labs including 2 VSAT systems, LightCycler, cytometer, portable freezers at INRB (DRC), ultralow freezer at IPC (Cambodia), kits and reagents to begin processing samples at RAHO6 and new gel electrophoresis equipment and UV trans-illuminator at HUA (Vietnam), and cloning kits and reagents to allow sequencing of positives at IBMB (Bolivia).
- Completed renovations at Eijkman Institute’s new Emerging Pathogens Laboratory for testing undiagnosed febrile human samples with PREDICT protocols (Indonesia).
- Hired new laboratory staff for PREDICT Deep Forest work in Sabah at the Sabah Wildlife

- Department (Malaysia), and at IPC to conduct PREDICT viral family screening (Cambodia)
- Coordinated with DELIVER to install the Liquid Nitrogen generator and trained six staff members on use and maintenance – liquid nitrogen is now consistently being produced.
- Continued refining real-time, on-line test result tracking in GAINS to streamline reporting of test findings to in-country government, obtaining government approvals for release of data and movement of data to become available to partners and the public on HealthMap.
- Continued negotiation with reagent supply companies (Life Technologies, Qiagen, Biomerieux) to develop sustainable pricing and supply chains for collaborating laboratories.

Table 1: Labs Receiving Assistance from PREDICT to date

	# of labs targeted for screening with desired viral families	# of labs receiving training in preparation for screening of desired viral families	# of labs that have initiated work that will eventually lead to screening desired viral families (labs with partial capacity)
Africa	6	6	5
Asia / SE Asia	19	16	9
Latin America	8	6	6
Totals	33	28	20

- **Sub-activity 1.1.2: Capacity Assessment and Tracking of Development Progress**
 - Compiled data from the Y3 Rapid Survey Update Tools for 18 PREDICT countries in order to continue to track change over time for field capacity, laboratory capacity, and human capacity to conduct wildlife surveillance to detect zoonotic pathogens; the update also included a module for country coordinators to interview wildlife officials external to the PREDICT project to better understand how the PREDICT project is viewed, how it has made progress, and how capacity can be improved in the future.
 - Analyzed Y2 capacity data from 20 PREDICT countries to evaluate capacity improvement trends reported by country coordinators. The majority of countries reported improvement with regard to human capacity, laboratory capacity, and overall zoonotic pathogen surveillance capabilities in wildlife since the start of the project.
 - Expanded analysis of the Y2 capacity data to evaluate factors associated with higher or

lower capacity to conduct wildlife surveillance in PREDICT countries by developing a capacity scoring system. Factors significantly associated with increased country capacity to conduct wildlife surveillance included increased educational expenditures and life expectancy at the country level; country size, population, GDP, and health expenditures were not significantly associated with increased capacity for wildlife surveillance.

- Enrolled four PREDICT countries in a local media surveillance pilot evaluation program that uses weekly reporting of health events identified by PREDICT staff reading non-online local print media sources. This program extends the reach of media surveillance beyond the digital sources currently captured by HealthMap, and will be evaluated using standardized protocols and forms in the subset of PREDICT countries over at least three months in order to characterize strengths and weaknesses of using this surveillance approach for early detection of health events that may be of interest to PREDICT and EPT.

Table 2: PREDICT Training:

Country		# Women	Trainings covered various combinations of the following topics:
Asia:			
Bangladesh	11	0	Lab techniques in BSL2 lab & lab diagnostics; epidemiology and outbreak investigation; capture and sampling of rodents & bats; sample collection and GAINS system; use of GIS.
Cambodia	71	12	Core safety, animal capture, & sampling skills and protocols; data collection & management; rodent and primate ID & primate and rodent sampling; respirator fit testing.
China	3	2	Core safety, animal capture & sampling skills and protocols; sample collection, handling, and transport; wildlife restraint & anesthesia; human & animal safety; bat, rodent, and primate sampling.
India	18	2	Core safety, animal capture & sampling; laboratory safety protocols; zoonoses; surveillance and sampling protocols; bar-coding and data management; animal necropsies.
Indonesia	31	14	Modeling behind the PREDICT project; zoonotic diseases of bats and rodents; human and animal safety during capture; laboratory safety & PPE use; sample collection; set up for sampling bats and rodents; respirator fit testing.
Lao PDR	98	21	Core safety, animal capture, & sampling skills and protocols; data collection; PPE use; bar-coding & data management; animal necropsies; surveillance & sampling; laboratory molecular techniques; respirator fit testing.
Malaysia	92	22	Core safety protocols; PPE and biosafety, animal capture & sampling skills and protocols; bat and rodent capture, handling & sampling; laboratory skills; packing and shipping samples & cold chain; sampling strategy & data collection; bat, rodent & macaque sampling; collection of trigeminal nerve root ganglia from macaques for Herpes testing; virus extraction; bat & rodent capture; rodent retro-orbital bleed; primate sampling & human and animal safety; PRC & cloning; respirator fit testing.
Thailand	37	18	Lab and bioinformatics training; animal capture; laboratory safety; animal sampling protocols; zoonotic diseases; respirator fit testing.
Vietnam	344	103	Core safety, animal capture & sampling skills and protocols; packing & shipping samples; barcode system;

			animal pathology; sample collection & data management & use of GAINS; surveillance; filter paper blood spot sampling; lab diagnostic protocols, virus family level protocols; one health & sampling strategy; sample transport & lab methods; wildlife pathology; First Aid; respirator fit testing.
Africa:			
Cameroon	104	33	Core safety, animal capture & sampling skills and protocols; specialized field sampling and laboratory skills; packing & shipping samples to reference lab; PPE use; bushmeat policy and wildlife ethics; extraction, RT-PCR, ELISA and other lab methods; lab systems; immunology and serology; ethics; pan-viral protocols; emergency preparedness and management; outbreak response training; bio-risk management; use of satellite phones; molecular biology and conventional PCR; respirator fit testing.
DRC	17	2	Core safety, animal capture & sampling skills and protocols; specialized field sampling and laboratory skills; RT-PCR, ELISA; administration and reporting; Monkeypox surveillance; sample tracking & GAINS system; ethical issues; blood spot sampling; DNA & RNA extraction from animal samples; respirator fit testing.
Gabon	5	2	Bushmeat sampling; packing & shipping samples; PPE use and biosafety; lab safety; animal capture; bat & rodent sampling; sampling for AI; animal sample collection; cold chain; lab methods, DNA extraction, PCR; sample prioritization; safe handling of liquid nitrogen; sequencing; virus isolation; RNA & RT-PCR; GAINS system & data management.
Republic of Congo	13	2	Core safety, PPE and biosafety; safe animal capture, & sampling skills and protocols; bat, rodent, and primate sampling; laboratory safety & skills; data collection; cold chain; protecting human subjects in research; virology laboratory methods; respirator fit testing.
Rwanda	206	25	Core safety, animal capture & sampling skills and protocols; PPE use and biosafety; bat, rodent, and primate capture, handling, and sampling; zoonoses; ethics and responsibilities; wildlife pathology & necropsy; sample collection & preservation; packing & shipping samples; tracking primates & health monitoring; lab personnel safety; PCR protocols & sample processing; bushmeat handling.
Tanzania	40	7	Core safety, animal capture & sampling skills and protocols; bat and rodent capture, handling & sampling; data management; laboratory safety; surveillance; information management and GAINS system; wildlife capture & restraint; emergency preparedness; ethics, cultural sensitivity & SHP; pathogen detection; extraction and PCR & protocols; cold chain; respirator fit testing.
Uganda	29	9	Core safety, animal capture & sampling skills and protocols; PPE & biosafety; laboratory safety; packing & shipping samples; bushmeat sampling; cold chain; GPS; Animal Mortality Monitoring Study; bat capture, handling & sampling; PPE & biosafety to handle dead animals.
Latin America:			
Bolivia	169	75	Core safety, animal capture, laboratory & sampling skills and protocols and zoonotic diseases; bat, rodent, and primate sampling; bushmeat sampling; molecular and parasite diagnostic methods; lab safety and methods; packing and shipping samples; wildlife management and disease management; work ethics, cultural sensitivity & SHP; managing livestock & poultry diseases; detecting zoonoses; sample collection and storage; methods of detecting Salmonella in wildlife; biostatistics; respirator fit testing.
Brazil	34	17	Core safety, animal capture, handling & sampling skills and protocols; PPE use & biosafety; bat and rodent sampling; bushmeat sampling; packing and shipping samples; cold chain; surveillance, ethics, and responsibilities; primate sampling; respirator fit testing.
Colombia	54	29	Core safety, animal capture & sampling skills and protocols; lab safety & methods; One Health; Conservation Medicine; GAINS system and data management.
Mexico	27	14	Core safety, animal capture, handling & sampling skills and protocols; lab safety & methods; PPE use & biosafety; disease modeling; animal care and use protocols; lab diagnostic techniques; respirator fit testing.
Peru	259	138	Core safety, animal capture & sampling skills and protocols; PPE use & biosafety; surveillance; zoonotic

			disease risks from wildlife trade and consumption; wildlife regulations, wildlife management and disease monitoring; sample collection & storage; species ID & health risks; emergency management of spider bites; safe transport of confiscated animals; respirator fit testing.
Total Trained	1,662	547	

- **Activity 1.2: Surveillance**

- Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**

- Conducted surveillance activities in Brazil, Bangladesh, Cambodia, China, Lao PDR, Malaysia, Indonesia, Thailand, Cameroon, DRC, Gabon, Republic of Congo, Rwanda, Tanzania, and Uganda.
- Progress toward implementing surveillance in Nepal included hiring of team members, conducting site characterizations and assessments of target interfaces, surveillance planning, and linking with community groups. A letter of support for the program was acquired from the Ministry of Agriculture.
- Conducted sampling in new surveillance sites to target additional high-risk interfaces, including rural areas of Tanzania with bushmeat consumption and peri-domestic areas with extractive industries, and sampling with an indigenous population hunting wildlife for meat in Bangladesh.
- In Bolivia, conducted targeted sampling to follow up on test findings, as well as in areas where hemorrhagic fever is endemic and where hantavirus infections in humans were recorded last year for the first time.
- Deep Forest project: in Brazil, sampled bats at the urban site; in Malaysia, conducted meetings in Sabah, expanded program team, and completed the first round of sampling in the pristine site; in Uganda, continued sampling, including in an area near the pristine site.
- Coordinating with new head of Forestry Administration in Cambodia to improve collaboration and initiate surveillance at government wildlife rescue centre and held meeting with government animal health laboratory to discuss sampling primate "farms."
- Collected samples from animals in outbreak site as part of the Ebola response in DRC.
- Conducted surveys with PREVENT in Cambodia to identify frequent hunters and/or high consumers of wildlife in 3 ethnic minority villages in the Preah Vihear protected area.
- Provided the CDC field sites in Guangdong Province (China) with reports of first round of testing and supplemental supplies for follow-up enrollment of high-exposure cohort of human study. The US and China CDCs have completed their follow-up enrollment.

Table 3: PREDICT Global Surveillance Summary by Region, Taxa and Primary Risk Interface in GAINS (to date):

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
Africa					
Bats	193	4398	23082	9861	30859
Rodents	50	3731	13465	1520	3769
Non-human Primates	32	3326	11276	1402	7439
Other Taxa	54	5826	11329	659	1384
Asia					
Bats	519	4791	37470	2425	14267
Rodents	23	732	4758	322	483
Non-human Primates	0	4	60	0	0
Other Taxa	17	706	4909	12	18
Southeast Asia					
Bats	183	2591	8208	2230	8860
Rodents	174	1785	7250	734	1109
Non-human Primates	60	236	741	6	48
Other Taxa	23	882	2079	790	1011
Latin America					
Bats	131	3432	18170	2814	6012
Rodents	0	767	7146	507	2122
Non-human Primates	10	860	7026	1268	3505
Other Taxa	1	1715	9804	245	717
TOTALS	1470	35782	166773	24795	81603

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - **Sub-activity 1.3.1: Introduction of New Technologies**
 - Designed Universal Control #2 and assemblage of the plasmid is presently underway; this plasmid will allow expansion of PREDICT testing by 20 protocols (delivery of plasmid targeted for Rome all-Predict meeting in March 2013).
 - Optimized primers for all universal control #1-associated virus families.
 - Installed and trained all lab staff on new equipment: Nanodrop spectrophotometer for nucleic acid quantification (Cameroon) and liquid nitrogen generator (DRC).
 - Imported kits and reagents from the US for DNA cloning at various laboratories.
 - Received the MiniMag extraction machine from DELIVER (Brazil).

- Sub-activity 1.3.2: **Pathogen detection and discovery (Year 4 Quarter 1):**
 - Began testing of human samples in Gabon and Indonesia with signs of acute human illness (Deep Freeze) for viral families including enterovirus, coronavirus, adenovirus, sapovirus, astrovirus, filovirus, arenavirus, hantavirus, alphavirus, flavivirus, and phlebovirus.
 - Detected encephalomyocarditis virus (EMCV) in samples collected from bonobos that died at the sanctuary in DRC; sequencing and characterization is on-going at the Center for Infection.

Table 4: PREDICT Test Findings (Y4Q1; see additional data in country reports below):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release (yes or no)
Rodents (195)	Predict/GVF Cameroon	PCR	Arena, Hanta virus	Presumptive positives	New sequence company identified	Cameroon	No
Rodents (90)	PREDICT/INRB LAB	PCR	Arena, Alpha, Boca virus	Presumptive positives	Sequence confirmation pending	DRC	No
Bats (Isiro outbreak 77)	PREDICT/INRB LAB	PCR	Filo, Arena, Hanta virus	Presumptive positives	Sequence confirmation pending	DRC	No
Bats (116)	PREDICT/INRB LAB	PCR	Filo, Arena, Hanta virus	Presumptive positives	Sequence confirmation pending	DRC	No
Rodents (82)	CIRMF	PCR	Alpha, Arena, viruses	Presumptive positives	Sent for Sequencing	Gabon	No
Human (104)	CIRMF	PCR	Alpha, Flavi viruses	Presumptive positives	Sent for Sequencing	Gabon	No
Non-human Primates (34)	Mailman School of Public Health, Columbia University	PCR	Herpes, Polyoma, Adeno, Entero virus	Confirmed positives	Sequence Interpretation ongoing	Rwanda	No
Non-human Primates (39)	UC Davis Wildlife Diagnostic Lab	PCR	Retro, Herpes, Polyoma virus	Confirmed positives	Sequence Interpretation ongoing	Rwanda	No
Bats (40)	Makerere University Walter Reed Project	PCR	Paromyxo, Corona virus	Presumptive positives	To undergo sequencing for confirmation	Rwanda	No
Rodents (106)	Makerere University Water Reed project	Conventional PCR	Alpha, Paramyxo viruses	Presumptive positives	Pending sequence confirmation	Tanzania	No

Shrew (1)	Makerere University Water Reed project	Conventional PCR	Alphaviruses	Presumptive positive	Pending sequence confirmation	Tanzania	No
Rodents (169 samples)	Institute Pasteur Cambodia	PCR	Hanta, Arena, Paramyxo viruses	Presumptive positive	Sequence confirmation ongoing	Cambodia	No
Non-human Primates (Macaca fascicularis 100)	PRC-IPB	PCR	Arena, Paramyxo, Corona, Filo virus	Presumptive positives	Sequences obtained, interpretation pending	Indonesia	No
Human (56)	Eijkman	PCR	Filo, Paramyxo, Seadorna, Boca virus	Presumptive positives	Sequence confirmation pending	Indonesia	No
Bats (173 animals)	Institut Pasteur du Cambodge	PCR	Corona, Astro viruses	Presumptive positives	Sequences obtained, interpretation ongoing	Lao PDR, Cambodia - country of testing	No
Bats (173)	VRI	PCR	Coronaviruses	Presumptive positives	Sequence obtained, interpretation ongoing	Malaysia	No
Bats (71)	WHO-CC Chula	PCR	Corona, Paramyxo virus	Presumptive positives	Sequences obtained, interpretation ongoing	Thailand	No
Bats (97)	WHO-CC Chula	PCR	Coronavirus	Presumptive positives	Sequences obtained, interpretation ongoing	Thailand	No
Weasels (2)	WIV	PCR	Paramyxovirus	Presumptive positive	Sequence obtained, interpretation ongoing	China	No
Shrews (21)	WIV	PCR	Coronavirus	Presumptive positives	Sequences obtained, interpretation ongoing	China	No
Rodents (46)	WIV	PCR	Astrovirus	Presumptive positives	Sequences obtained, interpretation ongoing	China	No
Bats (596 samples, 85 individuals)	IBMB-UMSA	PCR	Coronavirus	Presumptive positives	Sequence confirmation pending	Bolivia	No
Non-human Primates (83 sample, 51 individuals)	IBMB-UMSA	PCR	Arena, Corona viruses	Presumptive positives	Sequence confirmation pending	Bolivia	No
Rodents (50 samples, 44 individuals)	IBMB-UMSA	PCR	Alphavirus	Presumptive positives	Sequence Confirmation Pending	Bolivia	No
Bats (39)	ICB II	PCR	Arenavirus	Presumptive positive	Sequence Confirmation Pending	Brazil	No
Bats (160)	Conservation Genetic Laboratory, University of Costa Rica	PCR	Equine Encephalitis Virus	Presumptive positive	Sequence Confirmation Pending	Mexico	No

Bats (801)	Mailman School of Public Health, Columbia University	PCR	Flavivirus (Hepaci/Pegi-like viruses)	Confirmed positives	Interpretation ongoing	Bangladesh	No
Bats (368)	Mailman School of Public Health, Columbia University	PCR	Flavivirus (Hepaci/Pegi-like viruses)	Confirmed positives	Interpretation ongoing	Mexico	No
Bats (606)	Mailman School of Public Health, Columbia University	PCR	Coronavirus	32 positive	13 novel coronavirus clades	Mexico	Yes
Bats (777)	Mailman School of Public Health, Columbia University	PCR	Coronavirus, Polyomavirus, Alphavirus, Astrovirus, Paramyxovirus, Rhabdovirus, Filovirus, Flavivirus (genus)	Confirmed and presumptive positives	Sequence confirmation and interpretation pending	Brazil	No

- **Activity 1.4: Sample Tracking and Information Management**
 - Sub-activity 1.4.1: **Optimize surveillance data management**
Ongoing improvements to and optimization of GAINS.org including:
 - Developed and implemented a prioritization scheme for data cleansing.
 - Developed and implemented an online test result data entry tool.
 - Sub-activity 1.4.2: **Establish global open access to database and procedure for dissemination of knowledge**
 - Implemented additional Geneious server capabilities, a bioinformatic software program that is now used to archive and analyze nucleic acid and protein sequences.
- **Activity 1.5 Program Management**
 - Sub-activity 1.5.2: **Communication**
 - Held another Washington, DC Briefing on PREDICT progress at the Smithsonian for White House and other agencies.
 - Presented PREDICT at the EcoHealth 2012 Conference (meeting of the International Association for Ecology and Health) in China.

- Presented an update on disease in wildlife at the FAO/OIE Fifth Meeting of the Global Steering Committee of the Global-Framework for the Progressive Control of Transboundary Animal Diseases (GF-TADs) Initiative (GSC5).
- Presented PREDICT at The IDRAM Initiative: Extractive Industries Infectious Disease Risk Assessment and Management Meeting.
- Provided input on successful coordination of wildlife surveillance and data collection systems based on the PREDICT program during the North American Wildlife Health Strategy Workshop – domestic activities now planned to complement and model after international activities.
- Held semi-annual PREDICT global meeting in New York.
- Coordinated activities with CDC GDD.
- Participated and represented PREDICT at the Africa “One Health senior level health ministries meeting (sponsored by USAID and WHO-AFRO) in Gabon.
- Led annual meeting (as President of the OIE Working Group on Wildlife Diseases) to establish priorities for 2013, including reviewing list of wildlife diseases for recommended modifications, providing information on wildlife hosts susceptible to OIE-reportable diseases, and providing updates to the OIE on emerging disease trends.
- Reappointed a PREDICT leader as Co-Chair of the IUCN Species Survival Commission Wildlife Health Specialist Group.
- Presented overview of PREDICT meta-population models of farm structure and zoonotic risk at the Influenza Risk Assessment and Risk Modeling workshop held by FAO.
- Presented PREDICT at the Institute of Medicine (IOM) Symposium (commemorating the 15th anniversary of the Forum of Microbial Threats and 20th anniversary of the *Emerging infections Report*).
- Discussed with members of national and international health agencies the progress in discovering, tracking, and preventing disease emergence at the IOM Anniversary Meeting- Emerging Infections, Microbial Threats to Health, and the Microbiome. Moderated discussion titled "Emerging Infectious Disease Events of the Last 20 Years."
- Participated in conference call with PREVENT to discuss the Deep Forest Human Contact Survey and results from the pilot.

LOW 2: Risk Determination

- **Activity 2.1: Develop risk filter strategy**
 - Sub-activity 2.1.1: **Refine the conceptual and structural framework for Extractive Industry work:**
 - Continued collaborating with the Extractive Industry Working Group (EIWG) to plan the strategy for rolling out of the risk screening and mitigation tools for zoonotic diseases (the Planning Tool and the Audit Tool).
 - The EIWG in collaboration (PREDICT, PREVENT and RESPOND) with the Chatham House Infectious Disease Risk Assessment and Management (IDRAM) Initiative held a round table to facilitate interaction between the extractive industry and international development and finance institutions, national government stakeholders and science leaders to address the challenge of assessing and managing risk around the extractive industry interface.
 - Prepared a briefing to support EIWG planning and scoping visit to Uganda in November. The trip was planned to meet with USG and in country partners and assess the potential for developing a strategy of risk assessment, prevention, and mitigation in anticipation of oil and gas developments in the Albertine Rift area.
 - Continued to refine the beta version of the PREDICT Hazard Assessment Tool (PHAT) – a desktop and field applicable screening tool to strengthen and improve the risk science foundation and address current gaps in identifying zoonotic infectious disease risks from wildlife at the extractive industry interface.
 - Sub-activity 2.1.2: **Improve targeted surveillance strategies for influenza**
 - Developed an Influenza database by combining information from all publicly available datasets. Database currently contains 735 influenza A strains covering all 122 known subtypes.
 - Extracted all location, subtype, strain, host, and type of novelty (mutation, recombination, antigenic shift) information available for analysis.
 - Conducted literature review on AI surveillance methodologies and use of geospatial modeling to date.
 - Began to evaluate predictor variables from our existing global datasets including:
 - Livestock density (e.g., poultry, swine)

- Species diversity of potential hosts
- Land-use indices, including a land-use change index
- Vegetation indices (e.g., NDVI, EVI, Evapotranspiration)
- Updated bias correction measures
- Currently developing a PREDICT-type approach to AI risk by evaluating the amount of phylogenetic diversity in different countries and ecoregions, as well as the apparent speed of evolution/mutation and spread of AI types by location.
- **Sub-activity 2.1.3: Inform and integrate other relevant agencies**
 - Participated in a North American Wildlife Health Strategy Workshop with multiple units within Departments of Interior and Commerce, as well as Canadian representatives. Discussed lessons learned from Predict for the development of a domestic EID strategy.
 - Worked with China CDC and both US and China National Science Foundations on recommended strategies for prevention and drivers of EIDs.
 - Held the Technical Advisory Committee on December 10 in Washington, DC in conjunction with the Smithsonian Agency Briefing; the community was highly supportive of PREDICT's current strategies, and the advisors made several recommendations for informing and integrating other relevant agencies (see appendix1), including:
 - Continue work on land use gradients. The intermediate areas, with both people and wildlife, could be especially interesting.
 - Major risk assessment and modeling work to guide sample testing and decision making, should continue to be an emphasis.
 - Continue building professional network in PREDICT countries. Clinicians (MD, DVM, etc.) are the ones most likely to notice and report health events. As they usually send specimens to laboratories to identify the responsible pathogen, it may be most efficient to go through labs, as a hub, rather than individual clinicians alone.
 - Work on livestock is not a PREDICT emphasis, but livestock are important as a potential bridge between wildlife and humans, and for food security. Not duplicating work by EPT+, PREDICT could consider work on feral (free-ranging) livestock and wildlife-livestock interactions at PREDICT-priority sample locations, as well as livestock in urban settings (the latter building on the work PREDICT is currently doing in live animal markets).
 - Conduct a gap analysis of activities.

- Continue building partnerships with CDC. One potential synergy is that as CDC identifies the human disease events, PREDICT can try to trace possible reservoirs and routes of exposure. CDC also has expertise in ruling out common (“normative”) pathogens; capitalize on this strength, so that PREDICT can focus on emerging or previously unknown pathogens if rule-out of common pathogens done by CDC.
- **Activity 2.2 Optimize models for diversity of disease emergence**
 - Sub-activity 2.2.1: **Refine, test and exploit geographical and temporal 'hotspot' models**
 - Updated mammal survey methodologies for Deep Forest, including bat acoustic surveys in order to include the non-captured bat diversity.
 - Preliminary Landscape Development Index (LDI) calculated for all Deep Forest sampling sites in Brazil, Malaysia and Uganda.
 - Developed hypotheses to test the importance of anthropogenic activities on EIDs, and identified hypotheses to tease apart mechanisms fostering disease emergence due to land-use change consistent with the goals of the Deep Forest project.
 - Sub-activity 2.2.2: **Iteratively improve datasets**
 - Continued compilation of gridded data, including the Governance Indicators published by the World Bank: voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, and corruption.
 - Gathered and updated the number of outbreaks per country from the World Health Organization.
 - Deployed scalable instance on the cloud (Amazon Web Services).
 - Integrated mechanisms for peer review of EIDs (proposed edits, reference links, and ranking).
 - Added user interface for expert reviewers.
 - Updated mammalian virus database from literature by >30% to include 2,050 virus-mammal associations, 460 unique viruses and 588 unique host species.
 - Sub-activity 2.2.3: **Design a 'Global Vulnerability' modeling strategy**
 - Formulated analytical plan to develop an avian influenza hotspot risk model.
 - Formulated draft scenarios for Chikungunya, Crimean-Congo Hemorrhagic Fever, Dengue, and Mayaro virus.

- Piloted the DFHC survey in Brazil and modified survey accordingly (~60 households). Analyzing preliminary data to characterize human ecology (the occupancy, abundance and behavior of people) at the landscape level and quantify human contact with potential wildlife reservoirs of disease and domestic animals.
- Commenced analyses on the co-occurrence patterns of PREDICT target viral families and 'viral species', pushing towards better understanding of viral community ecology underpinning risk determination.

AFRICA

CAMEROON

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Conducted training sessions on PPE and the source of zoonotic pathogens with 27 staff of the Ministry of Environment, Protection of Nature and Sustainable Development.
 - Attended the EPT country coordination team meeting to discuss the progress on Prime Ministerial decree creating a “One Health” unit and the national program for the fight against diseases of zoonotic origin, and to prepare for the WHO “One Health” high-level meeting in Libreville.
 - Attended the Cameroon Bioscience Conference.
 - b) **Laboratory System Improvements**
 - Trained a member of the lab team on PCR gel purification, sample management, and data entry.
 - Conducted fit tests for N95 respirators for 10 PREDICT staff members.
 - Attended a workshop on Research Management.
- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**
 - Conducted a 10-day field trip targeting hunted bats in the Djocloumbe area, an area with iron ore mining potential and hunting of *Rousettus* bats.
 - Conducted a field trip targeting ecotourism caves on Mount Cameroon.
 - Collected 266 samples, including oral and rectal swabs and blood from 85 animals (four hunted animals and 81 captured bats).
 - Began implementing the local media surveillance evaluation project for disease and risk events screening 5 local newspapers.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
CAMEROON					
Bats					
contact with domestic animals or humans NOT likely	0	462	4696	1342	5119
domestic/near human dwelling(s)	0	67	203	201	691
hunted	0	289	1079	513	1596
peri-domestic/in or near human dwelling(s)	0	122	343	326	1058
Rodents					
contact with domestic animals or humans NOT likely	0	138	1400	374	852
peri-domestic/in or near human dwelling(s)	0	23	61	61	110
hunted	0	853	967	128	192
Non-human Primates					
contact with domestic animals or humans NOT likely	0	141	142	0	0
hunted	0	708	1070	67	168
sanctuary	0	945	4828	669	2910
Other taxa					
contact with domestic animals or humans NOT likely	0	174	604	99	329
domestic/in or near human dwelling(s)	0	14	37	37	123
hunted	19	3873	4736	115	367
peri-domestic/in or near human dwelling(s)	13	96	261	178	731
sanctuary	0	46	271	5	5
TOTALS	32	7951	20698	4115	14251

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.1: **Introduction of New Technologies**
 - Installed Nanodrop spectrophotometer for nucleic acid quantification, and trained all lab staff on use.
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Year 4 Quarter 1):**
 - Extracted RNA and synthesized cDNA for 333 bat samples, 65 rodent samples and 8 non-human primate samples.
 - Completed a total of 4,693 PCR reactions this quarter.

PREDICT Test Findings (Y4Q1):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Bats (889)	Predict/GVF Cameroon	PCR	Arenaviruses (705)	All negative	-	Cameroon	No
Bats (889)	Predict/GVF Cameroon	PCR	Coronavirus (521)	All negative	-	Cameroon	No
Bats (889)	Predict/GVF Cameroon	PCR	Filovirus (521)	All negative	-	Cameroon	No
Bats (889)	Predict/GVF Cameroon	PCR	Flaviviruses (504)	All negative	-	Cameroon	No
Bats (889)	Predict/GVF Cameroon	PCR	Hantavirus (518)	All negative	-	Cameroon	No
Bats (889)	Predict/GVF Cameroon	PCR	Herpesviruses (671)	All negative	-	Cameroon	No
Bats (889)	Predict/GVF Cameroon	PCR	Paramyxovirus (522)	All negative	-	Cameroon	No
Non-Human Primates (2)	Predict/GVF Cameroon	PCR	Arenaviruses (1)	All negative	-	Cameroon	No
Non-Human Primates (2)	Predict/GVF Cameroon	PCR	Coronavirus (1)	All negative	-	Cameroon	No
Non-Human Primates (2)	Predict/GVF Cameroon	PCR	Filovirus (2)	All negative	-	Cameroon	No
Non-Human Primates (2)	Predict/GVF Cameroon	PCR	Flaviviruses (1)	All negative	-	Cameroon	No
Non-Human Primates (2)	Predict/GVF Cameroon	PCR	Hantavirus (1)	All negative	-	Cameroon	No
Non-Human Primates (2)	Predict/GVF Cameroon	PCR	Paramyxovirus (2)	All negative	-	Cameroon	No
Rodents (195)	Predict/GVF Cameroon	PCR	Alphaviruses (151)	All negative	-	Cameroon	No
Rodents (195)	Predict/GVF Cameroon	PCR	Arenavirus (150)	Presumptive positive	New sequence company identified	Cameroon	No
Rodents (195)	Predict/GVF Cameroon	PCR	Hantavirus (151)	Presumptive positive	New sequence company identified	Cameroon	No
Rodents (195)	Predict/GVF	PCR	Coronavirus (193)	All negative	-	Cameroon	No

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
	Cameroon						

- **Activity 1.4: Sample Tracking and Information Management**
 - Sub-activity 1.4.1: **Surveillance Data Management**
 - Continually updated GAINS data to new template formats produced by GAINS management team.
 - Responded to queries, identified and corrected errors in uploaded data.

LOW 3: Outbreak Response Capacity Building

- Submitted a request to the Ministry of Public Health to integrate PREDICT into the epidemic response working group and to participate in the weekly coordination meetings of this group. A memo describing the outbreak response capacities of PREDICT was submitted with this request.

DEMOCRATIC REPUBLIC OF CONGO

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Worked with the Congolese Institute for the Conservation of Nature (ICCN) and the Ministry of Agriculture to find new collection sites for wildlife surveillance, according to PREDICT strategy.
 - Made arrangements to participate in the set up of an intranet network in DRC with the Kinshasa School of Public Health (KSPH), including universities/training institutions and national laboratories (veterinary and public health).
 - Participated in the preparation of the final report for the Ministry of Health (MoH) on the

Ebola outbreak in Isiro; the team added new ideas to improve collaboration between staff from environment, agriculture, and public health agencies during outbreak response.

- Worked with WHO DRC to propose new ideas on improving collaboration between human, wildlife and livestock agencies during outbreak response.
- Participated in the weekly surveillance meeting at the MoH.

b) Laboratory System Improvements

- Prepared an internal database to better document all extractions and PCR tests.
- Installed a Liquid Nitrogen (LN2) generator that is functioning properly following replacement of the condenser.
- Conducted training for 6 individuals on proper use and maintenance of the LN2 generator (3 maintenance technicians from INRB and 3 PREDICT staff).
- Received 2 VSAT systems, a LightCycler, a cytometer, portable freezers, laboratory consumables and reagents from the USAMRIID funded field site in Kole, Sankuru; all equipment is being installed in the PREDICT lab at INRB.

- **Activity 1.2: Surveillance**

- Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**

- Focused activities on new collection sites around Kinshasa to improve sampling efficiency and at the request of the Ministry of Environment and Agriculture. Sites include: the Ndolo bush meat market, the Kimwenza forest, and Monako village in Maluku (near the Congo river).
- Collected samples from newly admitted animals at the Bonobo sanctuary.
- Collected sequential samples in October and December from 2 human-habituated Grauer's gorillas (*Gorilla beringei graueri*) rescued by Congolese wildlife authorities from poachers in September 2012 that are being held in a temporary holding facility at Virunga National Park headquarters in Rumangabo.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
DEMOCRATIC REPUBLIC OF CONGO					
Bats					
contact with tourists/ecotourism	24	34	264	2	50
domestic/near human dwelling(s)	15	15	90	0	20
for sale in small market (< 5 vendors)	0	6	114	0	8
free-ranging	0	49	519	3	162
hunted	1	8	61	1	8
sanctuary	0	20	152	14	91
other high risk interface	113	161	946	77	708
Rodents					
contact with tourists/ecotourism	2	2	36	0	0
free-ranging	0	5	94	14	26
hunted	14	764	1958	386	542
sanctuary	4	80	0	0	0
toher high risk interface	2	3	67	1	1
Non-human Primates					
contact with park personnel/intensive wildlife management area	0	2	28	0	0
contact with tourists/ecotourism	0	13	139	0	0
domestic/near human dwelling(s)	1	1	7	0	0
for sale in large market (> 20 vendors)	7	7	55	0	0
free-ranging	0	14	106	15	88
hunted	5	594	871	270	889
other	9	9	72	0	0
private wildlife collection or pet	0	9	54	10	70
raiding crops	0	1	18	0	0
sanctuary	4	53	295	6	28
temporary holding facility	0	1	7	0	0
temporary holding facility/wildlife trade transport	0	2	16	0	0
zoo	0	21	211	21	21
Other taxa					
free-ranging	0	4	61	3	15
hunted	10	658	930	4	10
private wildlife collection or pet	0	3	8	8	56

DEMOCRATIC REPUBLIC OF CONGO	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
TOTALS	211	2537	7179	835	2793

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Year 4 Quarter1):**
 - Extracted RNA and/or DNA from over 500 samples to enable rapid PCR testing according to PREDICT testing priorities.
 - Found traces of encephalomyocarditis virus (EMCV) in samples collected from bonobos that died at the sanctuary; characterization is on-going at the Center for Infection and Immunity at Columbia University (CII).
 - Initiated intensive testing of all bat samples collected to date and continued RNA extractions from blood and oral swabs collected from rodents and non-human primates.
 - Received information on the presence of 2 human cases of suspected viral hemorrhagic fever in the Katako-Kombe territory, Sankuru District, Oriental Province, and facilitated the shipment of samples to the INRB laboratory where they tested negative for Ebola and Marburg viruses; the remaining samples will be tested via PREDICT protocols.

PREDICT Test Findings (Y4Q1):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release (yes or no)
Rodents (90)	PREDICT/INRB LAB	PCR	Bocavirus	Presumptive positives	Sequence confirmation needed	DRC	No
Bats (Isiro outbreak) (77)	PREDICT/INRB LAB	PCR	Flavivirus	Negative	-	DRC	No
Bats (Isiro outbreak) (77)	PREDICT/INRB LAB	PCR	Coronavirus	Negative	-	DRC	No

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release (yes or no)
Bats (Isiro outbreak) (77)	PREDICT/INRB LAB	PCR	Filovirus	Presumptive positives	Sequence confirmation needed	DRC	No
Bats (Isiro outbreak) (77)	PREDICT/INRB LAB	PCR	Arenavirus	Presumptive positive	Sequence confirmation needed	DRC	No
Bats (Isiro outbreak) (77)	PREDICT/INRB LAB	PCR	Hantavirus	Presumptive positives	Sequence confirmation needed	DRC	No
Rodents (50)	PREDICT/INRB LAB	PCR	Hantavirus	Negative	-	DRC	No
Rodents (50)	PREDICT/INRB LAB	PCR	Coronavirus	Negative	-	DRC	No
Rodents (45)	PREDICT/INRB LAB	PCR	Arenavirus	Presumptive positives	Sequence confirmation needed	DRC	No
Rodents (50)	PREDICT/INRB LAB	PCR	Alphavirus	Presumptive positives	Sequence confirmation needed	DRC	No
Bats (110)	PREDICT/INRB LAB	PCR	Arenavirus	Presumptive positive	Sequence confirmation needed	DRC	No
Bats (116)	PREDICT/INRB LAB	PCR	Filovirus	Presumptive positives	Sequence confirmation needed	DRC	No
Bats (110)	PREDICT/INRB LAB	PCR	Flavivirus	All negative	-	DRC	No
Bats (110)	PREDICT/INRB LAB	PCR	Coronavirus	All negative	-	DRC	No
Bats (102)	PREDICT/INRB LAB	PCR	Hantavirus	Presumptive positives	Sequence confirmation needed	DRC	No

- **Activity 1.4: Sample Tracking and Information Management**
 - Sub-activity 1.4.1: **Surveillance Data Management**
 - Corrected all erroneous data previously submitted to GAINS and routinely updated new

- data submissions.
- Began online submission of laboratory test results and successfully uploaded them to GAINS.
- **Activity 1.5 Program Management**
 - Sub-activity 1.5.1: **Significant Changes to Administrative Management**
 - Ended subcontract with UCLA for field management.
 - Hired additional personnel to support program management, including an administrative and finance director, laboratory manager and field ecologist.
 - Sub-activity 1.5.2: **Communication**
 - Worked with the USAID mission to prepare a memo to the DRC government to improve the importation process and reduce problems with customs clearance.

LOW 3: Outbreak Response Capacity Building

- Sent a report to the Ministry of Health, asking for stronger inclusion and collaboration with the Ministries of Environment and Agriculture during outbreak response.

GABON

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - b) **Laboratory System Improvements**
 - Hired an engineer for maintenance (cleaning and calibration) of all real-time PCR cyclers and thermocyclers in the lab.
 - Conducted maintenance on airflow and freezers in the lab.

- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**
 - Focused on rodent samples collected in rural areas surrounding Franceville and Makokou.
 - Assisted the Ministry of Health (MoH) in collecting data from provinces and district health offices, acting as a reference center and providing diagnostic samples.
 - Continued to liaise with US leads, as well as with other EPT partners, to ensure the surveillance activities for PREDICT were met.

Summary of Surveillance Activities and Testing by Country in GAINS to date (from start of project):

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
GABON					
Bats					
free-ranging; contact with domestic animals or humans not likely	0	2193	9473	7093	18806
Rodents					
free-ranging; contact with domestic animals or humans not likely	0	462	2312	220	517
peri-domestic/in or near human dwelling(s)	0	20	73	0	0
other high risk interface	0	146	873	0	0
Non-human Primates					
other high risk interface	0	3	15	0	0
Other taxa					
contact with park personnel/intensive wildlife management area	0	30	30	30	30
free-ranging; contact with domestic animals or humans not likely	0	346	368	342	344
other high risk interface	0	19	95	0	0
TOTALS	0	3219	13239	7685	19697

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.1: **Introduction of New Technologies**
 - Continued characterizing specimens from suspected VHF samples for further pathogen discovery by pyrosequencing in the US.
 - Attended a conference on next-generation sequencing adapted to high-resolution genome applications.
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Year 4 Quarter 1):**

- Extracted RNA and synthesized cDNA for a total of 268 rodent samples.
- Completed a total of 1,134 PCR reactions in rodent samples.
- Extracted RNA and synthesized cDNA for a total of 104 human samples.
- Tested acute human samples for various pathogens, including enterovirus, coronavirus, adenovirus, sapovirus, astrovirus, filovirus, arenavirus, hantavirus, alphavirus, flavivirus, and phlebovirus.
- Found positives for Chikungunya and Dengue viruses from human samples.
- Completed a total of 728 PCR reactions in human samples.

PREDICT Test Findings (Y4Q1):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family / genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release (yes or no)
Rodents (82)	CIRMF	PCR	Alphaviruses	Presumptive positives	Sent for sequencing	Gabon	No
Rodents (82)	CIRMF	PCR	Arenaviruses	Presumptive positive	Sent for sequencing	Gabon	No
Rodents (82)	CIRMF	PCR	Hantaviruses	Negative	-	Gabon	No
Rodents (82)	CIRMF	PCR	Paramyxoviruses	Negative	-	Gabon	No
Rodents (90)	CIRMF	PCR	Alphaviruses	Presumptive positives	Sent for sequencing	Gabon	No
Rodents (90)	CIRMF	PCR	Arenaviruses	Presumptive positives	Sent for sequencing	Gabon	No
Rodents (90)	CIRMF	PCR	Paramyxoviruses	Negative	- -	Gabon	No
Rodents (90)	CIRMF	PCR	Hantaviruses	Negative	-	Gabon	No
Rodents (96)	CIRMF	PCR	Paramyxoviruses	Negative	-	Gabon	No
Human (104)	CIRMF	PCR	Alphaviruses	Presumptive positives	Sent for sequencing	Gabon	No
Human (104)	CIRMF	PCR	Flaviviruses	Presumptive positives	Sent for sequencing	Gabon	No
Human (104)	CIRMF	PCR	Bunyaviruses	Negative	-	Gabon	No

- **Activity 1.4: Sample Tracking and Information Management**
 - Sub-activity 1.4.1: **Surveillance Data Management**
 - Registered new lab coordinator in GAINS system.
- **Activity 1.5 Program Management**
 - Sub-activity 1.5.1: **Significant Changes to Administrative Management**
 - (b)(6) implemented structural and management changes at the facility, increasing testing efficiency and program management.
 - Sub-activity 1.5.2: **Communication**
 - Held a conference on epidemiological context of viruses in Gabon for researchers at the Ecole Doctorale Régionale d'Afrique Centrale in Franceville.

LOW 3: Outbreak Response Capacity Building

- Provided technical and diagnostic support to the Gabonese MoH response efforts during the Chikungunya outbreak in Mouila, Gabon.

REPUBLIC OF CONGO

Alternative plans for implementing PREDICT in the Republic of Congo are being finalized for Q2Y4; Shipped bat, primate and rodent samples from recent PREDICT surveillance activities to UC Davis for testing.

RWANDA

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) National or Regional Surveillance System Improvements**
 - Participated by invitation in a meeting held by the Rwanda Agricultural Board and its stakeholders to discuss animal (including wildlife) disease surveillance in Nyagatare District, regarding infectious disease outbreaks occurring in adjacent districts in Uganda (e.g Foot and Mouth Disease in livestock, Ebola and Marburg virus in humans); discussed potential role of wildlife in outbreaks and tentative plans to sample primates and bats in the district.
 - Met with representatives of One Health Central East Africa (OHCEA) to discuss collaborative opportunities with Rwanda’s governmental One Health Steering Committee.
 - Updated Rwanda Biomedical Center – Epidemic Infectious Diseases Unit on recent activities, including training of Umutara Polytechnical University veterinary students on PREDICT protocols and recent activities of the One Health Steering Committee.
 - Continued to facilitate One Health activities and training at Umutara Polytechnic University, including guiding veterinary students undertaking disease research on baboons in Akagera National Park, training Umutara’s wildlife faculty on PREDICT modules, and presenting One Health concepts to Umutara’s One Health Student Executive Club.
 - Met upon request with a CDC veterinary public health officer and the Rwanda Agricultural Board Veterinary Director regarding procedures for sharing information on human and domestic animal diseases outbreaks, and on CDC and the Rwanda government’s surveillance sites for (known) zoonotic diseases.
 - Presented PREDICT’s role in wildlife surveillance to Huye District governmental representatives.
- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**
 - Sampled bats (multiple species) at high-risk interfaces (peri-domestic and ecotourism

interfaces) in the towns of Huye and Kibuye, and on islands (ecotourism interface) in Lake Kivu.

- Sampled non-human primates (mountain gorilla, golden monkey, vervet monkey) at high-risk interfaces (ecotourism, proximity to/ entrance of human dwellings, crop raiding) in Volcanoes National Park, Huye district and Nyagatare.

Summary of Surveillance Activities and Testing by Country in GAINS to date (from start of project):

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
RWANDA					
Bats					
contact with tourists/ecotourism	15	60	253	0	0
free-ranging	0	0	0	0	0
peri-domestic/in or near human dwelling(s)	12	66	323	0	0
Rodents					
peri-domestic/in or near human dwelling(s)	0	19	38	0	0
other high risk interface	0	277	405	0	0
Non-human Primates					
contact with park personnel/intensive wildlife management area	0	9	112	0	0
contact with tourists/ecotourism	2	18	166	7	111
free-ranging	0	72	642	77	951
free-ranging; contact with domestic animals or humans not likely	0	7	32	1	14
hunted	0	9	199	45	456
peri-domestic/in or near human dwelling(s)	0	1	11	0	0
raiding crops	10	11	101	0	0
sanctuary	0	2	39	6	136
temporary holding facility	1	9	93	18	382
temporary holding facility/wildlife trade transport	0	3	21	8	56
Other taxa					
contact with domestic animals or humans NOT likely	0	44	216	0	0
hunted	0	3	10	4	28
peri-domestic/in or near human dwelling(s)	0	39	78	0	0
temporary holding facility/wildlife trade transport	0	1	2	2	14
other high risk interface	0	11	19	0	0
TOTALS	40	661	2,760	168	2,148

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.1: **Pathogen detection and discovery (Year 4 Quarter 1):**
 - Successfully processed and submitted 42 extracted wildlife samples (cDNA) to Makerere University Walter Reed Project (MUWRP) for viral family testing.

PREDICT Test Findings (Y4Q1):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Non-Human Primates (34)	Mailman School of Public Health, Columbia University	PCR	Herpesvirus	Confirmed positives	Sequence confirmed, interpretation ongoing	Rwanda	No
Non-Human Primates (34)	Mailman School of Public Health, Columbia University	PCR	Polyomavirus	Confirmed positives	Sequence confirmed, interpretation ongoing	Rwanda	No
Non-Human Primates (34)	Mailman School of Public Health, Columbia University	PCR	Adenovirus	Confirmed positives	Sequence confirmed, interpretation ongoing	Rwanda	No
Non-Human Primates (39)	Mailman School of Public Health, Columbia University	PCR	Enterovirus	Confirmed positives	Sequence confirmed, interpretation ongoing	Rwanda	No
Non-Human Primates (39)	UC Davis Wildlife Diagnostic Lab	PCR	Coronavirus	Presumptive positives	Sequence confirmation: NEGATIVE	Rwanda	No
Non-Human Primates (39)	UC Davis Wildlife Diagnostic Lab	PCR	Retrovirus	Confirmed positives	Sequence confirmed, interpretation ongoing	Rwanda	No
Non-Human Primates (39)	UC Davis Wildlife Diagnostic Lab	PCR	Influenza virus	Presumptive positives	Sequence confirmation: NEGATIVE	Rwanda	No

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Non-Human Primates (39)	UC Davis Wildlife Diagnostic Lab	PCR	Herpesvirus	Confirmed positives	Sequence confirmed, interpretation ongoing	Rwanda	No
Non-Human Primates (39)	UC Davis Wildlife Diagnostic Lab	PCR	Polyomavirus	Confirmed positives	Sequence confirmed, interpretation ongoing	Rwanda	No
Non-Human Primates (39)	UC Davis Wildlife Diagnostic Lab	PCR	Adenovirus	Presumptive positives	Sequence confirmation: NEGATIVE	Rwanda	No
Bats (40)	Makerere University Walter Reed Project	PCR	Paromyxovirus	Presumptive positives	To undergo confirmatory testing	Rwanda	No
Bats (40)	Makerere University Walter Reed Project	PCR	Arenavirus	Negative	Not planned	Rwanda	No
Bats (40)	Makerere University Walter Reed Project	PCR	Coronavirus	Presumptive positives	To undergo confirmatory testing	Rwanda	No
Bats (40)	Makerere University Walter Reed Project	PCR	Filovirus	All negative	Not planned	Rwanda	No
Bats (40)	Makerere University Walter Reed Project	PCR	Flavivirus	All negative	Not planned	Rwanda	No
Non-Human Primates (30)	Makerere University Walter Reed Project	PCR	Paromyxovirus	All negative	Not planned	Rwanda	No
Non-Human Primates (30)	Makerere University Walter Reed Project	PCR	Arenavirus	All negative	Not planned	Rwanda	No

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Non-Human Primates (30)	Makerere University Walter Reed Project	PCR	Coronavirus	All negative	Not planned	Rwanda	No
Non-Human Primates (30)	Makerere University Walter Reed Project	PCR	Filovirus	All negative	Not planned	Rwanda	No
Non-Human Primates (30)	Makerere University Walter Reed Project	PCR	Flavivirus	All negative	Not planned	Rwanda	No

TANZANIA

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Continued discussions with the Center for Disease Control Global Disease Detection office in Nairobi Kenya on opportunities for paired human/animal surveillance activities in northern Tanzania.
 - Participated in training course for liquid nitrogen plant operation and maintenance under Stirling Cryogenics B.V in Son Netherlands.
 - Attended Tanzania Veterinary Association scientific conference on contribution of the veterinary professionals to the improvement of human health.
 - Participated in the Ruaha National Park round table meeting hosted by Tanzania National Parks (TANAPA) and involving researchers and non-government organizations working in the Ruaha ecosystem.

b) Laboratory System Improvements

- Strengthened coordination between the Tanzania and regional diagnostic lab in Uganda through formalization of financial systems and data tracking/reporting, and initiated confirmatory testing of presumptive positive specimens through the lead diagnostic laboratory at UC Davis.
- Reviewed and began training on protocol for RNA extractions from fecal samples.
- Initiated further training and capacity building of project laboratory technician through the Masters in One Health Molecular Biology at Sokoine University of Agriculture.

- **Activity 1.2: Surveillance**

- Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**

- Conducted surveillance in Southern Tanzania (Ruvuma/Mbinga and Mbeya/Kiwira coal mines), and characterized new interfaces for bushmeat and extractive industries to further surveillance activities.
- Continued bushmeat surveillance of hunted and depredated wildlife in the Ruaha ecosystem, and prioritized bushmeat specimens for viral family level testing.
- [REDACTED]
- [REDACTED]
- Renewed research permit for wildlife surveillance through the Tanzania Commission for Science and Technology (COSTECH) and the Tanzania Wildlife Research Institute (TAWIRI).
- [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED] teams in [REDACTED]

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
TANZANIA					
Bats					
contact with workers in extractive industry	36	36	185	0	0
peri-domestic/in or near human dwelling(s)	0	80	454	11	11
Rodents					
hunted	0	23	119	0	0
peri-domestic/in or near human dwelling(s)	20	243	1428	68	68
raiding crops	12	202	1202	60	60
Non-human Primates					
hunted	0	13	75	0	0
raiding crops	0	5	10	0	0
Other taxa					
contact with workers in extractive industry	2	2	8	0	0
hunted	6	300	1276	0	0
peri-domestic/in or near human dwelling(s)	1	12	75	2	2
preying on livestock or their food	3	15	28	0	0
raiding crops	0	3	14	0	0
TOTALS	80	934	4874	141	141

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Year 3 Quarter 4 and Year 4 Quarter 1):**
 - Continued extraction and processing of bat and rodent samples, with plans to send 104 specimens to the MUWRP lab in Uganda for testing.
 - Submitted results to GAINS from the first 141 specimens tested for Arenaviruses in

Tanzania (the Tanzania lab's active viral family protocol). An additional 107 rodent and 9 bat specimens were tested at MUWRP (Rodents: Arenaviruses, Hantaviruses, Alphaviruses, Flaviviruses, and Paramyxoviruses; Bats: Arenaviruses, Coronaviruses, Flaviviruses, Filoviruses, and Paramyxoviruses), and results will be submitted to GAINS in year 4 quarter 2.

- Sent 21 bat specimens and 73 rodent specimens to UC Davis for duplicative testing as part of laboratory optimization between Tanzania and Uganda. Of these specimens, 2 presumptive positives (Alphaviruses and Paramyxoviruses) were included for confirmatory testing.

PREDICT Test Findings (Y4Q1):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Rodents (128)	SUA	Conventional PCR	Arenaviruses,	All negative	Interpretation completed	Tanzania	No
Rodents (107)	Makerere University Water Reed project	Conventional PCR	Arenaviruses	All negative	Interpretation completed	Tanzania	No
Rodents (106)	Makerere University Water Reed project	Conventional PCR	Alphaviruses	Presumptive positive	Pending confirmatory testing	Tanzania	No
Rodents (107)	Makerere University Water Reed project	Conventional PCR	Flaviviruses	All negative	Interpretation completed	Tanzania	No
Rodents (106)	Makerere University Water Reed project	Conventional PCR	Hantaviruses	All negative	Interpretation completed	Tanzania	No
Rodents (104)	Makerere University Water Reed project	Conventional PCR	Paramyxovirus es	Presumptive positive	Pending confirmatory testing	Tanzania	No
Bats (11)	SUA	Conventional PCR	Arenaviruses	All negative	Interpretation pending	Tanzania	No
Bats (9)	Makerere University Water Reed project	Conventional PCR	Arenaviruses	All negative	Interpretation completed	Tanzania	No
Bats (9)	Makerere University Water Reed project	Conventional PCR	Coronaviruses	All negative	Interpretation completed	Tanzania	No
Bats (9)	Makerere University Water Reed project	Conventional PCR	Filoviruses	All negative	Interpretation completed	Tanzania	No

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Bats (9)	Makerere University Water Reed project	Conventional PCR	Flaviruses	All negative	Interpretation completed	Tanzania	No
Bats (9)	Makerere University Water Reed project	Conventional PCR	Paramyxoviruses	All negative	Interpretation completed	Tanzania	No
Bushmeat (2)	SUA	Conventional PCR	Arenaviruses	All negative	Interpretation completed	Tanzania	No
Shrew (1)	Makerere University Water Reed project	Conventional PCR	Arenaviruses	All negative	Interpretation completed	Tanzania	No
Shrew (1)	Makerere University Water Reed project	Conventional PCR	Alphaviruses	Presumptive positive	Pending confirmatory testing	Tanzania	No
Shrew (1)	Makerere University Water Reed project	Conventional PCR	Flaviviruses	All negative	Interpretation completed	Tanzania	No
Shrew (1)	Makerere University Water Reed project	Conventional PCR	Hantaviruses	All negative	Interpretation completed	Tanzania	No
Shrew (1)	Makerere University Water Reed project	Conventional PCR	Paramyxoviruses	All negative	Interpretation completed	Tanzania	No

- **Activity 1.4: Sample Tracking and Information Management**
 - Sub-activity 1.4.1: **Surveillance Data Management**
 - Modified the data tracking system for improved real-time information management of all collected samples and processed specimens.
- **Activity 1.5 Program Management**
 - Sub-activity 1.5.2: **Communication**
 - Held meeting with USAID Tanzania representatives on project objectives, activities, achievements, and future plans both globally and in Tanzania, and also discussed ways to strengthen collaboration and communications in country.

UGANDA

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **Laboratory System Improvements**
 - Installed a new (second) thermocycler at MUWRP to enhance capacity for wildlife sample testing.

- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**
 - Conducted wildlife sampling in Queen Elizabeth National Park in response to reports of sick monkeys received in Y3Q4 through the Animal Mortality Monitoring Program (AMMP): caught 2 monkeys and collected 12 specimens.
 - Conducted bat sampling for Deep Forest project at pristine sites inside Bwindi Impenetrable National Park (BINP) and at modified landscape sites outside BINP: caught 4 bats and collected 28 specimens.
 - Continued participation in the Local Media Surveillance project and provided weekly reports generated from the selected local media sources.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
UGANDA					
Bats					
contact with tourists/ecotourism	0	3	36	0	0
protected area management	0	8	199	0	0
public safety hazard (e.g. threat to human)	0	30	446	0	0
contact with domestic animals or humans NOT likely	4	4	28	0	0
preying on livestock or their food	0	1	5	0	0
Rodents					
contact with tourists/ecotourism	0	46	181	0	0
free-ranging; contact with domestic animals or humans not likely	0	105	632	0	0
peri-domestic/in or near human dwelling(s)	0	64	664	0	0
protected area management	0	1	25	0	0
hunted	0	13	130	0	0
Non-human Primates					
contact with park personnel/intensive wildlife management area	0	1	15	0	0
contact with tourists/ecotourism	1	314	376	8	56
free-ranging	0	5	26	7	68
rfree-ranging; contact with domestic animals or humans not likely	0	3	38	0	0
protected area management	0	15	254	0	0
raiding crops	0	4	72	0	0
preying on livestock or their food	0	1	6	0	0
public safety hazard (e.g. threat to humans)	2	2	16	0	0
Other taxa					
free-ranging; contact with domestic animals or humans not likely	0	34	268	0	0
hunted	0	4	15	0	0
peri-domestic/in or near human dwelling(s)	0	9	94	0	0
raiding crops	0	1	15	0	0
other high risk interface	0	17	50	0	0
ccntact with tourists/ecotourism	0	35	194	0	0
preying on livestock or their food	0	1	7	0	0
TOTALS	7	721	3792	15	124

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - **Sub-activity 1.3.1: Introduction of New Technologies**

- Drafted protocol (see Appendix 2) for responding to mobile phone-based AMMP reports of sick or dead wildlife to be executed jointly with Uganda Wildlife Authority (UWA): submitted draft to UWA for review (underway).
- Continued monthly AMMP training of Queen Elizabeth Conservation Area governmental personnel: currently 100 QECA personnel are trained and 40 mobile phones are deployed to 26 ranger outposts, resulting in the submission of 144 animal morbidity and mortality reports this quarter, including 14 non-human primates, 5 bats, and 4 rodents.
- Sub-activity 1.3.2: **Pathogen detection and discovery (Year 4 Quarter 1):**
 - Submitted 195 Deep Forest Project samples and another 106 samples collected at other priority interfaces viral family testing to Makerere University Walter Reed Project Laboratory (MUWRP).
 - Tested the first sets of extracted wildlife samples shipped from Tanzania and Rwanda for priority viral families utilizing standard PCR protocols at Makerere University Walter Reed Project Laboratory (MUWRP), the regional diagnostic laboratory for emerging wildlife pathogen testing.

PREDICT Test Findings (Y4Q1):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Domestic livestock (28)	Makerere University Walter Reed Project	PCR	Alphavirus	Presumptive positives	Sequence confirmation: NEGATIVE	Uganda	No
Domestic livestock (28)	Makerere University Walter Reed Project	PCR	Arenavirus	Presumptive positives	Sequence confirmation: NEGATIVE	Uganda	No
Domestic livestock (28)	Makerere University Walter Reed Project	PCR	Hantavirus	Presumptive positives	Sequence confirmation: NEGATIVE	Uganda	No
Rodents (42)	Makerere University Walter Reed Project	PCR	Alphavirus	Presumptive positives	Sequence confirmation: NEGATIVE	Uganda	No

Rodents (42)	Makerere University Walter Reed Project	PCR	Arenavirus	Presumptive positives	Sequence confirmation: NEGATIVE	Uganda	No
Rodents (42)	Makerere University Walter Reed Project	PCR	Hantavirus	Presumptive positives	Sequence confirmation: NEGATIVE	Uganda	No
Non-Human Primates (30)	Makerere University Walter Reed Project	PCR	Arenavirus	Presumptive positives	Sequence confirmation: NEGATIVE	Uganda	No
Non-Human Primates (30)	Makerere University Walter Reed Project	PCR	Hantavirus	Presumptive positives	Sequence confirmation: NEGATIVE	Uganda	No
Non-Human Primates (30)	Makerere University Walter Reed Project	PCR	Filovirus	Presumptive positives	Sequence confirmation: NEGATIVE	Uganda	No

LOW 2: Risk Determination

- Continued field work to contribute to Deep Forest project, investigating the relationship between host and viral biodiversity across gradients of land use in Uganda, Brazil, and Malaysia; coordinated with Deep Forest team to optimize and apply study design and sampling protocols; and started planning for implementation of human-animal contact questionnaires designed to assess zoonoses transmission risk in communities surrounding Bwindi Impenetrable National Park.

Low 3: Outbreak Response Capacity Building

- Received situation reports and updates from the Uganda Government's National Task Force on Epidemic Preparedness and Response on the October/November Marburg virus outbreak in Kabale and Ibanda district.
- Submitted final report on results of Human–Animal Contact Surveys conducted during the August 2012 Ebola Sudan virus outbreak investigation to the National Task Force (See Appendix 3).

SOUTHEAST ASIA

CAMBODIA

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Two National Veterinary Research Institute (NaVRI) technical staff members and 4 veterinary students from Royal University of Agriculture joined PREDICT team to assist with wildlife sampling.
 - Presented wildlife surveillance activities in Zoonotic Technical Working Group meeting.
 - Met with Forestry Administration to discuss ranger training for wildlife disease and mortality reporting.
 - b) **Laboratory System Improvements**
 - In-country partner Institut Pasteur du Cambodia (IPC) trained two laboratory technicians from NaVRI on viral family screening of PREDICT samples with the goal to transfer a portion of viral family screening to NaVRI.
 - Installed additional ultralow temperature storage at IPC for wildlife samples.
 - Two new laboratory technicians joined IPC staff to conduct viral family screening.
- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**
 - Conducted sampling of hunted wildlife and surveys to identify consumers and hunters of wildlife in four ethnic Khmer villages within protected areas in Preah Vihear Province and three Phnong ethnic minority villages in Mondulkiri Province.
 - Conducted sampling of hunted rodents and primates in ethnic minority village in Ratanakiri Province.
 - Conducted sampling of primates and rodents being sold for food in markets in Preah Vihear, Stung Treng and Ratanakiri Provinces.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

CAMBODIA	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
Bats					
contact with domestic animals or humans not likely	0	239	239	238	1913
hunted	0	704	1823	547	3188
for sale in restaurant	0	347	595	0	0
Rodents					
contact with domestic animals or humans not likely	0	44	44	44	132
for sale in large market (> 20 vendors)	5	11	21	0	0
hunted	14	169	844	3	15
other high risk interface	0	54	269	0	0
Non-human Primates					
for sale in large market (> 20 vendors)	23	43	71	0	0
for sale in medium market (5-20 vendors)	0	1	1	0	0
hunted	15	39	85	0	0
rehabilitation center	6	6	6	6	48
sanctuary	0	8	51	0	0
Other taxa					
for sale in large market (> 20 vendors)	2	34	45	0	0
for sale in medium market (5-20 vendors)	0	93	93	0	0
hunted	2	366	748	674	714
TOTALS	67	2158	4935	1512	6010

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Year 4 Quarter 1):**
 - Completed PCR screening for 3 viral families on 169 samples from 42 rodents and 21 samples from 10 animals of “other taxa” including widely consumed ungulates and hare.
 - Conducted testing for 8 viral families on samples from 6 sick primates.

PREDICT Test Findings (Y4Q1):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Rodents (169 samples)	Institute Pasteur Cambodia	PCR	Hanta, Arena, Paramyxo viruses	Presumptive positive	Sequence confirmation ongoing	Cambodia	No
Ungulates, hare (21 samples, 10 animals)	Institute Pasteur Cambodia	PCR	Hanta, Arena, Paramyxo viruses	Negative	-	Cambodia	Yes
Non-Human Primates (6)	Institute Pasteur Cambodia	PCR	Filo, Arena, Paramyxo, Flavi, Herpes B, Corona, Influenza A, entero viruses	Negative	-	Cambodia	No

Activity 1.4: Sample Tracking and Information Management

- Sub-activity 1.4.1: **Surveillance Data Management**
 - Updated PCR testing and sequencing results for 603 bats and 44 rodents into GAINS.
 - Uploaded testing results for 6 primates to GAINS.

INDONESIA

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1: Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Attended and participated in EPT quarterly meeting, organized by USAID-Indonesia.

b) Laboratory System Improvements

- Purchased PCR machine to increase laboratory capacity.
- Procured reagents and consumables for testing archived-specimens from non-human primates.
- Procured additional reagents and consumables for testing of undiagnosed febrile human specimens from Bandung, Indonesia.
- Completed renovations of the Emerging Virus Research Unit at Eijkman Institute.

- **Activity 1.2: Surveillance**

- Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**

- Planned logistics for Y4Q2 field trip to conduct surveillance in North Sulawesi and to sample specimens from bats, rodents and non-human primates.
 - Initiated plans to expand surveillance to Papua, Sumba, and Sulawesi from archived specimens.
 - Received PPE supplies (masks, gloves, respirators) from DELIVER.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
INDONESIA					
Bats					
wild animal farm	0	20	20	0	0
contact with tourists/ecotourism	0	0	39	0	0
Rodents					
wild animal farm	0	11	11	0	0
Non-human Primates					
contact with tourists/ecotourism	0	213	213	0	0
Other Taxa					
contact with tourists/ecotourism	0	18	18	0	0
Totals	0	262	301	0	0

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.1: **Introduction of New Technologies**
 - Optimized primers for all Universal Control 1 associated virus families.
 - Received protocol to rule out possibility of contamination with Universal Control 1 in samples when a positive PCR result is obtained.
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Year 4 Quarter 1):**
 - Archived specimens (PBMCs and plasma) from Bali monkeys (n=100) tested with viral family level protocols, including arena, paramyxo, corona, filo and flavi viruses.
 - Performed analyses of presumptive positive sequences; indicated contamination with Universal Control 1.
 - Prepared protocol to address potential contamination issues.
 - Tested specimens from hospitalized patients (n=157) with PREDICT viral family level protocols, including flaviruses, alphaviruses, bunyaviruses, coronaviruses, filoviruses, paramyxoviruses, arenaviruses, seadornaviruses, hantaviruses, bocaviruses.

PREDICT Test Findings (Y4Q1):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release (yes or no)
Non-Human Primate (Macaca fascicularis) (100)	PRC-IPB	PCR	Arenavirus	Presumptive positives	Sequences obtained, interpretation pending	Indonesia	No
Non-Human Primate Macaca fascicularis (100)	PRC-IPB	PCR	Paramyxovirus	Presumptive positives	Sequences obtained, interpretation pending	Indonesia	No
Non-Human Primate Macaca fascicularis (100)	PRC-IPB	PCR	Coronavirus	Presumptive positives	Sequences obtained, interpretation pending	Indonesia	No

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release (yes or no)
Macaca fascicularis (100)	PRC-IPB	PCR	Filovirus	Presumptive positives	Sequences obtained, interpretation pending	Indonesia	No
Human (56)	Eijkman	PCR	Filovirus	Presumptive positive	Sequence confirmation pending	Indonesia	No
Human (57)	Eijkman	PCR	Arenavirus	Negative		Indonesia	No
Human (56)	Eijkman	PCR	Paramyxovirus	Presumptive positive	Sequence confirmation pending	Indonesia	No
Human (56)	Eijkman	PCR	Seadornavirus	Presumptive positive	Sequence confirmation pending	Indonesia	No
Human (56)	Eijkman	PCR	Bocavirus	Presumptive positives	Sequence confirmation pending	Indonesia	No
Human (35)	Eijkman	PCR	Hantavirus	Negative	-	Indonesia	No
Human (3)	Eijkman	PCR	Coronavirus	Negative	-	Indonesia	No

- **Activity 1.5 Program Management**
 - Sub-activity 1.5.2: **Communication**
 - Began regular communications within the region and with Malaysia, Thailand and Cameroon teams to facilitate use of the Universal Control 1 and assist with problem solving.

LAO PDR

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National Surveillance System Improvements**
 - Trained two National Animal Health Centre (NAHC) staff in the field on biosecurity

measures, sample collection, storage of samples in liquid nitrogen, data entry and wildlife species identification.

b) Laboratory System Improvements

- Provided one month of training on PCR diagnostics at NAHC (mid-September to mid-October). Four NAHC personnel now extracting samples, producing cDNA and running beta-actin PCR.

- **Activity 1.2: Surveillance**

- Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**

- Sampled wildlife at 4 markets in two provinces.
 - A total of 617 samples from 105 animals were collected (33 bats, 66 rodents, 2 primates, 4 civets).

Summary of Surveillance Activities and Testing by Country in GAINS to date:

LAO PDR	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
Bats					
for sale in large market (> 20 vendors)	33	404	1637	20	16
for sale in market, unknown size	0	338	1366	572	1673
hunted	0	110	271	104	308
other	0	6	26	2	1
Rodents					
for sale in large market (> 20 vendors)	39	636	2661	0	0
for sale in market, unknown size	0	156	670	160	168
for sale in medium market (5-20 vendors)	27	51	255	0	0
for sale in small market (<5 vendors)	0	29	117	0	0
hunted	0	377	1475	98	100
other high risk interface	0	3	18	0	0
Non-human Primates					
for sale in large market (> 20 vendors)	0	5	19	0	0
for sale in medium market (5-20 vendors)	2	3	20	0	0

Other taxa					
for sale in large market (> 20 vendors)	2	103	430	0	0
for sale in market, unknown size	0	18	75	8	8
for sale in medium market (5-20 vendors)	2	7	31	0	0
for sale in small market (<5 vendors)	0	1	5	0	0
hunted	0	56	149	26	26
other	0	1	2	0	0
TOTALS	105	2304	9227	990	2300

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Year 4 Quarter 1):**
 - Extracted 2083 (616 bats, 10 primates, 1275 rodents, 182 other species) all rectal and oral swab samples at the National Animal Health Centre and quality control (beta-actin) PCR run on 937 samples.
 - Completed sequence confirmation on all samples with positive family level viral screening at Institut Pasteur Cambodia (54 bat samples), sequencing data awaiting interpretation.

PREDICT Test Findings (Y4Q1):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release (yes or no)
Bats (173 animals)	Institut Pasteur du Cambodge	RT-PCR for Coronaviruses, Hemi-nested PCR for Astroviruses, RT-PCR for Filoviruses, hemi-nested RT-PCR + Taq Man RT-PCR (genotype 1) + Real-time RT-PCR SYBR Green (other genotypes) for lyssaviruses, RT-PCR SYBR Green for henipavirus	Coronaviruses, Astroviruses, Lyssaviruses, Filoviruses, Henipavirus	Presumptive positives corona, and astro viruses, filo, lyssa, henipa viruses negative	Sequences obtained, interpretation ongoing	Lao PDR, Cambodia - country of testing	No

Activity 1.4: Sample Tracking and Information Management

- Sub-activity 1.4.1: **Surveillance Data Management**
 - Completed entry into GAINS of all results (4220) from family level PCR screenings.
 - Completed entry into GAINS of all results (54) from sequence confirmation.

MALAYSIA

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Conducted joint Bio Safety Training with IDENTIFY at the Veterinary Research Institute (VRI) in Ipoh for 29 participants; Sabah Wildlife Department (SWD), Danau Girang Field Centre, PERHILITAN and the Department of Veterinary Services; training included sample collection and handling, Bio Safety, PPE and chemical spill response.
 - Conducted training in Sabah for 30 participants from SWD, Danau Girang Field Centre, Sepilok Orangutan Rehabilitation Centre and Borneo Sun Bear Conservation Centre; training included PPE, Bio Safety, sampling primates, bats and small mammals and wet labs on bat and small mammal capture and sampling.
 - b) **Laboratory System Improvements**
 - Arranged for IDENTIFY to provide two Bio-Safety cabinets, a PCR hood, an autoclave, and two emergency showers for the new lab at the Sabah Wildlife Health Unit.
 - Ordered remaining required supplies for the new lab at the Sabah Wildlife Health Unit.
 - SWD began carrying out the necessary modifications for the new lab and have ordered lab benches.
 - Organized bio-hazard disposal for Sabah Wildlife Health Unit and Lok Kawi Wildlife Park.
 - Trained new microbiologist to use PREDICT Universal Control.

- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**
 - Identified and hired microbiologist and veterinarian for positions at Sabah Wildlife Health Unit for Deep Forest.
 - Conducted site visits with PREVENT for Deep Forrest Human Contact (DFHC) study in communities near Deep Forest Project sampling sites along the Kinabatangan River in Sabah.
 - Continued sampling primates at sites along the Kinabatangan River.
 - Completed the first Deep Forest sampling trip at pristine site 1 in the Gomantong Virgin Jungle Reserve. Caught 111 bats and 5 rodents (1227 samples).
 - In total, 1378 samples from 126 animals were collected in Sabah this quarter.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
MALAYSIA					
Bats					
zoo	1	1	12	0	0
Non-human Primates					
contact with tourists/ecotourism	0	6	84	0	0
raiding crops	0	3	61	0	0
sanctuary	0	7	38	0	0
Other Taxa					
contact with park personnel/intensive wildlife management area	115	115	1187	0	0
domestic/near human dwelling(s)	0	1	11	0	0
raiding crops	9	9	138	0	0
Totals	125	142	1531	0	0

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Year 4 Quarter 1):**
 - Analyzed sequencing results from 173 presumptive PCR positive samples, interpretation ongoing.

- Remaining 170 presumptive PCR positive samples were false positives.

PREDICT Test Findings (Y4Q1):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Bat - <i>Cynopterus brachyotis</i>	VRI	Consensus PCR	Coronaviruses	Presumptive positive	Sequence obtained, interpretation ongoing	Malaysia	No
Bat - <i>Hipposideros bicolor</i>	VRI	Consensus PCR	Coronaviruses	Presumptive positive	Sequence obtained, interpretation ongoing	Malaysia	No
Bat - <i>Murina cyclotis</i>	VRI	Consensus PCR	Coronaviruses	Presumptive positive	Sequence obtained, interpretation ongoing	Malaysia	No

- **Activity 1.4: Sample Tracking and Information Management**
 - Sub-activity 1.4.1: **Surveillance Data Management**
 - Data from sample collection in Sabah and Peninsular Malaysia entered into GAINS.
- **Activity 1.5 Program Management**
 - Sub-activity 1.5.2: **Communication**
 - Met with PREVENT and Department of Health Sabah (DOHS) to discuss planned activities in Sabah.
 - Met with PREVENT and SWD to discuss DFHC survey in Sabah.
 - Continued communication with RESPOND on collaborations to provide epidemiology and outbreak response training to staff from MOH, DVS and PERHILITAN.
 - RDMA Advisor visited PREDICT lab at PERHILITAN.
 - Met with PERHILITAN to discuss GAINS database. PERHILITAN will notify PREDICT when they have reached a final decision about the use of GAINS database in Y4Q2.

THAILAND

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Presented on “One Health Surveillance for Nipah Virus in Thailand” at AFRIMS, Bangkok.
 - Co-organized the Training workshop “Strengthening Capacity on Bat Ecology Study” with FAO in Bangkok, 19-23 November 2012 at Faculty of Forestry, Kasetsart University.
 - Presented on “Human Safety During Animal Capture for Sampling” and “One Health Surveillance for Nipah Virus in Thailand” at the “Strengthening Capacity on Bat Ecology Study” Training Workshop in Bangkok.
 - b) **Laboratory System Improvements**
 - Participated in the meeting “Laboratory Network for EID in Thailand”, organized by the Ministry of Science and Technology, Thailand.
- **Activity 1.2 Surveillance**

Summary of Surveillance Activities and Testing in GAINS to date:

THAILAND	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
Bats					
contact with park personnel/intensive wildlife management area	0	253	575	149	199
contact with tourists/ecotourism	0	8	8	8	22
other	0	82	218	88	91
sanctuary	0	28	28	16	36
Rodents					
contact with tourists/ecotourism	0	3	3	3	6
other	0	8	21	4	4

protected area management	30	60	213	0	0
Other Taxa					
contact with tourists/ecotourism	0	1	1	1	2
Totals	30	443	1067	269	360

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Year 4 Quarter 1):**

PREDICT Test Findings (Y4Q1):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results (no. of positive PCR)	Pathogen discovery	Country	Approved by Government for release (yes or no)
Bats (<i>Hipposideros armiger</i> 54)	WHO-CC Chula	PCR	Corona; Paramyxo; Seadorna; Flavi; and Filoviridae	Negative	-	Thailand	No
Bats (<i>Hipposideros cineraceus</i> 4)	WHO-CC Chula	PCR	Corona; Paramyxo; Seadorna; Flavi; and Filoviridae	Negative	-	Thailand	No
Bats (<i>Hipposideros larvatus</i> 3)	WHO-CC Chula	PCR	Corona; Paramyxo; Seadorna; Flavi; and Filoviridae	Negative	-	Thailand	No
Bats (<i>Hipposideros lekaguli</i> 71)	WHO-CC Chula	PCR	Coronavirus	Presumptive positives	Sequences obtained, interpretation ongoing	Thailand	No
Bats (<i>Hipposideros lekaguli</i> 71)	WHO-CC Chula	PCR	Paramyxovirus	Presumptive positives	Sequences obtained, interpretation ongoing	Thailand	No
Bats (<i>Hipposideros lekaguli</i> 71)	WHO-CC Chula	PCR	Seadorna; Flavi; and Filoviridae	Negative	-	Thailand	No
Bats (<i>Megaderma lyra</i> 1)	WHO-CC Chula	PCR	Corona; Paramyxo; Seadorna; Flavi; and Filoviridae	Negative	-	Thailand	No

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results (no. of positive PCR)	Pathogen discovery	Country	Approved by Government for release (yes or no)
Bats (Miniopterus magnate 16)	WHO-CC Chula	PCR	Corona; Paramyxo; Seadorna; Flavi; and Filoviridae	Negative	-	Thailand	No
Bats (Miniopterus pusillus 1)	WHO-CC Chula	PCR	Corona; Paramyxo; Seadorna; Flavi; and Filoviridae	Negative	-	Thailand	No
Bats (Myotis horsfieldi 2)	WHO-CC Chula	PCR	Corona; Paramyxo; Seadorna; Flavi; and Filoviridae	Negative	-	Thailand	No
Bats (Rhinolophus shameli 5)	WHO-CC Chula	PCR	Corona; Paramyxo; Seadorna; Flavi; and Filoviridae	Negative	-	Thailand	No
Bats (Taphozous melanopogon 43)	WHO-CC Chula	PCR	Corona; Paramyxo; Seadorna; Flavi; and Filoviridae	Negative	-	Thailand	No
Bats (H. armiger, Rad cave, 33 rectal swabs)	WHO-CC Chula	PCR	Coronavirus	Negative	-	Thailand	No
Bats (H. armiger, Salika cave, 16 rectal swabs)	WHO-CC Chula	PCR	Coronavirus	Negative	-	Thailand	No
Bats (H. cineraceus, Chakan cave, 3 rectal swabs)	WHO-CC Chula	PCR	Coronavirus	Negative	-	Thailand	No
Bats (H. larvatus, Rad cave, 3 rectal swabs)	WHO-CC Chula	PCR	Coronavirus	Negative	-	Thailand	No
Bats (H. lekaguli, Chakan Cave, 66 rectal swabs)	WHO-CC Chula	PCR	Coronavirus	Presumptive positives	Sequences obtained, interpretation ongoing	Thailand	No
Bats (Megaderma lyra, Rad cave, 1 rectal swab)	WHO-CC Chula	PCR	Coronavirus	Presumptive positive	Sequence obtained, interpretation ongoing	Thailand	No

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results (no. of positive PCR)	Pathogen discovery	Country	Approved by Government for release (yes or no)
Bats (M. magnate, Chakan cave, 7 rectal swabs)	WHO-CC Chula	PCR	Coronavirus	Presumptive positives	Sequences obtained, interpretation ongoing	Thailand	No
Bats (M. pusillus, Chakan cave, 1 rectal swab)	WHO-CC Chula	PCR	Coronavirus	Presumptive positive	Sequence obtained, interpretation ongoing	Thailand	No
Bats (M. horsfieldi, Chakan cave, 1 rectal swab)	WHO-CC Chula	PCR	Coronavirus	Negative	-	Thailand	No
Bats (R. shameli, Chakan cave, 5 rectal swabs)	WHO-CC Chula	PCR	Coronavirus	Presumptive positives	Sequences obtained, interpretation ongoing	Thailand	No
Bats (T. melanopogon, Rad cave, 16 rectal swabs)	WHO-CC Chula	PCR	Coronavirus	Negative	-	Thailand	No
Bats (T. melanopogon, Chakan cave, 4 rectal swabs)	WHO-CC Chula	PCR	Coronavirus	Negative	-	Thailand	No
Bats (T. melanopogon, Salika cave, 20 rectal swabs)	WHO-CC Chula	PCR	Coronavirus	Negative	-	Thailand	No
Bats (H. armiger, Rad cave, 9 feces)	WHO-CC Chula	PCR	Coronavirus	Negative	-	Thailand	No
Bats (H. armiger, Salika cave, 3 feces)	WHO-CC Chula	PCR	Coronavirus	Negative	-	Thailand	No
Bats (H. larvatus, Rad cave, 1 feces)	WHO-CC Chula	PCR	Coronavirus	Negative	-	Thailand	No
H. lekaguli (Chakan cave); 10 feces	WHO-CC Chula	PCR	Coronavirus	Negative	-	Thailand	No
M. magnater (Chakan cave); 6 feces	WHO-CC Chula	PCR	Coronavirus	Presumptive positives	Sequences obtained, interpretation ongoing	Thailand	No
Bats (T. melanopogon, Rad cave,; 4 feces)	WHO-CC Chula	PCR	Coronavirus	Presumptive positive	Sequence obtained, interpretation ongoing	Thailand	No
Bats (T. melanopogon, Salika cave, 3 feces)	WHO-CC Chula	PCR	Coronavirus	Negative	-	Thailand	No
Rodents (Menetes berdmorei 1)	WHO-CC Chula	PCR	Seadorna; Flavi; Hanta; Arena; and Alpha –viruses	Negative	-	Thailand	No

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results (no. of positive PCR)	Pathogen discovery	Country	Approved by Government for release (yes or no)
Rodents (Rattus exulans 1)	WHO-CC Chula	PCR	Seadorna; Flavi; Hanta; Arena; and Alpha –viruses	Negative	-	Thailand	No
Rodents (Rattus exulans 6)	WHO-CC Chula	PCR	Seadorna; Flavi; Hanta; Arena; and Alpha –viruses	Negative	-	Thailand	No
Rodents (Rattus losea 3)	WHO-CC Chula	PCR	Seadorna; Flavi; Hanta; Arena; and Alpha –viruses	Negative	-	Thailand	No
Rodents (Rattus rattus 4)	WHO-CC Chula	PCR	Seadorna; Flavi; Hanta; Arena; and Alpha –viruses	Negative	-	Thailand	No
Rodents (Rattus rattus 53)	WHO-CC Chula	PCR	Seadorna; Flavi; Hanta; Arena; and Alpha –viruses	Negative	-	Thailand	No

VIETNAM

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Completed and signed an Activity Agreement with Soc Trang Province Department of Animal Health (sub-DAH) and the Regional Animal Health Centre (RAHO6) to carry out disease surveillance and wildlife sample collection in wet markets in Soc Trang Province, Mekong Delta Region, Vietnam.
 - Introduced “One Health” and PREDICT project at a workshop in Hanoi entitled “Strengthening Law Enforcement Preparedness for Key Government Agencies to Address Illegal Wildlife Trafficking in Quang Binh Province, Vietnam”. Information presented

included health risks at the human, wildlife, and domestic animal interface and the need for a coordinated approach.

- Attended a briefing by PREVENT-FHI 360 (b)(6) (b)(6), on bio-security on wildlife farms in Vietnam at the USAID Mission office in Hanoi.
- Met with (b)(6) at the Oxford University Clinical Research Unit (OUCRU) in Ho Chi Minh City to discuss collaboration between with OUCRU on sampling and diagnostics
- Met with the Head of Epidemiology Department and the General Director of the National Department of Animal Health (DAH) to coordinate PREDICT surveillance and sampling activities.
- Formalized a relationship with the Cat Ba Langur Conservation Project to support and coordinate arrangements for sample collection, transport, storage and diagnostic procedures related to Cat Ba Langur Translocation activities.

b) **Laboratory System Improvements**

- Ordered kits for processing samples in Vietnam (QIAAmp Viral RNA Mini Kit; RNEasy Plus Mini Kit, QIAprep Spin Mini Kit; and QIAQuick Gel Extraction Kit).
- Purchased gel electrophoresis equipment to improve the Hanoi University of Agriculture's capacity to run PREDICT protocols.

- **Activity 1.2: Surveillance**

- Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**
 - Collected 14 samples from 2 non-human primates during a translocation activity organized by the Cat Ba Langur Conservation Project.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
VIETNAM					
Rodents					
for sale in restaurant	0	123	322	51	51
Other taxa					
for sale in restaurant	0	132	314	31	61
rehabilitation center	0	42	50	50	200
wild animal farm	0	14	42	0	0
TOTALS	0	311	728	132	312

- **Activity 1.4: Sample Tracking and Information Management**
 - Sub-activity 1.4.1: **Surveillance Data Management**
 - Entered data from sampling events and sample information into GAINS.

- **Activity 1.5 Program Management**
 - Sub-activity 1.5.1: **Significant Changes to Administrative Management**
 - Hired new (b)(6) (b)(6) who took over responsibilities in-country.

ASIA

BANGLADESH

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Participated in AI/EPT Partners in Bangladesh meetings.
 - Participated in FAO Bangladesh coordination meeting.
 - b) **Laboratory System Improvements**
 - Met with Chief Officers of Forestry Department on issues relating to the construction of the new wildlife lab building and lab training of forestry personnel.
- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter.**
 - Continued to identify new areas with wildlife-human interfaces, including areas with heavy hunting activity and/or wildlife consumption and developed surveillance strategies for these areas.
 - Trained two staff and one student from Forestry Department in PREDICT sampling and field safety protocols.
 - Sampled 309 bats and 40 rodents, yielding 4662 samples.
 - Reported all field activities to the Forestry Department.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
BANGLADESH					
Bats					
contact with domestic animals or humans NOT likely	0	2964	24853	2425	14066
domestic/near human dwelling(s)	100	100	800	0	0
Free-ranging	0	60	832	0	0
hunted	0	137	1781	0	0
peri-domestic/in or near human dwelling(s)	169	348	5255	0	0
raiding crops	40	40	624	0	0
Rodents					
contact with domestic animals or humans NOT likely	0	189	2549	0	0
peri-domestic/in or near human dwelling(s)	23	76	1148	0	0
zoo	0	15	221	0	0
Non-human Primates					
zoo	0	4	60	0	0
Other Taxa					
contact with domestic animals or humans NOT likely	0	451	3401	0	0
peri-domestic/in or near human dwelling(s)	17	92	1257	0	0
zoo	0	4	60	0	0
Totals	349	4480	42841	2425	14066

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.1: **Introduction of New Technologies:**
 - Received PREDICT primers.

- Sub-activity 1.3.2: **Pathogen detection and discovery (Year 4 Quarter 1):**
 - Initiated PCR analysis of the following viral families: hanta-, arena- and paramyxoviruses at the ICDDR, B lab.
- **Activity 1.4: Sample Tracking and Information Management**
 - Sub-activity 1.4.1: **Surveillance Data Management**
 - Entered all field and surveillance data into GAINS database.
 - Updated previous surveillance sheets as requested.
- **Activity 1.5 Program Management**
 - Sub-activity 1.5.2: **Communication**
 - Held in-person meetings and telephone communications with Forestry Department, Ministry of Health, and Department of Livestock Services.

CHINA

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **International, National or Regional Surveillance System Improvements**
 - Held workshop on emerging infectious disease and One Health at East China Normal University in Shanghai, and established a partnership between Shanghai CDC, ECNU, Shanghai Veterinary Department, and Shanghai Public Health Department to pursue joint projects focused on One Health.
 - Discussion with head of wildlife farming association in Guilin regarding an expansion of sampling within their farmer network to obtain blood samples from farmed animals. Launched QQ group (China online chat forum) to encourage local CDC teams to communicate with PREDICT team.

b) **Laboratory System Improvements**

- Began search for laboratory technician to be based at both GDCDC laboratory and Guangzhou office.

- **Activity 1.2: Surveillance**

- Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**

- Completed customs clearance for USAID DELIVER-donated PPE kits currently stored in Guangzhou office, will be transferred to GDCDC next quarter.
- Developing animal field guide based on guide from Cameroon to be used as a systematic tool to assist with surveillance in China.
- Began sampling activities in Jiangxi, Fujian and Guangxi provinces of 210 animals from eleven different species of bats, across five locations.
- Conducted site visits for highly-exposed human acute surveillance in north and eastern areas of Guangdong Province, including Lianshan, Lianzhou, Heping, Lianping, Dabu, Jiaoling and Pingyuan Centers for Disease Control (CDCs county level), as well as Meizhou and Heyuan CDCs (city level); field teams provided each site with reports of first round of testing (to report to participants) and supplemental supplies for follow-up enrollment.
- Dabu and Pingyuan CDCs completed follow-up case enrollment; samples were transferred from Dabu and Pingyuan (county level) CDCs to Meizhou (city level) CDC.
- Field teams began monitoring hospitals for cases matching inclusion criteria, which are participating in human acute surveillance.
- GDCDC field teams reinforced personnel training at local field sites in communication and questioning techniques, consent form collection, sample collection, sample standardized labeling, sample storage and sample transfer.
- Started discussions with Yale Occupational and Environmental Medicine Program (YOEMP) to collaborate on behavioral data analysis.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
CHINA					
Bats					
contact with domestic animals or humans NOT likely	0	98	196	0	0
contact with tourists/ecotourism	210	504	797	0	0
Free -ranging	0	271	542	0	0
other	0	36	72	0	0
Rodents					
contact with domestic animals or humans NOT likely	0	161	322	0	0
for sale in large market (> 20 vendors)	0	64	64	0	0
wild animal farm	0	227	454	322	483
Other Taxa					
contact with domestic animals or humans NOT likely	0	26	52	0	0
for sale in large market (> 20 vendors)	0	127	127	0	0
wild animal farm	0	6	12	12	18
Totals	210	1520	2638	334	501

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Year 4 Quarter 1):**
 - Transferred samples to Wuhan Institute of Virology.
 - Chinese partners prepared for laboratory analysis of rodent samples collected in Zhanjiang.
 - In coordination with GDCDC, began preparation of manuscript describing the Bunyavirus human serological finding from the Human-Animal Interface Project (reported in Y3Q4 report).
 - Made preliminary plan to test archived samples located at GDCDC for a least 5 family-level viruses.
 - Discussed the possibility of including retrospective human specimens as part of PREDICT virus level testing with GDCDC.

PREDICT Test Findings (Y4Q1):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
161 Rodents	WIV	One-step RT-PCR	Paramyxoviridae	Negative	-	China	No
2 Weasels	WIV	One-step RT-PCR	Paramyxoviridae	Presumptive positive	Sequence obtained, interpretation ongoing	China	No
21 shrews	WIV	One-step RT-PCR	Paramyxoviridae	All negative	-	China	No
3 Pikas	WIV	One-step RT-PCR	Paramyxovirus	All negative	-	China	No
161 Rodents	WIV	One-step RT-PCR	Coronavirus	Negative	-	China	No
2 Weasels	WIV	One-step RT-PCR	Coronavirus	Negative	-	China	No
21 shrews	WIV	One-step RT-PCR	Coronavirus	Presumptive positives	Sequences obtained, interpretation ongoing	China	No
3 Pikas	WIV	One-step RT-PCR	Coronavirus	Negative	-	China	No
46 rodents	WIV	One-step RT-PCR	Astrovirus	Presumptive positives	Sequences obtained, interpretation ongoing	China	No
1 weasels	WIV	One-step RT-PCR	Astrovirus	Negative	-	China	No

- **Activity 1.4: Sample Tracking and Information Management**
 - Sub-activity 1.4.1: **Surveillance Data Management**
 - Standardized labeling for follow-up enrollment of the PREDICT Surveillance Human-Animal Interface Project.
- **Activity 1.5 Program Management**
 - Sub-activity 1.5.1: **Significant Change in Project Management**
 - Participated in Statement of Cash Flow (SCF) training organized by the Institute of Public Accountants to familiarize staff with the algorithm of a Statement of Cash Flow, as well as to review current accounting principles. Guangzhou Office is adapting to International Financial Reporting Standards for all account reporting.

NEPAL

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Received permits from the Ministry of Forests and Soil Conservation Department of National Parks and Wildlife Conservation for project operations and wildlife surveillance.
 - Initiated letter of support from the Ministry of Agriculture Department of Livestock Services for project activities and initiated a Memorandum of Understanding between PREDICT implementing partner Center for Molecular Dynamics Nepal (CMDN) and the Ministry.
 - Initiated letters of support for project activities with the Ministry of Health Department of Epidemiology and Disease Control.
 - Initiated discussions with USAID Nepal (b)(6) for regular correspondence and collaboration on engagement with government and ministry level partners.
 - Participated in the One Health Alliance South Asia (OHASA) Nepal Chapter Initiative to support planning and facilitating a meeting and workshop on improving coordination of One

Health related research and activities in Nepal among government, NGO, academic, and private sector stakeholders.

b) Laboratory System Improvements

- Continued procurement of laboratory supplies and cold chain, along with other laboratory infrastructure needs.

- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**
 - Developed a field surveillance team and initiated training on surveillance site characterization and assessment at key interfaces throughout the Kathmandu Valley.
 - Developed a Site Characterization and Assessment Tool (SCAT) to standardize site characterization of targeted interfaces and potential field surveillance sites to assist with prioritizing sites for wildlife capture and sampling.
 - Implemented the SCAT to evaluate 36 sites in the Kathmandu Valley as potential high-risk interfaces to prioritize for sampling including 9 high-risk interfaces for rodent-borne disease (unplanned settlements and slums), 6 for non-human primate borne disease (temples, ecotourism sites, and other urban areas with high reported contact between humans and macaques), and 20 for bat borne disease (caves, tree roosting sites and temples with tourism and other observed and reported high likelihood of contact between people and bats).
 - Initiated preparations for field activities through procurement of field supplies.

- **Activity 1.4: Sample Tracking and Information Management**
 - Sub-activity 1.4.1: **Surveillance Data Management**
 - Continued orientation with GAINS in preparation for sample collection and testing.

LATIN AMERICA

BRAZIL

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Presented and established new contacts at the Convention on Biological Diversity Regional Workshop on the Inter-Linkages between Human Health and Biodiversity in the Americas hosted by Brazilian Ministry of Health.
 - b) **Laboratory System Improvements**
 - Institute of Biomedical Sciences (ICB II) received all reagents and primers and continued sample analysis.
 - Arranged for ICB II to purchase laboratory reagents at discounted price from Life Technologies.
- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**
 - Collected 297 bat, 55 marsupial and 5 rodent samples during the rainy season at the pristine site (pending data entry in GAINS).
 - Sampled primates from Parque do Mindu, a highly urbanized area, yielding 36 samples.
 - Adjusted sampling sites and methodology to better fit the objectives of Deep Forest Project.
 - Selected new intermediate site, at Rio de Preto, which will be sampled next quarter

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
BRAZIL					
Bats					
contact with domestic animals or humans NOT likely	56	523	2800	0	0
other	0	181	1275	76	99
peri-domestic/in or near human dwelling(s)	0	36	190	0	0
zoo	0	103	335	0	0
Rodents					
contact with domestic animals or humans NOT likely	0	48	433	0	0
other	0	22	68	0	0
peri-domestic/in or near human dwelling(s)	0	6	21	0	0
Non-human Primates					
contact with domestic animals or humans NOT likely	0	13	93	0	0
domestic/near human dwelling(s)	5	5	36	0	0
other	0	15	52	0	0
peri-domestic/in or near human dwelling(s)	0	11	59	0	0
wild animal farm	0	6	28	0	0
Other Taxa					
contact with domestic animals or humans NOT likely	0	31	282	0	0
other	0	170	914	0	0
peri-domestic/in or near human dwelling(s)	0	12	36	0	0
Totals	61	1182	6622	76	99

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - **Sub-activity 1.3.1: Introduction of New Technologies**
 - Received MiniMag extraction machine from DELIVER.
 - **Sub-activity 1.3.2: Pathogen detection and discovery (Year 4 Quarter 1):**
 - Conducted separate manual nucleic acid extraction for bat samples.

- Conducted PCR screening according to Deep Forest Project procedures.
- Purified PCR products to conduct sequencing.

PREDICT Test Findings (Y4Q1):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
39 oral swabs, rectal swabs, serum and red blood cell clots from bats were pooled by animal	ICB II	PCR	Alphaviruses Arenaviruses Bocaviruses Coronaviruses Filoviruses Flaviviruses Hantaviruses Nipah viruses Paramyxoviruses Seadornaviruses	Presumptive arena positive	Sequence Confirmation Pending	Brazil	No

PREDICT Quarter 1 Year 4 Report - LATIN AMERICA

BOLIVIA

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Discussed progress on wild rodent disease surveillance and testing of samples collected in northern Bolivian Amazonia with the Director of the Beni Regional Department of Health (SEDES Beni), where hemorrhagic disease outbreaks occurred in 2012, and evaluated possibilities for further cooperation with the Ministry of Health.
 - b) **Laboratory System Improvements**
 - Imported DNA cloning kits and reagents from the US for testing at IBMB laboratory (these materials are to be used in the next quarter to confirm or reject presumptive positive results obtained to date).
 - Planned genetic identification of rodent species with IBMB laboratory to study the role of local taxa as reservoirs for zoonotic viruses.
 - Trained twelve (12) staff and collaborators in biosafety methods for laboratory operations.
 - Reviewed current procedures for communicating test results to the Bolivian government.

Activity 1.2: Surveillance

- Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**
 - Focused on bat surveillance this quarter. A recent bat sampling campaign targeted insectivorous, frugivorous and nectivorous species, and was conducted in conjunction with the “Noel Kempf Mercado” Museum of Natural History in Madidi National Park (San Jose de Uchupiamonas indigenous territories) in areas where presumptive positives for arena, corona and flavivirus infections were recently detected in primate samples collected by

- indigenous hunters.
- Captured and sampled additional bats in livestock farming ranches across northern Amazonia (Mamoré province, Beni Region) in areas where hemorrhagic fever is endemic, and where hantavirus infections were recorded in humans for the first time in 2011.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
BOLIVIA					
Bats					
free-ranging; contact with domestic animals or humans not likely	0	365	2187	141	326
peri-domestic/in or near human dwelling(s)	0	173	1003	54	174
other high risk interface	17	19	179	5	36
Rodents					
for sale in market	0	36	739	41	136
free-ranging; contact with domestic animals or humans not likely	0	11	260	14	56
Hunted	0	8	129	0	0
peri-domestic/in or near human dwelling(s)	0	13	331	21	116
preying on livestock or their food	0	11	299	20	80
public safety hazard (e.g. threat to human)	0	210	3152	228	720
Non-human Primates					
for sale in large market (> 20 vendors)	0	1	10	3	7
for sale in medium market (5-20 vendors)	0	1	11	1	2
for sale in small market (< 5 vendors)	0	4	57	5	14
for sale in market	0	4	152	10	35
free-ranging; contact with domestic animals or humans not likely	0	3	125	5	25
Hunted	0	68	1115	89	577
rehabilitation center	0	36	548	39	190
temporary holding facility	5	28	355	27	129
Other taxa					
for sale in large market (> 20 vendors)	1	49	794	82	273
for sale in medium market (5-20 vendors)	0	57	627	50	189
for sale in small market (< 5 vendors)	0	4	32	4	13
for sale in market	0	54	1431	25	53

free-ranging; contact with domestic animals or humans not likely	0	1	10	0	0
Hunted	0	167	2249	31	40
peri-domestic/in or near human dwelling(s)	0	1	32	0	0
temporary holding facility	0	44	376	25	74
rehabilitation center	0	43	377	17	54
other high risk interface	1	6	189	0	0
TOTALS	24	1417	16769	937	3319

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**

PREDICT Test Findings (Y3Q4):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Bats (85) <i>(oral/rectal swabs; feces; urine/urinary bladder frozen in lysis buffer)</i>	IBMB-UMSA	Conventional and nested RT-PCR	Flavi, Corona, Arena, Filo viruses	Presumptive positives for coronavirus	Sequence Confirmation Pending	Bolivia	No
Monkeys (83) <i>(oral/rectal swabs; frozen blood/serum/plasma; feces frozen in lysis buffer)</i>	IBMB-UMSA	Conventional and nested RT-PCR	Filo, Paramyxo, Arena, Flavi, Corona viruses	Presumptive positives for corona, arena virus	Sequence Confirmation Pending	Bolivia	No
Rodents (50) <i>(oral/rectal swabs; urine)</i>	IBMB-UMSA	Conventional and nested RT-PCR	Hanta, Arena, Alpha, Flavi virus	Presumptive positives for alphavirus	Sequence Confirmation Pending	Bolivia	No

- **Activity 1.4: Sample Tracking and Information Management**

- Sub-activity 1.4.1: **Surveillance Data**

- Revised data to ensure accuracy of the information uploaded into GAINS.

COLOMBIA

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Participated in a workshop for government staff and partners in the city of Bogotá (October 16-18th 2012) with the Ministry of Environment and the local Association of Wildlife Veterinarians (AVVS). This event was a valuable tool to engage government agencies, universities and NGOs in an inter-institutional alliance for monitoring wildlife diseases in Colombia. A draft plan for wildlife disease surveillance will be finalized over the next few weeks and presented to the Environment Ministry.
 - No further PREDICT activities are planned for Colombia in Y4.

MEXICO

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - b) **Laboratory System Improvements**
 - Validated corona-, filo-, flavi- and paramyxovirus protocols.
 - Completed transition of conducting all further diagnostic testing at the Conservation Medicine Laboratory of Instituto Politecnico Nacional (IPN).
 - Trained two IPN lab staff in diagnostic protocols for corona-, filo-, flavi- and paramyxovirus protocols.

- **Activity 1.2: Surveillance**

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
MEXICO					
Bats					
contact with tourists/ecotourism	0	31	122	0	0
free-ranging; contact with domestic animals or humans not likely	0	1579	7716	117	117
sanctuary	0	26	128	0	0
Rodents					
free-ranging; contact with domestic animals or humans not likely	0	36	176	0	0
sanctuary	0	1	5	0	0
Other taxa					
free-ranging; contact with domestic animals or humans not likely	0	28	44	0	0
TOTALS	0	1701	8191	117	117

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**

- Sub-activity 1.3.2: **Pathogen detection and discovery (Year 4 Quarter 1):**
 - Tested 250 samples for corona, filo, flavi and paramyxo viral families; tested 160 specifically for equine encephalitis virus and West Nile virus.

PREDICT Test Findings (Y4Q1):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Bats (160)	Conservation Genetic Laboratory, University of Costa Rica	PCR	Equine Encephalitis Virus	Presumptive positives	Sequence confirmation pending	Mexico	Pending
Bats (160)	Conservation Genetic Laboratory, University of Costa Rica	PCR	West Nile Virus	Negative	-	Mexico	Pending
Bats (250)	Conservation Medicine Laboratory (IPN)	PCR	Filovirus	Negative	-	Mexico	Pending
Bats (250)	Conservation Medicine Laboratory (IPN)	PCR	Flavivirus,	Negative	-	Mexico	Pending
Bats (250)	Conservation Medicine Laboratory (IPN)	PCR	Coronavirus,	Negative	-	Mexico	Pending
Bats (250)	Conservation Medicine Laboratory (IPN)	PCR	Paramyxovirus,	Negative	-	Mexico	Pending

PERU

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Worked on a cooperative agreement with the School of Veterinary Medicine (University of San Marcos) to continue monitoring wildlife zoonoses beyond the end of PREDICT.
 - Discussed progress to date with the Director of Epidemiology Unit from the Peruvian Veterinary Service (SENASA), and formalized further cooperation for testing normative diseases on stored PREDICT samples over Y4 (costs will be covered by SENASA).
 - Presented a report to the USDA Animal and Plant Health Inspection Service (APHIS) on a training workshop on wildlife disease surveillance, which was co-organized by PREDICT and SENASA.
 - Trained 19 participants (veterinary and biology students; animal handlers from zoos and rescue centers) in methods for safe animal sampling and preservation of samples for testing during the Symposium on Conservation Medicine (School of Veterinary Medicine, University of San Marcos)
 - Provided guidance to key government agencies (e.g., Zoonoses Unit, Ministry of Public Health; Peruvian Institute of Health; Loreto Regional Administration of Forestry and Wildlife) for conducting safe captures and sampling of wildlife during outbreak investigations.
 - Planned on-the-job training for government staff in wildlife sampling methods to be conducted during future outbreak investigations.
 - b) **Laboratory System Improvements**
 - Facilitated communications between laboratory staff at the Peruvian Institute of Health (INS) and technicians from the main partner lab in Bolivia (the Institute of Molecular Biology, University of San Andrés), to review protocols being used at INS and ensure reliability of results obtained from ongoing viral family testing.

- Purchased additional supplies locally and in the US for testing at INS Laboratory.
- Reviewed PREDICT protocols for communicating test results to the Peruvian government.

- **Activity 1.2: Surveillance**

Summary of Surveillance Activities and Testing by Country in GAINS to date:

PERU	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
Bats					
free-ranging	0	12	78	0	0
free-ranging; contact with domestic animals or humans not likely	0	58	205	59	118
Rodents					
for sale in medium market (5-20 vendors)	0	28	241	0	0
free-ranging; contact with domestic animals or humans not likely	0	1	8	0	0
Hunted	0	263	264	0	0
peri-domestic/in or near human dwelling(s)	0	50	900	52	104
temporary holding facility	0	5	30	0	0
temporary holding facility/wildlife trade transport	0	3	14	0	0
Zoo	0	12	29	0	0
Non-human Primates					
for sale in large market (> 20 vendors)	0	6	42	10	20
for sale in medium market (5-20 vendors)	0	111	586	213	527
Hunted	0	207	208	0	0
peri-domestic/in or near human dwelling(s)	0	26	275	77	178
Sanctuary	0	77	768	63	63
temporary holding facility	0	149	1567	407	860
Zoo	0	79	843	206	442
other high risk interface	0	1	12	3	3
Other taxa					
for sale in large market (> 20 vendors)	0	40	90	0	0
for sale in medium market (5-20 vendors)	0	231	763	3	8
for sale in market	0	75	211	0	0
free-ranging; contact with domestic animals or humans not likely	0	1	4	1	2
Hunted	0	531	540	1	1

peri-domestic/in or near human dwelling(s)	0	1	18	0	0
temporary holding facility	0	60	213	0	0
Zoo	0	60	119	0	0
TOTALS	0	2087	8028	1095	2326

- Sub-activity 1.3.2: **Pathogen detection and discovery (Year 4 Quarter 1):**

PREDICT Test Findings (Y4Q1):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Primates (226) <i>(oral swabs)</i>	INS	Conventional RT-PCR	Arenavirus, Coronavirus	Negative	-	Peru	No
Bats (58) <i>(oral swabs; urine)</i>	INS	Conventional RT-PCR	Arenavirus, Coronavirus	Negative	-	Peru	No
Rodents (309) <i>(oral swabs; urine)</i>	INS	Conventional RT-PCR	Arenavirus, Coronavirus	Negative	-	Peru	No

- **Activity 1.4: Sample Tracking and Information Management**
 - Sub-activity 1.4.1: **Surveillance Data Management**
 - Revised data to ensure accuracy of the information uploaded into GAINS.
 - Planned training of INS laboratory technicians in the use of GAINS templates for reporting test results (to be developed during the next quarter).

PREDICT Quarter 4 Year 4 Reporting

LATIN AMERICA

BOLIVIA

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Completed final version of the Rapid Survey Tool. This survey includes information gathered after three years of project implementation, as well as input provided by Points of Contact in government (agriculture, public health, and environment ministries) through frequent communications in previous quarters. Information is being processed by the Capacity Assessment Team to evaluate changes in local infrastructure for wildlife pathogen surveillance and outbreak response.
 - b) **Laboratory System Improvements**
 - Focused on efforts to quickly wrap up laboratory work at the Institute of Molecular Biology (IBMB, University of San Andres) because of the mandatory USAID close-out in-country.
 - Diagnostic leads provided assistance (after an inadvertent contamination of universal control 1) to reset molecular protocols and decontaminate all equipment, supplies, and surfaces at the IBMB molecular lab to render future diagnostic testing reliable.
 - Applied for permits from government agencies to export frozen samples to UC Davis for retesting, sequencing and confirmation.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
BOLIVIA					
Bats					

Hunted	0	60	519	72	526
Other	0	185	1065	168	672
peri-domestic/in or near human dwelling(s)	0	370	2266	276	2032
Rodents					
For sale in market, unknown size	0	36	739	41	172
Contact with domestic animals or humans not likely	0	4	70	6	42
Hunted	0	8	129	0	0
Peri-domestic/in or near human dwelling(s)	0	20	521	35	158
Preying on livestock or their food	0	11	299	20	80
Public safety hazard (e.g. threat to human)	0	210	3152	334	1676
Non-human Primates					
For sale in large market (> 20 vendors)	0	1	10	3	8
For sale in medium market (5-20 vendors)	0	1	11	1	2
For sale in small market (< 5 vendors)	0	4	57	12	54
For sale in market, unknown size	0	4	152	12	59
Contact with domestic animals or humans not likely	0	3	125	5	25
Hunted	0	68	1115	91	649
Rehabilitation center	0	36	548	42	238
Temporary holding facility	0	1	8	0	0
Temporary holding facility/wildlife trade transport	0	24	286	47	261
Other taxa					
For sale in large market (> 20 vendors)	0	49	794	82	273
For sale in medium market (5-20 vendors)	0	57	627	50	189
For sale in small market (< 5 vendors)	0	4	32	4	13
For sale in market, unknown size	0	54	1431	43	107
Contact with domestic animals or humans not likely	0	1	10	0	0
Hunted	0	172	2631	61	131
Peri-domestic/in or near human dwelling(s)	0	2	55	3	24
Temporary holding facility/wildlife trade transport	0	44	376	25	74
Rehabilitation center	0	43	377	17	54
TOTALS	0	1472	17405	1450	7519

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Q4Y4):**
 - Standardized molecular protocols to test for additional viral families with universal control 2 and to clone products for sequencing; capacity is now operative for testing twelve viral

families at IBMB lab (flavi, alpha, corona, arena, hanta, filo, paramyxo, bunya, henipa, rhabdo, orthomyxo, and poxvirus).

- Completed last round of viral family testing on specimens from rodents, bats, and primates sampled in years 1-3 screened for viral families with universal control 2; frozen samples are being prepared for submission to UC Davis for retesting and confirmation.
- Submitted samples for sequencing to MacroGen Genetics Laboratory in Seoul, Korea and confirmed samples to be negative.
- Shipped 1,027 bat samples (38 different species) to Columbia University for pathogen detection and discovery.

PREDICT Test Findings (Q4Y4):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Bats (162 animals, 487 samples - feces, oral swab, serum, urine, urine/urogenital swab)	Instituto de Biología Molecular y Biotecnología	PCR	Arena, Bunya, Corona, Filo, Flavi, Henipa, Influenza, Nipah, Paramyxo and Rhabdo viruses	Products for sequencing obtained for Influenza, Nipah, Paramyxoand Rhabdo viruses	Sequencing pending	Bolivia	No
Birds (1 animal, 3 samples - cloacal swab, oral swab, serum)	Instituto de Biología Molecular y Biotecnología	PCR	Arena, Corona, Filo and Flavi viruses	All negative	-	Bolivia	No
Non-human primates (18 animals, 18 samples - blood (whole), nasal swab, oral swab, plasma)	Instituto de Biología Molecular y Biotecnología	PCR	Bunya, Henipa, Influenzaand Orthopox viruses	All negative	-	Bolivia	No

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Rodent & Shrews (16 animals, 16 samples - blood (whole), oral swab)	Instituto de Biología Molecular y Biotecnología	PCR	Bunya, Influenza, Orthopox and Rhabdo viruses	Products for sequencing obtained for Bunya and Influenza virus	Sequencing pending	Bolivia	No

- **Activity 1.4: Sample Tracking and Information Management**
 - Sub-activity 1.4.1: **Surveillance Data**
 - Revised data to ensure accuracy of the information uploaded into GAINS.
- **Activity 1.5 Program Information Dissemination**
 - Sub-activity 1.5.1: **Communication**
 - Prepared a draft of the final report for government agencies and partners in country.
 - Helped refine draft handouts (2 and 4-page flyers) summarizing PREDICT progress in country for use by stakeholders and partners.
 - Presented on PREDICT scientific work and progress (through oral presentations and posters) at the “2nd International Congress on Pathogens at the Human-Animal Interface (ICOPHAI)” (Porto de Galinhas, Brazil) and “1st Biennial Meeting of the Wildlife Disease Association Latin America Section”. (Sao Paulo, Brazil).
 - Submitted abstract for oral presentation on PREDICT scientific work at the 3rd International Congress on Disease Ecology (Mérida-Yucatán, Mexico), which was accepted.
 - Prepared draft manuscripts to be published in scientific literature.

PERU

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Completed final version of the Rapid Survey Tool. This survey includes information gathered after three years of project implementation, as well as input provided by Points of Contact in government (agriculture, public health, and environment ministries) through frequent communications in previous quarters. Information is being processed by the Capacity Assessment Team to evaluate changes in local infrastructure for wildlife pathogen surveillance and outbreak response.
 - Formalized a contract with the Association for Research and Integral Development (AIDER) to train park rangers from the Peruvian National Park Service (SERNANP) to improve wildlife disease reporting and surveillance in protected areas (e.g. Tambopata and Bahuaja Sonene Natural Reserves).
 - In collaboration with SERNANP, conducted a one-week on-site training course for 11 park rangers on sample and data collection methods in Manu National Park (south-eastern Peru). This training was planned in response to recent mortality events affecting peccaries in the area.
 - b) **Laboratory System Improvements**
 - Purchased additional supplies and reagents in the U.S. to expand testing toward additional viral families with universal control 2, and to perform cDNA cloning and sequencing at INS laboratory. At present, capacity is available for testing four viral families (filo, arena, flavi and coronavirus).
- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**
 - Sampled 60 bats and 1 marsupial from unexplored pristine areas and collected oral/rectal swabs, feces, blood, and urine. The expedition was organized by partners using non-PREDICT funds to conduct a taxonomic inventory in Bahuaja Sonene Natural Reserve (southern Peruvian Amazonia),

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
PERU					
Bats					
Peri-domestic/in or near human dwelling(s)	0	12	78	0	0
Contact with domestic animals or humans not likely	0	118	450	90	428
Rodents					
For sale in medium market (5-20 vendors)	0	24	224	0	0
For sale in large market (> 20 vendors)	0	4	17	2	6
Contact with domestic animals or humans not likely	0	2	10	0	0
Hunted	0	262	263	0	0
Peri-domestic/in or near human dwelling(s)	0	50	900	52	104
Temporary holding facility/wildlife trade transport	0	5	30	0	0
Zoo	0	12	29	0	0
Non-human Primates					
For sale in large market (> 20 vendors)	0	25	112	23	67
For sale in medium market (5-20 vendors)	0	92	513	200	643
Hunted	0	207	208	0	0
Peri-domestic/in or near human dwelling(s)	0	26	274	36	114
Rehabilitation center	0	9	68	5	30
Sanctuary	0	77	768	139	171
Temporary holding facility	0	58	612	209	1132
Temporary holding facility/wildlife trade transport	0	87	887	204	820
Zoo	0	76	836	206	845
Other taxa					
Contact with domestic animals or humans not likely	0	1	4	1	2
For sale in market, unknown size	0	75	211	0	0
For sale in large market (> 20 vendors)	0	114	386	0	0
For sale in medium market (5-20 vendors)	0	157	467	1	4
Hunted	0	532	541	0	1
Peri-domestic/in or near human dwelling(s)	0	1	18	0	0
Temporary holding facility	0	15	90	5	20
Temporary holding facility/wildlife trade transport	0	55	186	0	0
Zoo	0	51	95	1	2
TOTALS	0	2147	8277	1174	4389

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Q4Y4):**
 - Extracted RNA from samples from bats, primates, and rodents and tested for priority viral families at the Peruvian Institute of Health (INS).

PREDICT Test Findings (Q4Y4):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Non-human primates (114 animals, 168 samples - oral swab, rectal swab)	Biomedicina LAB, INS, Lima	PCR	Arena, Corona, Filo, Flavi and Paramyxo viruses	Products for sequencing obtained for Corona and Flavi virus	Sequencing pending	Peru	No
Bats (31 animals, 31 samples - oral swab)	Biomedicina LAB, INS, Lima	PCR	Arena, Coronas, Filo, Flavi and Paramyxo viruses	Products for sequencing obtained for Arenavirus	Sequencing pending	Peru	No

- **Activity 1.4: Sample Tracking and Information Management**
 - Sub-activity 1.4.1: **Surveillance Data Management**
 - Revised data to ensure accuracy of the information uploaded into GAINS.
- **Activity 1.5 Program Information Dissemination**
 - Sub-activity 1.5.1: **Communication**
 - Prepared a draft final report for government agencies and partners in-country.
 - Helped refine draft handouts (2 and 4-page flyers) summarizing progress in-country for use by stakeholders and partners.

- Presented on PREDICT scientific work and progress (oral presentations and posters) at the “2nd International Congress on Pathogens at the Human-Animal Interface (ICOPHAI)” (Porto de Galinhas, Brazil), and “1st Biennial Meeting of the Wildlife Disease Association Latin America Section” (Sao Paulo, Brazil).
- Prepared draft manuscripts to be published in the scientific literature.

PREDICT Quarter 4 Year 4 Reporting

GLOBAL – US, Africa, Southeast Asia, Asia & Latin America

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**

- Sub-activity 1.1.1: **Operationalizing One Health Highlights**

- a) **International, National, or Regional Surveillance System Improvements**

- Across countries, held meetings and provided updates on PREDICT activities with high-level ministry officials (related to Human Health and Epidemiology, Forestry and Wildlife, Livestock, Medical Research, and Disease Response) and other One Health partners.
 - Analyzed data on global avian influenza surveillance systems provided by OIE and OFFLU.
 - Presented at “Viral Zoonosis: News and Views from the Experts at the Healthcare Beyond Boundaries: Asian Initiative meeting” organized by Chulalongkorn U. Faculty of Medicine.
 - Attended the H7N9 workshop and provided technical consultation: “Lessons Learned from The Experience in China”, organized by Thai Ministry of Public Health.
 - Participated in National EIDs steering committee meeting on preparedness, prevention, and control, organized by the Ministry of Public Health in Thailand, and presented at a regional Office of Diseases Prevention and Control meeting on EIDs from bats.
 - Presented on “Sharing Experiences on the Application of One Health Approaches in China” at The United Nations Theme Group on Health Working Group on Diseases at the Animal Human Interface” in Beijing, attended by the Chinese government, FAO, and WHO.
 - Attended Indonesian Coordinating Ministry for People’s Welfare meeting on Preparedness for Emerging Pandemic H7N9, and the Directorate of Animal Health Services, Ministry of Agriculture’s meeting on AI A/(H5N1) and AI A/(H7N9) viral surveillance results.
 - Participated in a One Health Symposium organized by Lao PDR government.
 - Organized the WHO-supported National Training on Laboratory Diagnosis of Viral Zoonotic Diseases in Bangkok.
 - The Cameroon Ministry of Forests and Wildlife nominated 2 individuals as One Health focal points to serve as points of contact for the ministry for One Health initiatives and zoonoses.
 - Uganda Wildlife Authority began integrating the AMMP mobile app into its data system.

- Organized a training on wildlife disease surveillance and biosafety practices for park rangers and field biologists in response to peccary mortality events in Peru's Manú National Park.
- Held a symposium at University of São Paulo describing PREDICT and Deep Forest work in Brazil for Microbiology and Veterinary Medicine faculty and graduate students.
- Provided personnel to support a local team with the Ministry of Health in response to an outbreak in DRC.
- Attended meeting for Internal Research on "Zoonotic Disease Risk Associated with Performance Monkeys on Java and Bali, Indonesia".
- Held a meeting with the Bangladesh One Health initiative to develop collaboration.
- Presented "USAID PREDICT Enhanced One Health Surveillance of Avian Influenza H7N9 Infection in Guangdong Province, China" report on H7N9 response to GDIPH/GDCDC.
- Participated in preparation of One Health training documents for veterinary and medical students in DRC (with RESPOND, the Ministry of Agriculture and Environment), and trained OHCEA Masters students in Tanzania on capture, handling and sampling protocols.
- Strengthened IUCN Wildlife Health Specialist Group networks across EPT regions.
- Proposed opportunities to build collaborations to enhance the reporting and sharing of information on diseases affecting animals and people to the OIE.

b) Laboratory System Improvements

- Implemented and optimized viral family-level PCR protocols at an additional laboratory in the Department of Animal Health Regional Animal Health Office 6 (RAHO6) in Ho Chi Minh City (Vietnam), Eijkman Institute (Indonesia) and GDCDC (China).
- Began to expand viral family testing to include protocols associated with Universal Control 2 at additional laboratories including at ICDDRB (Bangladesh), VRI (Malaysia), INS laboratory (Peru) and University of Sao Paulo (Brazil).
- Continued to provide weekly testing and result interpretation support from US teams to laboratory teams at NAHC (Laos PDR), Makerere University (Uganda), CMDN (Nepal), Sokoine University of Agriculture (Tanzania), GDCDC (China), Eijkman Institute (Indonesia), IPB (Indonesia), INRB (DRC), RAHO6 (Vietnam), INS (Peru), USP (Brazil) and IBMB (Bolivia).
- Continued discussions on implementation of PREDICT protocols with IDENTIFY (FAO) for piloting on samples collected from livestock.

- Continued to provide training and support to laboratory technicians including two laboratory technicians from NaVRI at Institut Pasteur du Cambodia (Cambodia) receiving weekly training on viral family screening of PREDICT samples with the goal to transfer a portion of viral family screening to NaVRI; and one laboratory technician from INRB (DRC) trained on laboratory management and laboratory protocols.
- Provided equipment/supplies for laboratory diagnostics including an ultralow temperature freezer and reagents to NAHC (Laos PDR), laboratory equipment for sample extraction and cold chain at Eijkman Institute (Indonesia), new thermocycler and performed maintenance of equipment at CIRMF (Gabon) and reagents for sample extraction and testing to USP (Brazil).
- Completed construction of diagnostic lab at Sabah Wildlife Department in Kota Kinabalu, Sabah to conduct testing of Deep Forest samples in Y5.
- Completed comparative cost analysis of using PREDICT protocols for detecting Influenza A versus real time PCR for influenza A / H7N9 detection at ECNU, Shanghai.
- Completed last round of viral family testing at IBMB (Bolivia) before final close-out and applied for permits from government agencies to export frozen samples to UC Davis for retesting, sequencing, and confirmation; and shipped bat samples to Columbia University for pathogen testing.
- Continued refining on-line test result tracking in GAINS to streamline reporting of test findings to in-country government, obtaining government approvals for release of data, and movement of data to become available to partners and the public on HealthMap.

Table 1: Labs Receiving Assistance from PREDICT to date

	# of labs targeted for screening with desired viral families	# of labs receiving training in preparation for screening of desired viral families	# of labs that have initiated work that will eventually lead to screening desired viral families (labs with partial capacity)
Africa	7	6	5
Asia / SE Asia	19	18	14
Latin America	8	6	6
Totals	34	30	25

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.2: **Capacity Assessment and Tracking of Development Progress**
 - Received final rapid tool surveys from Peru and Bolivia that were completed within two months of their country level programmatic completion to document change during the course of the four years of the PREDICT project in those countries. Rapid survey tools were also prepared for roll out to other PREDICT countries as each country nears the end date in 2014.
 - Completed drafts of two capacity assessment publications that are under coauthor review for submission: one presenting baseline capacity data from 20 PREDICT countries that prioritizes challenges and opportunities for capacity building to strengthen surveillance systems for wildlife surveillance in sustainable ways, and a second to compare stakeholder and country coordinator perspectives to identify awareness and communication gaps.
 - Presented local media surveillance (LMS) pilot program findings at the Digital Disease Detection 2013 conference. A manuscript has also been drafted summarizing the LMS program that was implemented in six PREDICT countries where health and risk events identified by staff reading non-online local print media sources on a weekly basis was used to extend the reach of media surveillance beyond the digital sources currently captured by HealthMap. Program evaluation surveys were completed by all countries as they finished the 3 month pilot program, and some countries have chosen to continue their LMS program activities.

Table 2: PREDICT Training

Country		# Women	Trainings covered various combinations of the following topics:
Asia:			
Bangladesh	15	1	Lab techniques in BSL2 lab & lab diagnostics; epidemiology and outbreak investigation; capture and sampling of rodents & bats; sample collection and GAINS system; use of GIS.
Cambodia	111	27	Core safety, animal capture, & sampling skills and protocols; data collection & management; rodent and primate ID & primate and rodent sampling; respirator fit testing. Intro to emerging zoonoses and surveillance in Cambodia.
China	24	10	Core safety, animal capture & sampling skills and protocols; sample collection, handling, and transport; wildlife restraint & anesthesia; human & animal safety; bat, rodent, and primate sampling; zoonoses of bats & rodents.
India	18	2	Core safety, animal capture & sampling; laboratory safety protocols; zoonoses; surveillance and sampling protocols; bar-coding and data management; animal necropsies.

Indonesia	42	20	Modeling behind the PREDICT project; zoonotic diseases of bats and rodents; human and animal safety during capture; laboratory safety & PPE use; sample collection; set up for sampling bats and rodents; respirator fit testing.
Lao PDR	101	22	Core safety, animal capture, & sampling skills and protocols; data collection; PPE use; bar-coding & data management; animal necropsies; surveillance & sampling; laboratory molecular techniques; respirator fit testing, and cold chain.
Malaysia	109	33	Core safety protocols; PPE and biosafety, animal capture & sampling skills and protocols; bat and rodent capture, handling & sampling; laboratory skills; packing and shipping samples & cold chain; sampling strategy & data collection; bat, rodent & macaque sampling; collection of trigeminal nerve root ganglia from macaques for Herpes testing; virus extraction; bat & rodent capture; rodent retro-orbital bleed; primate sampling & human and animal safety; PRC & cloning; respirator fit testing.
Nepal	16	5	Biosafety & PPE, animal capture safety, laboratory safety, data collection procedures, rodent sampling methods.
Philippines	3	1	Animal capture safety.
Thailand	153	55	Lab and bioinformatics training; animal capture; laboratory safety; animal sampling protocols; zoonotic diseases; respirator fit testing.
Vietnam	484	127	Core safety, animal capture & sampling skills and protocols; packing & shipping samples; barcode system; animal pathology; sample collection & data management & use of GAINS; surveillance; filter paper blood spot, sampling; lab diagnostic protocols, virus family level protocols; one health & sampling strategy; sample transport & lab methods; wildlife pathology; First Aid; respirator fit testing. One Health and disease risks of handling wildlife.
Africa:			
Cameroon	169	59	Core safety, animal capture & sampling skills and protocols; specialized field sampling and laboratory skills; packing & shipping samples to reference lab; PPE use; bushmeat policy and wildlife ethics; extraction, RT-PCR, ELISA and other lab methods; lab systems; immunology and serology; ethics; pan-viral protocols; emergency preparedness and management; outbreak response training; bio-risk management; use of satellite phones; molecular biology and conventional PCR; respirator fit testing.
DRC	17	2	Core safety, animal capture & sampling skills and protocols; specialized field sampling and laboratory skills; RT-PCR, ELISA; administration and reporting; Monkeypox surveillance; sample tracking & GAINS system; ethical issues; blood spot sampling; DNA & RNA extraction from animal samples; respirator fit testing.
Gabon	6	3	Bushmeat sampling; packing & shipping samples; PPE use and biosafety; lab safety; animal capture; bat & rodent sampling; sampling for AI; animal sample collection; cold chain; lab methods, DNA extraction, PCR; sample prioritization; safe handling of liquid nitrogen; sequencing; virus isolation; RNA & RT-PCR; GAINS system & data management.
Republic of Congo	13	2	Core safety, PPE and biosafety; safe animal capture, & sampling skills and protocols; bat, rodent, and primate sampling; laboratory safety & skills; data collection; cold chain; protecting human subjects in research; virology laboratory methods; respirator fit testing.
Rwanda	206	25	Core safety, animal capture & sampling skills and protocols; PPE use and biosafety; bat, rodent, and primate capture, handling, and sampling; zoonoses; ethics and responsibilities; wildlife pathology & necropsy; sample collection & preservation; packing & shipping samples; tracking primates & health monitoring; lab personnel safety; PCR protocols & sample processing; bushmeat handling.
Tanzania	46	11	Core safety, animal capture & sampling skills and protocols; bat and rodent capture, handling & sampling; data management; laboratory safety; surveillance; information management and GAINS system; wildlife

			capture & restraint; emergency preparedness; ethics, cultural sensitivity & SHP; pathogen detection; extraction and PCR & protocols; bat cold chain; respirator fit testing.
Uganda	52	10	Core safety, animal capture & sampling skills and protocols; PPE & biosafety; laboratory safety; packing & shipping samples; bushmeat sampling; cold chain; GPS; Animal Mortality Monitoring Study; bat capture, handling & sampling; PPE & biosafety to handle dead animals.
Latin America:			
Bolivia	169	75	Core safety, animal capture, laboratory & sampling skills and protocols and zoonotic diseases; bat, rodent, and primate sampling; bushmeat sampling; molecular and parasite diagnostic methods; lab safety and methods; packing and shipping samples; wildlife management and disease management; work ethics, cultural sensitivity & SHP; managing livestock & poultry diseases; detecting zoonoses; sample collection and storage; methods of detecting Salmonella in wildlife; biostatistics; respirator fit testing.
Brazil	39	17	Core safety, animal capture, handling & sampling skills and protocols; PPE use & biosafety; bat and rodent sampling; bushmeat sampling; packing and shipping samples; cold chain; surveillance, ethics, and responsibilities; primate sampling; respirator fit testing.
Colombia	54	29	Core safety, animal capture & sampling skills and protocols; lab safety & methods; One Health; Conservation Medicine; GAINS system and data management.
Mexico	27	14	Core safety, animal capture, handling & sampling skills and protocols; lab safety & methods; PPE use & biosafety; disease modeling; animal care and use protocols; lab diagnostic techniques; respirator fit testing.
Peru	259	138	Core safety, animal capture & sampling skills and protocols; PPE use & biosafety; surveillance; zoonotic disease risks from wildlife trade and consumption; wildlife regulations, wildlife management and disease monitoring; sample collection & storage; species ID & health risks; emergency management of spider bites; safe transport of confiscated animals; respirator fit testing.
Total Trained	2,133	688	

- **Activity 1.2: Surveillance**

- Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**

- Conducted surveillance activities in Brazil, Bangladesh, Cambodia, China, Indonesia, Lao PDR, Malaysia, Nepal, Thailand, Vietnam, Cameroon, DRC, Gabon, Rwanda, Tanzania, and Uganda.
- Identified markets for AI surveillance & market surveys in three provinces in China.
- Discussed results with CDC Indonesia from cooperative testing of acute human samples.
- Coordinated with the Tanzania Wildlife Research Institute on training for primate immobilization for the capture of baboons.
- Conducted sampling of vervets in the Entebbe area with the Uganda Wildlife Authority.
- Received open permission to sample animals arriving at the Tek Chhu Zoo in Cambodia; collected samples from macaques intended for zoo animal food that had been purchased from a macaque farm where they had been found dead.
- Transferred all samples and human behavioral data questionnaires from the follow up

- phase of the high-risk human cohort study to the China GDCDC for analysis.
- Implemented PREDICT protocols to test over 200 human samples (suspected encephalitis, hemorrhagic fever, or influenza-like) for China's syndromic surveillance study.
 - Met with fruit bat and primate hunters to explore sampling opportunities in Cambodia.
 - Completed the Bwindi Community Hospital study in Uganda; Samples were collected from 300 patients. The clinic targeted patients with undiagnosed illness, and collection was accompanied by a survey to characterize animal and forest contact. Viral family screening will be conducted, and results compared to findings from animal samples from the region.
 - Collaborated with CDC on paired human-wildlife sampling at a Tanzania sugarcane fields.
 - Sampled at new market and free-ranging sites and interfaces (in Gorontalo and North Sulawesi) with scientists from three Indonesian universities.
 - Visited China prefecture level CDCs and sentinel hospitals with a team from GDCDC and communicated with staff about implementation across the collaborative network in Year 5.
 - Conducted follow-up testing using PREDICT protocols for a suspected case of viral hemorrhagic fever that tested negative at the INRB lab for known viruses in DRC.
 - Deep Forest: Completed the dry season sampling for all three gradients in Brazil; Conducted sampling at pristine, disturbed; and semi-disturbed sites in Sabah, Malaysia; Conducted sampling and viral family screening in Uganda.
 - Confirmed the first human case of H7N9 in Guangdong Province in China by GDCDC; GDCDC agreed to utilize PREDICT protocols to analyze a sample from this patient.

Table 3: PREDICT Global Surveillance Summary by Region, Taxa and Primary Risk Interface in GAINS (to date):

Taxa	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
Africa					
Bats	304	5797	28241	11925	40760
Non-human Primates	320	4245	15273	1880	12646
Other Taxa	29	5563	10315	514	1094
Rodents & Shrews	169	4940	17541	2638	10743
Central Asia					
Bats	470	6458	43185	2425	15366
Non-human Primates	36	686	1284	114	669
Other Taxa	5	540	2767	40	130
Rodents & Shrews	301	1457	11370	963	3256
Southeast Asia					
Bats	236	4583	15366	2675	11953
Non-human Primates	31	951	11267	136	1182
Other Taxa	11	1093	3950	888	1204
Rodents & Shrews	22	2419	11370	1882	4467
Latin America					
Bats	58	3749	19551	4639	16143
Non-human Primates	0	861	6981	1257	5258
Other Taxa	19	1742	10135	300	952
Rodents & Shrews	13	799	7278	629	2771
High Risk Interface					
Wildlife trade transport	0	117	1291	0	0
Temporary holding facility	0	138	1169	258	1329
Contact with locals for religious activities	122	155	536	21	52

Contact with workers harvesting crops	311	628	2725	437	1661
Raiding markets	0	144	1574	0	0
Peri-domestic/in or near human dwelling(s)	424	10439	76788	8965	41642
For sale in large market (> 20 vendors)	102	2620	11528	1468	4148
For sale in medium market (5-20 vendors)	43	567	2322	212	665
For sale in small market (< 5 vendors)	0	248	1821	88	692
For sale in market, unknown size	0	262	2971	309	1132
For sale in restaurant	0	687	1720	350	1398
Hunted	121	13383	31190	4940	17431
Preying on livestock or their food	0	48	499	63	433
Private wildlife collection or pet	1	89	591	29	212
Public safety hazard (e.g. threat to humans)	53	402	3806	474	2483
Raiding crops	18	332	2386	89	888
Rehabilitation center	3	87	288	63	280
Sanctuary	12	1291	8096	1037	5378
Temporary holding facility/wildlife trade transport	0	177	1466	252	1297
Wild animal farm	0	1166	1467	334	501
Zoo	36	226	1669	250	1052
Urban forest fragment with recreational activities	0	112	392	91	690
Contact with park personnel/intensive wildlife management area	232	2028	13799	1484	3744
Contact with researchers (other than PREDICT staff)	0	498	1539	487	1605
Contact with tourists/ecotourism	270	3030	8909	1484	6021
Contact with workers in extractive industry	46	194	1262	159	949
Free-ranging	0	422	1649	0	0
Contact with domestic animals or humans NOT likely	17	3162	17396	1729	9800
Other	213	3231	15025	7832	23111
TOTAL	2024	45883	215874	32905	128594

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.1: **Introduction of New Technologies**
 - Deployed and optimized Universal Control 2 to all PREDICT sites (positive control for the following virus family protocols: Herpesviruses, Adenoviruses, Polyomaviruses, Bunyaviruses, Parapoxviruses, Poxviruses, Influenza A viruses, Enteroviruses, Lyssaviruses, Flaviviruses, Astroviruses, Orbiviruses, Phleboviruses, Lentiviruses, Rhabdoviruses, SFVs, Henipaviruses);
 - Obtained positive control for a protocol to detect Bas Congo virus (Cameroon, Gabon, DRC) and Hantavirus (Indonesia).
 - Initiated ultrasonic bat detectors (SM2BAT+ Passive Ultrasonic Bat Recorder) to perform acoustic surveys to estimate the number of bat species unaccounted for during sampling in the Deep Forest countries (Brazil, Uganda, Malaysia)
 - Enhanced molecular assays with implementation of Nanodrop nucleic acid spectrophotometers (Gabon and Cameroon).
 - Procured equipment and/or reagents for cloning of PCR amplicons (Indonesia and Peru).
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Q4Y4):**
 - Began developing guidelines to assess viral sequences and cut-offs to classify as known or novel viruses based on sequence similarity for priority viral families/genera.
 - Hosted (b)(6) for one month, for training in diagnostics and discovery.
 - New Publications
Published: A strategy to estimate unknown viral diversity in mammals, *mBio*; Isolation and characterization of a bat SARS-like coronavirus that uses the ACE2 receptor, *Nature*

Table 4: PREDICT Test Findings (Q4Y4 new results; see additional data in country reports below):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release (yes or no)
Bats (1234 animals, 1663 samples - oral swab, rectal swab, urine, urine/urogenital swab)	Center for Infection and Immunity, Columbia University	PCR	Adeno, Astro, Boca, Corona, Herpes, Nipah, Paramyxo and Polyoma viruses	Products for sequencing obtained for Adeno, Astro, Boca, Corona, Herpes, Nipah, Paramyxo and Polyoma viruses	Sequences obtained, interpretation ongoing	Bangladesh	No
Rodent & shrews (257 animals, 584 samples - oral swab, rectal swab, urine/urogenital swab)	Icddr,b Lab	PCR	Arenaviruses, Hantaviruses, Paramyxoviruses	Product for sequencing obtained for Hanta and Paramyxo viruses	Sequencing pending	Bangladesh	No
Other mammals (7 animals, 21 samples - oral swab, rectal swab, urine/urogenital swab)	Icddr,b Lab	PCR	Arena, Hanta and Paramyxo viruses	Products for sequencing obtained for Hanta and Paramyxo viruses	Sequencing pending	Bangladesh	No
Bats (468 animals, 588 samples - oral swab, rectal swab, urine/urogenital swab)	Center for Infection and Immunity, Columbia University	PCR	Boca, Corona, Herpes and Nipah viruses	Product for sequencing obtained for Boca, Corona, Herpes and Nipah viruses	Sequences obtained, interpretation ongoing	Bangladesh	No
Human ILI cases (nasal swabs 170)	GDCDC	Conventional PCR	Influenza A, Corona, Paramyxo, Arena, Henipa and Hanta viruses	Products obtained for Influenza A and Corona viruses for sequencing	Sequencing pending	China	No
Rodents (498 samples)	Institute Pasteur Cambodia	PCR	Paramyxoviruses	Product for sequencing obtained	Sequences obtained, interpretation ongoing	Cambodia	No
Non-Human Primates (325 samples)	Institute Pasteur Cambodia	PCR	Filo, Arena, Astro, Paramyxo, Flavi, Herpes, Corona, Influenza A, Entero, Bunya, Boca, Seadorna, Orthopox, Henipa and Retro viruses	Products for sequencing obtained for Corona, Astro, Entero, Herpes and Retro viruses \	Sequences obtained, interpretation ongoing	Cambodia	No

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release (yes or no)
Bats (309 samples)	Institute Pasteur Cambodia	PCR	Paramyxoviruses	Product for sequencing detected	Sequences obtained, interpretation ongoing	Cambodia	No
Non-human primates (67 animals, 67 samples - buffy coat, feces, plasma, red blood cells)	PRC-IPB	PCR	Arena, Corona, Filo, Flavi and Paramyxo viruses	Products for sequencing obtained for Arena and Paramyxo viruses	Sequences obtained, interpretation ongoing	Indonesia	No
Humans (154/154)	Eijkman	PCR	Phlebo, Rhabdo, Henipa, Hanta, Entero, Lenti, Orbi and Herpes viruses	Products for sequencing obtained for herpes and lenti viruses	Sequences obtained, interpretation ongoing	Indonesia	No
Bats (243 animals)	Institut Pasteur du Cambodge	RT-PCR	Arena, Flavi, Paramyxo, Influenza, Filo, Henipa and Lyssa viruses	Product for sequencing obtained for Influenza A	Additional testing and sequencing ongoing	Lao PDR, Cambodia - country of testing	No
Bats (210), Other mammals (97), Rodents (6)	NAHC	RT-PCR	Corona and Rhabdo viruses	Products obtained for sequencing for Corona and Rhabdo viruses	Sending to IPC for sequence confirmation	Lao PDR	No
Non-human primates (pooled throat, rectal urine swab samples from 255 animals)	VRI	Consensus PCR	Adeno, Arena, Astro, Corona, Entero, Flavi, Herpes, Influenza, Retro, Rhabdo, Seadorna, Simian Foamy, Adeno, Boca, Henipa and Pox viruses	Products for sequencing obtained for Arena, Astro, Herpes, Retro, Simian Foamy, Adeno and Pox viruses	Sequence confirmation ongoing	Peninsular Malaysia	No
Rodents and small mammals (pooled throat, rectal urine swab samples from 142 animals)	VRI	Consensus PCR	Adeno, Astro, Corona, Filo, Flavi, Herpes, Influenza, Paramyxo, Rhabdo, Seadorna, Pox, Adeno, Bunya and Henipa viruses	Products for sequencing obtained for Astro, Paramyxo, Herpes, Pox and Adeno viruses	Sequence confirmation ongoing	Peninsular Malaysia	No

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release (yes or no)
Bats (pooled throat, rectal urine swab samples from 119 animals)	VRI	Consensus PCR	Adeno, Astro, Flavi, Herpes, Influenza, Rhabdo, Seadorna, Adeno, Hanta, Bunya, Henipa viruses	Products for sequencing obtained for Astro, Herpes, Adeno and Henipa viruses	Sequence confirmation ongoing	Peninsular Malaysia	No
Orangutan (pooled throat, rectal and urine swab samples from 37 animals)	VRI	Consensus PCR	Herpes, Boca, Alpha, Corona, Astro, Henipa, Seadorna, Arena, Filo, Flavi, Paramyxo, Bunya, Retro, Influenza, Simian Foamy virus, Hepatitis, Encephalomyocarditis and Pox viruses	Products for sequencing for Herpesvirus	Sequences obtained, interpretation ongoing	Sabah, Malaysia	No
Orangutan (pooled tissue samples from 1 animal)	VRI	Consensus PCR	Herpes, Boca, Alpha, Corona, Astro, Henipa, Arena, Filo, Flavi, Seadorna, Paramyxo, Bunya, Retro, Influenza, Simian Foamy, Encephalomyocarditis, Hepatitis and Pox viruses	Products for sequencing obtained for Herpesvirus	Sequences obtained, interpretation ongoing	Sabah, Malaysia	No
Bats (200)	WHO-CC Chula	PCR	Corona, Paramyxo, Seadorna, Flavi, Filo, Hanta, Arena, Rhabdo, Henipa, Influenza and Bunya viruses	Products for sequencing for Corona, Paramyxo and Henipa viruses	Sequences obtained, interpretation ongoing	Thailand	No
Bats (Rad cave, 68 rectal swabs)	WHO-CC Chula	PCR	Corona and Astro viruses	Products for sequencing obtained for Astroviruses	Sequencing ongoing	Thailand	No
Bats (Chakan cave, 87 rectal swabs)	WHO-CC Chula	PCR	Corona and Astro viruses	Products for sequencing obtained for Corona and Astro viruses	Sequencing ongoing	Thailand	No

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release (yes or no)
Bats (Salika cave, 20 rectal swabs)	WHO-CC Chula	PCR	Corona and Astro viruses	Products for sequencing obtained for Astroviruses	Sequencing ongoing	Thailand	No
Bats (Rad cave, 14 feces)	WHO-CC Chula	PCR	Corona and Astro viruses	Products for sequencing obtained for Corona and Astro viruses	Sequencing ongoing	Thailand	No
Bats (Chakan cave 16 feces)	WHO-CC Chula	PCR	Corona and Astro viruses	Products for sequencing obtained for Astroviruses	Sequencing ongoing	Thailand	No
Bats (Salika cave, 3 feces)	WHO-CC Chula	PCR	Corona and Astro viruses	Products for sequencing obtained for Astroviruses	Sequencing ongoing	Thailand	No
Rodents (58 rectal swabs, 3 feces)	WHO-CC Chula	PCR	Corona and Astro viruses	Products for sequencing obtained for Astroviruses	Sequencing ongoing	Thailand	No
Non-human Primate (Macaca fascicularis 50 rectal swabs)	WHO-CC Chula	PCR	Retro, Filo, Flavi, Influenza, Paramyxo, Henipa, Corona, Arena Bunya, Pox, Boca, Seadorna, Hanta, Herpes and Astro viruses	Products for sequencing obtained for Herpes and Astro viruses	Sequencing ongoing	Thailand	No
Bats (38 animals, 42 samples - feces, urine/urogenital swab)	Regional Animal Health Office No. 6	PCR	Arena, Flavi and Paramyxo viruses	Product for sequencing obtained for Arena and Paramyxo viruses	Sequencing pending	Vietnam	No
Rodent & Shrews (89 animals, 90 samples - feces, muscle, oral swab, rectal swab)	HUA National Key Laboratory of Veterinary Biotechnology	PCR	Arena, Flavi, Hanta and Paramyxo viruses	Product for sequencing obtained for Arena and Paramyxo viruses	Sequencing pending	Vietnam	No
Rodent & Shrews (130 animals, 270 samples - feces, lung, oral swab, rectal swab, small intestine, urine/urogenital swab)	Regional Animal Health Office No. 6	PCR	Arena, Flavi, Hanta and Paramyxo viruses	Product for sequencing obtained for Arena, Flavi, Hanta and Paramyxo viruses	Sequencing pending	Vietnam	No

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release (yes or no)
Carnivores (14 animals, 19 samples - feces, lung, muscle, oral swab, spleen, urine)	HUA National Key Laboratory of Veterinary Biotechnology	PCR	Arena, Corona, Flavi and Paramyxo viruses	Product for sequencing obtained for Corona, Flavi and Paramyxo viruses	Sequencing pending	Vietnam	No
Non-human primates (146 animals, 160 samples - buffy coat, liver, oral swab, plasma, rectal swab, spleen)	GVFI Cameroon	PCR	Alpha, Arena, Bunya, Filo, Herpes, Influenza and Seadorna viruses	Products for sequencing obtained for Alpha and Herpes viruses	Sequences obtained, interpretation ongoing	Cameroon	No
Rodent & shrews (437 animals, 939 samples - blood (whole), blood drop, genital swab, liver, oral swab, plasma, rectal swab, spleen)	GVFI Cameroon	PCR	Alpha, Arena, Bunya, Corona, Entero, Flavi, Hanta, Influenza, Paramyxo, Pox, Rhabdo and Seadorna viruses	Products for sequencing obtained for Entero and Seadorna viruses	Sequences obtained, interpretation ongoing	Cameroon	No
Bats (981 animals, 1952 samples - blood drop, liver, oral swab, plasma, rectal swab, spleen)	GVFI Cameroon	PCR	Arena, Astro, Bunya, Corona, Entero, Filo, Flavi, Hanta, Henipa, Influenza, Paramyxo, Rhabdo and Seadorna viruses	Products for sequencing obtained for Corona and Henipa viruses	Sequences obtained, interpretation ongoing	Cameroon	No
Bats (139 animals, 284 samples - liver, oral swab, plasma, rectal swab, spleen)	GVFI Cameroon	PCR	Bas Congo Virus	Products for sequencing obtained	Sequencing pending	Cameroon	No
Non-human primates (149 animals, 188 samples - blood drop, liver, oral swab, plasma, rectal swab, spleen)	GVFI PREDICT Lab, Kinshasa	PCR	Alphav, Arena, Boca, Corona, Filo, Flaviviruses, Henipa and Paramyxo viruses	Products for sequencing obtained for Arena, Corona and Henipa viruses	Sequencing pending	Congo, Democratic Republic Of	No
Bats (182 animals, 358 samples - liver, oral swab, rectal swab, spleen)	GVFI PREDICT Lab, Kinshasa	PCR	Alpha, Arena, Corona, Filo, Flavi, Henipa and Paramyxo viruses	Products for sequencing obtained for Filov and Henipa viruses	Sequencing pending	Congo, Democratic Republic Of	No
Ungulates (1 animal, 1 sample - oral swab)	GVFI PREDICT Lab, Kinshasa	PCR	Alpha, Arena, Corona, Filo, Flavi, Henipa and Paramyxo viruses	Products for sequencing obtained for Paramyxoviruses	Sequencing pending	Congo, Democratic Republic Of	No

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release (yes or no)
Bats (182 animals, 358 samples - liver, oral swab, rectal swab, spleen)	GVFI PREDICT Lab, Kinshasa	PCR	Bas-Congo virus	Products for sequencing obtained	Sequencing pending	Congo, Democratic Republic Of	No
Rodent & shrews (39 animals, 72 samples - oral swab, rectal swab)	GVFI PREDICT Lab, Kinshasa	PCR	Bas-Congo virus	Products for sequencing obtained	Sequencing pending	Congo, Democratic Republic Of	No
Non-human primates (3 animals, 3 samples - liver, spleen)	CIRMF	PCR	Alpha, Arena, Boca, Bunya, Corona, Flavi, Herpes, Orbi, Orthopox, Paramyxo, Parapox and Rhabdo viruses	Products for sequencing obtained for Arena, Bunya and Parapox viruses	Sequencing pending	Gabon	No
Ungulates (16 animals, 16 samples - liver, spleen)	CIRMF	PCR	Alpha, Arena, Boca, Bunya, Corona, Flavi, Herpes, Orbi, Orthopox, Paramyxo, Parapox and Rhabdo viruses	Products for sequencing obtained for Arena, Boca, Bunya, Orbi and Rhabdo viruses	Sequencing pending	Gabon	No
Bats (102 animals - oral swabs, rectal swabs, lung, brain)	UC Davis Wildlife Diagnostic Lab	PCR	Filo, Corona, Paramyxo, Flavi, Astro, Arena, Influenza, Rhabdo, Enterovirus, Lyssa, Seadornavirus, Hanta, Nipah, Henipavirus, Bunyavirus, Orbi and Phleboviruses	Products for sequencing obtained for Orbi, Astro, Corona, Paramyxo, Rhabdo and Flavi viruses	Sequences obtained, interpretation pending	Republic of Congo	No
Non-Human Primates (130 specimens)	Makerere University Walter Reed Project, Kampala, Uganda	PCR	Arena, Corona, Henipavirus, Herpes Filovirus, Influenza, Paramyxo, Bunyavirus and Retroviruses	Products obtained for sequencing for Arena, Corona, Henipavirus and Herpesvirus	Sequencing pending	Rwanda	No

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release (yes or no)
Bats (225 specimens)	Makerere University Walter Reed Project, Kampala, Uganda	PCR	Arena, Corona, Filo, Henipa, Paramyxo, Rhabdo and Bunya viruses	Products obtained for sequencing for Arena, Corona, Filo, Henipa, Paramyxo, Rhabdo and Bunya virus	Sequencing pending	Rwanda	No
Bats (23 animals, 23 samples - oral swab, rectal swab)	UC Davis Wildlife Diagnostic Lab	PCR	Alpha, Arena, Corona, Filo, Flavi, Hanta, Henipa, Influenza, Paramyxo and Rhabdo viruses	Product for sequencing obtained for Paramyxovirus	Sequence obtained, interpretation ongoing	United Republic of Tanzania	No
Rodents (241 specimens)	Makerere University Walter Reed Project	PCR	Hanta, Rhabdo, Arena, Adeno, Henipa, Herpes, Corona, Filo, Flavi, Paramyxo Alphavirus, hantavirus and influenza viruses	Products for sequencing obtained for Hanta, Rhabdo, Arena, Adeno, Henipa, Herpes, Corona, Filo Flavi and Paramyxo virus	Sequencing pending	Uganda	No
Non-human primates (201 specimens)	Makerere University Walter Reed Project	PCR	Rhabdo, Influenza, Entero, Filo, Paramyxo, Flavi, Henipa, Herpes, Retro, Alpha, Arena, Hanta Corona viruses	Products obtained for sequencing for Rhabdo, Influenza, Entero, Filo, Paramyxo, Flavi, Henipa, Herpes and Retro virus	Sequencing pending	Uganda	No
Bats (33 specimens)	Makerere University Walter Reed Project	PCR	Filo, Herpes, Rhabdo, Adeno, Entero, Flavi, Arena, Corona, Hanta, Henipa, Influenza, Paramyxo viruses	Products obtained for sequencing for Filo, Herpes, Rhabdo, Adeno, Entero and Flavi virus	Sequencing pending	Uganda	No
Rodent & Shrews (16 animals, 16 samples - blood (whole), oral swab)	Instituto de Biología Molecular y Biotecnología	PCR	Bunya, Influenza, Orthopox and Rhabdo viruses	Products for sequencing obtained for Bunya and Influenza virus	Sequencing pending	Bolivia	No

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release (yes or no)
Bats (162 animals, 487 samples - feces, oral swab, serum, urine, urine/urogenital swab)	Instituto de Biología Molecular y Biotecnología	PCR	Arena, Bunya, Corona, Filo, Flavi, Henipa, Influenza, Nipah, Paramyxo and Rhabdo viruses	Products for sequencing obtained for Influenza, Nipah, Paramyxo and Rhabdo virus	Sequencing pending	Bolivia	No
Non-human primates (114 animals, 168 samples - oral swab, rectal swab)	Biomedicina LAB, INS, Lima	PCR	Arena, Corona, Filo, Flavi and Paramyxo viruses	Products for sequencing obtained for Corona and Flavi virus	Sequencing pending	Peru	No
Bats (31 animals, 31 samples - oral swab)	Biomedicina LAB, INS, Lima	PCR	Arena, Coronas, Filo, Flavi and Paramyxo viruses	Products for sequencing obtained for Arenavirus	Sequencing pending	Peru	No
Bats (178 animals, 701 samplrd-anal swab, blood clot, oral swab, rectal swab, skin, urine)	Center for infection and Immunity (Columbia University)	PCR	Adeno, Astroviruses, Coronaviruses, Hanta, Paramyxo and Polyoma viruses	Products for sequencing obtained for Adeno, Astro, Corona, Hanta and Polyoma virus	Sequencing Pending	Brazil	No
Rodents & Shrews (37 animals, 76 samples- liver, lung, serum)	Center for infection and Immunity (Columbia University)	PCR	Adeno, Astro, Corona, Hanta, Paramyxo and Polyoma viruses	Products for sequencing obtained for Astro and Paramyxo virus	Sequence pending	Brazil	No
Bats (220 animals, 274 samples - blood (whole), genital swab, liver, milk, oral swab, rectal swab, spleen, urine, urine/urogenital swab)	BSL3 Virology laboratory ICB II, University of São Paulo	PCR	Alpha, Arena, Boca, Corona, Filo, Flavi, Hanta, Nipah , Paramyxo and Seadorna viruses	Product for sequencing obtained for Coronaviruses	Sequences obtained, interpretation pending	Brazil	No

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release (yes or no)
Primate (Macaque faeces; 458)	Center for infection and Immunity (Columbia University)	Consensus PCR	Corona, Entero, Astro, Herpes, Simian Foamy, Lenti, Boca, Arena, Filo, Flavi, Picorna, Paramyxo, Henipa, Hanta, Bunya, Phlebo, Pox, Orthopox, Parapox, Papilloma, Adeno, Polyoma, Influenza, Calici, Seadorna, Rhabdo, Lyssa and Alpha viruses	Products for sequencing obtained for Corona, Entero, Astro, Herpes, Simian Foamy, Boca, Adeno, Polyoma and Rhabdo virus	Sequences obtained, interpretation pending	Bangladesh	No
Primate (Macaque faeces; 458)	Center for infection and Immunity (Columbia University)	Deep Sequencing	-	Pending	458 samples processed as 58 pools of 7 or 8 samples per pool. Data currently being analyzed	Bangladesh	No

- **Activity 1.4: Sample Tracking and Information**
 - Sub-activity 1.4.1: **Optimize surveillance data management system**
 - Developed and implemented a new system for managing viral sequences in GAINS to feed into GENEIOUS.
 - Developed and implemented new quarterly report system for test data that dramatically improved GAINS performance.
 - Conducted web-based survey of GAINS users to gauge value, utility, acceptance, and ease-of-use of system.
 - Sub-activity 1.4.2: **Establish global open access to database and procedure for dissemination of knowledge**
 - Implemented mechanism for public sharing of surveillance and test result data on healthmap.org/PREDICT; Awaiting input from sufficient national government partners to

implement public release.

- **Activity 1.5 Program Information Dissemination**

- Sub-activity 1.5.1: **Communication (National and International Meetings)**

- Presented PREDICT work at Albert Schweitzer Centenary Symposium, Presidential Palace, Gabon.
- Participated in USAID EPT Asia Regional Meeting.
- Participated in USAID EPT Africa Regional Meeting.
- Met with Bwindi Community Hospital and Batwa Clinic leaders in Uganda to discuss leveraging other US-funded projects to augment human-animal pathogen sharing data.
- Attended and participated in the NAS DoD biodefense committee meeting.
- Attended and participated in the IOM “Standing Committee on Health Threats Resilience” meeting.
- Attended “Options for the Control of Influenza” meeting, Cape Town.
- Invited to participate in a MERS-Coronavirus mission to the Kingdom of Saudi Arabia with the Food and Agriculture Organization of the United Nations with support of our One Health and global health security goals. Met with leaders from the Ministries of Health and Agriculture and conducted field visits, providing advice on next steps to help identify the source of the novel virus and help prevent further transmission.
- Presented on MERS at the Department of Homeland Security’s workshop on “Preparing for and Responding to High Consequence and Foreign Animal Diseases in Fish and Wildlife Populations.”
- Published a summary of PREDICT in the American Public Health Association’s Veterinary Public Health Special Primary Interest Group newsletter.
- Presented “Our Planet: Exam room or patient?” at the AVMA Global Health Summit on One Health.
- Co-hosted the “6th Annual Workshop on Regional Surveillance and Research for Wildlife-borne Diseases” in collaboration with USDA APHIS Wildlife Services and the Chinese Academy of Sciences. There was strong participation from scientists from PREDICT Asia countries. Presented on approaches to collaboration and the disease risks of wildlife trade.
- Participated in the 2nd Annual Digital Disease Detection conference organized by HealthMap. Presented results from the Local Media Surveillance program and a tech-demo of the PathFinder (see 2.1.1. below) tool.

- Presented on One Health, global health security risks and the PREDICT project at the U.S. Department of State's OES (Ocean and International Environmental and Scientific Affairs) bureau Brown Bag event.
- Highlighted PREDICT in the Huffington Post blog piece "Pennies to Prevent Pandemics -- Virodiversity as a Grand Challenge for Global Health Security."
- Presented PREDICT methodology and results at the Society for Conservation Biology, in the Conservation Medicine Symposium to introduce conservation biologists to the importance of health in the work they do and how wildlife health is interconnected with human health.
- Presented PREDICT results at the International Conference of the Wildlife Disease Association.
- Attended the International Congress on Pathogens at the Human-Animal Interface (ICOPHAI) meeting in Brazil. Presented the Deep Forest methodology and participated in session with all Latin American Country Coordinators and partners to discuss Y5 wrap-up process.
- Sub-activity 1.5.2: **Final Report**
 - Developed plan for content and format of the final report on behalf of USAID and PREDICT partners to stakeholders.
 - Solicited material for country-specific flyers that will be used to disseminate project activities to stakeholders and initiated development of the flyers.
 - Initiated compilation of material for the final report, including background information, methodology, project activities, and success stories for each country, including photos and maps showing surveillance sites, partnerships to ensure sustainability, and publications.
 - Explored novel media tools to design an interactive web-based version for reporting project activities.
 - Contributed material to a web page through the One Health Institute website that includes a description of the project, project countries and partnerships, success stories, and publications.

LOW 2: Risk Determination

- **Activity 2.1: Develop risk filter strategy**

- Sub-activity 2.1.1: **Refine the conceptual and structural framework for Extractive Industry work:**
 - Continued supporting the Extractive Industry Working Group (EIWG) and reviewed an updated article on extractive industries and emerging infectious diseases with objective of peer-review publication.
 - Continued to refine the beta version of the PREDICT PathFinder disease identification toolkit and began working with HealthMap to develop an online application through the HealthMap PREDICT portal; presented PathFinder in a technology demonstration at the Digital Disease Detection conference.

- Sub-activity 2.1.2: **Improve targeted surveillance strategies for influenza:**
 - Identified 21 “high-priority” influenza A subtypes based on the criteria that they were detected in 3 or more animal species and in 2 or more countries. Of those, 14 had sequence data available in public databases (Influenza Research Database and GenBank) to compare the rates of nucleotide evolution among multiple countries and regions. Thus, the following subtypes were analyzed: H1N2, H3N2, H3N6, H3N8, H4N6, H5N1, H5N2, H5N3, H6N1, H6N2, H6N8, H7N3, H7N7, and H9N2; from the following countries (# of subtypes tested shown in parenthesis): Bangladesh (2), Cambodia (2), Canada (5), China (8), Egypt (2), France (2), Germany (1), Hong Kong (5), India (3), Indonesia (1), Iran (2), Israel (2), Italy (3), Japan (9), Laos (1), Mongolia (1), Myanmar (1), Nigeria (1), Pakistan (3), Romania (1), Russia (3), Saudi Arabia (1), South Africa (1), South Korea (9), Sweden (2), Taiwan (4), Thailand (2), Turkey (1), United Arab Emirates (1), United Kingdom (3), United States (14), and Vietnam (2).
 - Based on the analysis described above, found the evolutionary rates of the hemagglutinin (HA) genes across nearly all influenza subtypes were consistently higher in Asia (primarily East Asia) and Europe than in North America (U.S. and Canada). A comparison of regional and global evolutionary rates is presented in figure1 below showing the average regional and global evolutionary rates (nucleotide substitutions/site/year). These findings suggest that novel pathogenic strains of influenza may be more likely to evolve in Asia and Europe as compared to North America. However, additional factors such as population density, farming practices, the presence of live-bird markets, and other cultural and management practices will be important in determining whether a particular strain becomes established.
 - In addition to evolutionary rates, assessed the selective pressures acting on the same

subtypes by calculating the ratio of non-synonymous (D_N) and synonymous (D_S) nucleotide substitutions per site (D_N/D_S ratio). This analysis showed that overall, the HA gene among all subtypes, was under the effects of purifying selection ($dN/dS < 1$). However, certain subtypes did exhibit higher dN/dS ratios than others (i.e. H3N2, H3N8, and H5N1).

- Completed a PREDICT risk strategy model including Avian Influenza testing, healthcare spending, human and livestock population density, corruption indices, and avian diversity as predictors based on 40,449 geo-coded Influenza A strains and mapped sub-type diversity by country. Both sampling effort and healthcare spending per capita were the major determinants of HA and NA diversity suggesting that wealthier nations, which have the resources to carry out more thorough influenza testing, are detecting a greater diversity of subtypes. We are now updating the model to include evolutionary rates based on the analysis above.

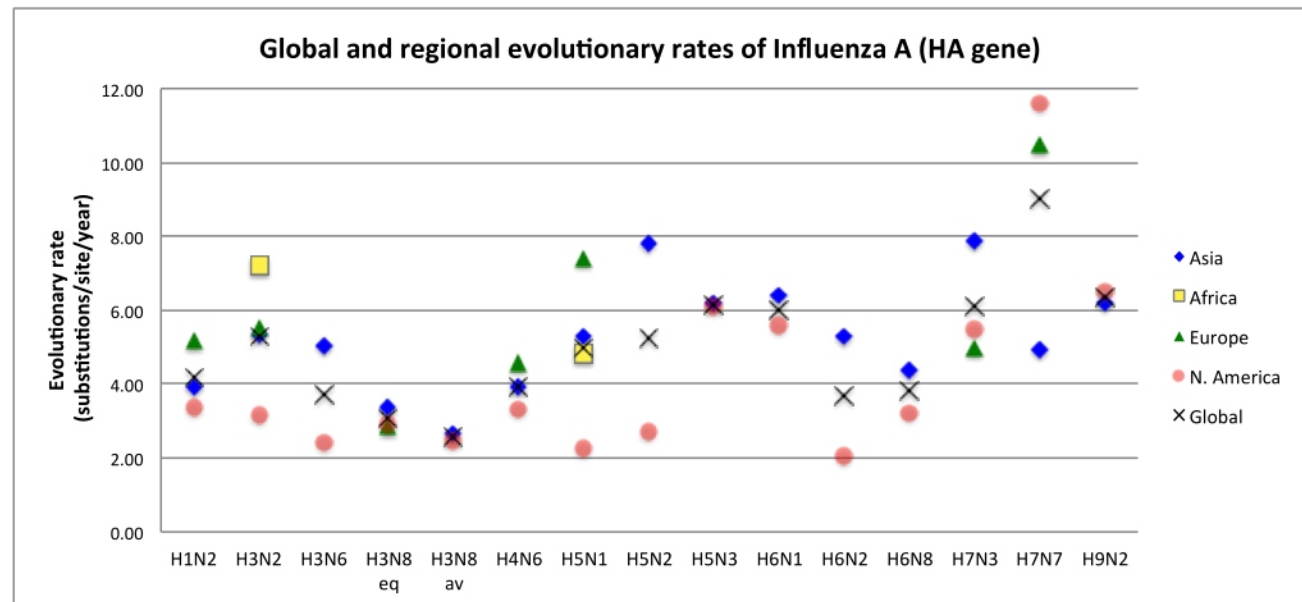


Figure 1. Evolutionary rates (nucleotide substitutions/site/year) of influenza A hemagglutinin (HA) genes from high priority subtypes. The regional and global rates presented in the figure represent averages of evolutionary rates calculated for individual countries. H3N8-eq = equine and canine strains. H3N8-av = avian strains.

- Sub-activity 2.1.3: **Inform and integrate other relevant agencies**

- Participated in the Office of Science and Technology Policy/White House “Infectious Disease Prediction Workshop” where the Pandemic Forecasting Project was launched.
 - Continued contact with CDC GDD with MPH student placement at GDD, Bangkok (student completed MPH thesis based on GDD Bangkok data and has graduated); and continued communication with (b)(6) on maintaining activities.
 - Participated in EPT “Visioning” Meeting with members of USAID, DTRA, CDC, Fogarty, and other organizations.
 - Continued discussions with CDC (b)(6) and (b)(6) about potential joint activities and risk assessment methodologies; plans to continue discussions with (b)(6) and (b)(6) in Atlanta.
- **Activity 2.2 Optimize models for diversity of disease emergence**
 - Sub-activity 2.2.1: **Refine, test and exploit geographical and temporal 'hotspot' models**
 - Finalized Deep Forest (DF) dry season sampling in Brazil and Sabah.
 - Finalized and distributed the DF booklet.
 - Began ecological analysis of DF data from GAINS.
 - Completed all Deep Forest Human Contact (DFHC) surveys in the disturbed sites in Manaus, Brazil; on-going surveys in both pristine and semi-disturbed sites. Approximately 700 surveys have been completed.
 - On-going development of DataMator database to manage and analyze DFHC survey data.
 - Began analysis plan for DFHC survey data.
 - Developed new models for the Hotspots dataset, including implementing models using boosted regression trees, which confer a number of marked advantages over traditional linear models for ecological modeling problems.
 - Began implementation of novel model validation approaches, including partitioning of datasets to compare the predictive abilities of different model types and parameterizations.
 - Continued compiling and reviewing EID events for Sicki platform.
 - Started compiling spatial data for recent disease emergence events (2004-2013) to validate predictability of existing Hotspots models.
 - Began travel analysis of MERS and Influenza A/H7N9.

- Began executing series of Generalized Linear Models to predict spillover risk of viruses known in mammals using both host and virus traits from mammal host-pathogen database; model runs 60% complete on database of 570 host species, 406 viruses, and 1580 host-virus associations.
- Constructed a competing land use model to analyze the tradeoffs between economic benefits and costs of land-use change and urbanization with particular consideration for potential damages from infectious disease outbreaks.
- Developed market observation protocols and surveys for wet market vendors and consumers to better understand the patterns of local trade and consumption of meat and food animals, and broaden our understanding of the types, condition, and numbers of different species sold for food to identify risks for disease transmission.

PREDICT Quarter 4 Year 4 Reporting

AFRICA

CAMEROON

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Trained six staff members from the Ministry of Forestry and Wildlife; four staff members from the Ministry of Livestock Fisheries and Animal Industries; one staff member from the Ministry of Environment, Protection of Nature, and Sustainable Development; and two staff members from the Ministry of Higher Education in the field on animal capture and sampling.
 - Trained four Masters II students from the Higher Institute of Medical Technology (ISTM) in the lab on topics such as research ethics; Standard Operating Procedures; cDNA Synthesis; Real time PCR; Conventional PCR; Gel purification of PCR products; serology (rapid tests, peptide ELISA, commercial ELISA); Collection, management, and usefulness of DBS samples; the One Health Approach; EPT Overview; zoonoses of bats and rodents; PPE; and bat capture.
 - Held a three-day workshop for 19 fifth year veterinary students from the Universitie de Montagnes on the following topics: Introduction to the one health approach; EPT; bat and rodent sampling; outbreak response preparedness; PPE; animal and human influenza; zoonoses of bats and rodents; collection, handling, and utility of DBS; healthy hunting education; data and sample management.
 - Travelled to Kinshasa to assist in surveillance activities in DRC.
 - b) **Laboratory System Improvements**
 - Returned broken thermocycler to the USA for repairs.

- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**
 - Conducted four field trips in rural areas (Ngoila, Akonolinga, Maga, Garoua, Nyabissan, and Mount Cameroon) and collected 693 samples, including oral and rectal swabs, plasma, and blood were collected from 409 animals, including 6 hunted primates, 18 hunted rodents, 182 bats, 83 rodents, and 15 primates from sanctuaries, as well as 2,016 DBS from hunted animals.
 - Hosted a consultant from the University of Maroua to assist staff with bat capture and identification.
 - Hosted a researcher from the University of Douala at the lab for four days to assist in identification of rodent specimens.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
CAMEROON					
Bats					
Contact with domestic animals or humans not likely	0	110	1053	336	1653
Contact with tourists/ecotourism	0	136	926	376	1180
Contact with workers harvesting crops	0	10	30	20	90
Hunted	0	554	2405	1167	4829
Other	0	19	56	38	133
Peri-domestic/ in or near human dwelling(s)	148	903	3486	2159	10413
Public safety hazard (e.g. threat to humans)	17	17	46	34	170
Rodents & Shrews					
Contact with domestic animals or humans not likely	0	53	650	145	620
Contact with tourists/ecotourism	35	35	105	70	140
For sale in medium market (5-20 vendors)	22	40	102	0	0
For sale in small market (< 5 vendors)	0	22	111	0	0
Hunted	31	1358	1758	296	1033
Peri-domestic/ in or near human dwelling(s)	19	312	1195	646	2643
Wild animal farms	0	1	1	0	0

CAMEROON	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
Non-human Primates					
Contact with domestic animals or humans not likely	0	141	141	0	0
For sale in medium market (5-20 vendors)	4	23	77	0	0
For sale in small market (< 5 vendors)	0	2	11	0	0
Hunted	1	1029	1459	81	338
Peri-domestic/in or near human dwelling(s)	0	5	16	2	3
Sanctuary	12	976	5444	783	4485
Zoo	0	1	7	1	16
Other taxa					
Contact with domestic animals or humans not likely	0	67	223	0	0
Contact with tourists/ecotourism	0	11	29	0	0
For sale in medium market (5-20 vendors)	17	38	143	0	0
For sale in small market (< 5 vendors)	0	26	113	0	0
Hunted	1	3512	3997	69	136
Peri-domestic/in or near human dwelling(s)	0	54	122	0	0
Sanctuary	0	19	52	5	5
TOTALS	30718	9474	23758	6228	27887

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Year 4 Quarter 4):**
 - Optimized new PREDICT PCR protocols: Enteroviruses VP3/VP1, Enteroviruses VP4/VP2, Bunyaviruses, Rhabdoviruses.
 - Prepared 250 samples for deep sequencing analysis.
 - Extracted RNA and synthesized cDNA for 612 samples from bats and rodents.

PREDICT Test Findings (Y4Q4):

# of Animals and Samples Submitted (by Taxa)	Diagnostic Lab	Diagnostics Method	Pathogen family/genus screening/or specific virus	Results	Pathogen Discovery	Country	Approved by Government for Release
Non-human primates (146 animals, 160 samples - buffy coat, liver, oral swab, plasma, rectal swab, spleen)	GVFI Cameroon	PCR	Alpha, Arena, Bunya, Filo, Herpes, Influenza and Seadorna viruses	Products for sequencing obtained for Alpha and Herpes viruses	Sequences obtained, interpretation ongoing	Cameroon	No
Rodent & shrews (437 animals, 939 samples - blood (whole), blood drop, genital swab, liver, oral swab, plasma, rectal swab, spleen)	GVFI Cameroon	PCR	Alpha, Arena, Bunya, Corona, Entero, Flavi, Hanta, Influenza, Paramyxo, Pox, Rhabdo and Seadorna viruses	Products for sequencing obtained for Entero and Seadorna viruses	Sequences obtained, interpretation ongoing	Cameroon	No
Bats (981 animals, 1952 samples - blood drop, liver, oral swab, plasma, rectal swab, spleen)	GVFI Cameroon	PCR	Arena, Astro, Bunya, Corona, Entero, Filo, Flavi, Hanta, Henipa, Influenza, Paramyxo, Rhabdo and Seadorna viruses	Products for sequencing obtained for Corona and Henipa viruses	Sequences obtained, interpretation ongoing	Cameroon	No
Non-human primates (3 animals, 6 samples - oral swab, rectal swab)	GVFI Cameroon	PCR	Bas Congo Virus	All negative	-	Cameroon	No
Bats (139 animals, 284 samples - liver, oral swab, plasma, rectal swab, spleen)	GVFI Cameroon	PCR	Bas Congo Virus	Products for sequencing obtained	Sequencing pending	Cameroon	No

- **Activity 1.4: Sample Tracking and Information Management**
 - Sub-activity 1.4.1: **Surveillance Data Management**
 - Provided updates to collected data in GAINS to address missing/erroneous data points.

- **Activity 1.5: Program Information Dissemination**
 - Sub-activity 1.5.2: **Communication**
 - Discussed PREDICT results with Ministry of Defense point of contact at CRESAR and received approval for release of data.
 - Following official communication of results, met with the Minister of Livestock and Chief Veterinary Officer to discuss the results and their entry in GAINS.
 - Received correspondence from Ministry of Forestry and Wildlife indicating results have been received and will be integrated in communication planning by the Ministry.

DEMOCRATIC REPUBLIC OF CONGO

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Participated in the weekly surveillance meeting at the Ministry of Health.
 - Participated with the RESPOND project and the Ministry of Agriculture and Environment in the preparation of training documents intended for students at veterinary and medical schools on the One Health concept.
 - In concert with the Ministry of Environment, prepared a staff training for parks and reserves.
 - Prepared a plan for extending the training at provincial and district levels (including training of bush meat hunters) after it was noted that more Monkeypox cases are reported from areas where PREDICT field work occurred.
 - Participated in the EPT partners meeting to discuss plans for supporting the DRC

Government in sustaining One Health activities in country.

- Participated in the first One Health conference organized by One Health Central and Eastern Africa (OHCEA).

b) Laboratory System Improvements

- Implemented and optimized all protocols included in Universal Control 2.
- Created a follow-up laboratory and field activity tool that allows daily tracking of laboratory and field activity and streamlined production of reports.
- Increased production of liquid nitrogen, which is now available to support other research projects in Kinshasa.
- Trained a new technician in laboratory management and laboratory protocols.

- **Activity 1.2: Surveillance**

- Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**

- Continued to collect biological samples from wildlife (bats, rodents, and NHP) including new localities as planned to expand the diversity of sites and interfaces of field activities:
 - Sites around Kinshasa – Bonobo Sanctuary, Mona Paradis, Athene school, and Ndolo bush meat market.
 - Bas Congo Mission – Nlambazi, Kinganga and Kintoto villages where wild animal samples were collected.
 - Collected 16 specimens from a wild human-habituated geriatric adult female Grauer’s gorilla (*Gorilla beringei graueri*) in Kahuzi-Biega National Park that suffered intraspecific trauma.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

DRC	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
Bats					

Contact with tourists/ecotourism	7	78	548	78	241
Contact with workers harvesting crops	0	14	103	28	84
For sale in small market (< 5 vendors)	0	6	114	8	14
Hunted	0	12	77	13	39
Other	8	27	108	38	114
Peri-domestic/in or near human dwelling(s)	23	376	2147	412	1741
Sanctuary	0	36	258	47	140
Rodents & Shrews					
Contact with tourists/ecotourism	0	18	172	4	6
For sale in large market (> 20 vendors)	0	1	8	0	0
Hunted	12	885	2394	485	747
Other	12	51	544	66	66
Peri-domestic/in or near human dwelling(s)	0	28	396	47	59
Sanctuary	0	2	30	2	2
Non-human Primates					
Contact with park personnel/intensive wildlife management area	1	7	71	0	0
Contact with tourists/ecotourism	0	23	183	22	164
For sale in large market (> 20 vendors)	4	46	319	61	262
Hunted	0	631	912	374	1192
Peri-domestic/in or near human dwelling(s)	0	15	111	28	93
Private wildlife collection or pet	0	19	116	21	156
Raiding crops	0	1	18	0	0
Sanctuary	0	61	641	58	426
Temporary holding facility/wildlife trade transport	0	1	7	0	0
Zoo	0	21	211	42	189
Other Taxa					
For sale in large market (> 20 vendors)	0	12	79	0	0
Hunted	0	667	909	4	11

Peri-domestic/in or near human dwelling(s)	0	3	22	0	0
For sale in small market (< 5 vendors)					
TOTALS	67	3041	10498	1838	5746

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.1: **Introduction of New Technologies**
 - Obtained positive control for a protocol to detect Bas Congo virus.
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Q4Y4):**
 - Continued RNA and DNA extractions from swabs, blood, and tissue samples from rodent, bat, and NHP specimens (n=346).
 - Shipped human samples collected from staff at the Sanctuary of Bonobo (people in close contact with sick and diseased bonobos) during the outbreak of EMCV virus, a rare infection that caused 4 deaths among bonobos (*Pan paniscus*) to the Center for Infection and Immunity at Columbia University (CII) to look for the presence of EMCV or other infections in that population with a high risk for zoonotic infections.

PREDICT Test Findings (Q4Y4):

# of Animals and Samples Submitted (by Taxa)	Diagnostic Lab	Diagnostic Method	Pathogen family/genus screening/or specific virus	Results	Pathogen Discovery	Country	Approved by Government for Release
Non-human primates (149 animals, 188 samples - blood drop, liver, oral swab, plasma, rectal swab, spleen)	GVFI PREDICT Lab, Kinshasa	PCR	Alphav, Arena, Boca, Corona, Filo, Flaviviruses, Henipa and Paramyxo viruses	Products for sequencing obtained for Arena, Corona and Henipa viruses	Sequencing pending	Congo, Democratic Republic Of	No
Bats (182 animals, 358 samples - liver, oral swab, rectal swab, spleen)	GVFI PREDICT Lab, Kinshasa	PCR	Alpha, Arena, Corona, Filo, Flavi, Henipa and Paramyxo viruses	Products for sequencing obtained for Filov and Henipa viruses	Sequencing pending	Congo, Democratic Republic Of	No
Rodent & shrews (39 animals, 72 samples - oral swab, rectal swab)	GVFI PREDICT Lab, Kinshasa	PCR	Alpha, Arena, Corona, Filoviruses, Flavi, Henipa and Paramyxo viruses	All negative	-	Congo, Democratic Republic Of	No
Ungulates (1 animal, 1 sample - oral swab)	GVFI PREDICT Lab, Kinshasa	PCR	Alpha, Arena, Corona, Filo, Flavi, Henipa and Paramyxo viruses	Products for sequencing obtained for Paramyxoviruses	Sequencing pending	Congo, Democratic Republic Of	No
Non-human primates (132 animals, 171 samples - liver, oral swab, plasma, rectal swab, spleen)	GVFI PREDICT Lab, Kinshasa	PCR	Bas-Congo virus	All negative	-	Congo, Democratic Republic Of	No

Bats (182 animals, 358 samples - liver, oral swab, rectal swab, spleen)	GVFI PREDICT Lab, Kinshasa	PCR	Bas-Congo virus	Products for sequencing obtained	Sequencing pending	Congo, Democratic Republic Of	No
Rodent & shrews (39 animals, 72 samples - oral swab, rectal swab)	GVFI PREDICT Lab, Kinshasa	PCR	Bas-Congo virus	Products for sequencing obtained	Sequencing pending	Congo, Democratic Republic Of	No
Ungulates (1 animal, 1 sample - oral swab)	GVFI PREDICT Lab, Kinshasa	PCR	Bas-Congo virus	All negative	-	Congo, Democratic Republic Of	No

- **Activity 1.4: Sample Tracking and Information Management**
 - Sub-activity 1.4.1: **Surveillance Data Management**
 - Continued to submit the data on sample collections and test results into GAINS.
- **Activity 1.5 Program Information Dissemination**
 - Sub-activity 1.5.1: **Communication**
 - Worked with USAID for customs clearance.
 - Organized regular meetings with local partners to present progress of activities in country.

GABON

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Continued to assist the Ministry of Health (MoH) and the Ministry of Water and Forest (MoWF) in data collection from provinces and district health offices, acting as a reference center and providing diagnostic support.
 - b) **Laboratory System Improvements**
 - Conducted maintenance on lab airflow and freezers.
 - Purchased a new thermocycler for pathogen testing.
 - Provided maintenance (cleaning and calibration) on the automated nucleic acid extractors and certification of the glove box in the BSL-4 lab.
- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**
 - Trapped and sampled 200 bats in North-East Gabon near Belinga caves.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
GABON					
Bats					
Contact with domestic animals or humans not likely	0	15	78	63	165
Contact with park personnel/intensive wildlife management area	0	1	5	4	10

Other	0	2102	9013	6727	17882
Peri-domestic/in or near human dwelling(s)	0	75	375	299	749
Rodents					
Contact with park personnel/intensive wildlife management area	0	140	686	0	0
Hunted	0	14	53	0	0
Other	0	158	935	159	931
Peri-domestic/in or near human dwelling(s)	0	322	1611	328	1213
Non-human Primates					
Other high risk interface	0	3	15	3	51
Other taxa					
Contact with park personnel/intensive wildlife management area	0	30	30	30	30
Contact with tourists/ecotourism	0	340	340	340	340
Other	0	19	95	18	306
TOTALS	0	3219	13236	7971	21677

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Q4Y4):**
 - Extracted RNA and synthesized cDNA from 25 bushmeat and 156 rodent samples.
 - Completed a total of 1,213 PCR reactions.

PREDICT Test Findings (Q4Y4):

# Samples submitted	Diagnostic lab	Diagnostics Method	Pathogen family / genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release (yes or no)
Non-human primates (3 animals, 3 samples - liver, spleen)	CIRMF	PCR	Alpha, Arena, Boca, Bunya, Corona, Flavi, Herpes, Orbi, Orthopox, Paramyxo, Parapox and Rhabdo viruses	Products for sequencing obtained for Arena, Bunya and Parapox viruses	Sequencing pending	Gabon	No
Rodent & shrews (3 animals, 3 samples - liver, spleen)	CIRMF	PCR	Alpha, Arena, Boca, Bunya, Corona, Flavi, Herpes, Orbi, Orthopox, Paramyxo, Parapox and Rhabdo viruses	All negative	-	Gabon	No
Carnivores (2 animals, 2 samples - liver, spleen)	CIRMF	PCR	Alpha, Arena, Boca, Bunya, Corona, Flavi, Herpes, Orbi, Orthopox, Paramyxo, Parapox and Rhabdo viruses	All negative	-	Gabon	No
Ungulates (16 animals, 16 samples - liver, spleen)	CIRMF	PCR	Alpha, Arena, Boca, Bunya, Corona, Flavi, Herpes, Orbi, Orthopox, Paramyxo, Parapox and Rhabdo viruses	Products for sequencing obtained for Arena, Boca, Bunya, Orbi and Rhabdo viruses	Sequencing pending	Gabon	No
Bats (21 animals, 24 samples - brain, heart, lung, kidney, liver, spleen, small intestine)	CIRMF	PCR	Corona, Flavi, Lyssa and Paramyxo viruses	All negative	-	Gabon	No

- **Activity 1.4: Sample Tracking and Information Management**
 - Sub-activity 1.4.1: **Surveillance Data Management**
 - Updated GAINS with new data and corrected errors.

REPUBLIC OF CONGO

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Met with (b)(6) and (b)(6) in preparation for field surveillance activities; a copy of the Ministry of Defense memo was signed and addressed to Ministries of Health, Research, and Forestry to announce the launching of PREDICT activities..
 - Met with the (b)(6) to discuss current status of the project, outbreak response preparedness, advocacy for local government support and approvals, clearance for data publication, and to draft and sign an MoU between LNSP and PREDICT.
 - Met with (b)(6) to discuss current status of the project, the inclusion of LNV staff in surveillance activities, and to draft and sign an MoU between LNV and PREDICT.
 - Submitted a research permit application to the Ministry of Scientific Research by (b)(6)
 - Prepared documentation for wildlife handling/capture permit with (b)(6) of the LNV while awaiting the approval of research permit.
 - b) **Laboratory System Improvements**
 - Received shipment of supplies at the INRB (PREDICT DRC), Kinshasa for analysis of samples collected in RoC.

- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**
 - Held discussions on field site selection for sampling in the Sangha area (north of Congo) with local government partners.
 - Selected and assigned technical support staff from PREDICT Cameroon to provide surveillance assistance in-country for wildlife sample collection.
 - Ordered all requisite supplies for field surveillance from Fischer Scientific.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

RoC	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
Bats					
Contact with domestic animals or humans NOT likely	0	338	2077	29	396
Contact with researchers (other than PREDICT staff)	0	11	3	11	34
Hunted	0	54	336	9	290
Peri-domestic/in or near human dwelling(s)	0	1	17	0	0
Rodents & Shrews					
Contact with domestic animals or humans NOT likely	0	160	321	153	1164
Contact with researchers (other than PREDICT staff)	0	31	1	14	56
For sale in small market (< 5 vendors)	0	6	51	2	64
Hunted	0	34	218	6	192
Peri-domestic/in or near human dwelling(s)	0	31	102	14	144
Non-human Primates					
Contact with domestic animals or humans NOT likely	0	169	191	167	1021
For sale in small market (< 5 vendors)	0	30	278	14	476
Hunted	0	91	555	34	1156
Other Taxa					

Contact with domestic animals or humans NOT likely	0	2	0	0	0
For sale in small market (< 5 vendors)	0	108	946	0	0
Hunted	0	248	1519	19	76
Other	0	1	15	0	0
Peri-domestic/in or near human dwelling(s)	0	1	6	0	0
TOTALS	0	1316	6636	472	5069

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Y4Q4):**
 - Testing of rodent, bat ,and non-human primate samples for Filo, Corona, Flavi, Astro, Arena, Retro, Influenza, Rhabdo, Herpes, Pox, Alpha, Seadorna, Hanta, Paramyxo, Bunya, and Henipa viruses pending.

- **Activity 1.5 Program Information Dissemination**
 - Sub-activity 1.5.1: **Communication**
 - (b)(6) (b)(6) and (b)(6) (b)(6) met with the Minister of Scientific Research to discuss the research permit, which is required before further field sample collection can be initiated; the minister gave his support and promised to have his technical department speed the review and approval process.
 - Set up bank account for fund management in RoC.

RWANDA

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) National or Regional Surveillance System Improvements**
 - Participated in meetings of the Government's One Health Steering Committee to discuss its strategic plan, arrangements to work with a consultant to assess stakeholder roles in One Health, and to update participants on Committee activities.
 - Met with Rwanda Development Board, Rwanda Agricultural Board, and Rwanda Biomedical Center to discuss the detection by the Rwanda Development Board and Louis Pasteur Institute in Senegal of Zika virus (a flavivirus) in samples from wild baboons in Akagera National Park (samples obtained in concert with PREDICT field surveillance activities).
 - Met with the Dean of Umutara Polytechnic (UP) Institute, Directors of the Wildlife and Public Health Departments at UP and with Eastern Province governmental veterinarians on project activities progress and to discuss the potential for student training.
 - Attended the 2013 International Congress on Pathogens at the Human Animal Interface (ICOPHAI) conference in Brazil and presented a poster describing project activities and successes in Uganda.
- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**
 - Collected samples from rodents at high-risk interfaces (peri-domestic, contact with park personnel) in Kanyinyar, Nyarugenge, Nyankora, and Kabarondo Sectors in and around the city of Kigali and in/around Akagera National Park.
 - Collected samples from bats at high-risk interfaces (intensive wildlife management areas, ecotourism sites, peri-domestic sites) in Nyarugenge and Kayonza Sectors, Nyamagabe District, and near Akagera National Park.

- Collected samples from primates at high-risk interfaces (ecotourism, crop-raiding) adjacent to Nyungwe National Park and in the Bugesera Agricultural Swamp area.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
RWANDA					
Bats					
Contact with tourists/ecotourism	0	102	395	0	0
Peri-domestic/in or near human dwelling(s)	0	101	470	0	0
Contact with park personnel/intensive wildlife management area	0	36	134	0	0
Contact with workers harvesting crops	0	25	100	0	0
Other	0	29	130	0	0
Rodents					
Peri-domestic/in or near human dwelling(s)	24	63	233	0	0
Contact with researchers (other than PREDICT staff)	0	184	221	0	0
Hunted	0	13	55	0	
Other	0	104	203	0	0
Non-human Primates					
Contact with park personnel/intensive wildlife management area	0	10	129	55	888
Contact with tourists/ecotourism	8	92	816	0	0
Private wildlife collection or pet	0	1	2	2	14
Hunted	0	4	8	8	56
Peri-domestic/in or near human dwelling(s)	0	34	300	4	108
Raiding crops	11	12	116	0	0
Sanctuary	0	7	114	10	244
Temporary holding facility/wildlife trade transport	0	17	289	61	824
Other		11	96	0	
Other taxa					
Hunted	0	1	6	0	0
Other	0	58	92	0	0
Contact with tourists/ecotourism	1	1	2	0	0
TOTALS	43	905	3,911	140	2134

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Q4Y4):**
 - Submitted 60 rodent samples to Makerere University Walter Reed Project (MUWRP) for extraction and viral family testing.
 - Conducted viral family testing on 130 specimens from 60 primates and on 225 specimens from 178 bats at the Makerere University Walter Reed Project laboratory; prepared PCR products for shipment to US for confirmatory sequencing.

PREDICT Test Findings (Q4Y4):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Non-Human Primates (130 specimens)	Makerere University Walter Reed Project, Kampala, Uganda	PCR	Arena, Corona, Henipa, Herpes Filo, Flavi, Influenza, Paramyxo, Bunya and Retro virus	Products obtained for sequencing for Arena, Corona, Henipa, and Herpes virus	Sequencing pending	Rwanda	No
Bats (225 specimens)	Makerere University Walter Reed Project, Kampala, Uganda	PCR	Arena, Corona, Filo, Henipa, Paramyxo, Rhabdo and Bunya viruses	Products obtained for sequencing for Arena, Corona, Filo, Henipa, Paramyxo, Rhabdo, and Bunya virus	Sequencing pending	Rwanda	No

- **Activity 1.5 Program Information Dissemination**
 - Sub-activity 1.5.2: **Communication**
 - Met with the Directors of the Rwanda Development Board – Tourism & Conservation department and with the Rwanda Agricultural Board Animal Health Services department to provide updates on PREDICT project progress and plans.

TANZANIA

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Conducted field and lab site visits with the Director of Global Disease Detection (GDD) and International Emerging Infections Program from CDC Kenya and held meetings with the Kilombero District Chief Medical Officer on plans for collaborative surveillance at sugarcane plantations.
 - Coordinated with RESPOND's One Health Central East Africa (OHCEA) program to train 36 One Health students from Sokoine University of Agriculture and Muhimbili University of Health and Allied Sciences on safe capture, handling, sampling of bats and rodents, and data management at our Kilombero human-animal interface site.
 - Attended the International Congress on Pathogens at the Human-Animal Interface (ICOPHAI) 2013 and presented on Tanzania field and lab approaches in a poster session.
 - Trained 9 students from the Sokoine University of Agriculture's Faculty of Veterinary

Medicine Bachelor of Science in Biotechnology and Laboratory Science in biosafety, safe capture and handling of animals, data management, and sample processing under project protocols.

- Prepared Partner Update reports to inform partners of project progress and achievements, and scheduled meetings with ministries to officially report confirmed findings and discuss public release.
- Submitted an abstract to the Tanzania Wildlife Research Institute (TAWIRI) under the sub-theme human-wildlife interaction and received approval to participate in the 9th TAWIRI Scientific Conference “Sustaining Wildlife Conservation in Growing Socio-economic Demands” in December 2013.
- Procured permit renewals for field and laboratory activities through TAWIRI, the Tanzania Commission for Science and Technology, and the Tanzania National Parks for the upcoming calendar year enabling access to 15 national parks and surrounding areas throughout the country.

b) **Laboratory System Improvements**

- Initiated permissions process for exporting nonhuman primate fecal samples to the US through TAWIRI.
- Continued regional laboratory collaboration with Makerere University Walter Reed Project (MUWRP) in Uganda and shipped 2 bat and 14 rodent oropharyngeal swab specimens to MUWRP for viral family-level testing. Results are pending.
- Maintained weekly communication with the UC Davis lab to ensure quality control in sample processing.

- **Activity 1.2: Surveillance**

- Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**

- Conducted surveillance in Morogoro region and collected samples from 61 fruit bats (*Eidolon helvum*) at Nunge in Morogoro municipality (peri-domestic interface), 27 insectivorous bats in Ifakara District (peri-domestic and transport interfaces), and 5 small insectivorous bats in Mlali village (peri-domestic interface).

- Revisited our surveillance site at the Kilombero Sugar Company to sample fruit bats and meet objectives for colony comparison seasonality, as well as to sample rodents at a crop-raiding interface where previous efforts were unsuccessful due to rains. Successfully sampled 36 fruit bats and 32 rodents meeting objectives.
- Initiated non-invasive sampling of non-human primates by collecting fresh fecal samples in 5 forests in the Udzungwa Mountains (Mwanihana, Magombera, New Dabaga-Ulongambi, Nyumbanitu, and Ndundulu). Successfully collected samples from 239 primates, including Iringa red colobus, black and white colobus, yellow baboon, Syke's monkeys, and Sanje mangabeys.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

Tanzania	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
Bats					
Contact with tourists/ecotourism	0	59	240	0	0
Contact with workers in extractive industry	0	36	185	18	252
Peri-domestic/in or near human dwelling(s)	93	406	2397	11	119
Rodents & Shrews					
Hunted	1	76	429	0	0
Peri-domestic/in or near human dwelling(s)	0	297	1724	73	547
Raiding crops	0	213	1262	86	855
Raiding markets	0	9	55	0	0
Non-human Primates					
Contact with park personnel/intensive wildlife management area	122	122	366	0	0
Contact with tourists/ecotourism	30	30	90	0	0
Hunted	1	14	78	0	0
Other	56	56	168	0	0

Peri-domestic/in or near human dwelling(s)	22	22	66	0	0
Raiding crops	12	17	46	0	0
Other Taxa					
Contact with workers in extractive industries	0	2	8	0	0
Hunted	3	305	1278	0	0
Peri-domestic/in or near human dwelling(s)	0	8	55	0	0
Preying on livestock or their food	0	15	28	0	0
Raiding crops	0	3	14	0	0
TOTALS	340	1690	8489	188	1773

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Q4Y4):**
 - Completed sample processing (RNA extraction and cDNA synthesis) from bat samples collected at the Muheza and Amboni caves in quarter 3.
 - Shipped PCR products from 108 bats and 144 rodents to the UC Davis lab for viral family screening, including specimens previously tested at the MUWRP lab in Uganda as part of ongoing quality assurance testing between our East Africa labs.

PREDICT Test Findings (Y4Q4):

# of Animals and Samples Submitted (by Taxa)	Diagnostic Lab	Diagnostics Method	Pathogen family/genus screening/or specific virus	Results	Pathogen Discovery	Country	Approved by Government for Release
Bats (23 animals, 23 samples - oral swab, rectal swab)	UC Davis Wildlife Diagnostic Lab	PCR	Alpha, Arena, Corona, Filo, Flavi, Hanta, Henipa, Influenza, Paramyxo and Rhabdo viruses	Product for sequencing obtained for Paramyxoviruses	Sequence obtained, interpretation ongoing	Tanzania	No

Rodent & shrews (70 animals, 70 samples - oral swab)	UC Davis Wildlife Diagnostic Lab	PCR	Alpha, Arena, Filo, Flavi, Hanta, Influenza, Paramyxo and Rhabdo viruses	All negative	-	Tanzania	No
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- **Activity 1.4: Sample Tracking and Information Management**
 - Sub-activity 1.4.1: **Surveillance Data Management**
 - Maintained communication between lab and field teams and continued to update specimen tracking sheets and GAINS as needed.

UGANDA

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Trained Makerere University final-year veterinary students on PREDICT protocols (biosafety and PPE use and safe animal capture and sampling) during a field practical in Lake Mburo National Park July 22-26.
 - Facilitated receipt of extracted wildlife samples from PREDICT Tanzania to Makerere University Walter Reed Project, the regional laboratory partner for PREDICT viral family diagnostics.
 - Attended the 2013 International Congress on Pathogens at the Human Animal Interface (ICOPHAI) conference in Brazil in July: presented a poster describing PREDICT activities

and successes in Uganda.

- Invited to provide One Health perspectives and expertise at a Makerere University Wildlife and Aquatic Resources Management (WARM) Department meeting and to discuss WARM's strategic plan and review and revamp curriculum for the wildlife Master's degree at WARM, which aims to serve as a regional training program.
 - Attended a USAID Mission Uganda Implementing Partners meeting to provide program updates and discuss strengthening cooperation and synergies between related programs.
- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**
 - Collected >150 samples from 34 primates (vervet monkeys) at high-risk interfaces (peri-domestic at a zoo/captive wildlife facility) in Entebbe.
 - Collected 38 samples from 8 marabou storks captured at high-risk interfaces (urban markets, abattoirs, and dump sites) in Kampala, Uganda.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
UGANDA					
Bats					
Contact with tourists/ecotourism	8	53	205	0	0
Contact with park personnel/intensive wildlife management	0	8	199	0	0
Peri-domestic/in or near human dwellings	0	12	46	0	0
Contact with domestic animals or humans not likely	0	4	28	0	0
Public safety hazard (e.g. threat to humans)	0	30	446	0	0
Preying on livestock or their food	0	1	5	0	0
Rodents					
Contact with domestic animals or humans not likely	0	136	864	18	108
Contact with tourists/ecotourism	13	34	157	0	0
Peri-domestic/in or near human dwelling(s)	51	123	929	0	0

Contact with park personnel/intensive wildlife management area	0	1	25	0	0
Hunted	0	13	130	24	144
Non-human Primates					
Contact with park personnel/intensive wildlife management area	2	18	281	0	0
Contact with tourists/ecotourism	0	324	463	18	157
Hunted	0	2	20	1	27
Contact with domestic animals or humans not likely	0	10	85	17	187
Zoo/captive wildlife facility	34	60	456	0	0
Raiding crops	0	4	72	2	22
Preying on livestock or their food	0	2	20	2	22
Public safety hazard (e.g. threat to humans)	0	2	16	0	0
Peri-domestic/in or near human dwelling(s)	0	1	4		
Sanctuary	0	47	255		
Temporary holding facility	0	30	150		
Other taxa					
Free-ranging; contact with domestic animals or humans not likely	0			0	0
Hunted	0	21	65	26	156
Peri-domestic/in or near human dwelling(s)	8	9	107	0	0
Raiding crops	0	1	15	1	11
Contact with tourists/ecotourism	0	3	36	1	11
Preying on livestock or their food	0	1	7	1	11
TOTALS	116	959	5,086	111	856

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - **Sub-activity 1.3.1: Introduction of New Technologies**
 - Continued deployment and utilization of the cellphone-based Animal Mortality Monitoring Program (AMMP) at 26 ranger outposts in and around Queen Elizabeth Conservation Area and in surrounding communities, resulting in the submission of 33 animal morbidity and mortality reports, including 2 non-human primates and 1 bat.

- Sub-activity 1.3.2: **Pathogen detection and discovery (Q4Y4):**
 - Conducted PREDICT viral family testing on 241 rodent, 201 primate, and 33 bat samples at the Makerere University Walter Reed Project laboratory; prepared PCR products for shipment to US for confirmatory sequencing.

PREDICT Test Findings (Q4Y4):

# of Animals and Samples Submitted (by Taxa)	Diagnostic Lab	Diagnostics Method	Pathogen family/genus screening/or specific virus	Results	Pathogen Discovery	Country	Approved by Government for Release
Rodents (241 specimens)	Makerere University Walter Reed Project	PCR	Hanta, Rhabdo, Arena, Adeno, Henipa, Herpes, Corona, Filo, Flavi, Paramyxo Alphavirus, hantavirus and influenza viruses	Products for sequencing obtained for Hanta, Rhabdo, Arena, Adeno, Henipa, Herpes, Corona, Filo Flavi and Paramyxo virus	Sequencing pending	Uganda	No
Non-human primates (201 specimens)	Makerere University Walter Reed Project	PCR	Rhabdo, Influenza, Entero, Filo, Paramyxo, Flavi, Henipa, Herpes, Retro, Alpha, Arena, Hanta Corona viruses	Products obtained for sequencing for Rhabdo, Influenza, Entero, Filo, Paramyxo, Flavi, Henipa, Herpes and Retro virus	Sequencing pending	Uganda	No
Bats (33 specimens)	Makerere University Walter Reed Project	PCR	Filo, Herpes, Rhabdo, Adeno, Entero, Flavi, Arena, Corona, Hanta, Henipa, Influenza, Paramyxo viruses	Products obtained for sequencing for Filo, Herpes, Rhabdo, Adeno, Entero and Flavi virus	Sequencing pending	Uganda	No

- **Activity 1.5 Program Information Dissemination**
 - Sub-activity 1.5.2: **Communication**
 - Provided updates on PREDICT activities and progress to the Uganda EPT Coordinator and EPT Uganda partners at monthly meetings in Kampala.

LOW 2: Risk Determination

- Conducted 20 days of wildlife sampling for the Deep Forest Project in pristine and intermediate project sites in the Bwindi Impenetrable National Park area: collected 24 samples from 8 bats, and 228 samples from 64 rodents.
- Conducted human-animal contact surveys in 200 households in communities surrounding Bwindi Impenetrable National Park to assess zoonotic disease transmission risk.
- Facilitated transfer to UC Davis of human samples collected at Bwindi Community Hospital and an adjacent community clinic (near Deep Forest sites) for investigation of zoonotic viral pathogen exposure in people presenting with fever.

ASIA

BANGLADESH

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Traveled to Nepal to conduct training on bat sampling with the Nepal team and some of the Global team.
 - Attended in-country partners EPT/EPT+ and AI coordination meeting with USAID Mission in Dhaka.
 - Participated in Annual One Health coordination meeting in Dhaka.
 - b) **Laboratory System Improvements**
 - Met with Forestry Department to discuss data reporting, data sharing policy, Safari Park wildlife lab development, and lab training of a forestry veterinarian.
 - ICDDR,B lab expanded wildlife screening to include more viral families under the second protocol set.
- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter.**
 - Continued to identify new areas with wildlife-human interfaces, including areas with heavy hunting activity and/or wildlife consumption, and developed surveillance strategies for sampling.
 - Sampled 139 rodents and shrews, collecting 1873 samples.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

Bangladesh	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
Bats					
Contact with domestic animals or humans NOT likely	0	114	1460	0	0
Peri-domestic/in or near human dwelling(s)	0	3523	32301	2121	13744
Raiding crops	0	40	624	0	0
Raiding markets	0	51	458	0	0
Rodents & Shrews					
Contact with domestic animals or humans NOT likely	0	70	894	156	624
Contact with tourists/ecotourism	0	19	281	37	148
Other	139	139	1873	0	0
Peri-domestic/in or near human dwelling(s)	0	371	5161	640	2540
Raiding markets	0	84	1061	0	0
Non-human Primates					
Contact with tourists/ecotourism	0	4	60	8	32
Peri-domestic/in or near human dwelling(s)	0	539	1078	0	0
Other Taxa					
Contact with domestic animals or humans NOT likely	0	383	2445	2	8
Peri-domestic/in or near human dwelling(s)	0	311	1951	330	1706
TOTALS	139	5648	49647	3294	18802

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - **Sub-activity 1.3.1: Introduction of New Technologies:**
 - Received universal positive control 2 and associated protocols for the laboratory.
 - Received additional 8 viral family primers; expanding lab testing to include (influenza, flavi, astro, rhabdo, and corona virus families).
 - **Sub-activity 1.3.2: Pathogen detection and discovery (Q4Y4):**

- Extracted 256 rodent samples.
- Initiated PCR analysis of 256 rodent samples for viral families: hanta-, arena- and paramyxoviruses at icddr,b.

PREDICT Test Findings (Q4Y4):

# Samples submitted	Diagnostic lab	Diagnostic Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Bats (1234 animals, 1663 samples - oral swab, rectal swab, urine, urine/urogenital swab)	Center for Infection and Immunity, Columbia University	PCR	Adeno, Astro, Boca, Corona, Herpes, Nipah, Paramyxo and Polyoma viruses	Products for sequencing obtained for Adeno, Astro, Boca, Corona, Herpes, Nipah, Paramyxo and Polyoma viruses	Sequences obtained, interpretation ongoing	Bangladesh	No
Non-human primates (4 animals, 8 samples - oral swab, rectal swab)	Icddr,b Lab	PCR	Arena, Hanta and Paramyxo viruses	All negative	-	Bangladesh	No
Rodent & shrews (257 animals, 584 samples - oral swab, rectal swab, urine/urogenital swab)	Icddr,b Lab	PCR	Arenaviruses, Hantaviruses, Paramyxoviruses	Product for sequencing obtained for Hanta and Paramyxo viruses	Sequencing pending	Bangladesh	No
Carnivores (2 animals, 5 samples - oral swab, rectal swab, urine/urogenital swab)	Icddr,b Lab	PCR	Arena, Hanta and Paramyxo viruses	All negative	-	Bangladesh	No
Other mammals (7 animals, 21 samples - oral swab, rectal swab, urine/urogenital swab)	Icddr,b Lab	PCR	Arena, Hanta and Paramyxo viruses	Products for sequencing obtained for Hanta and Paramyxo viruses	Sequencing pending	Bangladesh	No
Other taxa (1 animals, 2 samples - oral swab, rectal swab)	Icddr,b Lab	PCR	Arena, Hanta and Paramyxo viruses	All negative	-	Bangladesh	No

Bats (468 animals, 588 samples - oral swab, rectal swab, urine/urogenital swab)	Center for Infection and Immunity, Columbia University	PCR	Boca, Corona, Herpes and Nipah viruses	Product for sequencing obtained for Boca, Corona, Herpes and Nipah viruses	Sequences obtained, interpretation ongoing	Bangladesh	No
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- **Activity 1.4: Sample Tracking and Information Management**
 - Sub-activity 1.4.1: **Surveillance Data Management**
 - Entered all field and surveillance data into GAINS database.
 - Updated previous surveillance sheets as requested.
- **Activity 1.5 Program Information Dissemination**
 - Sub-activity 1.5.2: **Communication**
 - Met IEDCR Director of MOH and shared update of PREDICT findings.
 - Received government approval for publishing PREDICT findings to international community via scientific journal and online publication.

CHINA

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Participated in a national conference “Sharing Experiences on the Application of One Health Approaches in China” and presented project proceedings and exchanged experiences, challenges, and accomplishments in China with partners from FAO, WHO, International Livestock Research Institute (ILRI), and officers from various Chinese government departments.

- Traveled to east Guangdong Province with GDCDC/GDIPH to summarize Y4 work involving prefecture level CDCs and sentinel hospitals and coordinated activities for Y5.
- Expanded understanding of the work at GDCDC/GDIPH that has encouraged other public health sectors in China to seek collaborations with partners.

b) Laboratory System Improvements

- Continued and expanded implementation of the testing at GDCDC/GDIPH on specimens from humans with acute diseases.

- **Activity 1.2: Surveillance**

- Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**

- Surpassed sample animal target with more than 2500 animals sampled from priority taxa and high risk interfaces.
- Conducted wildlife sampling in Yunnan, Guangxi, Guizhou, and Guangdong Provinces.
- Continued collaborations with Yunnan and Shanghai CDC.
- Identified wet markets, animal markets, poultry markets, and farmers (of 'wild' animals) in Yunnan, Guangxi, and Guangdong Provinces to conduct Avian Influenza surveillance and market questionnaires.
- Purchased field supplies for Avian Influenza fieldwork in South China.
- Conducted trials of wet market and animal market questionnaires.
- Enrolled 99 new participants in the follow-up phase of Animal-Human Interface Project.
- Collected samples from 51 human cases with encephalitis and 22 with hemorrhagic fever for hospital-based surveillance study.
- Enrolled Donghua Hospital (Dongguan, Guangdong Province) as a new sentinel hospital for hospital-based surveillance study in Y5.
- Performed data analysis of human behavioral data through collaborative works with Yale Occupational and Environmental Medicine Program (YOEMP).
- Extended human surveillance to a new province via a collaboration with Jiangsu Provincial Center for Disease Control and Prevention (JSCDC), which is interested in analyzing archived human samples from cases displaying hemorrhagic symptoms.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

CHINA	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
Bats					
Contact with domestic animals or humans NOT likely	6	137	286	0	0
Contact with locals for religious activities	104	104	416	0	0
Contact with tourists/ecotourism	151	1113	2277	0	0
Contact with workers harvesting crops	163	258	688	0	0
Contact with workers in extractive industry	46	83	166	0	0
Free-ranging	0	267	534	0	0
Hunted	0	174	348	0	0
Peri-domestic/in or near human dwelling(s)	0	36	72	0	0
Raiding crops	0	26	52	0	0
Rodents & Shrews					
Contact with domestic animals or humans NOT likely	0	182	364	0	0
Contact with locals for religious activities	3	3	12	0	0
Contact with workers harvesting crops	144	144	576	0	0
For sale in large market (> 20 vendors)	0	64	64	0	0
Wild animal farm	0	247	494	322	483
Other Taxa					
Contact with domestic animals or humans NOT likely	0	5	10	0	0
Contact with tourists/ecotourism	1	3	8	0	0
Contact with workers harvesting crops	4	4	8	0	0
For sale in large market (> 20 vendors)	0	127	127	0	0
Wild animal farm	0	6	12	12	18
Total	622	2983	6514	334	501

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.2: **Pathogen detection and discovery:**
 - *Nature* paper accepted for publication on “Isolation and characterization of a bat SARS-like coronavirus that uses the ACE2 receptor.”
 - Analyzed human samples from 170 ILI cases and 45 encephalitis cases using PREDICT protocols for influenza A, paramyxo, corona, henipa, arena, hanta, seadorna, and flavi viruses.

PREDICT Test Findings (Q4Y4):

# Samples submitted	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Human ILI cases (nasal swabs 170)	GDCDC	Conventional PCR	Influenza A	Products obtained for sequencing	Sequencing pending	China	No
Human ILI cases (nasal swabs 170)	GDCDC	Conventional PCR	Coronavirus	Products obtained for sequencing	Sequencing pending	China	No
Human ILI cases (nasal swabs 170)	GDCDC	Conventional PCR	Paramyxovirus	All negative	-	China	No
Human ILI cases (nasal swabs 170)	GDCDC	Conventional PCR	Henipavirus	All negative	-	China	No
Human ILI cases (nasal swabs 93)	GDCDC	Conventional PCR	Arenavirus	All negative	-	China	No
Human ILI cases (nasal swabs 77)	GDCDC	Conventional PCR	Hantavirus	All negative	-	China	No
Human Encephalitis CSF, serum, nasopharyngeal swabs (45)	GDCDC	Conventional PCR	Paramyxovirus	All negative	-	China	No
Human Encephalitis cases (CSF, serum, nasopharyngeal swabs 45)	GDCDC	Conventional PCR	Arenavirus	All negative	-	China	No
Human Encephalitis cases (CSF, serum, nasopharyngeal swabs 45)	GDCDC	Conventional PCR	Hantavirus	All negative	-	China	No
Human Encephalitis cases (CSF, serum, nasopharyngeal swabs 45)	GDCDC	Conventional PCR	Seadornavirus	All negative	-	China	No

# Samples submitted	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Human Encephalitis cases (CSF, serum, nasopharyngeal swabs 45)	GDCDC	Conventional PCR	Flavivirus	All negative	-	China	No

- **Activity 1.4: Sample Tracking and Information Management**
 - Sub-activity 1.4.1: **Surveillance Data Management**
 - Uploaded all field data to GAINS database.

- **Activity 1.5 Program Information Dissemination**
 - Sub-activity 1.5.2: **Communication**
 - Held meetings with ECNU/YNCDC and GDCDC/GDIPH on a weekly basis to update on activities.
 - Produced a report (both in English and Chinese) outlining PREDICT activities in support of the H7N9 outbreak response, “USAID PREDICT Enhanced One Health Surveillance of Avian Influenza H7N9 Infection in Guangdong Province, China” and shared with all partners.
 - Held regular meetings with in-country coordinator and PREDICT Partners to organize Avian Influenza H7N9 surveillance efforts in Guangdong, Guangxi, and Yunnan Provinces.

NEPAL

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) National or Regional Surveillance System Improvements**
 - Hosted the UC Davis team and met with USAID Nepal, the Ministry of Forests and Soil Conservation, Ministry of Agriculture, and Ministry of Health to discuss opportunities for training in wildlife disease surveillance and pathogen testing and expansion of disease surveillance activities.
 - Received permissions from the Department of National Parks and Wildlife Conservation to transfer cDNA and PCR products for sequencing to UC Davis for comparison, quality control, and additional viral family screening.
 - Finalized the partner reporting format and submitted an official partner update to the Ministry of Forests and Soil Conservation, Ministry of Agriculture, Ministry of Health and USAID Nepal.
 - b) Laboratory System Improvements**
 - Initiated discussions with the Department of Livestock Services Central Veterinary Laboratory (CVL) on a joint training program for CVL technicians using viral family screening protocols on avian specimens in the CVL archive collected during influenza surveillance activities.
 - Initiated discussions with the Patan Academy of Health Sciences to incorporate specimens collected by PAHS into the Deep Freeze Project.
- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**
 - Conducted refresher trainings for the surveillance team on bio-safety, cold chain, safe animal capture and handling techniques, rodent sampling protocols, non-invasive bat sampling protocols, and information management (GAINS) protocols.

- Optimized the surveillance strategy and made adjustments to the rodent surveillance plan: sites at Teku Dovan, Kuleshwor, Balkhu and Jadibuti (the remaining 4 planned surveillance sites) will be sampled once (no paired wet-dry season sampling) but with increased numbers of samples collected per site (n=50).
- Completed dry season rodent sampling at the Bansighat and Jadibuti sites, and wet season rodent sampling at the Thapathali and Bansighat sites.
- Completed all primate sampling activities for the project, including additional wet season primate sampling at the Pashupati temple complex.
- Initiated assessment of local media sources to start Local Media Surveillance program to monitor for and report outbreaks and infectious disease events in both animals and people in Nepal.
- Hosted the Bangladesh Country Coordinator to lead trainings in non-invasive bat sample collection, and completed all planned bat surveillance through the training.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
Nepal					
Rodents & Shrews					
Peri-domestic/in or near human dwelling(s)	53	172	1046	57	449
Non-human Primates					
Public safety hazard (e.g. threat to humans)	36	143	146	106	637
Total	89	315	1192	163	1086

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Q4Y4):**
 - Optimized lab protocols for all selected viral families and initiated viral family testing: rodent specimens are being screened for paramyxo, arena, hanta, bunya and rhabdo viruses; macaque specimens for paramyxo, retro, influenza, henipa and corona viruses; and bat specimens for paramyxo, rhabdo, filo, henipa, and corona viruses.
 - Prepared c-DNA of all samples to ship to UC Davis for testing for quality assurance testing, screening of additional viral families and sequencing (as needed).

PREDICT Test Findings (Q4Y4):

# of Animals and Samples Submitted (by Taxa)	Diagnostic Lab	Diagnostics Method	Pathogen family/genus screening/or specific virus	Results	Pathogen Discovery	Country	Approved by Government for Release
Rodent & shrews (57 animals, 57 samples - oral swab)	CMDN/INTRE PID NEPAL	PCR	Arena, Bunya, Hanta, Paramyxo and Rhabdo viruses	All negative	-	Nepal	No

- **Activity 1.4: Sample Tracking and Information Management**
 - Sub-activity 1.4.1: **Surveillance Data Management**
 - Conducted GAINS refresher training with both surveillance and laboratory teams.

SOUTHEAST ASIA

CAMBODIA

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Two National Veterinary Research Institute (NaVRI) technical staff members and 8 veterinary students from Prek Leap National Agriculture Institute (PLNAI) assisted with wildlife sampling.
 - Presented wildlife surveillance activities at Zoonotic Technical Working Group meeting.
 - Met with Forestry Administration to discuss further collaboration on surveillance and ranger training.
 - Trained two veterinary students from the Royal University of Agriculture on testing for Enteroviruses and Herpesviridae at Institut Pasteur du Cambodia (IPC) using primate samples they had collected during surveillance training.
 - Attended the regional Wildlife Health Capacity Forum held in Bangkok, Thailand.
 - b) **Laboratory System Improvements**
 - Continued to train two laboratory technicians from NaVRI on viral family screening of samples at IPC with the goal to conduct primate viral family screening at NaVRI.
 - Continued to refine Roche 454 protocols for sample testing.
 - Optimized additional PREDICT protocols for the detection of bunya, orthopox, retro, herpes, and entero viruses.
- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**
 - Completed final planned quarterly sampling and concurrent survey event with hunters of wildlife in three Khmer villages in Preah Vihear Province.
 - Sampled fruit bats hunted from around the temples at Angkor Wat.

- Sampled macaques that died on primate farms.
- Sampled gibbons at the Angkor Centre for Conservation of Biodiversity.
- Sampled primates hunted by villagers in Ratanakiri Province in Northeastern Cambodia.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

CAMBODIA	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
Bats					
Contact with tourists/ecotourism	0	96	96	96	769
For sale in restaurant	0	347	595	0	0
Hunted	46	990	2345	547	3497
Peri-domestic/in or near human dwelling(s)	0	143	143	142	1144
Wild animal farm	0	898	918	0	0
Rodents & Shrews					
Contact with tourists/ecotourism	0	10	10	10	30
For sale in large market (> 20 vendors)	0	11	21	0	0
Hunted	1	328	1307	144	695
Other	0	54	269	0	0
Peri-domestic/in or near human dwelling(s)	0	34	34	34	102
Non-human Primates					
Contact with tourists/ecotourism	0	25	29	0	0
For sale in large market (> 20 vendors)	0	52	100	0	0
For sale in medium market (5-20 vendors)	0	2	4	0	0
Hunted	15	97	220	0	0
Rehabilitation center	2	8	14	6	48
Sanctuary	0	8	51	0	0
Zoo	2	2	4	0	0
Other Taxa					
Contact with tourists/ecotourism	0	22	22	0	0

For sale in large market (> 20 vendors)	0	21	29	0	0
For sale in medium market (5-20 vendors)	0	93	93	0	0
For sale in small market (< 5 vendors)	0	1	1	0	0
Hunted	9	396	824	674	714
Private wildlife collection or pet	1	1	2	0	0
TOTALS	76	3639	7131	1653	6999

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Q4Y4):**
 - Screened 325 primate samples for 15 viral families, interpretation of positives is ongoing.
 - Screened 498 rodent samples for Paramyxoviruses, interpretation of positives is ongoing.
 - Screened 309 bat samples for Paramyxoviruses, interpretation of positives is ongoing.

PREDICT Test Findings (Q4Y4):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Rodents (498 samples)	Institute Pasteur Cambodia	PCR	Paramyxo viruses	Product for sequencing obtained	Sequences obtained, interpretation ongoing	Cambodia	No
Non-Human Primates (325 samples)	Institute Pasteur Cambodia	PCR	Filo, Arena, Astro, Paramyxo, Flavi, Herpes, Corona, Influenza A, Enterovirus, Bunyavirus, Boca, Seadornavirus, Orthopox, Henipavirus and Retroviruses	Products for sequencing obtained for Corona, Astro, Enterovirus, Herpes and Retroviruses \	Sequences obtained, interpretation ongoing	Cambodia	No

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Bats (309 samples)	Institute Pasteur Cambodia	PCR	Paramyxo viruses	Product for sequencing detected	Sequences obtained, interpretation ongoing	Cambodia	No

Activity 1.4: Sample Tracking and Information Management

- Sub-activity 1.4.1: **Surveillance Data Management**
 - Updated PCR testing and sequencing results in GAINS.

INDONESIA

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1: Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Continued assisting the Government with follow-up and verification of an article published by Indonesian scientist on the evidence for antibody of Ebola virus exposure in orangutans.
 - Attended a meeting to establish a National Committee for Wildlife Health, led by the Ministry of Forestry and Ministry of Agriculture.
 - Attended a meeting on the Preparedness for Emerging Pandemic H7N9 at Coordinating Ministry for People’s Welfare.

- Attended a meeting on AI A/(H5N1) and AI A/(H7N9) virus surveillance by FAO Indonesia at Directorate of Animal Health Services, Ministry of Agriculture.

b) Laboratory System Improvements

- Procured additional reagents and consumables for testing of undiagnosed febrile clinical specimens from Bandung Cluster, Papua, and Bandung cohort studies.
 - Optimized additional PREDICT protocols for Rhabdo and Hanta viruses.
 - Received an additional Hantavirus positive control obtained from rat lung provided by NIHRD, Ministry of Health.
 - Procured laboratory equipment.
- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**
 - Field surveillance trip to Gorontalo and North Sulawesi provinces to collect wildlife specimens, including from 98 live bats, 6 rodents, and 15 monkeys (912 specimens in total).

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
INDONESIA					
Bats					
Contact with researchers (other than PREDICT staff)	0	20	140	0	0
For sale in large market (> 20 vendors)	98	158	1107	31	279
Peri-domestic/in or near human dwelling(s)	0	37	274	18	162
Rodents & Shrews					
Contact with researchers (other than PREDICT staff)	0	11	77	0	0
Contact with tourists/ecotourism	6	16	131	0	0

Non-human Primates					
Contact with tourists/ecotourism	11	140	180	124	1116
Total	115	382	1909	173	1557

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Q4Y4):**
 - Optimized Universal Control 2 protocol for prioritized virus families for three animal taxa to be applied in Y5, including pox, bunya, and rhabdo viruses in rodents; influenza, astro, and henipa viruses in bats; retro and herpes viruses in non-human primates.
 - Tested archived human samples from Bandung hospitalization study (154) for 15 viral families/genera.
 - Tested archived human samples from Papua (54).

PREDICT Test Findings (Q4Y4):

# Samples submitted	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release (yes or no)
Non-human primates (67 animals, 67 samples - buffy coat, feces, plasma, red blood cells)	PRC-IPB	PCR	Arena, Corona, Filo, Flavi and Paramyxo viruses	Products for sequencing obtained for Arena, , and Paramyxo viruses	Sequences obtained, interpretation ongoing	Indonesia	No
Bats (7 animals, 7 samples - oral swab)	PRC-IPB	PCR	Corona, Flavi and Paramyxo viruses	All negative	-	Indonesia	No
Humans (54/54)	Eijkman	PCR	Hanta and Henipa viruses	All negative	-	Indonesia	No
Humans (154/154)	Eijkman	PCR	Phlebo, Rhabdo, Henipa, Hanta, Entero, Lenti, Orbi and Herpes viruses	Products for sequencing obtained for herpes and lenti viruses	Sequences obtained, interpretation ongoing	Indonesia	No

- **Activity 1.4: Sample Tracking and Information Management**
 - Sub-activity 1.4.1: **Surveillance Data Management**
 - Data on collected wildlife samples from Sulawesi submitted to GAINS.

LAO PDR

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) National Surveillance System Improvements**
 - Presented wildlife surveillance activities from Laos, Cambodia, and Vietnam at Wildlife Health Forum in Bangkok, Thailand.
 - Trained two National Animal Health Laboratory (NAHL) staff in the field on biosafety, maintaining cold chain, data entry, and wildlife species identification.
 - b) Laboratory System Improvements**
 - Installed additional ultralow temperature freezers at NAHL for wildlife samples.
 - Delivered kits, equipment, and essential supplies to partner laboratories.
- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**
 - Sample collection now targeting bats and non-human primates to increase sample size.
 - Due to heavy rainfall and flooding in the country, hunting has been reduced and many markets were found to have no wildlife present during surveillance field trips; 7 markets were visited; no bats or primate samples were available for collection.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

LAO PDR	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
Bats					
For sale in large market (> 20 vendors)	0	781	3187	672	2792
For sale in medium market (5-20 vendors)	0	2	8	0	0
For sale in small market (< 5 vendors)	0	6	26	13	69
For sale in market, unknown size	0	39	166	82	426
Hunted	0	110	271	210	645
Rodents					
For sale in large market (> 20 vendors)	0	916	3888	422	552
For sale in market, unknown size	0	49	248	125	353
For sale in medium market (5-20 vendors)	0	62	315	4	4
For sale in small market (<5 vendors)	0	37	155	51	69
Hunted	0	380	1508	419	444
Non-human Primates					
For sale in large market (> 20 vendors)	0	12	60	0	0
For sale in medium market (5-20 vendors)	0	4	24	0	0
Hunted	0	1	8	0	0
Peri-domestic/in or near human dwelling(s)	0	1	2	0	0
Other taxa					
For sale in large market (> 20 vendors)	0	149	654	34	37
For sale in market, unknown size	0	5	24	6	15
For sale in medium market (5-20 vendors)	0	7	31	0	0
For sale in small market (<5 vendors)	0	4	15	0	0

Hunted	0	56	150	71	76
Totals	0	2621	10740	2109	5482

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Q4Y4):**
 - Tested 313 samples (210 bats, 97 other mammals, 6 rodents) for Corona and rhabdo viruses at NAHC in Laos, products obtained will be sent to IPC for sequencing.
 - Tested 499 bat samples, 600 rodent and small mammal samples, and 243 bat samples for three viral families.
 - Tested samples from 291 rodents for five additional viral families at IPC in Cambodia.

PREDICT Test Findings (Q4Y4):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release (yes or no)
Bats (499 animals)	Institut Pasteur du Cambodge	RT-PCR	Arena, Flavi, Paramyxo and Influenza viruses	All negative	-	Lao PDR, Cambodia - country of testing	No
Bats (243 animals)	Institut Pasteur du Cambodge	RT-PCR	Arena, Flavi, Paramyxo, Influenza, Filo, Henipa and Lyssa viruses	Product for sequencing obtained for Influenza A	Additional testing and sequencing ongoing	Lao PDR, Cambodia - country of testing	No
Rodents (600 animals)	Institut Pasteur du Cambodge	RT-PCR	Flavi, Paramyxo and influenza viruses	All negative	-	Lao PDR, Cambodia - country of testing	No

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release (yes or no)
Rodents (291 animals)	Institut Pasteur du Cambodge	RT-PCR	Flavi, Paramyxo, Influenza Arena, Hanta and Bunya viruses.	All negative	-	Lao PDR, Cambodia - country of testing	No
Bats (210), Other mammals (97), Rodents (6)	NAHC	RT-PCR	Corona and Rhabdo viruses	Products obtained for sequencing for Corona and Rhabdo viruses	Sending to IPC for sequence confirmation	Lao PDR	No

Activity 1.4: Sample Tracking and Information Management

- Sub-activity 1.4.1: **Surveillance Data Management**
 - Updated PCR testing and sequencing results in GAINS.

Activity 1.5 Program Information Dissemination

- Sub-activity 1.5.1: **Communication**
 - Submitted MOU to Government of Lao to allow project activities to continue until September 2014.
 - Held meeting with Ministry of Health, Ministry of Agriculture and Forestry, and the National Emerging Infectious Disease Coordination Office to present first round of results and develop a plan for approval and release of result data. Consensus on data sharing protocol reached, and document detailing protocol signed by Directors of the relevant ministries.

MALAYSIA

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Trained 22 staff (4 PERHILITAN, 4 VRI, 1 DGFC, 10 SWD --including the WHU -- and 3 PREDICT) with IDENTIFY on laboratory hazards and safety protocols at a 2 day training course at SWD Lok Kawi Zoo and the Wildlife Health, Genetic, and Forensic Laboratory (WHGFL).
 - Assisted SWD with the investigation of the deaths of 14 pygmy elephants in Sabah.
 - Arranged for samples to be screened at AFRIMS, the Ramathibodi Poison Center in Thailand and Queensland Biosecurity Sciences Laboratory in Australia with coordination through USAID RDMA, for herpesvirus using the PREDICT universal control.
 - b) **Laboratory System Improvements**
 - Moved samples from PERHILITAN to VRI for screening with PREDICT universal control.
 - Modified protocols for lab and sample management developed at VRI and PERHILITAN for the WHGFL, Sabah.
 - Delayed opening of the WHGFL by one month after a landslide at the edge of the site resulted in the generator house needing to be relocated.
- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**
 - Joined VRI Zoonotic Unit on cow sampling trip to Teluk Intan Abattoir to assist with evaluating PPE and sampling protocols.
 - Plotted transects and trap locations for Semi Disturbed 2 and Semi Disturbed 3 sites for the Deep Forest project.
 - Completed fourth Deep Forest sampling trip at pristine site 3 (Dry Season) in the Gomantong Virgin Jungle Reserve, 107 animals sampled (5 rodents, 1 civet, 9 tree shrews, 92 bats; 983 samples); completed Disturbance surveillance transect for this site.

- Sampled 3 Proboscis monkeys for Deep Forest Project collecting 33 samples along the Lower Kinabatangan River.
- Collected 1,028 samples from 111 animals in Sabah.

Summary of Surveillance Activities in GAINS to date:

Peninsular Malaysia

PENINSULAR MALAYSIA	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	*Total # of diagnostic tests run
Bats					
contact with park personnel/intensive wildlife management area	0	61	651	0	0
contact with workers harvesting crops	0	6	83	0	0
peri-domestic/in or near human dwelling(s)	0	66	755	0	0
Rodents & Shrews					
contact with park personnel/intensive wildlife management area	0	90	999	0	0
contact with workers harvesting crops	0	7	122	0	0
peri-domestic/in or near human dwelling(s)	0	15	182	0	0
rehabilitation center	0	1	14	0	0
Non-human Primates					
peri-domestic/in or near human dwelling(s)	0	499	9062	0	0
private wildlife collection or pet	0	5	155	0	0
Other Taxa					
contact with park personnel/intensive wildlife management area	0	7	91	0	0
peri-domestic/in or near human dwelling(s)	0	7	84	0	0

private wildlife collection or pet	0	5	50	0	0
rehabilitation center	0	9	87	0	0
wildlife trade transport	0	117	1291	0	0
Total	0	895	13626	0	0

Sabah Malaysia

SABAH MALAYSIA	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	*Total # of diagnostic tests run
Bats					
contact with park personnel/intensive wildlife management area	92	333	2970	0	0
Sanctuary	0	49	412	0	0
Zoo	0	1	12	0	0
Rodents & Shrews					
contact with park personnel/intensive wildlife management area	15	41	462	0	0
Non-human Primates					
contact with park personnel/intensive wildlife management area	0	58	885	0	0
contact with tourists/ecotourism	0	12	170	0	0
peri-domestic/in or near human dwelling(s)	1	2	26	0	0
raiding crops	0	9	138	0	0
rehabilitation center	0	1	18	0	0
Sanctuary	0	9	84	0	0
Zoo	0	1	14	0	0
Other Taxa					
contact with park personnel/intensive wildlife management area	0	6	75	0	0
rehabilitation center	1	1	12	0	0

Sanctuary	0	1	12	0	0
Zoo	0	1	5	0	0
Total	109	525	5295	0	0

*Tests not yet in GAINS; see table below for preliminary results information.

PREDICT Test Findings (Q4Y4):

Peninsular Malaysia

# Samples submitted	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Non-human primates (pooled throat, rectal urine swab samples from 255 animals)	VRI	Consensus PCR	Adeno, Arena, Astro, Corona, Entero, Flavi, Herpes, Influenza, Retro, Rhabdo, Seadorna, Simian Foamy, Adeno, Boca, Henipa and Pox viruses	Products for sequencing obtained for Arena, Astro, Herpes, Retro, Simian Foamy, Adeno and Pox viruses	Sequence confirmation ongoing	Peninsular Malaysia	No
Rodents and small mammals (pooled throat, rectal urine swab samples from 142 animals)	VRI	Consensus PCR	Adeno, Astro, Corona, Filo, Flavi, Herpes, Influenza, Paramyxo, Rhabdo, Seadorna, Pox, Adeno, Bunya and Henipa viruses	Products for sequencing obtained for Astro, Paramyxo, Herpes, Pox and Adeno viruses	Sequence confirmation ongoing	Peninsular Malaysia	No
Bats (pooled throat, rectal urine swab samples from 119 animals)	VRI	Consensus PCR	Adeno, Astro, Flavi, Herpes, Influenza, Rhabdo, Seadorna, Adeno, Hanta, Bunya, Henipa viruses	Products for sequencing obtained for Astro, Herpes, Adeno and Henipa viruses	Sequence confirmation ongoing	Peninsular Malaysia	No

# Samples submitted	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Orangutan (pooled throat, rectal and urine swab samples from 37 animals)	VRI	Consensus PCR	Herpes, Boca, Alpha, Corona, Astro, Henipa, Seadorna, Arena, Filo, Flavi, Paramyxo, Bunya, Retro, Influenza, Simian Foamy virus, Hepatitis, Encephalomyocarditis and Pox viruses	Products for sequencing for Herpesvirus	Sequences obtained, interpretation ongoing	Sabah, Malaysia	No
Orangutan (pooled tissue samples from 1 animal)	VRI	Consensus PCR	Herpes, Boca, Alpha, Corona, Astro, Henipa, Arena, Filo, Flavi, Seadorna, Paramyxo, Bunya, Retro, Influenza, Simian Foamy, Encephalomyocarditis, Hepatitis and Pox viruses	Products for sequencing obtained for Herpesvirus	Sequences obtained, interpretation ongoing	Sabah, Malaysia	No
Borneo pygmy elephant (Whole blood, cecum content, feces and tissue samples from 4 animals)	VRI	Consensus PCR	Herpes, Rhabdo, Pox, Boca, Henipa, Arena, Corona, Filo, Flavi, Paramyxo, Alpha, Seadorna, Astro, Retro, Bunya, Influenza and Pox viruses	All negative	-	Sabah, Malaysia	No

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Q4Y4):**
 - Screened bat, rodent, and primate samples from Peninsular Malaysia using universal control according to priority pathogen list.
- **Activity 1.4: Sample Tracking and Information Management**
 - Sub-activity 1.4.1: **Surveillance Data Management**
 - Entered all Peninsular Malaysia priority species and all Sabah sampling data into GAINS.

- Began submitting all Peninsular and Sabah test results to GAINS.
- **Activity 1.5 Program Information Dissemination**
 - Sub-activity 1.5.2: **Communication**
 - Held meetings with points of contact at Ministry of Health, The Department of Livestock Services, PERHILITAN, SWD, and Sabah State Health Department.
 - Communicated with RDMA and US Embassy in KL regarding lab development in Sabah.
 - Communicated with GAINS team to ensure data upload (permission granted by Govt. of Malaysia in Y4Q3).
 - Discussed logistics with PREVENT to coordinate survey work with Deep Forest.
 - Communicated with FAO to develop and certify WHGFL in Sabah.
 - Attended and was a speaker at the Regional Wildlife Health Forum in Bangkok with colleagues from VRI, PERHILITAN, UPM, and UKM.
 - Finalized agreement with MOH regarding testing of archived Orang Asli samples at NPHL.

THAILAND

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Presented on EID from bats at the Regional Meeting on the Emerging Infectious Diseases in Kanchanaburi.
 - Met with US-CDC and aligned wildlife surveillance activities with human syndromic surveillance activities in northwest Thailand (surveillance to commence in Y5).

b) Laboratory System Improvements

- Presented on Rabies Diagnosis at the Lao PDR National Rabies Elimination Workshop.
- Organized the National Training on Laboratory Diagnosis of Viral Zoonotic Diseases 2013 in Bangkok, additional support provided by WHO.

Summary of Surveillance Activities in GAINS to date:

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
THAILAND					
Bats					
Contact with locals for religious activities	0	33	33	21	52
Contact with park personnel/intensive wildlife management area	0	111	111	111	136
Contact with tourists/ecotourism	0	3	3	3	6
Other	0	224	841	687	2854
Rodents & Shrews					
Contact with park personnel/intensive wildlife management area	0	64	243	230	901
Contact with tourists/ecotourism	0	4	4	4	8
Other	0	4	4	4	4
Totals	0	443	1239	1060	3961

PREDICT Test Findings (Q4Y4):

# Samples submitted	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release (yes or no)
Bats (200)	WHO-CC Chula	PCR	Corona, Paramyxo, Seadorna, Flavi, Filo, Hanta, Arena, Rhabdo, Henipa, Influenza and Bunya viruses	Products for sequencing for Corona, Paramyxo and Henipa viruses	Sequences obtained, interpretation ongoing	Thailand	No
Bats (Rad cave, 68 rectal swabs)	WHO-CC Chula	PCR	Corona and Astro viruses	Products for sequencing obtained for Astroviruses	Sequencing ongoing	Thailand	No
Bats (Chakan cave, 87 rectal swabs)	WHO-CC Chula	PCR	Corona and Astro viruses	Products for sequencing obtained for Corona and Astro viruses	Sequencing ongoing	Thailand	No
Bats (Salika cave, 20 rectal swabs)	WHO-CC Chula	PCR	Corona and Astro viruses	Products for sequencing obtained for Astroviruses	Sequencing ongoing	Thailand	No
Bats (Rad cave, 14 feces)	WHO-CC Chula	PCR	Corona and Astro viruses	Products for sequencing obtained for Corona and Astro viruses	Sequencing ongoing	Thailand	No
Bats (Chakan cave 16 feces)	WHO-CC Chula	PCR	Corona and Astro viruses	Products for sequencing obtained for Astroviruses	Sequencing ongoing	Thailand	No
Bats (Salika cave, 3 feces)	WHO-CC Chula	PCR	Corona and Astro viruses	Products for sequencing obtained for Astroviruses	Sequencing ongoing	Thailand	No
Rodents (64)	WHO-CC Chula	PCR	Seadorna, Flavi, Hanta, Arena, Alpha, Filo, Pox, Paramyxo, Bunya, Influenza and Rhabdo viruses	Negative	-	Thailand	No
Rodents (58 rectal swabs, 3 feces)	WHO-CC Chula	PCR	Corona and Astro viruses	Products for sequencing obtained for Astroviruses	Sequencing ongoing	Thailand	No
Non-human Primate (Macaca fascicularis 50 rectal swabs)	WHO-CC Chula	PCR	Retro, Filo, Flavi, Influenza, Paramyxo, Henipa, Corona, Arena Bunya, Pox, Boca, Seadorna, Hanta, Herpes and Astro viruses	Products for sequencing obtained for Herpes and Astro viruses	Sequencing ongoing	Thailand	No

VIETNAM

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Worked with RESPOND and the Vietnam One Health University Network (VOHUN) to develop a field-based training on wildlife disease and bio-security risk assessment that will be delivered to wildlife and veterinary practitioners in Dong Nai Province as part of the pilot disease surveillance of wildlife species raised on wildlife farms in Vietnam planned for Q1 and Q2 of Y5.
 - Participated in the first meeting of the wildlife farming bio-security and conservation sub-committee of the Vietnam Bio-Security Working Group, a collaboration between the Department of Livestock Production of the Ministry of Agriculture and Rural Development and FAO ECTAD in Vietnam.
 - Held a series of meetings with FAO RESPOND and EPT+ project representatives to further explore the opportunities to screen livestock samples with PREDICT viral family level screening protocols at partner laboratories in Vietnam; the swine samples collected as part of EPT+ were identified as the most relevant set of samples for testing.
 - b) **Laboratory System Improvements**
 - Delivered technical support to the Department of Animal Health Regional Animal Health Office 6 (RAHO6) in Ho Chi Minh City and Hanoi University of Agriculture (HUA) laboratories as they completed the PCR family level screening for Hanta, Flavi, Arena, Corona, and Paramyxo viruses.
- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**
 - Began surveillance of the live rat trade (markets and restaurants) and bat guano farming operations in Soc Trang Province and Dong Thap Province in the Mekong Delta Region;

1,286 samples have been collected, including 1,002 samples (oral swabs and tissues samples) from 199 individual rats and 284 samples from bats (10 urine; 274 fecal).

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
VIETNAM					
Rodents					
For sale in restaurant	0	208	811	297	1233
For sale in large market	0	77	566	138	690
Bats					
Peri-domestic/in or near human dwelling(s)	0	65	211	42	126
Non-human primates					
Sanctuary	0	2	18	6	18
Other taxa					
For sale in restaurant	0	132	314	53	165
Rehabilitation center	0	42	50	50	200
Wild animal farm	0	14	42	0	0
TOTALS	0	540	2012	586	2432

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.2: **Pathogen detection and discovery (Q4Y4):**
 - Completed PCR screening for 3 viral families (Flavi, Arena, and Paramyxovirus) on 50 samples from bats and extraction and PCR screening for 4 viral families (Flavi, Arena, Hanta, and Paramyxovirus) on 288 samples from rats at the RAHO6 laboratory.

PREDICT Test Findings (Q4Y4):

# Samples submitted (by taxa – can list multiple tissues or sample types together, if appropriate)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Non-human primates (2 animals, 6 samples - feces, oral swab, rectal swab)	HUA National Key Laboratory of Veterinary Biotechnology	PCR	Arena, Corona, Flavi and Paramyxo viruses	All negative	-	Vietnam	No
Bats (38 animals, 42 samples - feces, urine/urogenital swab)	Regional Animal Health Office No. 6	PCR	Arena, Flavi and Paramyxo viruses	Product for sequencing obtained or Arena and Paramyxo viruses	Sequencing pending	Vietnam	No
Rodent & Shrews (89 animals, 90 samples - feces, muscle, oral swab, rectal swab)	HUA National Key Laboratory of Veterinary Biotechnology	PCR	Arena, Flavi, Hanta and Paramyxo viruses	Product for sequencing obtained for Arena and Paramyxo viruses	Sequencing pending	Vietnam	No
Rodent & Shrews (130 animals, 270 samples - feces, lung, oral swab, rectal swab, small intestine, urine/urogenital swab)	Regional Animal Health Office No. 6	PCR	Arena, Flavi, Hanta and Paramyxo viruses	Product for sequencing obtained for Arena, Flavi, Hanta and Paramyxo viruses	Sequencing pending	Vietnam	No
Carnivores (14 animals, 19 samples - feces, lung, muscle, oral swab, spleen, urine)	HUA National Key Laboratory of Veterinary Biotechnology	PCR	Arena, Corona, Flavi and Paramyxo viruses	Product for sequencing obtained for Corona, Flavi and Paramyxo viruses	Sequencing pending	Vietnam	No

LATIN AMERICA

BRAZIL

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health**
 - a) **National or Regional Surveillance System Improvements**
 - Disseminated initial results through three posters and one oral presentation at the International Congress on Pathogens at the Human-Animal Interface (ICOPHA) meeting in Brazil.
 - Met with government representatives (Department of Health and Wildlife) to discuss the preferred method of results dissemination to the relevant government partners in order to publish and/or make public PREDICT results.
 - b) **Laboratory System Improvements**
 - Received reagents for the diagnostics of Deep Forest samples from DELIVER.
 - Deep Forest Laboratory Post-doc fellow visited CII, Columbia University, for training and delivered initial Deep Forest samples.
 - Formalized amendment with ongoing sub-award between WCS-Brazil and the Institute of Biomedical Sciences (ICB, University of Sao Paulo), to complete viral family testing with universal control 2 in all priority samples.
- **Activity 1.2: Surveillance**
 - Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**
 - Completed Deep Forest surveillance activities for the dry season.
 - Completed Deep Forest field schedule for upcoming surveillance during rainy season.
 - Completed all surveys (approximately 700) in DF UFAM fragment (disturbed site); on-going surveys in UFAM Fazenda (pristine site) and Rio Preto do Eva (semi-disturbed sites).
 - Began analysis plan for Deep Forest Human Contact (DFHC) survey data.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	# Animals Sampled this quarter	# Animals Sampled To Date	# of Samples collected To Date	# of Samples with at least one final test result	Total # of diagnostic tests run
BRAZIL					
Bats					
Contact with domestic animals or humans not likely	0	436	2577	203	1397
Contact with researchers (other than PREDICT staff)	0	89	356	325	584
Other	25	128	467	92	770
Peri-domestic/in or near human dwelling(s)	27	201	1481	418	761
Raiding crops	6	6	29	0	0
Urban forest fragment with recreational activity/temples	0	107	356	91	690
Rodents and Shrews					
Contact with domestic animals or humans not likely	11	62	522	20	98
Contact with locals for religious activities	2	2	10	0	0
Peri-domestic/in or near human dwelling(s)	0	44	121	84	312
Non-human Primates					
Contact with domestic animals or humans not likely	0	13	93	9	60
Contact with researchers (other than PREDICT staff)	0	14	74	7	50
Peri-domestic/in or near human dwelling(s)	0	3	13	1	5
Private wildlife collection or pet	0	15	52	0	0
Urban forest fragment with recreational activity/temples	0	5	36	0	0
Other Taxa					
Contact with domestic animals or humans not likely	0	95	601	5	15
Contact with locals for religious activities	13	13	65	0	0
Contact with researchers (other than PREDICT staff)	0	4	10	0	0
Peri-domestic/in or near human dwelling(s)	6	135	727	6	53
Private wildlife collection or pet	0	41	196	0	0
Totals	90	1413	7786	1261	4795

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - Sub-activity 1.3.2: **Pathogen Detection and Discovery (Q4Y4):**
 - Shipped previously collected Deep Forest rainy season samples from Manaus to Sao Paulo, ICB Laboratory for the viral family analysis.
 - Exported Deep Forest samples to the CII, Columbia University in order to start sequencing.
 - Conducted acid extraction for Deep Forest non-human primates samples.

PREDICT Test Findings (Q4Y4):

# Samples submitted	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Bats (178 animais, 701 samplrd-anal swab, blood clot, oral swab, rectal swab, skin, urine)	Center for infection and Immunity (Columbia University)	PCR	Adeno, Astroviruses, Coronaviruses, Hanta, Paramyxo and Polyoma viruses	Products for sequencing obtained for Adeno, Astro, Corona, Hanta and Polyoma virus	Sequencing Pending	Brazil	No
Rodents & Shrews (37 animais, 76 samples- liver, lung, serum)	Center for infection and Immunity (Columbia University)	PCR	Adeno, Astro, Corona, Hanta, Paramyxo and Polyoma viruses	Products for sequencing obtained for Astroand Paramyxo virus	Sequence pending	Brazil	No
Other mammals (2 animais, 2 samples – lung, serum)	Center for infection and Immunity (Columbia University)	PCR	Adeno, Astro, Corona, Hanta, Paramyxo and Polyoma viruses	All negative	-	Brazil	No
Non-human primates (10 animais, 16 samples - blood (whole), oral swab, rectal swab, urine/urogenital swab)	BSL3 Virology laboratory ICB II, University of São Paulo	PCR	Alpha, Arena, Boca, Corona, Filo, Flavi, Hanta, Nipah , Paramyxo and Seadorna viruses	All negative	-	Brazil	No

# Samples submitted	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release
Bats (220 animals, 274 samples - blood (whole), genital swab, liver, milk, oral swab, rectal swab, spleen, urine, urine/urogenital swab)	BSL3 Virology laboratory ICB II, University of São Paulo	PCR	Alpha, Arena, Boca, Corona, Filo, Flavi, Hanta, Nipah Paramyxo and Seadorna viruses	Product for sequencing obtained or Coronaviruses	Sequences obtained, interpretation pending	Brazil	No
Rodents & shrews (14 animals, 26 samples - blood (whole), kidney, oral swab, rectal swab, serum, spleen, urine/urogenital swab)	BSL3 Virology laboratory ICB II, University of São Paulo	PCR	Alpha, Arena, Boca, Corona, Filo, Flavi, Hantaviruses, Nipah, Paramyxo and Seadorna viruses	All negative	-	Brazil	No
Other mammals (8 animals, 11 samples - blood (whole), oral swab, rectal swab, urine/urogenital swab)	BSL3 Virology laboratory ICB II, University of São Paulo	PCR	Alpha, Arena, Boca, Corona, Filo, Flavi, Hantaviruses, Nipah, Paramyxo and Seadorna viruses	All negative	-	Brazil	No

- **Activity 1.4: Sample Tracking and Information Management**
 - Sub-activity 1.4.1: **Surveillance Data Management**
 - Submitted Deep Forest surveillance data to GAINS.
- **Activity 1.5 Program Information Dissemination**
 - Sub-activity 1.5.2: **Communication**
 - Submitted draft flyers summarizing progress in Brazil for approval to disseminate to stakeholders and partners.

PREDICT Quarter 1 Year 5 Reporting

GLOBAL – US, Africa, Southeast Asia, Asia & Latin America

LOW 1: Wildlife Pathogen Detection—identification of novel wildlife pathogens that pose a significant public health threat

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.1: **Operationalizing One Health Highlights**
 - a) International, National, or Regional Surveillance System Improvements**
 - Updated high-level ministry officials (representing Human Health, Forestry and Wildlife, Livestock, Medical Research, Disease Response, Development, and Tourism) and other One Health partners on PREDICT activities across countries.
 - At PREVENT's request, presented on emerging pandemic threats and PREDICT at a market stakeholder meeting in Lao PDR to discuss developing new guidelines for reducing disease transmission. Proposed changes to the Healthy Market guidelines were presented at the EPT quarterly meeting with government; Director General of the National Emerging Infectious Disease Coordinating Office will follow up on adapting them.
 - In Cameroon, attended a meeting with WHO on One Health.
 - In Tanzania, students from RESPOND OHCEA program at the Veterinary school received field training on biosafety, capture, and handling for surveillance.
 - Formed a partnership with CDC for more intensive and extensive investigation of occupational hazards and surveillance around sugar plantations in Tanzania.
 - In Vietnam, provincial level Department of Animal Health veterinarians and a representative from the epidemiology department of the DAH Regional Animal Health Office 6 joined surveillance efforts in markets.
 - In Democratic Republic of Congo, General Director of INRB (point of contact at MoH) announced PREDICT lab will systematically receive aliquots of all samples collected from suspected human cases of Viral Hemorrhagic Fever (VHF) and other zoonoses under MoH surveillance system.
 - In Cambodia, a Forestry Administration (FA) staff member has been assigned to join the PREDICT team for field surveillance activities to expand collaboration.

- In Indonesia, attended the national coordination meeting on zoonosis control organized by the KomNas Zoonosis Control.
- Held a conference with One Health Bangladesh. WHO, FAO, and the Bangladesh Public Health and Livestock Departments were represented. A PREDICT presentation was given.
- In Indonesia, met with PREVENT regarding coordination of sampling at markets.
- Invited by the Director of Animal Health Services as an expert in a discussion to review Health Requirements for non-human primate importation to Indonesia.
- Presented on PREDICT at The Virology Association's annual meeting in Thailand.
- In Vietnam, co-organized a training to launch sampling at wildlife farms in Dong Nai with RESPOND for rangers and officials (Forest Protection Department), veterinarians and animal health officers (sub-Department of Animal Health), and wildlife farm owners.
- In Cameroon, attended the Ministry of Health national epidemiological surveillance meetings.
- In Malaysia, met with PREVENT, the Department of Occupational Safety and Health, and Sabah Wildlife Department to discuss the Deep Forest Human Contact survey.
- Presented on assessing pathogen risk from bat guano, collaborative activities for zoonoses and, with partners from Thai Department of National Parks, viral infection surveys in *Macaca fascicularis* at the Asia-Pacific Workshop on Multi-Sectoral Collaboration for Zoonoses Prevention and Control in Kathmandu, organized by WHO, FAO and OIE.
- Presented on PREDICT Indonesia activities at the Cross Sectoral Meeting on Diagnostic Laboratory Network in Zoonoses Control, organized by the Ministry of Health.
- Presented on sampling techniques at the National Rabies workshop in Thailand, organized by Department of Diseases Control, Ministry of Public Health.
- Presented on "One Health Surveillance of Nipah Virus in Thailand: A power of Collaboration"; "Viral family surveillance in farmed wildlife"; and "Risk mitigation of wildlife trade in fresh markets (the Healthy Markets Initiative" at the USAID Partners Meeting on Value Chains and Zoonotic Pathogens.
- Presented on laboratory preparation for H7N9 and MERS at EID forum meeting, organized by Thai National Science and Technology Development Agency, Ministry of Science.
- Khmer PREDICT project coordinator presented on SMART wildlife disease surveillance at a One Health workshop held by the Royal University of Phnom Penh in Cambodia.

b) Laboratory System Improvements

- Began testing samples at the newly completed diagnostic lab at Sabah Wildlife Department in Kota Kinabalu, Sabah with PREDICT protocols.
- Began to expand viral family testing to include protocols associated with Universal Control 2 at additional laboratories including at INS laboratory (Peru, even though project funding has ended) and for Flavi and Hanta viruses at Eijkman Institute (Indonesia).
- Continued to provide weekly testing and result interpretation support from US teams to laboratory teams at NAHC (Laos PDR), Makerere University (Uganda), CMDN (Nepal), Sokoine University of Agriculture (Tanzania), GDCDC (China), Eijkman Institute (Indonesia), IPB (Indonesia), INRB (DRC), CIRMF (Gabon), RAHO6 (Vietnam), INS (Peru), and USP (Brazil).
- Continued to provide training and support to laboratory technicians including on performing Hanta and Flavi virus assays, laboratory biosafety and next generation sequencing at Eijkman Institute (Indonesia); two National Animal Health Laboratory (Laos PDR) staff on biosafety, and maintaining cold chain and data entry;
- Two laboratory technicians from NaVRI at Institut Pasteur du Cambodia (Cambodia) receiving weekly training on viral family screening of PREDICT samples with the goal to transfer a portion of viral family screening to NaVRI.
- Provided supplies for laboratory diagnostics, including a new thermocycler at Eijkman Institute (Indonesia) and reagents for sample extraction and testing.
- Prepared training for INRB and MoH staff on biosafety and biosecurity (DRC).
- Continued discussions on implementation of PREDICT protocols with IDENTIFY (FAO) for piloting on samples collected from livestock.
- Continued refining online test result tracking and interpreting viral sequence data in GAINS to streamline reporting of test findings to in-country government, obtaining government approvals for release of data, and movement of data to become available to partners and the public on HealthMap.

Table 1: Labs Receiving Assistance from PREDICT to date

	# of labs targeted for screening with desired viral families	# of labs receiving training in preparation for screening of desired viral families	# of labs that have initiated work that will eventually lead to screening desired viral families (labs with partial capacity)
Africa	7	6	5
Asia / SE Asia	19	19	14
Latin America	8	6	6
Totals	34	31	25

- **Activity 1.1 Capacity Building**
 - Sub-activity 1.1.2: **Capacity Assessment and Tracking of Development Progress**
 - Compiled and analyzed data from the final rapid tool surveys for Peru and Bolivia that were submitted in association with country level programmatic completion to document change and lessons learned during the PREDICT project lifetime in those countries.
 - Prepared additional rapid tool surveys for roll out to other PREDICT countries as each country nears their 2014 end dates.
 - Revised drafts of two capacity assessment publications that are under coauthor review for submission: one presenting baseline capacity data from 20 PREDICT countries that identifies challenges and opportunities associated with capacity building to strengthen surveillance systems for wildlife in sustainable ways and a second publication to compare stakeholder and country coordinator perspectives to identify awareness and communication gaps that may inform future locally-relevant capacity building efforts.
 - Summarized findings and lessons learned from the local media surveillance (LMS) pilot program in a manuscript that is now under coauthor review. The LMS pilot program was evaluated in six PREDICT countries where health and risk events identified by staff reading non-online local print media sources on a weekly basis was used to extend the reach of media surveillance beyond the digital sources currently captured by HealthMap. Program evaluation surveys were completed by all countries as they finished the 3 month pilot program, and some countries have chosen to continue their LMS program activities.

Table 2: PREDICT Training

Country		# Women	Trainings covered various combinations of the following topics:
Asia:			
Bangladesh	15	1	Lab techniques in BSL2 lab & lab diagnostics; epidemiology and outbreak investigation; capture and sampling of rodents & bats; sample collection and GAINS system; use of GIS.
Cambodia	225	100	Core safety, animal capture, & sampling skills and protocols; data collection & management; rodent and primate ID & primate and rodent sampling; PPE use and respirator fit testing. Intro to emerging zoonoses and surveillance in Cambodia.
China	24	10	Core safety, animal capture & sampling skills and protocols; sample collection, handling, and transport; wildlife restraint & anesthesia; human & animal safety; bat, rodent, and primate sampling; zoonoses of bats & rodents.
India	18	2	Core safety, animal capture & sampling; laboratory safety protocols; zoonoses; surveillance and sampling protocols; bar-coding and data management; animal necropsies.
Indonesia	42	20	Modeling behind the PREDICT project; zoonotic diseases of bats and rodents; human and animal safety during capture; laboratory safety & PPE use; sample collection; set up for sampling bats and rodents; respirator fit testing.
Lao PDR	101	22	Core safety, animal capture, & sampling skills and protocols; data collection; PPE use; bar-coding & data management; animal necropsies; surveillance & sampling; laboratory molecular techniques; respirator fit testing, and cold chain.
Malaysia	112	33	Core safety protocols; PPE and biosafety, animal capture & sampling skills and protocols; bat and rodent capture, handling & sampling; laboratory skills; packing and shipping samples & cold chain; sampling strategy & data collection; bat, rodent & macaque sampling; collection of trigeminal nerve root ganglia from macaques for Herpes testing; virus extraction; bat & rodent capture; rodent retro-orbital bleed; primate sampling & human and animal safety; PRC & cloning; respirator fit testing.
Nepal	16	5	Biosafety & PPE, animal capture safety, laboratory safety, data collection procedures, rodent sampling methods.
Philippines	3	1	Animal capture safety.
Thailand	153	55	Lab and bioinformatics training; animal capture; laboratory safety; animal sampling protocols; zoonotic diseases; respirator fit testing.
Vietnam	518	132	Core safety, animal capture & sampling skills and protocols; packing & shipping samples; barcode system; animal pathology; sample collection & data management & use of GAINS; surveillance; filter paper blood spot, sampling; lab diagnostic protocols, virus family level protocols; one health & sampling strategy; sample transport & lab methods; wildlife pathology; First Aid; respirator fit testing. One Health and disease risks of handling wildlife. Bat & rat sampling, Disease management & surveillance, and risk assessment.
Africa:			
Cameroon	169	59	Core safety, animal capture & sampling skills and protocols; specialized field sampling and laboratory skills; packing & shipping samples to reference lab; PPE use; bushmeat policy and wildlife ethics; extraction, RT-PCR, ELISA and other lab methods; lab systems; immunology and serology; ethics; pan-viral protocols; emergency preparedness and management; outbreak

			response training; bio-risk management; use of satellite phones; molecular biology and conventional PCR; respirator fit testing.
DRC	21	4	Core safety, animal capture & sampling skills and protocols; specialized field sampling and laboratory skills; RT-PCR, ELISA; administration and reporting; Monkeypox surveillance; sample tracking & GAINS system; ethical issues; blood spot sampling; DNA & RNA extraction from animal samples; respirator fit testing.
Gabon	6	3	Bushmeat sampling; packing & shipping samples; PPE use and biosafety; lab safety; animal capture; bat & rodent sampling; sampling for AI; animal sample collection; cold chain; lab methods, DNA extraction, PCR; sample prioritization; safe handling of liquid nitrogen; sequencing; virus isolation; RNA & RT-PCR; GAINS system & data management.
Republic of Congo	13	2	Core safety, PPE and biosafety; safe animal capture, & sampling skills and protocols; bat, rodent, and primate sampling; laboratory safety & skills; data collection; cold chain; protecting human subjects in research; virology laboratory methods; respirator fit testing.
Rwanda	206	25	Core safety, animal capture & sampling skills and protocols; PPE use and biosafety; bat, rodent, and primate capture, handling, and sampling; zoonoses; ethics and responsibilities; wildlife pathology & necropsy; sample collection & preservation; packing & shipping samples; tracking primates & health monitoring; lab personnel safety; PCR protocols & sample processing; bushmeat handling.
Tanzania	48	11	Core safety, animal capture & sampling skills and protocols; bat and rodent capture, handling & sampling; data management; laboratory safety; surveillance; information management and GAINS system; wildlife capture & restraint; emergency preparedness; ethics, cultural sensitivity & SHP; pathogen detection; extraction and PCR & protocols; Batcold chain; respirator fit testing.
Uganda	52	10	Core safety, animal capture & sampling skills and protocols; PPE & biosafety; laboratory safety; packing & shipping samples; bushmeat sampling; cold chain; GPS; Animal Mortality Monitoring Study; bat capture, handling & sampling; PPE & biosafety to handle dead animals.
Latin America:			
Bolivia	169	75	Core safety, animal capture, laboratory & sampling skills and protocols and zoonotic diseases; bat, rodent, and primate sampling; bushmeat sampling; molecular and parasite diagnostic methods; lab safety and methods; packing and shipping samples; wildlife management and disease management; work ethics, cultural sensitivity & SHP; managing livestock & poultry diseases; detecting zoonoses; sample collection and storage; methods of detecting Salmonella in wildlife; biostatistics; respirator fit testing.
Brazil	39	17	Core safety, animal capture, handling & sampling skills and protocols; PPE use & biosafety; bat and rodent sampling; bushmeat sampling; packing and shipping samples; cold chain; surveillance, ethics, and responsibilities; primate sampling; respirator fit testing.
Colombia	54	29	Core safety, animal capture & sampling skills and protocols; lab safety & methods; One Health; Conservation Medicine; GAINS system and data management.
Mexico	27	14	Core safety, animal capture, handling & sampling skills and protocols; lab safety & methods; PPE use & biosafety; disease modeling; animal care and use protocols; lab diagnostic techniques; respirator fit testing.
Peru	346	162	Core safety, animal capture & sampling skills and protocols; PPE use & biosafety; surveillance; zoonotic disease risks from wildlife trade and consumption; wildlife regulations, wildlife

			management and disease monitoring; sample collection & storage; species ID & health risks; emergency management of spider bites; safe transport of confiscated animals; respirator fit testing.
Total Trained	2,377	792	

- **Activity 1.2: Surveillance**

- Sub-activity 1.2.1: **Highlights of Surveillance Activities Completed in Current Quarter**

- Conducted surveillance activities in Brazil, Bangladesh, Cambodia, China, Indonesia, Lao PDR, Malaysia, Nepal, Thailand, Vietnam, Cameroon, DRC, Gabon, Rwanda, Tanzania, and Uganda.
 - Conducted priority taxa surveillance at new sites and interfaces, including bat sampling in villages and sites near gold mining activities in Geita, Tanzania; chimpanzee sampling for the first time around Rwanda's Nyungwe National Park; surveillance of the live rat trade (markets and restaurants) and bat guano farms in the Mekong Delta Region of Vietnam; rodents at additional farms in China; and bat and rodent sampling at Chiang Dao National Park, ChiangMai, Thailand (near Myanmar border).
 - Deep Forest: In Brazil, conducted sampling in pristine area for the wet season, completed dry season surveillance of bat and rodents, and working on local surveys to complement index information from satellite imagery; Finished human contact survey in Uganda; Conducted sampling at intermediate, disturbed, and semi-disturbed sites in Malaysia.
 - Finalizing collaboration with China's Jiangsu CDC to facilitate experimental analysis of archived samples.
 - Conducted scoping visits at six markets in Chinese provinces (Guangdong (2), Guangxi (2), and Yunnan (2)) for AI surveillance and trade surveys.
 - Coordinating with the National Public Health Laboratory regarding testing archived Orang Asli samples in Malaysia.
 - Sampling macaque and urban rodents in Dhakka to complement studies in Kathmandu.
 - Continued the follow-up phase of high risk cohort study (individuals with contact with wild animals or the contacts of sero-positive individuals from the first round of enrollment and testing) and initiated human sample collection from 8 sentinel hospitals in China.
 - In Lao PDR, using a new technique (punch biopsies) to test reliability of sampling liver and lungs without causing external damage to animals for sale in markets.

- Conducted a site characterization survey in Uganda and Rwanda on the human footprint high-risk interfaces and ecology of bats, rodents and primates at surveillance sites.
- Launched wildlife farm surveillance with Vietnam’s Department of Forest Protection and Department of Animal Health of Dong Nai Province (province has >1,000 wildlife farms).
- Assisted in sampling of confiscated bushmeat with Sabah Wildlife Department, Malaysia.
- In Cambodia, sampled primates and rodents in an ethnic minority hunting community.
- In Cameroon, malaria-negative febrile human samples were selected for Deep Freeze.

Table 3: PREDICT Global Surveillance Summary by Region, Taxa and Primary Risk Interface in GAINS (to date):

Taxa	# Animals sampled this quarter	# Animals sampled to date	# Animals with at least one final test result	# Animals with at least one test result with interpretation completed	# Animals with at least one test result cleared for release by govt
Africa					
Bats	262	6183	4240	4240	1066
Non-human Primates	18	4769	1710	1710	665
Other Taxa	44	6487	550	550	71
Rodents & Shrews	83	5565	2147	2147	497
Latin America					
Bats	1	3868	2167	2167	848
Non-human Primates	1	798	517	514	0
Other Taxa	2	1431	243	243	0
Rodents & Shrews	1	1895	370	370	13
Southeast Asia					
Bats	563	5253	2765	2747	487
Non-human Primates	26	1136	804	804	0
Other Taxa	16	1175	593	593	51
Rodents & Shrews	703	3123	1545	1545	458
Asia					
Bats	0	7242	1928	1928	1411

Non-human Primates	0	687	111	111	0
Other Taxa	0	541	16	16	0
Rodents & Shrews	136	1646	639	639	0
TOTALS	1856	51799	20345	20324	5567

- **Sub-activity 1.2.2: Partner with stakeholders in public and livestock health to explore use of PREDICT protocols and practicality/sustainability of One Health surveillance**
 - Continued to develop and refine PREDICT results reporting frameworks as needed in each country with public health, wildlife/environment, and agriculture ministries. In Indonesia, this effort has prompted development of the first national system for reporting wildlife surveillance activities to government ministries.
 - Analyzed country surveys and literature reporting of avian influenza surveillance in wild birds as requested by FAO/OIE OFFLU to inform a more coordinated global system.
 - The PREDICT influenza protocol was used to test a human H7N9 sample from a case confirmed by the Chinese provincial CDC in Guangdong Province.
 - Organized official opening of Malaysia's Wildlife Health, Genetic and Forensic Laboratory (attended by U.S. Ambassador and Sabah Minister of Tourism, Culture and Environment). The Laboratory is BSL-2 certified and will allow for local testing of samples in Sabah.

- **Activity 1.3: Technology Development and Pathogen Detection and Discovery**
 - **Sub-activity 1.3.1: Introduction of New Technologies**
 - Procured and/or received equipment and reagents for cloning of PCR amplicons to enhance quality and success of sequencing (Cameroon, Gabon, and DRC).
 - Deep sequencing technology was made available (via other USG funding sources) within in-country labs (Gabon and Indonesia), and PREDICT staff received training to allow potential utilization of this technology in the future.

 - **Sub-activity 1.3.2: Pathogen detection and discovery (Q1Y5):**
 - Continued developing guidelines to assess viral sequences and cut-offs to classify as known or novel viruses based on sequence similarity for priority viral families/genera.
 - Performed analysis and interpretation of 1800 sequences detected through the PREDICT project to classify the sequences as known and novel viruses; preparation of result reports

- for host-country governments is ongoing.
- Received samples for analysis from Uganda, Brazil, and Malaysia for Deep Forest Project.
 - Eduardo Aguirre is visiting the Center for Infection and Immunity (Columbia University) from IBMB (Bolivia) for three months for training. He is currently processing samples collected from bats in Bolivia.
 - New Publications Accepted: Discovery of HTLV4 reservoir in gorillas in Cameroon, Emerging Microbes and Infections.

Table 4: PREDICT Summary of Presumptive Positive Test Findings (Q1Y5 new results; see additional data in country reports below):

# Samples submitted (by taxa)	Diagnostic lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen discovery	Country	Approved by Government for release (yes or no)
Bats (704 animals, 706 samples - Urine/urogenital swab, Urine, Oral swab, Rectal swab)	Center for Infection and Immunity, Columbia University	PCR	Adeno, Astro, Boca, Corona, Herpes, Nipah, Paramyxo viruses	Products for sequencing	Interpretation Ongoing	Bangladesh	No
Rodents & Shrews (169 animals, 249 samples - Urine/urogenital swab, Oral swab, Rectal swab)	ICDDR,B	PCR	Hantaviruses	Product for sequencing	Sequencing pending	Bangladesh	No
Bats (487 animals, 627 samples - Oral swab, Rectal swab)	Wuhan Institute of Virology, CAS	RT-PCR	Astro, Corona, Paramyxo viruses	Products for sequencing	Interpretation Ongoing	China	No
Rodents & Shrews (161 animals, 324 samples - Oral swab, Rectal swab)	Wuhan Institute of Virology, CAS	RT-PCR	Astroviruses	Products for sequencing	Interpretation Ongoing	China	No
Human H7N9 Serum (1)	GDCDC	Conventional PCR	Influenza A	Product for sequencing	Sequence confirmation pending	China	No
Non-human Primates (132, Saliva)	UC Davis Wildlife Diagnostic Lab and CMDN	PCR	Corona, Retro – Lenti genus, Simian Foamy, Influenza, Paramyxo, Corona viruses	Products for sequencing	Sequencing ongoing	Nepal	No

Rodents and Shrews (194, Oral and Recta; swabs)	UC Davis Wildlife Diagnostic Lab and CMDN	PCR	Paramyxo, Rhabdo, Influenza, Arena viruses	Products for sequencing	Sequencing ongoing	Nepal	No
Bats (108, Feces and Urine)	UC Davis Wildlife Diagnostic Lab	PCR	Coronaviruses	Products for sequencing	Sequencing ongoing	Nepal	No
Bats (604 animals, 1185 samples - Brain, Feces, Liver, Oral swab, Spleen, Rectal swab, Lung)	Institut Pasteur Cambodia	PCR	Astro, Corona, Filo, Hanta, Lyssa, Paramyxo viruses	Products for sequencing	Interpretation Ongoing	Cambodia	No
Rodents & Shrews (289 animals, 1237 samples - Heart, Urine, Feces, Liver, Oral swab, Spleen, Rectal swab, Kidney, Lung)	Institut Pasteur Cambodia	PCR	Astro, Filo, Hanta viruses	Products for sequencing	Interpretation Ongoing	Cambodia	No
Bats (33 animals, 36 samples - Oral swab, Saliva, Serum, Tissue)	Primate Research Center, Bogor Agricultural University	PCR	Paramyxoviruses	Product for sequencing	Interpretation Completed, Preparation of Report for Government in Progress	Indonesia	No
Bats (124 animals, 749 samples - Urine/urogenital swab, Feces, Oral swab, Rectal swab, Red blood cells, Serum)	BSL 3, Veterinary Research Institute Ipoh, Department of Veterinary Services	PCR	Arena, Astro, Corona, Filo, Herpes, Paramyxo viruses	Products for sequencing	Interpretation Completed, Preparation of Report for Government in Progress	Malaysia	No
Bats (27 animals, 78 samples - Urine/urogenital swab, Oral swab, Rectal swab)	Center for Infection and Immunity, Columbia University	PCR	Adeno, Astro, Herpes viruses	Products for sequencing	Interpretation Ongoing	Malaysia	No
Non-human Primates (257 animals, 757 samples - Urine/urogenital swab, Oral swab, Rectal swab)	BSL 3, Veterinary Research Institute Ipoh, Department of Veterinary Services	PCR	Alpha, Arena, Astro, Filo, Flavi, Herpes, Paramyxo, Retrovirus - Lentivirus genus, Simian Foamy viruses	Product for sequencing	Interpretation Completed, Preparation of Report for Government in Progress	Malaysia	No
Non-human Primates (50 animals, 150 samples - Urine/urogenital swab, Oral swab, Rectal swab)	Center for Infection and Immunity, Columbia University	PCR	Herpesviruses	Product for sequencing	Interpretation Completed, Preparation of Report for Government in Progress	Malaysia	No

Rodents & Shrews (111 animals, 329 samples - Urine/urogenital swab, Oral swab, Rectal swab, Serum)	BSL 3, Veterinary Research Institute Ipoh, Department of Veterinary Services	PCR	Alpha, Astro, Hanta, Paramyxo viruses	Products for sequencing	Interpretation Completed, Preparation of Report for Government in Progress	Malaysia	No
Rodents & Shrews (27 animals, 75 samples - Urine/urogenital swab, Oral swab, Rectal swab)	Center for Infection and Immunity, Columbia University	PCR	Adeno, Astro viruses	Products for sequencing	Interpretation Ongoing	Malaysia	No
Ungulates (7 animals, 13 samples - Urine/urogenital swab, Oral swab, Rectal swab)	BSL 3, Veterinary Research Institute Ipoh, Department of Veterinary Services	PCR	Alpha, Hanta viruses	Products for sequencing	Interpretation Completed, Preparation of Report for Government in Progress	Malaysia	No
Other Mammals (12 animals, 39 samples - Urine/urogenital swab, Oral swab, Rectal swab)	BSL 3, Veterinary Research Institute Ipoh, Department of Veterinary Services	PCR	Astro, Flavi viruses	Product for sequencing	Interpretation Completed, Preparation of Report for Government in Progress	Malaysia	No
Non-human Primates (414 animals, 826 samples - Urine/urogenital swab, Oral swab, Rectal swab)	Diagnostic Lab, Department of Wildlife and National Parks Peninsular Malaysia (PERHILITAN)	PCR	Corona, Herpes viruses	Product for sequencing	Interpretation Completed, Preparation of Report for Government in Progress	Malaysia	No
Non-human Primates (38 animals, 115 samples - Heart, Urine/urogenital swab, Brain, Oral swab, Spleen, Rectal swab, Nerve)	BSL 3, Veterinary Research Institute Ipoh, Department of Veterinary Services	PCR	Alpha, Arena, Astro, Boca, Corona, Henipa, Herpes, Seadorna viruses	Product for sequencing	Interpretation Completed, Preparation of Report for Government in Progress	Malaysia	No
Sabah non-human primates pooled throat, rectal urine swab samples from 52 animals	WHGFL	Consensus PCR	Adeno, Arena, Astro Entero, Herpes, Paramyxo, Retro, Seadorna, SFV, Boca, Bunya, Pox Viruses	Product for sequencing	Interpretation Ongoing	Malaysia	No
Non-human Primates (50 animals, 200 samples - Oral swab, Plasma, Rectal swab, Urine)	WHO-CC viral zoonoses, Chulalongkorn University	PCR	Astro, Herpes viruses	Products for sequencing	Interpretation Ongoing	Thailand	No

Bats (193 animals, 212 samples - Feces, Rectal swab)	WHO-CC viral zoonoses, Chulalongkorn University	PCR	Astroviruses	Products for sequencing	Interpretation Ongoing	Thailand	No
Rodents & Shrews (63 animals, 69 samples - Feces, Rectal swab)	WHO-CC viral zoonoses, Chulalongkorn University	PCR	Astroviruses	Products for sequencing	Interpretation Ongoing	Thailand	No
Bats (178 animals, 701 samples - Skin, Urine, Oral swab, Rectal swab, Anal swab, Blood clot, Serum)	Center for Infection and Immunity, Columbia University	PCR	Astro, Corona, Entero viruses	Products for sequencing	Interpretation Ongoing	Brazil	No
Rodents & Shrews (39 animals, 76 samples - Liver, Lung, Serum)	Center for Infection and Immunity, Columbia University	PCR	Astro, Paramyxo viruses	Products for sequencing	Sequencing Pending	Brazil	No
Bats (286 animals, 355 samples - Urine/urogenital swab, Feces, Oral swab, Rectal swab, Blood (whole))	ICB II, University of São Paulo	PCR	Arena, Corona, Flavi, Hanta, Herpes, Henipa viruses	Products for sequencing	Interpretation Ongoing	Brazil	No
Rodents & Shrews (87 animals, 174 samples - Liver, Oral swab, Spleen, Rectal swab)	GVFI Cameroon	PCR	Henipaviruses	Product for sequencing	Sequencing pending	Cameroon	No
Bats (1001 animals, 2057 samples - Blood drop, Liver, Oral swab, Spleen, Rectal swab, Plasma, Serum)	GVFI Cameroon	PCR	Corona, Henipa viruses	Products for sequencing	Interpretation Ongoing	Cameroon	No
Non-human Primates (13 animals, 13 samples - Buffy coat, Plasma)	GVFI Cameroon	PCR	Herpesviruses	Products for sequencing	Interpretation Ongoing	Cameroon	No

Rodents & Shrews (194 animals, 358 samples - Blood drop, Liver, Oral swab, Rectal swab, Spleen)	GVFI PREDICT Lab, Kinshasa	PCR	Corona, Hanta viruses	Products for sequencing	Sequencing Pending	DRC	No
Non-human Primates (568 animals, 604 samples - Blood drop, Buffy coat, Colon, Liver, Lung, Oral swab, Spleen)	GVFI PREDICT Lab, Kinshasa	PCR	Boca, Herpes, Orthopox viruses	Products for sequencing	Interpretation Ongoing	DRC	No
Non-human Primates (20 animals, 20 samples - liver spleen)	CIRMF	PCR	Arena, Bunya, Flavi, Orbi viruses	Products for sequencing	Sequencing Pending	Gabon	No
Rodents & Shrews (7 animals, 7 samples - liver spleen)	CIRMF	PCR	Arena, Flavi viruses	Products for sequencing	Sequence Pending	Gabon	No
Carnivores (2 animals, 2 samples - liver spleen)	CIRMF	PCR	Arena, Flavi, Orbi viruses	Products for sequencing	Sequencing Pending	Gabon	No
Ungulates (34 animals, 34 samples - liver spleen)	CIRMF	PCR	Arena, Orbi viruses	Products for sequencing	Sequencing Pending	Gabon	No
Non-human Primates (9 animals, 12 samples - Blood clot, Oral swab, Pericardial fluid, Rectal swab)	Center for Infection and Immunity, Columbia University	PCR	Herpesviruses	Products for sequencing detected for Herpesviruses	The known virus Gorilla lymphocryptovirus 1 (AF250885) in the gammaherpes subfamily found in non-human primates was detected in 9 primates. To date this virus has not been detected in humans and there is no evidence at this time to suggest this virus poses a threat to human health.	Rwanda	Yes

<p>Non-human Primates (10 animals, 15 samples - Blood clot, Buffy coat, Oral swab, Rectal swab, Vaginal swab)</p>	<p>UC Davis Wildlife Diagnostic Lab</p>	<p>PCR</p>	<p>Herpesviruses</p>	<p>Products for sequencing</p>	<p>A new betaherpesvirus was detected in one primate; Strains of the known virus Cercopithecine herpesvirus 12 (AF091052) in the gammaherpes subfamily found in non-human primates was detected in one primate; Strains of the known virus Gorilla lymphocryptovirus 1 in the gammaherpes subfamily found in non-human primates was detected in three primates; A strain of the known virus Panine herpesvirus 2 (AF480884) in the betaherpesvirus subfamily found in non-human primates was detected in one primate. To date these viruses have not been detected in humans and there is no evidence at this time to suggest this virus poses a threat to human health.</p>	<p>Rwanda</p>	<p>Yes</p>
<p>Bats (117 animals, 1717 specimens) - blood, swabs.</p>	<p>Makerere University Walter Reed Project (MUWRP)</p>	<p>PCR</p>	<p>Adeno, Arena, Paramyxo, Corona, Arena, Filo, Bunya, Rhabdo viruses</p>	<p>Products for sequencing</p>	<p>Sequencing Pending</p>	<p>Rwanda</p>	<p>No</p>

Rodents & Shrews (158 animals, 190 samples - Feces, Oral swab, Rectal swab)	UC Davis Wildlife Diagnostic Lab	PCR	Alpha, Arena, Astro, Bunya, Flavi, Hanta, Influenza, Rhabdo viruses	Products for sequencing	Sequencing Pending	Tanzania	No
Bats (48 animals, 48 samples - Feces, Rectal swab)	UC Davis Wildlife Diagnostic Lab	PCR	Arena, Astro, Bunya, Corona, Filo, Nipah, Paramyxo, Rhabdo viruses	Products for sequencing	Sequencing Pending	Tanzania	No
Bats (48 animals, 48 samples - Feces, Rectal swab)	UC Davis Wildlife Diagnostic Lab	PCR	Paramyxoviruses	Product for sequencing	A new paramyxovirus in bats was detected in one bat. There is no evidence at this time to suggest this virus poses a threat to human health.	Tanzania	Yes
Bats (25 animals, 36 samples - Blood (whole), Blood clot, Oral swab, Rectal swab)	MUWRP	PCR	Adeno, Filo, Flavi, Herpes, Rhabdo viruses	Products for sequencing	Sequence Confirmation Pending at UC Davis Wildlife Diagnostic Lab	Uganda	No
Non-human Primates (47 animals, 141 samples - Blood (whole), Oral swab, Rectal swab)	MUWRP	PCR	Entero, Filo, Flavi, Henipa, Herpes, Paramyxo, Retrovirus - Lentivirus genus	Products for sequencing	Sequence Confirmation Pending at UC Davis Wildlife Diagnostic Lab	Uganda	No
Rodents & Shrews (67 animals, 200 samples - Blood (whole), Oral swab, Rectal swab)	MUWRP	PCR	Corona, Filo, Flavi, Henipa, Herpes, Paramyxo, Rhabdo viruses	Products for sequencing	Sequence Confirmation Pending at UC Davis Wildlife Diagnostic Lab	Uganda	No
Ungulates (17 animals, 28 samples - Blood (whole), Feces)	MUWRP	PCR	Henipa, Influenza, Rhabdo viruses	Products for sequencing	Sequence Confirmation Pending at UC Davis Wildlife Diagnostic Lab	Uganda	No
Bats (54 animals, 110 samples - Brain, Feces, Liver, Lung, Oral swab, Rectal swab)	UC Davis Wildlife Diagnostic Lab	PCR	Arena, Astro, Bunya, Corona, Entero, Flavi, Hanta, Henipa, Herpes, Influenza, Lyssa, Orbi, Paramyxo, Phlebo, Rhabdo, viruses	Products for sequencing	Interpretation Ongoing	Republic of Congo	No

Rodents & Shrews (2 animals, 2 samples - Blood drop, Lung)	UC Davis Wildlife Diagnostic Lab	PCR	Herpesviruses	Products for sequencing	Interpretation completed, Awaiting approval from government to share results.	Republic of Congo	No
Non-human Primates (49 animals, 38 samples – Feces, 12 samples - Liver, Lung)	Center for Infection and Immunity, Columbia University	PCR	Herpesviruses	Products for sequencing	Interpretation completed, Awaiting approval from government to share results.	Republic of Congo	No

- Sub-activity 1.4.1: **Optimize surveillance data management system**
 - Embarked on Project Deep Clean, an increased focus on data quality assurance and control.
- Sub-activity 1.4.2: **Establish global open access to database and procedure for dissemination of knowledge**
 - Implemented release of surveillance data on the PREDICT public website (www.healthmap.org/predict)
- **Activity 1.5 Program Information Dissemination**
 - Sub-activity 1.5.1: **Communication (National and International Meetings)**
 - Participated in meeting with PREVENT/USAID/UC Davis partners to discuss updates on Deep Forest Human Contact surveys, data management and preliminary analyses, DFHC conceptual model, survey overview, variables data products, analysis, and next steps.
 - Presented symposiums on One Health and EcoHealth Alliance’s experience with international collaborators and partnerships at the American Society of Tropical Medicine and Hygiene annual meeting.
 - Developed a national plan for wildlife surveillance for the Ministry of Environment and Parks that links to the needs of the Agriculture and Public Health Ministries in Israel; held a one day workshop with nearly 80 stakeholders to obtain input/feedback. PREDICT served as the main model of a One Health system that could be employed.
 - Attended the FAO/OIE Sixth Meeting of the Global Steering Committee of the Global Framework for the Progressive Control of Transboundary Animal Diseases (GF-TADs) initiative (GSC6) as an invited Permanent Observer and presented an update on disease in

- wildlife, including H7N9 and coronaviruses.
 - Led the annual meeting of the OIE WGWD. The group, in coordination with OIE, established priorities for the upcoming year, including targeting and cost-effectiveness of wildlife disease surveillance. The WGWD provided updates on emerging disease trends of relevance to animal health (including zoonoses), wildlife disease reporting, and avian influenza surveillance systems.
 - Highlighted PREDICT approaches in the presentations "Best Practices for Predicting and Preventing Pandemics" and "Using a One Health approach to prevent pandemics and mitigate the effects of emerging infectious diseases" at the American Public Health Association. Also discussed the One Health approach used to model, analyze, understand, and predict the risk of Nipah virus, SARS, avian influenza, and related pathogens at this important public health conference.
 - Published invited review on "Global influenza surveillance: advances in technology" (b)(6) (b)(6) Future Virology Expert Opinion series.
 - Contributed invited review on "Public Health Disease Surveillance Networks", in *One Health: People, Animals, and the Environment* (b)(6) ASM Press, in press (2014).
 - Reviewed "Public Health Disease Surveillance Networks", *Microbiology Spectrum* (new ASM online journal), 2(1):OH-0002-2012. doi:10.1128/microbiolspec.OH-0002-2012.
- Sub-activity 1.5.2: **Report Preparations**
 - Completed drafts of flyers for more than half of PREDICT countries that will be used to disseminate project activities to stakeholders. Included links to flyers on the PREDICT website for countries for which there are finalized versions.
 - Solicited material for country-specific sections of the final report to stakeholders from regional leads and country coordinators.
 - Continued to compile material for the final report including background information, methodology, project activities, and success stories for each country, including photos and maps showing surveillance sites, partnerships to ensure sustainability, and publications.
 - Contributed material to a web page through the One Health Institute website that includes a description of the project, project countries and partnerships, success stories, and publications.

LOW 2: Risk Determination

- **Activity 2.1: Develop risk filter strategy**
 - Sub-activity 2.1.1: **Refine the conceptual and structural framework for Extractive Industry work:**
 - Continued working with HealthMap on the development of the PathFinder disease identification application; collaborated with the Yale team to draft an article on PathFinder for submission as a “Technology and Tools” piece to Global Health Science and Practice.
 - Sub-activity 2.1.2: **Improve targeted surveillance strategies for influenza:**
 - Developed global distribution maps based on influenza A subtypes and host diversity. These analyses showed that reported subtype diversity was greatest in the United States followed by Canada, Japan, China, and Sweden. In contrast, most countries in Africa and South America had reported less than 5 subtypes each with many of the African countries not reporting any at all. The diversity of hosts from which influenza A had been reported was greatest in the United States followed by China, Thailand, South Korea, and Russia. Similar to subtype diversity, reported host diversity was lowest in many parts of Africa and South America. The observed trends in host and subtype diversity closely mirrored the sampling effort (total number submitted sequences) in each country, highlighting the large sampling and reporting discrepancies throughout the world. Additionally, work is now focusing on Influenza A evolution rates by ecoregion/epizones to look for more useful measures to help direct surveillance (see progress in bullet below).
 - Drafted a manuscript, “Evolutionary dynamics of influenza A: a global perspective”, where we employed a Bayesian evolutionary model, which utilizes the number and temporal distribution of genetic differences among viruses sampled at different times to calculate the nucleotide substitution rates of 14 high-priority influenza subtypes from 32 different countries. Higher evolutionary rates were observed for several subtypes including H5N1, H5N2, and H6N2 in East Asia as compared to North America. This finding suggests that novel pathogenic strains may be more likely to evolve in Asia. However, no single country stood out as an evolutionary “hot spot”, with consistently high mutational rates, across all of the subtypes analyzed. Using the same data set we estimated the selection pressures on the haemagglutinin (HA) gene by calculating the numbers of non-synonymous (d_N) and synonymous (d_S) nucleotide substitutions per site (d_N/d_S ratio). The analysis showed that

the HA gene was under the effects of purifying selection ($d_N/d_S < 1$) among all subtypes tested. However, several subtypes including, H3N2, H3N8, and H5N1 did exhibit considerably higher d_N/d_S ratios than others. Several factors including host type (mammal versus avian), recent host switch, and widespread vaccine use, which have all been shown to increase the selective pressures on influenza viruses, may help explain these differences.

- Developed a model that allows us to predict where in the world specific influenza A viruses are likely to occur based on currently known distributions of different HA and NA subtypes. For example, when a strain of concern within a particular subtype such as H7N9 emerges, this model can be used to quickly identify countries where both H7 and N9 subtypes have been reported previously even though the specific combination of H7N9 has not.
- Also drafted a manuscript focusing on wild bird strains of influenza for submission to *PLoS One*, entitled “Sampling strategies and biodiversity of influenza A subtypes in wild birds”. Our team examined 11,870 GenBank records to provide a baseline inventory and insight into patterns of global AIV subtype diversity and richness. Further, we conducted an extensive literature review and communicated directly with scientists to accumulate data from 50 non-overlapping studies and over 250,000 birds to assess the status of historic sampling effort. We then built virus subtype sample-based accumulation curves to better estimate sample size targets that capture a specific percentage of virus subtype richness at seven sampling locations. This study identified a sampling methodology that will detect an estimated 75% of circulating virus subtypes from a targeted bird population and outlines future surveillance and research priorities that are needed to explore the influence of host and virus biodiversity on emergence and transmission.
- **Sub-activity 2.1.3: Inform and integrate other relevant agencies**
 - Provided guidance on practices developed through PREDICT to the Chief Veterinarian and Director of Food and Agriculture Security, Office of Health Affairs, Department of Homeland Security. The information will inform a report DHS is preparing on approaches from PREDICT that can be applied to U.S. and Global Health Security efforts.
 - Participated in the NAS Standing Committee on the Department of Defense’s Programs to Counter Biological Threats.

- Sub-activity 2.1.4: **Pilot methods to assess occupational disease risk for wildlife health workers**
 - Completed draft survey questionnaire for field workers.
 - Submitted application to IRB at University of Washington to perform worker surveys and potential biological sampling.
 - Completed initial draft of 'Occupational Health Services for Wildlife Surveillance Workers' guidelines for PREDICT on-line manual.

- **Activity 2.2 Optimize models for diversity of disease emergence**
 - Sub-activity 2.2.1: **Refine, test and exploit geographical and temporal 'hotspot' models**
 - Completed Deep Forest (DF) wet season sampling in Brazil.
 - Developed theoretical framework of analysis linking biodiversity and disease ecology.
 - Began biodiversity and virodiversity exploratory analysis of Deep Forest data.
 - Implemented Quality Assurance/Quality Control processes on Deep Forest data.
 - Administering surveys at the household level to independent samples of men and women along the disturbance gradient.
 - Deep Forest Human Contact surveys completed for Pristine and Urban sites in Brazil.
 - Began preliminary analyses and data exploration on a subset of the surveys.
 - Deep Forest Human Contact surveys submitted for translation to Bahasa Malaysia.
 - Implemented cross-validation for Hotspots models.
 - Created "time-slice" models allowing temporally match EID events with the closest temporal snapshot of global population, cropland and pasture, and include change in these variables as predictors in the model as a proxy for land-use change.
 - Incorporated multiple sample runs into existing boosted regression tree models to explicitly account for spatial uncertainty in EID event location.
 - Continued compiling and reviewing EID events for Sicki platform.
 - Completed travel analysis of MERS and Influenza A/H7N9.
 - Developed a strategy to implement 'What if Scenarios.'
 - Began literature review and PREDICT data review to inform 'What if' scenarios.
 - Completed 100k+ model runs to predict spillover risk for viruses in mammals using host and virus traits. Best model shows that both host phylogeny and measures of host-human contact are important predictors after controlling for research bias.

- Identified specific viral traits as predictors of phylogenetic host breadth (increased spillover potential) using data from ~600 unique viruses, traits include RNA vs DNA; vector-transmission, and replication in the cytoplasm.
- Specific bat viral diversity models developed to better target surveillance and assess likelihood of finding specific viral family in a given sample type.
- Gathered socio-economic data on the burden of disease outbreaks for individuals, government and industry.
- Began econometric analysis to determine the optimal land area conversion to minimize outbreaks.



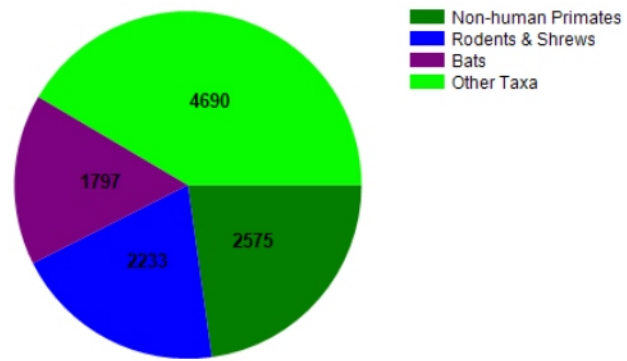
PREDICT Sampling and Testing in Cameroon

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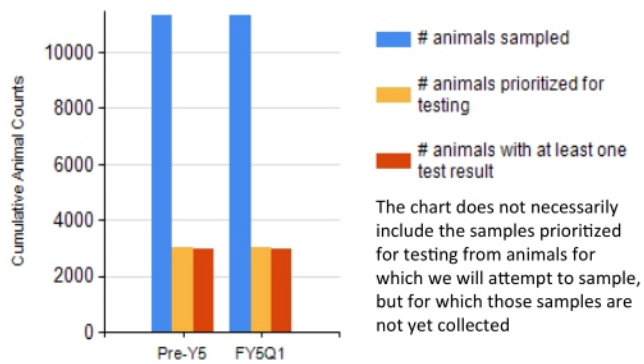
Sampling Locations



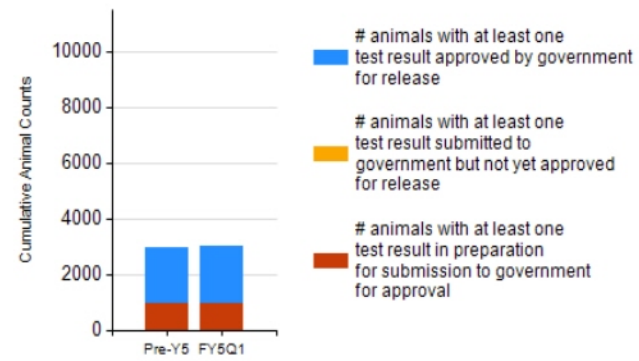
Number of Animals Sampled



Sampling and Testing Progress



Test Results Reporting Progress



For information purposes only - no action required

Significant Highlights, Results, and Success Stories for CAMEROON:

- Submitted primate T-lymphotropic virus (PTLV) paper detailing discovery of HTLV4 reservoir in gorillas in Cameroon that was accepted for publication in *Emerging Microbes and Infections*.
- Attended three Cameroon EPT meetings to brief EPT program and government partners on current activities and to coordinate activities.
- Provided logistical support for (b)(6) and met with her to discuss PREDICT project and EPT management and progress.
- Met with Zoological Society of London staff in Cameroon to discuss collaborating on field activities; communicated with Antwerp Zoo staff in relation to gorilla camera trap surveillance and gorilla oral scarring due to a possible infectious disease.
- Selected site and prepared budget for surveillance in an extractive industry site.
- Finalized list of animals for inclusion in PREDICT testing (allowing for minor additions in Y5Q2) and projected time for completion of analysis.
- Selected 31 malaria-negative febrile human samples for Deep Freeze pathogen discovery project.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

Taxa	Number animals sampled this quarter	Number animals sampled to date	Number of animals with at least one final test result	Number of animals with at least one test result with interpretation completed	Number of animals with at least one test result cleared for release by govt
Bats	0	1799	1696	1696	1033
Non-human Primates	0	2634	669	669	565
Other Taxa	0	4678	71	71	70
Rodents & Shrews	0	2231	544	544	336
High Risk Interface					
Contact with workers harvesting crops	0	10	10	10	0
Peri-domestic/in or near human dwelling(s)	0	1274	1177	1177	611
For sale in medium market (5-20 vendors)	0	101	0	0	0
For sale in small market (< 5 vendors)	0	50	0	0	0
Hunted	0	8219	803	803	659
Public safety hazard (e.g. threat to humans)	0	17	17	17	0
Sanctuary	0	1097	619	619	522

Wild animal farm	0	1	0	0	0
Zoo	0	1	1	1	0
Contact with tourists/ecotourism	0	182	171	171	58
Contact with domestic animals or humans NOT likely	0	371	163	163	154
Other	0	19	19	19	0
Total	0	11342	2980	2980	2004

PREDICT Test Findings (Q1Y5):

Number of animals and samples submitted by taxa	Diagnostic lab	Diagnostics method	Pathogen family genus screening or specific virus	Results	Pathogen discovery	Approved by government for release
Rodents & Shrews (87 animals, 174 samples - Liver, Oral swab, Spleen, Rectal swab)	GVFI Cameroon	PCR	Alphaviruses, Arenaviruses, Bunyaviruses, Enteroviruses, Hantaviruses, Henipaviruses, Paramyxoviruses, Seadornaviruses	Product for sequencing detected for Henipaviruses	Sequencing pending	No
Bats (1001 animals, 2057 samples - Blood drop, Liver, Oral swab, Spleen, Rectal swab, Plasma, Serum)	GVFI Cameroon	PCR	Astroviruses, Bunyaviruses, Coronaviruses, Enteroviruses, Henipaviruses, Influenzas, Rhabdoviruses, Seadornaviruses	Product for sequencing detected for Coronaviruses, Henipaviruses	Interpretation Ongoing	No
Non-human Primates (13 animals, 13 samples - Buffy coat, Plasma)	GVFI Cameroon	PCR	Bunyaviruses, Herpesviruses, Influenza viruses	Product for sequencing detected for Herpesviruses	Interpretation Ongoing	No



PREDICT

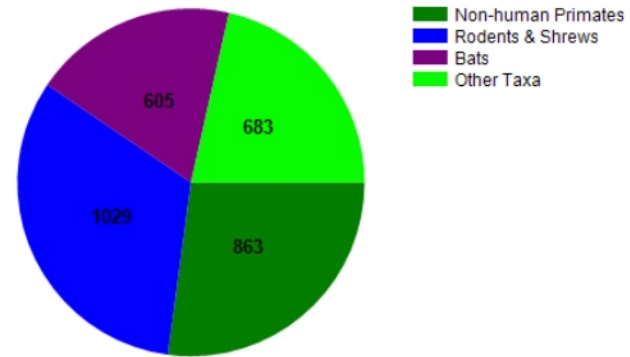
PREDICT Sampling and Testing in Congo, Democratic Republic of

The USAID Emerging Pandemic Threats PREDICT project has been working with government partners in 20 countries to develop efforts for surveillance, testing, and reporting of potential human pathogens in wildlife. This summary provides a country-level view of where wildlife sampling has been conducted to date, how sampling has been targeted on taxonomic groups of animals of high concern for human pathogens, and progress in laboratory analyses and approval of findings for sharing with the global health community.

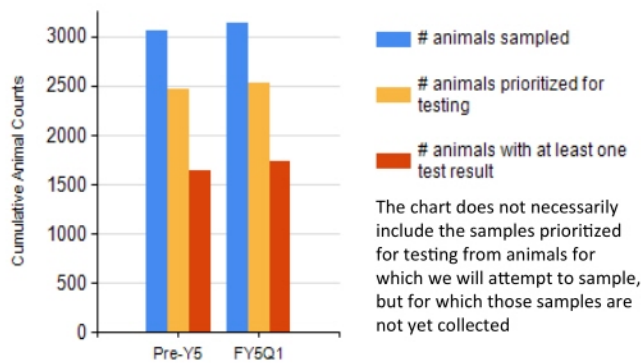
Sampling Locations



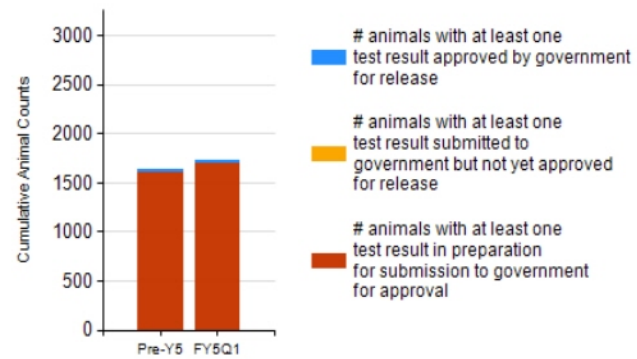
Number of Animals Sampled



Sampling and Testing Progress



Test Results Reporting Progress



For information purposes only - no action required

Significant Highlights, Results, and Success Stories DEMOCRATIC REPUBLIC OF CONGO

- Received notification that the PREDICT laboratory protocols are now included into the national disease surveillance system of the Ministry of Health. Going forward, at least one aliquot from all samples collected on suspected zoonoses throughout the country will be reserved for testing with the PREDICT panel.
- Organized a meeting with the scientific and technical staff of the Congolese Institute for the Conservation of Nature (ICCN) for the training of personnel working in parks and reserves on the prevention of zoonotic infections.
- Participated in best practices training with all USG implementing partners held by the Office of the General Inspector.
- Received and tested 7 human samples from suspected cases of VHF: 6 from Isiro and one from Viadana, all in Oriental Province; samples tested negative for all PREDICT protocols.
- Finalized list of animals for inclusion in PREDICT testing (allowing for minor additions in Y5Q2) and projected time for completion of analysis.
- Received a request to prepare the training for INRB and MoH staff on biosafety and biosecurity.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

Taxa	Number animals sampled this quarter	Number animals sampled to date	Number of animals with at least one final test result	Number of animals with at least one test result with interpretation completed	Number of animals with at least one test result cleared for release by govt
Bats	42	591	490	490	0
Non-human Primates	4	834	656	656	18
Other Taxa	0	682	8	8	0
Rodents & Shrews	25	1010	558	558	0
High Risk Interface					
Contact with workers harvesting crops	0	14	14	14	0
Peri-domestic/in or near human dwelling(s)	34	456	383	383	0
For sale in large market (> 20 vendors)	0	59	39	39	0
For sale in small market (< 5 vendors)	0	6	6	6	0
Hunted	0	2195	996	996	1
Private wildlife collection or pet	1	22	16	16	7
Raiding crops	0	1	0	0	0
Sanctuary	1	102	58	58	3

Temporary holding facility/wildlife trade transport	0	1	0	0	0
Zoo	0	21	21	21	0
Contact with park personnel/intensive wildlife management area	1	8	0	0	0
Contact with tourists/ecotourism	0	120	105	105	7
Other	34	112	74	74	0
Total	71	3117	1712	1712	18

PREDICT Test Findings (Q1Y5):

# of Animals and Samples Submitted (by Taxa)	Diagnostic Lab	Diagnostics Method	Pathogen family/genus screening/or specific virus	Results	Pathogen Discovery	Approved by Government for Release
Rodents & Shrews (194 animals, 358 samples - Blood drop, Liver, Oral swab, Rectal swab, Spleen)	GVFI PREDICT Lab	PCR	Alpha, Arena, Boca, Corona, Hanta, Herpes, Orthopox, Rhabdo viruses	Products for sequencing detected for Alpha, Arena, Boca, Corona, Hanta viruses	Sequencing pending	No
Non-human Primates (568 animals, 604 samples - Blood drop, Buffy coat, Colon, Liver, Lung, Oral swab, Spleen)	GVFI PREDICT Lab	PCR	Arena, Boca, Herpes, Orthopox viruses	Product for sequencing detected for Arena, Boca, Herpes, Orthopox viruses	Interpretation Ongoing	No
Bats (2 animals, 2 samples - Oral swab)	GVFI PREDICT Lab	PCR	Hantaviruses	Product for sequencing detected	Interpretation Completed	No
Ungulates (4 animals, 4 samples - Blood drop)	GVFI PREDICT Lab	PCR	Herpes, Orthopox viruses	All negative		No

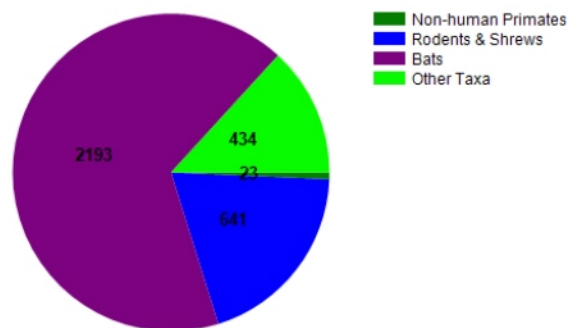
PREDICT Sampling and Testing in Gabon

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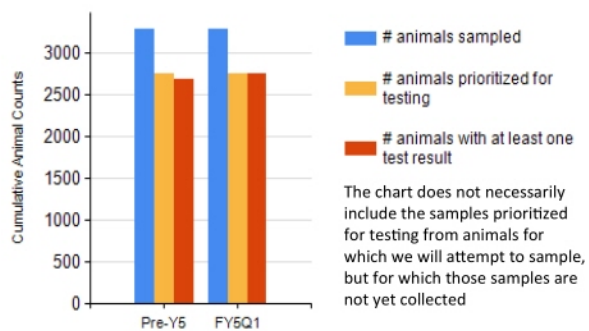
Sampling Locations



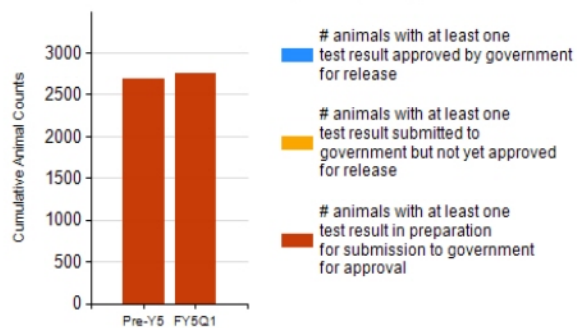
Number of Animals Sampled



Sampling and Testing Progress



Test Results Reporting Progress



For information purposes only - no action required

Significant Highlights, Results, and Success Stories for GABON:

- Assisted the Ministry of Health and the Ministry of Water and Forest in data collection from provinces and district health offices, acting as a reference center and providing diagnostic support.
- Selected subset of acute febrile archived human cases with hemorrhagic fever symptoms for inclusion in Deep Freeze project.
- Finalized list of animals for inclusion in PREDICT testing (allowing for minor additions in Y5Q2) and projected time for completion of analysis.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

Taxa	Number animals sampled this quarter	Number animals sampled to date	Number of animals with at least one final test result	Number of animals with at least one test result with interpretation completed	Number of animals with at least one test result cleared for release by govt
Bats	0	2193	1834	1834	0
Non-human Primates	0	23	23	23	0
Other Taxa	0	434	433	433	0
Rodents & Shrews	0	641	463	463	0
High Risk Interface					
Peri-domestic/in or near human dwelling(s)	0	397	376	376	0
Hunted	0	86	72	72	0
Contact with park personnel/intensive wildlife management area	0	171	31	31	0
Contact with tourists/ecotourism	0	340	340	340	0
Contact with domestic animals or humans NOT likely	0	15	15	15	0
Other	0	2282	1919	1919	0
Total	0	3291	2753	2753	0

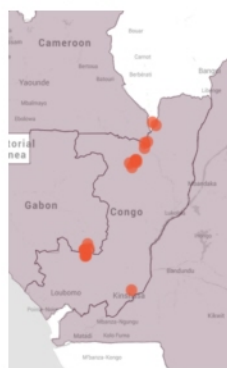
PREDICT Test Findings (Q1Y5):

# of Animals and Samples submitted (by taxa)	Diagnostic lab	Diagnostics Method	Pathogen family / genus screening / or specific virus	Results	Pathogen discovery	Approved by Government for release
Non-human Primates (20 animals, 20 samples - liver spleen)	CIRMF	PCR	Alpha, Arena, Boca, Bunya, Corona, Filo, Flavi, Hanta, Herpes, Orbi, Orthopox, Paramyxo, Parapox, Phlebo viruses	Product for sequencing detected for Arenaviruses, Bunyaviruses, Flaviviruses, Orbiviruses	Sequencing Pending	No
Rodents & Shrews (7 animals, 7 samples - liver spleen)	CIRMF	PCR	Alpha, Arena, Boca, Bunya, Corona, Filo, Flavi, Hanta, Herpes, Orbi, Orthopox, Paramyxo, Parapox, Phlebo viruses	Product for sequencing detected for Arenaviruses, Flaviviruses	Sequencing Pending	No
Carnivores (2 animals, 2 samples - liver spleen)	CIRMF	PCR	Alpha, Arena, Boca, Bunya, Corona, Filo, Flavi, Hanta, Herpes, Orbi, Orthopox, Paramyxo, Parapox, Phlebo viruses	Product for sequencing detected for Arenaviruses, Flaviviruses, Orbiviruses	Sequencing Pending	No
Ungulates (34 animals, 34 samples - liver spleen)	CIRMF	PCR	Alpha, Arena, Boca, Bunya, Corona, Filo, Flavi, Hanta, Herpes, Orbi, Orthopox, Paramyxo, Parapox, Phlebo viruses	Product for sequencing detected for Arenaviruses, Orbiviruses	Sequencing Pending	No
Other Mammals (9 animals, 9 samples - liver spleen)	CIRMF	PCR	Alpha, Arena, Boca, Bunya, Corona, Filo, Flavi, Hanta, Herpes, Orbi, Orthopox, Paramyxo, Parapox, Phlebo viruses	All negative		No

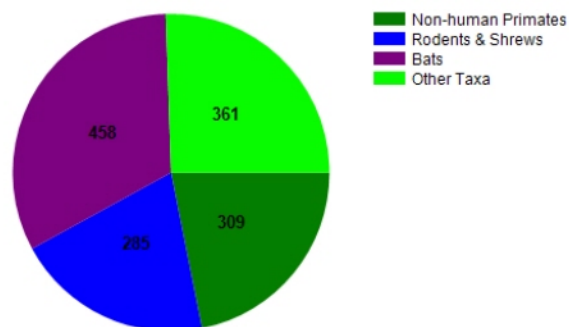
PREDICT Sampling and Testing in Congo, Republic of

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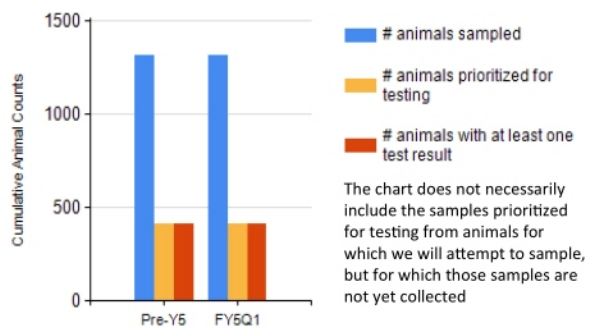
Sampling Locations



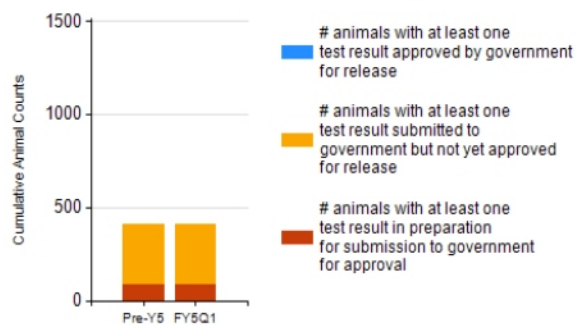
Number of Animals Sampled



Sampling and Testing Progress



Test Results Reporting Progress



For information purposes only - no action required

Significant Highlights, Results, and Success Stories for REPUBLIC OF CONGO:

- Traveled to Brazzaville for supervision, review of financial procedures, and administration with local management in preparation for the planned sample field collections (commencing in January 2014).
- Received approval for research permits by the Ministry of Scientific Research and Innovation.
- Received authorization for sample collection in the field by the Ministry of Forestry.
- Established an EPT One Health task force for PREDICT, IDENTIFY, PREVENT, and Congo PREDICT staff, including National Public Health Lab-Ministry of Health, National Veterinary lab, Ministry of Livestock, and a cross section of Military Health authorities who attended recent meetings.
- Held logistics meeting with Cameroon field staff and DRC lab staff to arrange a field trip and discuss mechanisms of technical support for sample collection, shipment, and analysis.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

	Number animals sampled this quarter	Number animals sampled to date	Number of animals with at least one final test result	Number of animals with at least one test result with interpretation completed	Number of animals with at least one test result cleared for release by govt
Taxa					
Bats	0	404	77	77	0
Non-human Primates	0	290	191	191	0
Other Taxa	0	360	14	14	0
Rodents & Shrews	0	262	127	127	0
High Risk Interface					
Peri-domestic/in or near human dwelling(s)	0	33	15	15	0
For sale in small market (< 5 vendors)	0	144	8	8	0
Hunted	0	427	77	77	0
Contact with researchers (other than PREDICT staff)	0	42	21	21	0
Contact with domestic animals or humans NOT likely	0	669	288	288	0
Other	0	1	0	0	0

Total	0	1316	409	409	0
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PREDICT Test Findings (Q1Y5):

Number of animals and samples submitted by taxa	Diagnostic lab	Diagnostics method	Pathogen family genus screening or specific virus	Results	Pathogen discovery	Approved by government for release
Bats (54 animals, 110 samples - Brain, Feces, Liver, Lung, Oral swab, Rectal swab)	UC Davis Wildlife Diagnostic Lab	PCR	Arena, Astros, Bunya, Corona, Entero, Filo, Flavi, Hanta, Henipa, Herpes, Influenza, Lyssa, Nipah, Orbi, Paramyxo, Phlebo, Rhabdo, Seadorna viruses	Products for sequencing detected for Arena, Astro, Bunya, Corona, Entero, Flavi, Hanta, Henipa, Herpes, Influenza, Lyssa, Orbi, Paramyxo, Phlebo, Rhabdo, viruses	Interpretation Ongoing	No
Rodents & Shrews (2 animals, 2 samples - Blood drop, Lung)	UC Davis Wildlife Diagnostic Lab	PCR	Arena, Astro, Bunya, Corona, Entero, Filo, Flavi, Hanta, Henipa, Herpes, Influenza, Lyssa, Nipah, Orbi, Paramyxo, Phlebo, Rhabdo, Seadorna viruses	Product for sequencing detected for Herpesviruses	Interpretation completed, Awaiting approval from government to share results.	No
Non-human Primates (38 animals, 38 samples - Feces)	Center for Infection and Immunity, Columbia University	PCR	Corona, Herpes viruses	Product for sequencing detected for Herpesviruses	Interpretation completed, Awaiting approval from government to share results.	No
Non-human Primates (11 animals, 12 samples - Liver, Lung)	UC Davis Wildlife Diagnostic Lab	PCR	Herpesviruses	Product for sequencing detected for Herpesviruses	Interpretation completed, Awaiting approval from government to share results.	No

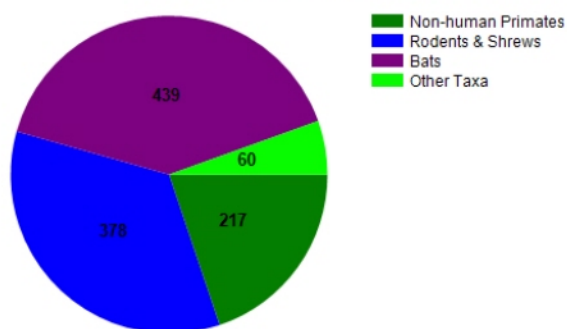
PREDICT Sampling and Testing in Rwanda

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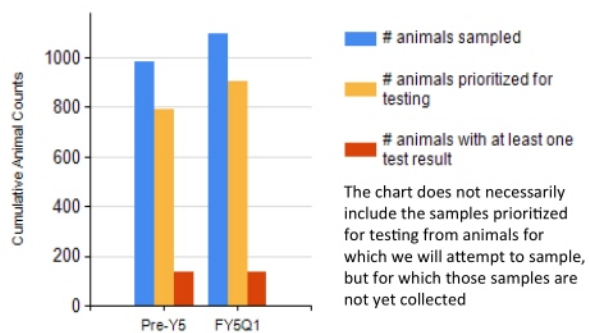
Sampling Locations



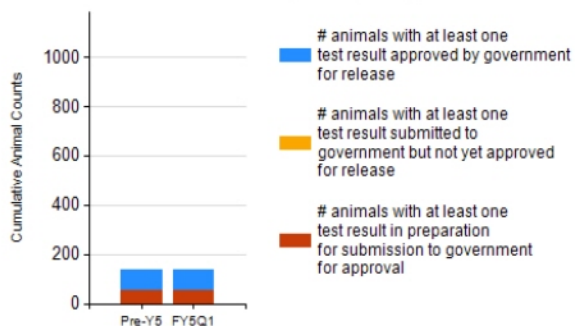
Number of Animals Sampled



Sampling and Testing Progress



Test Results Reporting Progress



For information purposes only - no action required

Significant Highlights, Results, and Success Stories for RWANDA:

- Participated in governmental One Health Steering Committee meeting to validate strategic plan for operationalizing One Health across government sectors.
- Met with collaborators at Ministry of Health, Rwanda Development Board (RDB), and RESPOND to discuss findings by RDB of Zika virus-seropositive baboons in Akagera National Park.
- Participated in a One Health consultative meeting at the National University of Rwanda School of Public Health in Kigali.
- Filled surveillance gaps: captured 107 bats from human dwellings and from roosts in urban settings.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

Taxa	Number animals sampled this quarter	Number animals sampled to date	Number of animals with at least one final test result	Number of animals with at least one test result with interpretation completed	Number of animals with at least one test result cleared for release by govt
Bats	107	404	39	39	0
Non-human Primates	5	197	76	76	60
Other Taxa	0	2	0	0	0
Rodents & Shrews	0	378	0	0	0
High Risk Interface					
Contact with workers harvesting crops	0	25	0	0	0
Peri-domestic/in or near human dwelling(s)	81	283	1	1	1
Hunted	0	18	4	4	4
Private wildlife collection or pet	0	1	1	1	1
Raiding crops	0	12	0	0	0
Sanctuary	1	8	3	3	3
Temporary holding facility/wildlife trade transport	0	17	14	14	14
Contact with park personnel/intensive wildlife management area	1	60	0	0	0
Contact with researchers (other than PREDICT staff)	1	185	0	0	0
Contact with tourists/ecotourism	28	224	92	92	37
Contact with workers in extractive industry	0	4	0	0	0

Other	0	144	0	0	0
Total	112	981	115	115	60

PREDICT Test Findings (Q1Y5):

Rwanda						
Number of animals and samples submitted by taxa	Diagnostic lab	Diagnostics method	Pathogen family genus screening or specific virus	Results	Pathogen discovery	Approved for release
Non-human Primates (9 animals, 12 samples - Blood clot, Oral swab, Pericardial fluid, Rectal swab)	Center for Infection and Immunity, Columbia University	PCR	Herpesviruses	Product for sequencing detected for Herpesviruses	The known virus Gorilla lymphocryptovirus 1 (AF250885) in the gammaherpes subfamily found in non-human primates was detected in 9 primates. To date this virus has not been detected in humans and there is no evidence at this time to suggest this virus poses a threat to human health	Yes
Non-human Primates (10 animals, 15 samples - Blood clot, Buffy coat, Oral swab, Rectal swab, Vaginal swab)	UC Davis Wildlife Diagnostic Lab	PCR	Herpesviruses	Product for sequencing detected for Herpesviruses	A new betaherpesvirus was detected in one primate; Strains of the known virus Cercopithecine herpesvirus 12 (AF091052) in the gammaherpes subfamily found in non-human primates was detected in one primate; Strains of the known virus Gorilla lymphocryptovirus 1 in the gammaherpes subfamily found in non-human primates was detected in three primates: A strain of the known virus Panine herpesvirus 2 (AF480884) in the betaherpesvirus subfamily found in non-human primates was detected in one primate To date these viruses have not been detected in humans and there is no evidence at this time to suggest this virus poses a threat to human health.	Yes
Bats (117 animals, 1717 specimens) - blood, swabs.	MUWRP	PCR	Adeno, Arena, Corona, Filo, Flavi, Hanta, Henipa, Herpes, Paramyxo, Retrovirus - Lentivirus genus, Rhabdo viruses	Products for sequencing detected for Paramyxo, Corona, Arena, Filo, Bunya, Rhabdo viruses	Sequencing Pending	No



PREDICT

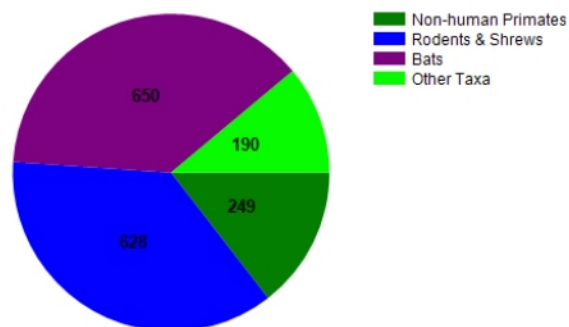
PREDICT Sampling and Testing in Tanzania, United Republic of

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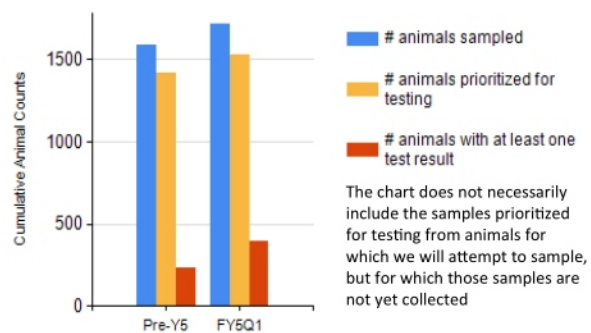
Sampling Locations



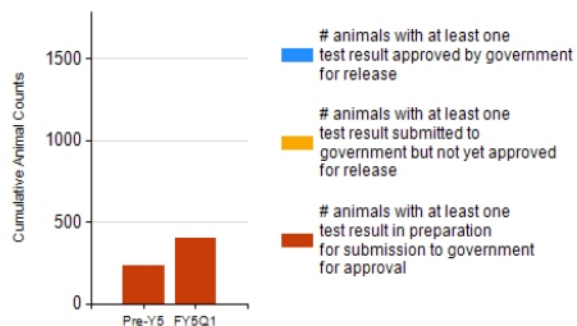
Number of Animals Sampled



Sampling and Testing Progress



Test Results Reporting Progress



For information purposes only - no action required

Significant Highlights, Results, and Success Stories for TANZANIA:

- Completed all planned wildlife surveillance activities. Focus for the remainder of the project is now directed towards data cleaning, specimen testing, and preparing data for reporting and publications.
- Shared the first batch of test results with government and ministry partners and received permission for public release of our surveillance and test result data on the public PREDICT data viewing platform HealthMap.
- Continued to explore the use of PREDICT's diagnostic approach or deep sequencing to detect any viral, bacterial, parasitic and/or fungal agents using an existing MOU between SUA and UC Davis.
- Continued to communicate and collaborate with the Center for Disease Control Global Disease Detection Group in Kenya on plans for collaborative surveillance at sugarcane plantations planned for the spring.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

Taxa	Number animals sampled this quarter	Number animals sampled to date	Number of animals with at least one final test result	Number of animals with at least one test result with interpretation completed	Number of animals with at least one test result cleared for release by govt
Bats	113	650	75	75	29
Non-human Primates	0	249	0	0	0
Other Taxa	19	190	5	5	0
Rodents & Shrews	0	628	317	317	159
High Risk Interface					
Raiding markets	0	9	0	0	0
Peri-domestic/in or near human dwelling(s)	101	878	221	221	84
Hunted	19	233	0	0	0
Preying on livestock or their food	0	15	0	0	0
Raiding crops	0	265	158	158	86
Contact with park personnel/intensive wildlife management area	0	122	0	0	0
Contact with tourists/ecotourism	0	89	0	0	0

Contact with workers in extractive industry	12	50	18	18	18
Other	0	56	0	0	0
Total	132	1717	397	397	188

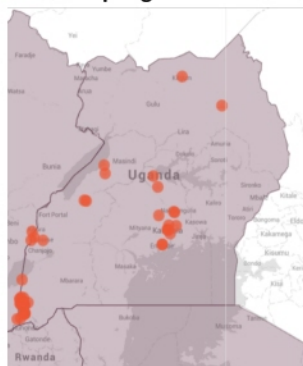
PREDICT Test Findings (Q1Y5):

Tanzania						
Number of animals and samples submitted by taxa	Diagnostic lab	Diagnostics method	Pathogen family genus screening or specific virus	Results	Pathogen discovery	Approved by government for release
Rodents & Shrews (158 animals, 190 samples - Feces, Oral swab, Rectal swab)	UC Davis Wildlife Diagnostic Lab	PCR	Alpha, Arena, Astro, Bunya, Flavi, Influenza, Paramyxo, Rhabdo viruses	Product for sequencing detected for Alpha, Arena, Astro, Bunya, Flavi, Hanta, Influenza, Rhabdo viruses	Sequencing Pending	No
Other Mammals (2 animals, 2 samples - Oral swab)	UC Davis Wildlife Diagnostic Lab	PCR	Alpha, Arena, Astro, Bunya, Flavi, Hanta, Influenza, Paramyxo, Rhabdo viruses	All negative		No
Bats (48 animals, 48 samples - Feces, Rectal swab)	UC Davis Wildlife Diagnostic Lab	PCR	Arena, Astro, Bunya, Corona, Filo, Henipa, Influenza, Nipah, Rhabdo viruses	Product for sequencing detected for Arena, Astro, Bunya, Corona, Filo, Nipah , Paramyxo, Rhabdo viruses	Sequencing Pending	No
Bats (48 animals, 48 samples - Feces, Rectal swab)	UC Davis Wildlife Diagnostic Lab	PCR	Paramyxoviruses	Product for sequencing detected	A new paramyxovirus in bats was detected in one bat. There is no evidence at this time to suggest this virus poses a threat to human health.	Yes

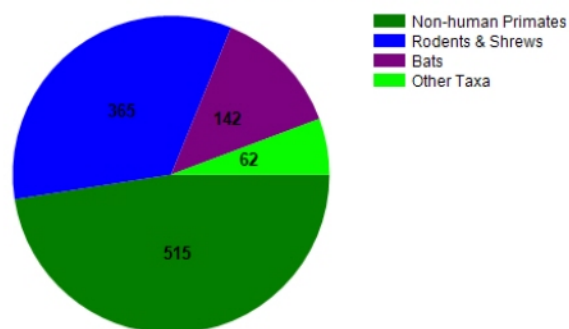
PREDICT Sampling and Testing in Uganda

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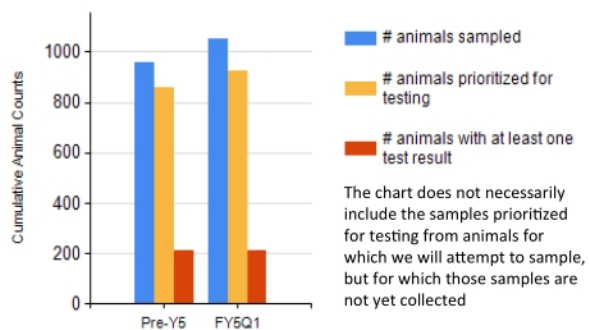
Sampling Locations



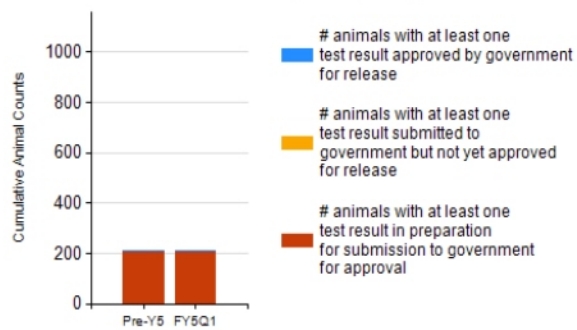
Number of Animals Sampled



Sampling and Testing Progress



Test Results Reporting Progress



For information purposes only - no action required

Significant Highlights, Results, and Success Stories for UGANDA:

- Participated in the dedication and strategic plan launch of the new Wildlife Health and Research Center (WHRC) of the Wildlife and Aquatic Resources Management Department, College of Veterinary Medicine, Makerere University; PREDICT's office and laboratory/storage space are co-located with the WHRC.
- Attended a USAID Mission Uganda Implementing Partners meeting in Kampala to strengthen coordination and cooperation among USAID-funded projects.
- Continued wildlife sampling for the Deep Forest Project: captured 58 rodents and collected 182 samples.
- Conducted wildlife sampling in Kampala: captured 25 marabou storks utilizing waste dump sites and abattoirs and collected 92 samples.
- Started PREDICT viral family testing at Makerere University Walter Reed Project laboratory of samples collected from >300 mountain gorillas (most were human-habituated) obtained during the 2012 census.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

Taxa	Number animals sampled this quarter	Number animals sampled to date	Number of animals with at least one final test result	Number of animals with at least one test result with interpretation completed	Number of animals with at least one test result cleared for release by govt
Bats	0	108	25	25	0
Non-human Primates	9	510	68	68	6
Other Taxa	25	60	18	18	0
Rodents & Shrews	58	365	98	98	0
High Risk Interface					
Peri-domestic/in or near human dwelling(s)	50	196	46	46	0
Hunted	0	36	28	28	1
Preying on livestock or their food	0	4	2	2	0
Public safety hazard (e.g. threat to humans)	0	32	15	15	0
Raiding crops	0	5	4	4	0
Temporary holding facility	0	30	30	30	0
Sanctuary	0	47	0	0	0
Zoo	0	60	0	0	0
Contact with park personnel/intensive	0	27	23	23	0

wildlife management area					
Contact with researchers (other than PREDICT staff)	9	9	0	0	0
Contact with tourists/ecotourism	8	422	13	13	5
Contact with domestic animals or humans NOT likely	0	150	48	48	0
Other	25	25	0	0	0
Total	92	1043	209	209	6

PREDICT Test Findings (Q1Y5):

Uganda						
Number of animals and samples submitted by taxa	Diagnostic Lab	Diagnostics method	Pathogen family genus screening or specific virus	Results	Pathogen discovery	Approved by government for release
Bats (25 animals, 36 samples - Blood (whole), Blood clot, Oral swab, Rectal swab)	MUWRP	PCR	Adeno, Arena, Corona, Filo, Flavi, Hanta, Henipa, Herpes, Paramyxo, Retrovirus - Lentivirus genus, Rhabdo viruses	Product for sequencing detected for Adeno, Filo, Flavi, Herpes, Rhabdo viruses	Sequence Confirmation Pending at UC Davis Wildlife Diagnostic Lab	No
Non-human Primates (47 animals, 141 samples - Blood (whole), Oral swab, Rectal swab)	MUWRP	PCR	Adeno, Boca, Corona, Entero, Filo, Flavi, Henipa, Herpes, Influenza, Paramyxo, Retro - Lentivirus genus, Rhabdo viruses	Product for sequencing detected for Entero, Filo, Flavi, Henipa, Herpes, Paramyxo, Retrovirus - Lentivirus genus	Sequence Confirmation Pending at UC Davis Wildlife Diagnostic Lab	No
Rodents & Shrews (67 animals, 200 samples - Blood (whole), Oral swab, Rectal swab)	MUWRP	PCR	Adeno, Arena, Corona, Filo, Flavi, Hanta, Henipa, Herpes, Influenza, Paramyxo, Retro - Lentivirus genus, Rhabdo viruses	Product for sequencing detected for Adeno, Arena, Corona, Filo, Flavi, Henipa, Herpes, Paramyxo, Rhabdo viruses	Sequence Confirmation Pending at UC Davis Wildlife Diagnostic Lab	No
Birds (1 animals, 3 samples - Blood (whole), Cloacal swab, Oral swab)	MUWRP	PCR	Adeno, Arena, Corona, Filo, Flavi, Hanta, Henipa, Herpes, Paramyxo, Retro - Lentivirus genus, Rhabdo viruses	All negative		No
Ungulates (17 animals, 28 samples - Blood (whole), Feces)	MUWRP	PCR	Alpha, Arena, Corona, Filo, Flavi, Hanta, Henipa, Influenza, Paramyxo, Rhabdo viruses	Product for sequencing detected for Henipa, Influenza, Rhabdo viruses	Sequence Confirmation Pending at UC Davis Wildlife Diagnostic Lab	No

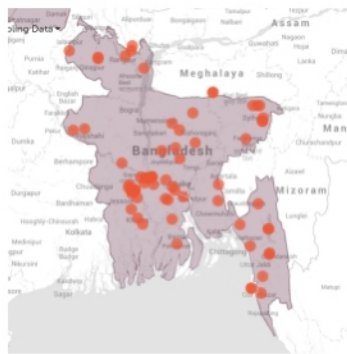
PREDICT Quarter 1 Year 5 Reporting – Asia Region



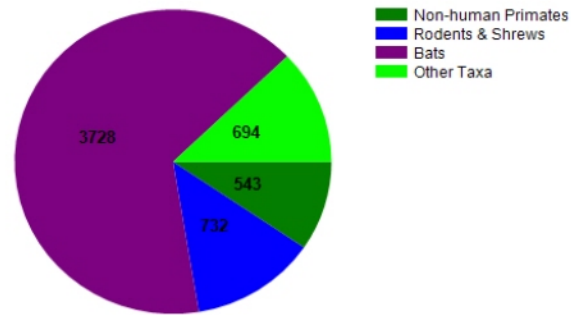
PREDICT Sampling and Testing in Bangladesh

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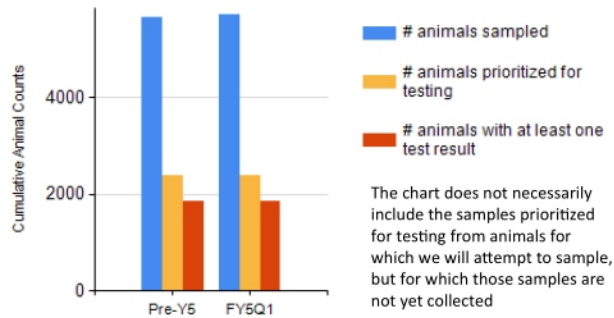
Sampling Locations



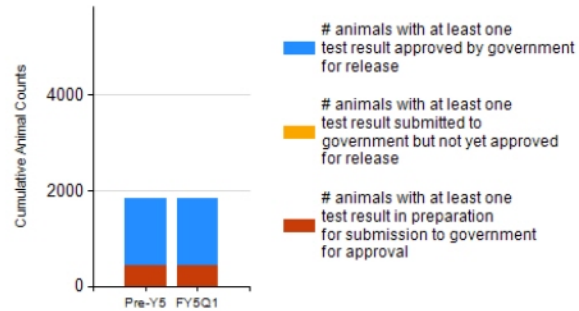
Number of Animals Sampled



Sampling and Testing Progress



Test Results Reporting Progress



For information purposes only - no action required

Significant Highlights, Results, and Success Stories in BANGLADESH:

- Presented PREDICT activities at the National One Health Bangladesh meeting in Dhaka; Government of Bangladesh, USAID, and local implementing partners were in attendance.
- Held meetings with IEDCR, Directorate of Health Services to update them on PREDICT activities.
- Shipped priority wildlife samples shipped to the Columbia University Center for Infection and Immunity (CII) for viral family testing.

Summary of Surveillance Activities and Testing in GAINS to date:

Taxa	Number animals sampled this quarter	Number animals sampled to date	Number of animals with at least one final test result	Number of animals with at least one test result with interpretation completed	Number of animals with at least one test result cleared for release by govt
Bats	0	4027	1411	1409	0
Non-human Primates	0	543	4	4	0
Other Taxa	0	395	10	10	0
Rodents & Shrews	49	732	421	421	0
High Risk Interface					
Raiding markets	0	135	0	0	0
Peri-domestic/in or near human dwelling(s)	0	4744	1752	1750	0
Raiding crops	0	40	0	0	0
Contact with tourists/ecotourism	0	23	23	23	0
Contact with domestic animals or humans NOT likely	0	567	71	71	0
Other	49	188	0	0	0
Total	49	5697	1846	1844	0

PREDICT Test Findings (Q1Y5):

Number of animals and samples submitted by taxa	Diagnostic lab	Diagnostics method	Pathogen family genus screening or specific virus	Results	Pathogen discovery	Approved by government for release
Bats (704 animals, 706 samples - Urine/urogenital swab, Urine, Oral swab, Rectal swab)	Center for Infection and Immunity, Columbia University	PCR	Adenoviruses, Astroviruses, Bocaviruses, Coronaviruses, Herpesviruses, Nipahviruses, Paramyxoviruses, Polyomaviruses	Product for sequencing detected for Adenoviruses, Astroviruses, Bocaviruses, Coronaviruses, Herpesviruses, Nipahviruses , Paramyxoviruses	Interpretation Ongoing	No
Rodents & Shrews (169 animals, 249 samples - Urine/urogenital swab, Oral swab, Rectal swab)	ICDDR,B	PCR	Arenaviruses, Hantaviruses, Paramyxoviruses	Product for sequencing detected for Hantaviruses	Sequencing pending	No

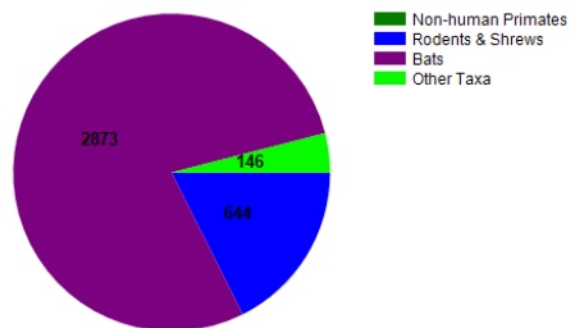
PREDICT Sampling and Testing in China

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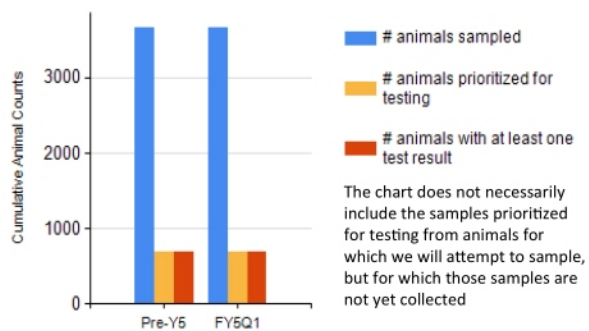
Sampling Locations



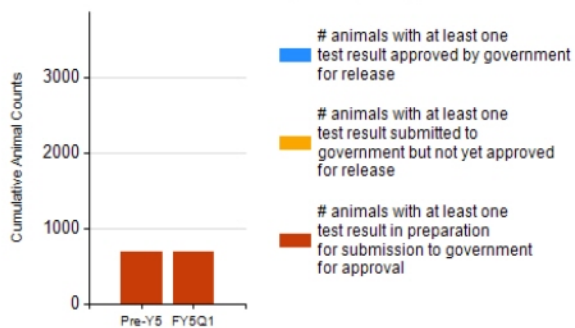
Number of Animals Sampled



Sampling and Testing Progress



Test Results Reporting Progress



For information purposes only - no action required

Significant Highlights, Results, and Success Stories in CHINA:

- Extended regional technical cooperation network with Jiangsu Provincial Center for Disease Control and Prevention (JSCDC).
- Performed cost analysis comparing WHO H7N9 and PREDICT protocols for responding to influenza outbreaks of unknown type.
- Completed human behavioral data entry and QA/QC for enrollment and follow up phases of animal-human interface study.

Summary of Y5Q1 Surveillance Activities in GAINS to date:

Taxa	No. Animals Sampled this Quarter	No. Animals Sampled to date	No. Animals with at least one final test result	No. Animals with at least one test result with interpretation completed	No. Animals with at least one test result cleared for release by govt
Bats	0	2874	487	487	0
Other Taxa	0	145	6	6	0
Rodents & Shrews	0	644	161	161	0
Total	0	3663	654	654	0
High Risk Interface					
Contact with locals for religious activities	0	107	0	0	0
Contact with workers harvesting crops	0	644	0	0	0
Peri-domestic/in or near human dwelling(s)	0	237	36	36	0
For sale in large market (> 20 vendors)	0	191	0	0	0
Hunted	0	174	0	0	0
Raiding crops	0	76	0	0	0
Free-ranging	0	267	237	237	0
Wild animal farm	0	253	167	167	0
Contact with tourists/ecotourism	0	1307	214	214	0

Contact with workers in extractive industry	0	83	0	0	0
Contact with domestic animals or humans NOT likely	0	324	0	0	0
Total	0	3663	654	654	0

NOTE: Human Surveillance activities:

Name of Sample Set	Sample Type	Quantity	Sampling Location
Human Encephalitis	Serum (23), CSF (63), Nasopharyngeal Swab (13)	23	Luoding, Meizhou, Maoming
Human Hemorrhagic Fever	Serum	31	Fengkai, Lianping, Yunfu, Yangjiang, Guangzhou
Animal-Human Interface	Human Serum	1,389	Fengkai, Dabu, Xinyi, Jiaoling, Lianshan, Lianzhou, Pingyuan, Yunan, Lianping, Heping, Yunfu, Deqing
Human H7N9	Serum	1	Dongguan
Human Influenza-like Illness	Throat Swab	2,249	Jiangmen, Chaozhou, Huizhou, Qingyuan, Shaoguan, Yangjiang, Zhongshan, Zhanjiang
Human Fever with Thrombocytopenia	Serum	3	Nanjing, Suzhou, Zhenjiang
Rodent	Serum	200	Zhanjiang
Bird	Anal Swab	130	Shaoguan, Heyuan
Bat	Brain (670), Lung (670), Kidney (670)	670	Zhaoqing

PREDICT Test Findings (Q1Y5):

Number of animals and samples submitted by taxa	Diagnostic lab	Diagnostic method	Pathogen family genus screening or specific virus	Results	Pathogen discovery	Approved by government for release
Bats (487 animals, 627 samples - Oral swab, Rectal swab)	Wuhan Institute of Virology, CAS	PCR	AstV, CoV, PMV	Product for sequencing detected for AstV, CoV, PMV	Interpretation Ongoing	No
Rodents & Shrews (161 animals, 324 samples - Oral swab, Rectal swab)	Wuhan Institute of Virology, CAS	PCR	AstV, CoV, PMV	Product for sequencing detected for AstV, CoV, PMV	Interpretation Completed, Preparation of Report for Government in Progress	No
Carnivores (6 animals, 12 samples - Oral swab, Rectal swab)	Wuhan Institute of Virology, CAS	PCR	AstV, CoV, PMV	Product for sequencing detected for CoV	Interpretation Completed, Preparation of Report for Government in Progress	No

NOTE: Human Test Results:

# Samples Submitted	Diagnostic Lab	Diagnostics Method	Pathogen family/genus screening / or specific virus	Results	Pathogen Discovery	Approved by Government for release
Human Encephalitis CSF (29), Nasopharyngeal Swab (12), Serum (12)	GDCDC	Conventional PCR	Seadorna, Flavi, Paramyxo, Arena, Hanta viruses	All negative		No
Human Hemorrhagic Fever Serum (8)	GDCDC	Conventional PCR	Paramyxo, Arena, Hanta, Filo, Flavi viruses	All negative		No
Human Fever with Thrombocytopenia Serum (3)	GDCDC	Conventional PCR	Filo, Flavi, Hanta, Paramyxo, Arena, Phlebo, Rhabdo, Bunya, Entero viruses	All negative		No
Human H7N9 Serum (1)	GDCDC	Conventional PCR	Influenza A	Product for Sequencing	Sequence confirmation pending	No

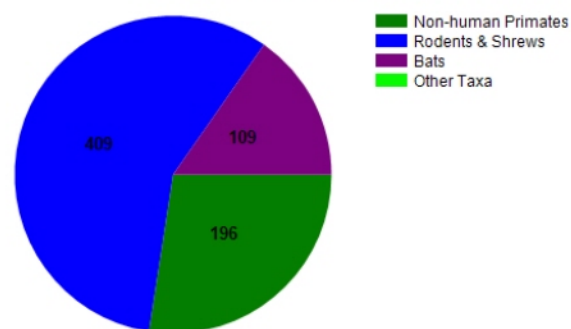
PREDICT Sampling and Testing in Nepal

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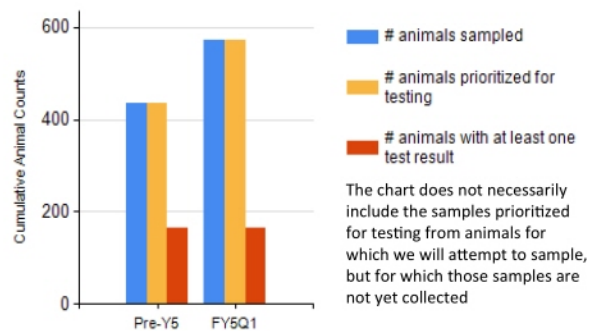
Sampling Locations



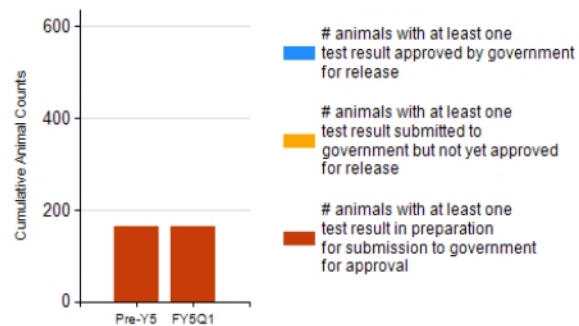
Number of Animals Sampled



Sampling and Testing Progress



Test Results Reporting Progress



For information purposes only - no action required

Significant Highlights, Results, and Success Stories in NEPAL:

- Established an agreement with the Animal Health Directorate to begin testing a subset of avian swab samples screened by the central veterinary laboratory for H5N1 and H1N1 testing for additional viral families using PREDICT protocols.
- Optimized and completed the surveillance site characterization sheets for Nepal.
- Held initial meetings with the Patan Academy of Health Sciences to discuss potential collaboration and participation in the Deep Freeze project or other prospective human sample collection in tandem with ongoing influenza like illness surveillance in Kathmandu.
- Completed sample collection at all planned bat and primate sites; began sampling of rodents at the remaining informal settlement site.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

Taxa	# animals sampled this quarter	# animals sampled to date	# of animals with at least one final test result	# of animals with at least one test result with interpretation completed	# of animals with at least one test result cleared for release by govt
Bats	0	109	0	0	0
Non-human Primates	0	144	107	107	0
Rodents & Shrews	123	306	57	57	0
High Risk Interface					
Peri-domestic/in or near human dwelling(s)	123	415	57	57	0
Public safety hazard (e.g. threat to humans)	0	144	107	107	0
Total	123	559	164	164	0

PREDICT Test Findings (Q1Y5):

Nepal						
Number of animals and samples submitted by taxa	Diagnostic lab	Diagnostics method	Pathogen family genus screening or specific virus	Results	Pathogen discovery	Approved by government for release
Non-human Primates (27 animals, - Saliva)	CMDN/Intrepid Nepal	PCR	Corona, Influenza, Paramyxo, Retro, Henipa viruses	All negative		No
Non-human Primates (3 animals, Saliva)	CMDN/Intrepid Nepal	PCR	Influenza	Product for sequencing		No
Non-human Primates (1 animals, Saliva)	CMDN/Intrepid Nepal	PCR	Paramyxoviruses	Product for sequencing		No
Non-human Primates (4 animals, Saliva)	CMDN/Intrepid Nepal	PCR	Coronaviruses	Product for sequencing		No
Non-human Primates (1 animals, Saliva)	CMDN/Intrepid Nepal	PCR	Henipaviruses	Product for sequencing		No
Rodents and Shrews (59 animals, oral swabs)	CMDN/Intrepid Nepal	PCR	Arena, Hanta, Bunya, Paramyxo, Rhabdo viruses	All negative		No
Rodent (1 animal, oral swab)	CMDN/Intrepid Nepal	PCR	Arenaviruses	Product for sequencing		No
Non-human Primates (105, Saliva)	UC Davis	PCR	Corona, Retro –Lenti genus, Simian Foamy viruses	Products for sequencing	Sequencing ongoing	No
Rodents and Shrews (135, Oral and Recta; swabs)	UC Davis	PCR	Paramyxo, Rhabdo, Influenza viruses	Products for sequencing	Sequencing ongoing	No
Bats (108, Feces and Urine)	UC Davis	PCR	Coronaviruses	Products for sequencing	Sequencing ongoing	No

PREDICT Quarter 1 Year 5 Reporting – SE ASIA REGION



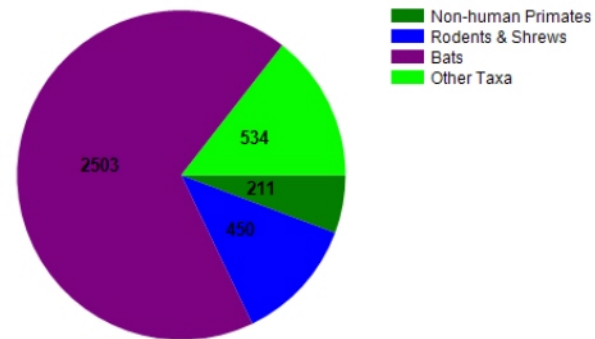
PREDICT Sampling and Testing in Cambodia

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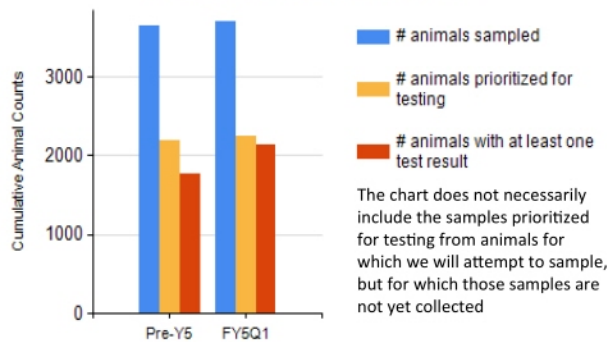
Sampling Locations



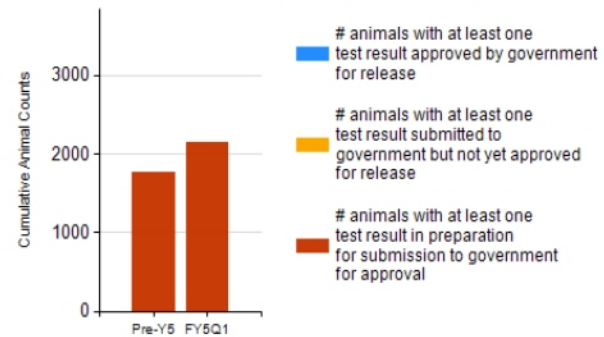
Number of Animals Sampled



Sampling and Testing Progress



Test Results Reporting Progress



For information purposes only - no action required

Significant Highlights, Results, and Success Stories in CAMBODIA:

- Increased collaboration with the Forestry Administration (FA) for joint sampling activities in 4 provinces.
- The National Veterinary Research Institute signed the Results Sharing document, and it is in review by the Forestry Administration (FA) to move forward approval of public reporting of testing results.
- Presented on “Targeted Wildlife Disease Surveillance at High Risk. Interfaces” at the Royal University of Agriculture’s One Health Workshop.
- Gave demonstration on safe sample collection and cold chain usage at the South East Asian Bat Conservation Research Unit (SEABCRU) regional workshop.
- Two students from the Prek Leap National College of Agriculture (PNCA) joined field sampling activities and were trained on PREDICT protocols.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

Taxa	Number animals sampled this quarter	Number animals sampled to date	Number of animals with at least one final test result	Number of animals with at least one test result with interpretation completed	Number of animals with at least one test result cleared for release by govt
Bats	29	2507	1260	1260	0
Non-human Primates	9	208	158	158	0
Other Taxa	0	530	358	358	0
Rodents & Shrews	11	448	365	365	0
High Risk Interface					
Peri-domestic/in or near human dwelling(s)	0	177	176	176	0
For sale in large market (> 20 vendors)	0	84	57	57	0
For sale in medium market (5-20 vendors)	0	95	1	1	0
For sale in small market (< 5 vendors)	0	1	0	0	0
For sale in restaurant	0	347	213	213	0
Hunted	45	1861	1184	1184	0
Private wildlife collection or pet	0	1	0	0	0

Rehabilitation center	0	8	6	6	0
Sanctuary	0	8	0	0	0
Wild animal farm	0	898	322	322	0
Zoo	2	4	0	0	0
Contact with tourists/ecotourism	0	153	128	128	0
Contact with domestic animals or humans NOT likely	2	2	0	0	0
Other	0	54	54	54	0
Total	49	3693	2141	2141	0

PREDICT Test Findings (Q1Y5):

Cambodia						
Number of animals and samples submitted by taxa	Diagnostic lab	Diagnostics method	Pathogen family genus screening or specific virus	Results	Pathogen discovery	Approved by government for release
Bats (604 animals, 1185 samples - Brain, Feces, Liver, Oral swab, Spleen, Rectal swab, Lung)	Institut Pasteur Cambodia	PCR	Alpha, Arena, Astro, Corona, Filo, Flavi, Hanta, Henipa, Lyssa, Paramyxo viruses	Products for sequencing detected for Astro, Corona, Filo, Hanta, Lyssa, Paramyxo viruses	Interpretation Ongoing	No
Rodents & Shrews (289 animals, 1237 samples - Heart, Urine, Feces, Liver, Oral swab, Spleen, Rectal swab, Kidney, Lung)	Institut Pasteur Cambodia	PCR	Astro, Bunya, Corona, Entero, Filo, Flavi, Hanta, Henipa, Herpes, Influenza, Lyssa, Orthopox, Paramyxo, Retrovirus - Lentivirus genus, Seadorna, Simian Foamy viruses	Products for sequencing detected for Astro, Filo, Hanta viruses	Interpretation Ongoing	No
Other Mammals (2 animals, 7 samples - Liver, Oral swab,	Institut Pasteur Cambodia	PCR	Astro, Filo, Flavi, Henipa, Lyssa viruses	All negative		No

Spleen, Rectal swab, Lung)						
Carnivores (8 animals, 24 samples - Liver, Oral swab, Spleen, Rectal swab, Lung)	Institut Pasteur Cambodia	PCR	Boca, Corona, Filo, Flavi, Henipa, Lyssa viruses	Product for sequencing detected for Coronaviruses	Interpretation Pending	No
Non-human Primates (152 animals, 302 samples - Heart, Urine, Blood drop, Brain, Feces, Liver, Oral swab, Muscle, Spleen, Skin, Lung, Rectal swab, Small intestine, Kidney, Stomach, Intestine with feces)	Institut Pasteur Cambodia	PCR	Bunya, Corona, Entero, Filo, Flavi, Henipa, Herpes, Influenza, Orthopox, Paramyxo, Retrovirus - Lentivirus genus, Seadorna, Simian Foamy viruses	Products for sequencing detected for Entero, Herpes, Simian Foamy viruses	Interpretation Ongoing	No
Ungulates (16 animals, 37 samples - Heart, Liver, Oral swab, Spleen, Rectal swab, Lung)	Institut Pasteur Cambodia	PCR	Corona, Filo, Flavi, Henipa, Lyssa viruses	Product for sequencing detected for Coronaviruses	Interpretation Pending	No
Bats (49 animals, 134 samples - Liver, Lung, Oral swab, Rectal swab, Spleen)	Institut Pasteur Cambodia	PCR	Orthoreoviruses	All negative		No

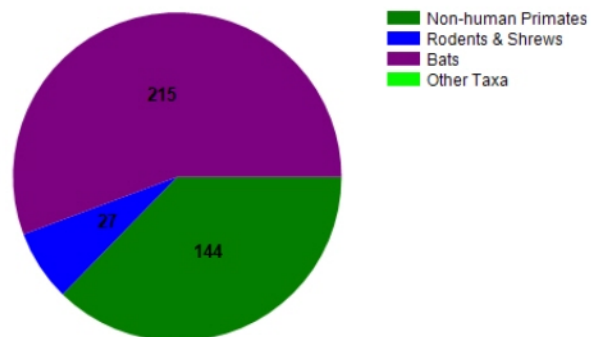
PREDICT Sampling and Testing in Indonesia

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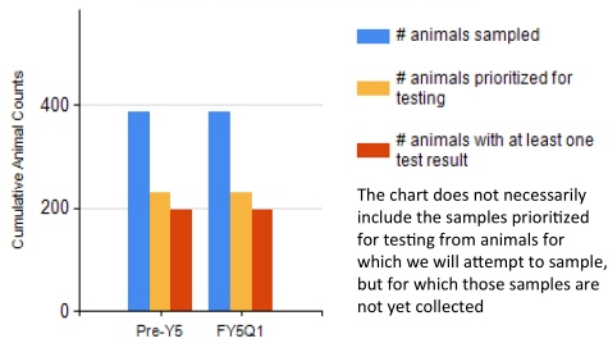
Sampling Locations



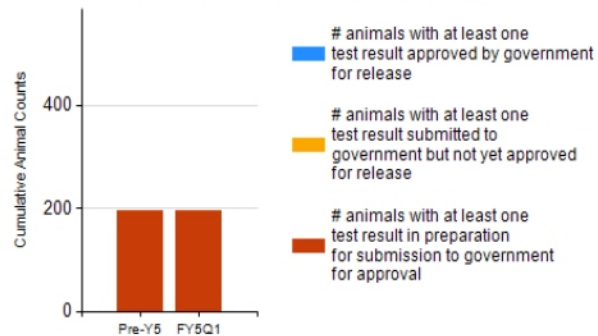
Number of Animals Sampled



Sampling and Testing Progress



Test Results Reporting Progress



For information purposes only - no action required

Significant Highlights, Results, and Success Stories in INDONESIA:

- Communicated with MoH regarding the mechanism of sharing results from human surveillance; agreed to apply existing results reporting mechanism for human pathogens surveillance.
- Attended the National Coordination meeting on zoonosis control organized by the KomNas Zoonosis Control in Jakarta.
- Attended meeting with (b)(6) and PREVENT (b)(6) (b)(6) emphasizing future coordination in specimen sampling, especially from markets; PREVENT team conducted market scope inspections and had good information on which market to sample and what time of year.
- Invited by Director of Animal Health Services to serve as an advisor to discuss review of Health Requirement of nonhuman primate importation to Indonesia.
- Attended Cross Sectoral Meeting on Diagnostic Laboratory Network in Zoonoses Control, in Salatiga, Central Java, and presented PREDICT Indonesia activities; the meeting was organized by the Institute for Vector and Reservoir Control Research and Development, National Institute of Health Research and Development - Ministry of Health, Republic of Indonesia.
- Enhanced capacity of lab staff via training: meeting on zoonosis laboratory network; workshop on laboratory biosafety; laboratory training for next generation sequencing; workshop on manuscript preparation.
- Installed new thermocycler in PREDICT lab to increase throughput.
- Met with USAID officials: (b)(6) (b)(6) (b)(6)
(b)(6) (b)(6)
(b)(6) (b)(6)
Education Office: (b)(6) (b)(6) (b)(6) (b)(6)
(b)(6) (b)(6) (b)(6)
- Extended access to acute human samples was made possible via approval of the in-country project, "Study of emerging viruses in samples from fever surveillance studies in the Indonesian Archipelago."

Summary of Surveillance Activities and Testing in GAINS to date:

Taxa	Number animals sampled this quarter	Number animals sampled to date	Number of animals with at least one final test result	Number of animals with at least one test result with interpretation completed	Number of animals with at least one test result cleared for release by govt
Bats	0	215	80	80	0
Non-human Primates	0	144	124	124	0
Rodents & Shrews	0	27	5	5	0
High Risk Interface					
Peri-domestic/in or near human dwelling(s)	0	37	37	37	0
For sale in large market (> 20 vendors)	0	158	31	31	0
Sanctuary	0	4	0	0	0
Contact with researchers (other than PREDICT staff)	0	31	17	17	0
Contact with tourists/ecotourism	0	156	124	124	0
Total	0	386	209	209	0

PREDICT Test Findings (Q1Y5):

Indonesia						
Number of animals and samples submitted by taxa	Diagnostic lab	Diagnostics method	Pathogen family genus screening or specific virus	Results	Pathogen discovery	Approved by government for release
Bats (33 animals, 36 samples - Oral swab, Saliva, Serum, Tissue)	Primate Research Center, Bogor Agricultural University	PCR	Arena, Corona, Filo, Flavi, Paramyxo viruses	Product for sequencing detected for Paramyxoviruses	Interpretation Completed, Preparation of Report for Government in Progress	No
Rodents & Shrews (5 animals, 5 samples - Blood clot)	Primate Research Center, Bogor Agricultural University	PCR	Arenaviruses	All negative		No

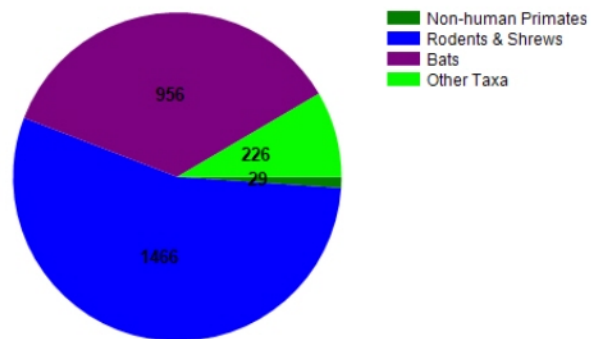
PREDICT Sampling and Testing in Lao Peoples Democratic Republic

The USAID Emerging Pandemic Threats PREDICT project has been working with government partners in 20 countries to develop efforts for surveillance, testing, and reporting of potential human pathogens in wildlife. This summary provides a country-level view of where wildlife sampling has been conducted to date, how sampling has been targeted on taxonomic groups of animals of high concern for human pathogens, and progress in laboratory analyses and approval of findings for sharing with the global health community.

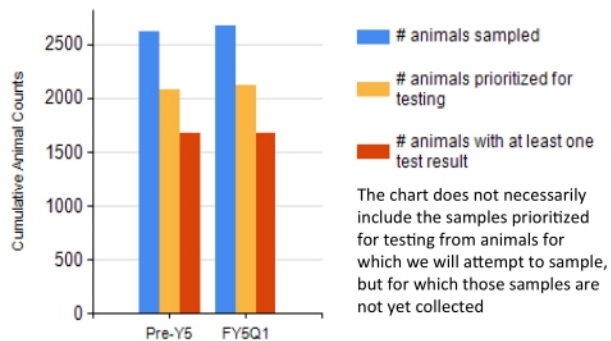
Sampling Locations



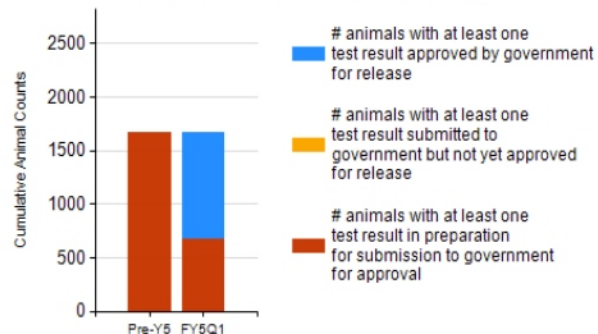
Number of Animals Sampled



Sampling and Testing Progress



Test Results Reporting Progress



For information purposes only - no action required

Significant Highlights, Results, and Success Stories in LAOS:

- Trained two National Animal Health Laboratory (NAHL) staff in the field on biosafety, maintaining cold chain, data entry, and wildlife species identification.
- Delivered kits, equipment, and essential supplies to partner laboratories.
- Focused surveillance activities focused on sampling primates (11) and bats (18) at new interfaces including temples, private pets, and a tourism site as well as the market interface.
- Re-extracted original samples from 30 pooled samples that initially tested positive for coronavirus or astrovirus at Institut Pasteur Cambodia at NAHL to aim to identify whether the virus originated in the rectal or oral swab.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

Taxa	Number animals sampled this quarter	Number animals sampled to date	Number of animals with at least one final test result	Number of animals with at least one test result with interpretation completed	Number of animals with at least one test result cleared for release by govt
Bats	18	956	798	798	487
Non-human Primates	11	29	1	1	0
Other Taxa	5	226	128	128	51
Rodents & Shrews	22	1466	747	747	458
High Risk Interface					
Peri-domestic/in or near human dwelling(s)	5	6	0	0	0
For sale in large market (> 20 vendors)	37	1895	1153	1153	561
For sale in medium market (5-20 vendors)	0	75	25	25	2
For sale in small market (< 5 vendors)	12	59	33	33	30
For sale in market, unknown size	0	93	93	93	91
Hunted	0	547	370	370	312
Private wildlife collection or pet	1	1	0	0	0
Contact with tourists/ecotourism	1	1	0	0	0
Total	56	2677	1674	1674	996

PREDICT Test Findings (Q1Y5):

Lao PDR						
Number of animals and samples submitted by taxa	Diagnostic lab	Diagnostics method	Pathogen family genus screening or specific virus	Results	Pathogen discovery	Approved by government for release
Bats (455 animals, 1017 samples - Oral swab, Rectal swab)	Institut Pasteur Cambodia	PCR	Arena, Filo, Flavi, Henipa, Influenza, Lyssa, Paramyxo viruses	Product for sequencing detected for Arenaviruses	Interpretation Completed, Preparation of Report for Government in Progress	No
Rodents & Shrews (603 animals, 1159 samples - Feces, Liver, Lung, Oral swab, Rectal swab, Urine/urogenital swab)	Institut Pasteur Cambodia	PCR	Arena, Bunya, Flavi, Hanta, Influenza, Paramyxo viruses	Product for sequencing detected for Arenaviruses	Interpretation Completed, Preparation of Report for Government in Progress	No
Other Mammals (32 animals, 86 samples - Feces, Liver, Lung, Oral swab, Rectal swab, Urine, Urine/urogenital swab)	Institut Pasteur Cambodia	PCR	Arena, Bunya, Flavi, Hanta, Influenza, Paramyxo viruses	All negative		No
Bats (310 animals, 576 samples - Oral swab, Rectal swab)	National Animal Health Centre	PCR	Corona, Rhabdo viruses	All negative		No
Non-human Primates (1 animals, 2 samples - Oral swab, Rectal swab)	National Animal Health Centre	PCR	Corona, Rhabdo viruses	All negative		No
Rodents & Shrews (3 animals, 6 samples - Oral swab, Rectal swab)	National Animal Health Centre	PCR	Corona, Rhabdo viruses	All negative		No
Carnivores (68 animals, 129 samples - Oral swab, Rectal swab, Urine/urogenital swab)	National Animal Health Centre	PCR	Corona, Rhabdo viruses	All negative		No
Other Mammals (8 animals, 16 samples - Oral swab, Rectal swab)	National Animal Health Centre	PCR	Corona, Rhabdo viruses	All negative		No
Birds (3 animals, 6 samples - Oral swab, Rectal swab)	Institut Pasteur Cambodia	PCR	Flavi, Influenza, Paramyxo viruses	All negative		No

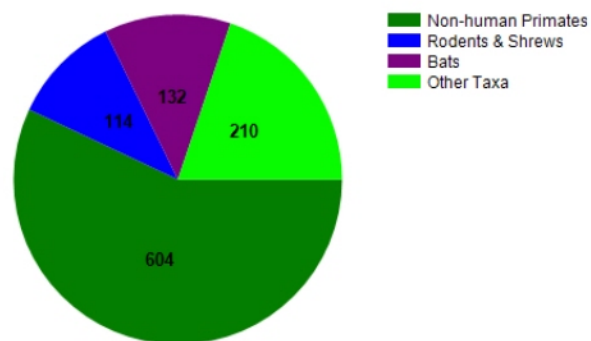
PREDICT Sampling and Testing in Malaysia, Peninsular

The USAID Emerging Pandemic Threats PREDICT project has been working with government partners in 20 countries to develop efforts for surveillance, testing, and reporting of potential human pathogens in wildlife. This summary provides a country-level view of where wildlife sampling has been conducted to date, how sampling has been targeted on taxonomic groups of animals of high concern for human pathogens, and progress in laboratory analyses and approval of findings for sharing with the global health community.

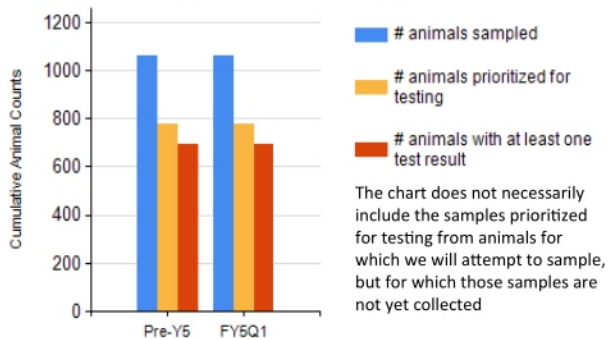
Sampling Locations



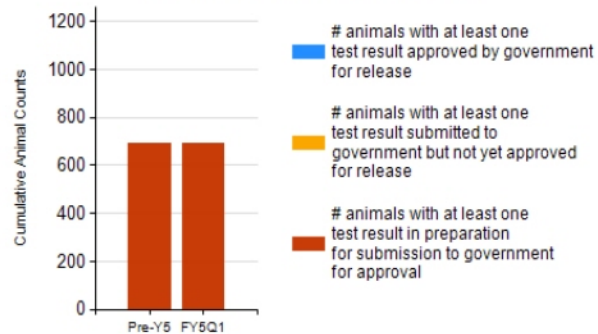
Number of Animals Sampled



Sampling and Testing Progress



Test Results Reporting Progress

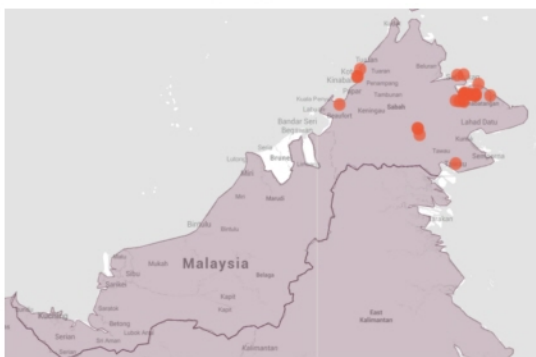


For information purposes only - no action required

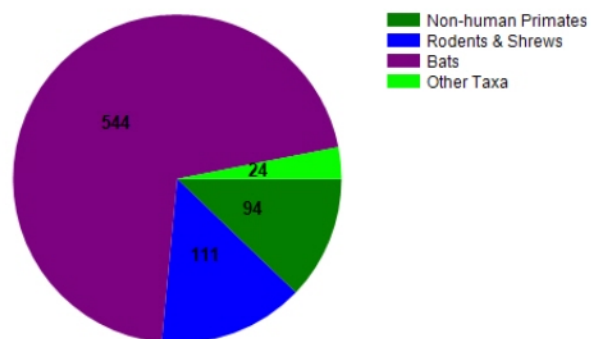
PREDICT Sampling and Testing in Malaysia, Sabah

The USAID Emerging Pandemic Threats PREDICT project has been working with government partners in 20 countries to develop efforts for surveillance, testing, and reporting of potential human pathogens in wildlife. This summary provides a country-level view of where wildlife sampling has been conducted to date, how sampling has been targeted on taxonomic groups of animals of high concern for human pathogens, and progress in laboratory analyses and approval of findings for sharing with the global health community.

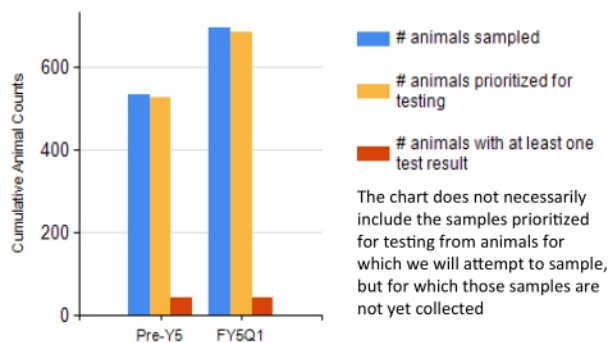
Sampling Locations



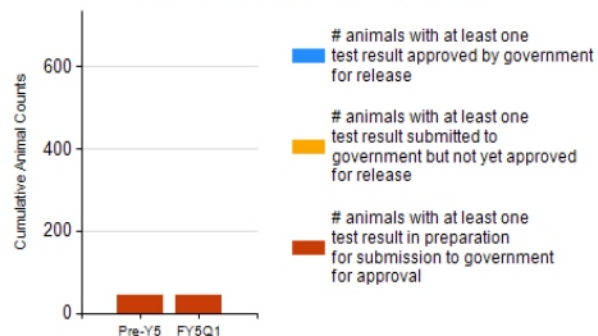
Number of Animals Sampled



Sampling and Testing Progress



Test Results Reporting Progress



For information purposes only - no action required

Significant Highlights, Results, and Success Stories in MALAYSIA (quad charts above are separate due to separate reporting requirements for government):

- Sent first shipment of Deep Forest samples from Sabah to the Columbia University Center for Infection and Immunity for novel pathogen detection; 1,333 samples collected from bats, rodents and macaques.
- The Wildlife Health, Genetic and Forensic Laboratory (WHGFL) established by PREDICT, SWD, and DGFC has been certified as a BSL 2 laboratory by the FAO Regional BioSafety Coordinator according to international standards.
- Presented on PREDICT work in Malaysia at Wildlife Animal Rescue Network meeting in Sabah.
- Started testing PREDICT and Deep Forest samples at the new WHGFL.
- Met with US Ambassador and (b)(6) (b)(6) to discuss PREDICT work in Malaysia.
- Signed MOU with SWD at the official opening of WHGFL by US Ambassador and Sabah Minister of Tourism, Culture and Environment. Opening generated a huge amount of local media coverage for PREDICT and USAID.
- Started to assist SWD with sampling confiscated bushmeat and advising SWD on necessary steps to use WHGFL for forensic work that can be used for country uses in the future.
- Completed 5 Deep Forest sampling trips; Human Disturbance surveillance transect was completed for all 5 sites.

Summary of Surveillance Activities and Testing in GAINS to date:

Taxa	Number animals sampled this quarter	Number animals sampled to date	Number of animals with at least one final test result	Number of animals with at least one test result with interpretation completed	Number of animals with at least one test result cleared for release by govt
Bats	101	617	123	123	0
Non-human Primates	1	697	468	468	0
Other Taxa	3	222	36	36	0
Rodents & Shrews	55	209	110	110	0
High Risk Interface					
Wildlife trade transport	0	194	24	24	0
Contact with workers harvesting crops	0	44	13	13	0
Peri-domestic/in or near human dwelling(s)	42	631	475	475	0

Private wildlife collection or pet	0	10	10	10	0
Raiding crops	118	127			
Public safety hazard (e.g. threat to humans)	0	57	22	22	0
Rehabilitation center	0	12	4	4	0
Contact with park personnel/intensive wildlife management area	0	596	188	146	0
Sanctuary	0	59			
Zoo	0	3	1	1	
Contact with tourists/ecotourism	0	12			
Total	320	3490	1474	1474	0

PREDICT Test Findings (Q1Y5):

Number of animals and samples submitted by taxa	Diagnostic lab	Diagnostics method	Pathogen family genus screening or specific virus	Results	Pathogen discovery	Approved by government for release
Bats (124 animals, 749 samples - Urine/urogenital swab, Feces, Oral swab, Rectal swab, Red blood cells, Serum)	BSL 3, Veterinary Research Institute Ipoh, Department of Veterinary Services	PCR	Adeno, Alpha, Arena, Astro, Bunya, Corona, Filo, Flavi, Hanta, Henipa, Herpes, Influenza, Nipah, Orthopox, Paramyxo, Parapox, Rhabdo, Seadorna viruses	Products for sequencing detected for Arena, Astro, Corona, Filo, Herpes, Paramyxo viruses	Interpretation Completed, Preparation of Report for Government in Progress	No
Bats (27 animals, 78 samples - Urine/urogenital swab, Oral swab, Rectal swab)	Center for Infection and Immunity, Columbia University	PCR	Adeno, Astro, Boca, Corona, Filo, Flavi, Hanta, Herpes, Influenza, Orthopox, Paramyxo, Parapox, Polyoma viruses	Products for sequencing detected for Adeno, Astro, Herpes viruses	Interpretation Ongoing	No
Non-human Primates (257 animals, 757 samples -	BSL 3, Veterinary Research	PCR	Adeno, Alpha, Arena, Astro, Boca, Bunya, Corona, Enterovirus, Filo,	Product for sequencing detected for Alpha,	Interpretation Completed, Preparation of	No

Urine/urogenital swab, Oral swab, Rectal swab)	Institute Ipoh, Department of Veterinary Services		Flavi, Henipa, Herpes, Influenza, Orthopox, Paramyxo, Parapox, Retrovirus - Lentivirus genus, Rhabdo, Seadorna, Simian Foamy viruses	Arena, Astro, Filo, Flavi, Herpes, Paramyxo, Retrovirus - Lentivirus genus, Simian Foamy viruses	Report for Government in Progress	
Non-human Primates (50 animals, 150 samples - Urine/urogenital swab, Oral swab, Rectal swab)	Center for Infection and Immunity, Columbia University	PCR	Adeno, Astro, Boca, Corona, Filo, Flavi, Hanta, Herpes, Influenza, Orthopox, Paramyxo, Parapox, Polyoma viruses	Product for sequencing detected for Herpesviruses	Interpretation Completed, Preparation of Report for Government in Progress	No
Rodents & Shrews (111 animals, 329 samples - Urine/urogenital swab, Oral swab, Rectal swab, Serum)	BSL 3, Veterinary Research Institute Ipoh, Department of Veterinary Services	PCR	Adeno, Alpha, Arena, Astro, Bunya, Corona, Filo, Flavi, Hanta, Henipa, Herpes, Influenza, Orthopox, Paramyxo, Parapox, Rhabdo, Seadorna viruses	Products for sequencing detected for Alpha, Astro, Hanta, Paramyxo viruses	Interpretation Completed, Preparation of Report for Government in Progress	No
Rodents & Shrews (27 animals, 75 samples - Urine/urogenital swab, Oral swab, Rectal swab)	Center for Infection and Immunity, Columbia University	PCR	Adeno, Astro, Boca, Corona, Filo, Flaviviruses, Hanta, Herpes, Influenza, Orthopox, Paramyxo, Parapox, Polyoma viruses	Products for sequencing detected for Adeno, Astro viruses	Interpretation Ongoing	No
Carnivores (12 animals, 37 samples - Urine/urogenital swab, Feces, Oral swab, Rectal swab)	BSL 3, Veterinary Research Institute Ipoh, Department of Veterinary Services	PCR	Adeno, Alpha, Arena, Astro, Bunya, Corona, Filo, Flavi, Hanta, Henipa, Herpes, Influenza, Orthopox, Paramyxo, Parapox, Rhabdo, Seadorna viruses	All negative		No
Ungulates (7 animals, 13 samples - Urine/urogenital swab, Oral swab, Rectal swab)	BSL 3, Veterinary Research Institute Ipoh, Department of Veterinary	PCR	Adeno, Alpha, Arena, Astro, Bunya, Corona, Filo, Flavi, Hanta, Henipa, Herpes, Influenza, Orthopox, Paramyxo, Parapox,	Products for sequencing detected for Alpha, Hanta viruses	Interpretation Completed, Preparation of Report for Government in Progress	No

	Services		Rhabdo, Seadorna viruses			
Other Mammals (12 animals, 39 samples - Urine/urogenital swab, Oral swab, Rectal swab)	BSL 3, Veterinary Research Institute Ipoh, Department of Veterinary Services	PCR	Adeno, Alpha, Arena, Astro, Bunya, Corona, Filo, Flavi, Hanta, Henipa, Herpes, Influenza, Orthopox, Paramyxo, Parapox, Rhabdo, Seadorna viruses	Product for sequencing detected for Astro, Flavi viruses	Interpretation Completed, Preparation of Report for Government in Progress	No
Bats (14 animals, 14 samples - Urine/urogenital swab)	Diagnostic Lab, Department of Wildlife and National Parks Peninsular Malaysia (PERHILITAN)	PCR	Arena, Flavi, Hanta viruses	Product for sequencing detected for Arenaviruses	Interpretation Completed, Preparation of Report for Government in Progress	No
Rodents & Shrews (11 animals, 12 samples - Urine/urogenital swab, Oral swab, Rectal swab)	Diagnostic Lab, Department of Wildlife and National Parks Peninsular Malaysia (PERHILITAN)	PCR	Arena, Corona, Flavi, Hanta viruses	Product for sequencing detected for Coronaviruses	Interpretation Completed, Preparation of Report for Government in Progress	No
Non-human Primates (414 animals, 826 samples - Urine/urogenital swab, Oral swab, Rectal swab)	Diagnostic Lab, Department of Wildlife and National Parks Peninsular Malaysia (PERHILITAN)	PCR	Corona, Herpes viruses	Product for sequencing detected for Corona, Herpes viruses	Interpretation Completed, Preparation of Report for Government in Progress	No
Carnivores (8 animals, 16 samples - Oral swab, Rectal swab)	Diagnostic Lab, Department of Wildlife and National Parks Peninsular Malaysia (PERHILITAN)	PCR	Coronaviruses	All negative		No
Non-human Primates (50 animals, 150 samples - Oral swab, Rectal swab,	Center for Infection and Immunity, Columbia	PCR	Papillomaviruses L1 Gene	All negative		No

Urine/urogenital swab)	University					
Bats (25 animals, 78 samples - Oral swab, Rectal swab, Urine/urogenital swab)	Center for Infection and Immunity, Columbia University	PCR	Papillomaviruses L1 Gene	All negative		No
Rodents & Shrews (27 animals, 75 samples - Oral swab, Rectal swab, Urine/urogenital swab)	Center for Infection and Immunity, Columbia University	PCR	Papillomaviruses L1 Gene	All negative		No
Bats (25 animals, 25 samples - Serum)	Center for Infection and Immunity, Columbia University	Serology	Retroviruses	All negative		No
Non-human Primates (50 animals, 50 samples - Plasma)	Center for Infection and Immunity, Columbia University	Serology	Retroviruses	All negative		No
Rodents & Shrews (24 animals, 24 samples - Serum)	Center for Infection and Immunity, Columbia University	Serology	Retroviruses	All negative		No
Non-human Primates (38 animals, 115 samples - Heart, Urine/urogenital swab, Brain, Oral swab, Spleen, Rectal swab, Nerve)	BSL 3, Veterinary Research Institute Ipoh, Department of Veterinary Services	PCR	Alpha, Arena, Astro, Boca, Bunya, Corona, Filo, Flavi, Henipa, Herpes, Influenza, Orthopox, Paramyxo, Parapox, Retrovirus - Lentivirus genus, Seadorna, Simian Foamy viruses	Product for sequencing detected for Alpha, Arena, Astro, Boca, Corona, Henipa, Herpes, Seadorna viruses	Interpretation Completed, Preparation of Report for Government in Progress	No
Other Mammals (4 animals, 30 samples - Heart, Brain, Feces, Liver, Spleen, Small intestine, Blood (whole), Colon, Kidney,	BSL 3, Veterinary Research Institute Ipoh, Department of Veterinary	PCR	Alpha, Arena, Astro, Boca, Bunya, Corona, Filo, Flavi, Henipa, Herpes, Influenza, Orthopox, Paramyxo, Parapox, Retrovirus -	Products for sequencing detected for Boca, Herpes, Parapox, Rhabdo viruses	Interpretation Completed, Preparation of Report for Government in Progress	No

Intestinal content, Lung)	Services		Lentivirus genus Rhabdo, Seadorna viruses			
Other Mammals (4 animals, 30 samples - Blood (whole), Brain, Colon, Feces, Heart, Intestinal content, Kidney, Liver, Lung, Small intestine, Spleen)	BSL 3, Veterinary Research Institute Ipoh, Department of Veterinary Services	PCR	Endotheliotropic herpesviruses - general, Endotheliotropic herpesviruses - specific 3/4, Endotheliotropic herpesviruses - specific 5, Endotheliotropic herpesviruses - Specific 6	Products for sequencing detected for Endotheliotropic	Interpretation Completed, Preparation of Report for Government in Progress	No
Non-human Primates (38 animals, 115 samples - Brain, Heart, Nerve, Oral swab, Rectal swab, Spleen, Urine/urogenital swab)	BSL 3, Veterinary Research Institute Ipoh, Department of Veterinary Services	PCR	Hepadna, Picorna viruses	All negative	Interpretation Completed, Preparation of Report for Government in Progress	No
Peninsular Malaysia non-human primates pooled throat, rectal urine swab samples from 170 animals	VRI	Consensus PCR	Alpha, Corona, Flavi,, Paramyxo, Seadorna, Boca	All negative		No
Sabah non-human primates pooled throat, rectal urine swab samples from 52 animals	WHGFL	Consensus PCR	Adeno, Alpha, Arena,, Astro, Corona, Entero, Filo, Flavi, Herpes, Influenza, Paramyxo, Retro, Rhabdo, Seadorna, SFV, Boca, Bunya, Henipa, Pox Viruses	Product for sequencing detected for: Adeno, Arena, Astro, Entero, Herpes, Paramyxo, Retro, Seadorna, SFV, Boca, Bunya, Pox viruses	Interpretation Ongoing	No

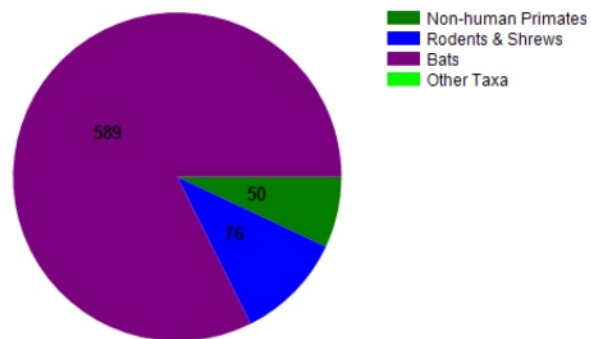
PREDICT Sampling and Testing in Thailand

The USAID Emerging Pandemic Threats PREDICT project has been working with government partners in 20 countries to develop efforts for surveillance, testing, and reporting of potential human pathogens in wildlife. This summary provides a country-level view of where wildlife sampling has been conducted to date, how sampling has been targeted on taxonomic groups of animals of high concern for human pathogens, and progress in laboratory analyses and approval of findings for sharing with the global health community.

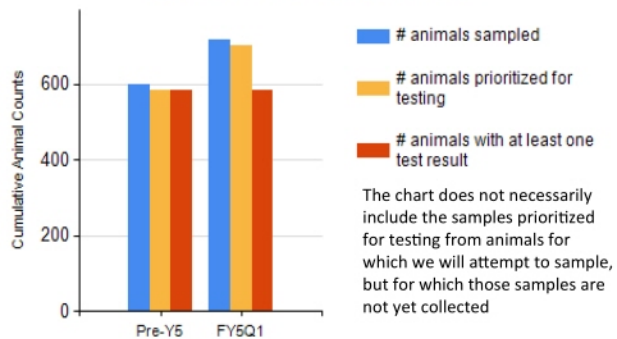
Sampling Locations



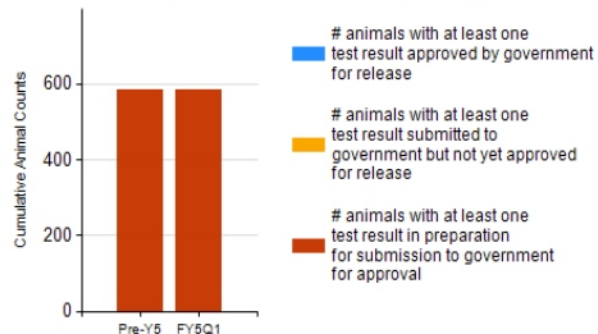
Number of Animals Sampled



Sampling and Testing Progress



Test Results Reporting Progress



For information purposes only - no action required

Significant Highlights, Results, and Success Stories in THAILAND:

- Performed testing of macaque specimens to support the surveillance project of Thai government (Department of National Parks, Wildlife and Plant Conservation).
- Coordinated wildlife sampling near CDC human site (near Myanmar border, Chiang Mai).
- Developed specimen storage management for CDC human surveillance project (Chiang Mai and Nakornratchasima). These specimens will be further screened for pathogens using PREDICT protocols.

Summary of Surveillance Activities and Testing in GAINS to date:

Taxa	Number animals sampled this quarter	Number animals sampled to date	Number of animals with at least one final test result	Number of animals with at least one test result with interpretation completed	Number of animals with at least one test result cleared for release by govt
Bats	114	485	359	359	0
Non-human Primates	0	50	50	50	0
Rodents & Shrews	4	76	72	72	0
High Risk Interface					
Contact with locals for religious activities	0	33	21	21	0
Contact with park personnel/intensive wildlife management area	0	175	175	175	0
Contact with researchers (other than PREDICT staff)	118	118	0	0	0
Contact with tourists/ecotourism	0	57	57	57	0
Other	0	228	228	228	0
Total	118	611	481	481	0

PREDICT Test Findings (Q1Y5):

Number of animals and samples submitted by taxa	Diagnostic lab	Diagnostics method	Pathogen family genus screening or specific virus	Results	Pathogen discovery	Approved by government for release
Non-human Primates (50 animals, 200 samples - Oral swab, Plasma, Rectal swab, Urine)	WHO-CC viral zoonoses, Chulalongkorn University	PCR	Arena, Astro, Boca, Bunya, Corona, Filo, Flavi, Hanta, Henipa, Herpes, Influenza, Paramyxo, Parapoxs, Retrovirus - Lentivirus genus, Seadorna viruses	Products for sequencing detected for Astro, Herpes viruses	Interpretation Ongoing	No
Bats (193 animals, 212 samples - Feces, Rectal swab)	WHO-CC viral zoonoses, Chulalongkorn University	PCR	Astroviruses	Products for sequencing detected	Interpretation Ongoing	No
Rodents & Shrews (63 animals, 69 samples - Feces, Rectal swab)	WHO-CC viral zoonoses, Chulalongkorn University	PCR	Astroviruses	Products for sequencing detected	Interpretation Ongoing	No

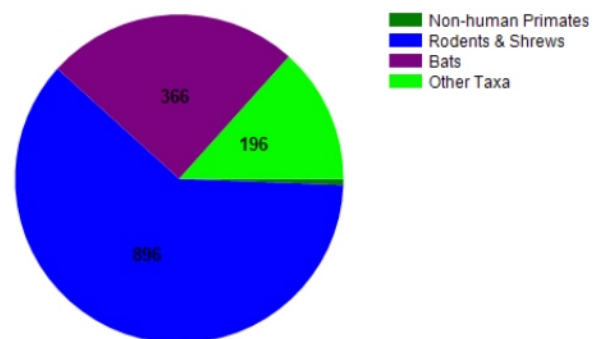
PREDICT Sampling and Testing in Vietnam

The USAID Emerging Pandemic Threats PREDICT project has been working with government partners in 20 countries to develop efforts for surveillance, testing, and reporting of potential human pathogens in wildlife. This summary provides a country-level view of where wildlife sampling has been conducted to date, how sampling has been targeted on taxonomic groups of animals of high concern for human pathogens, and progress in laboratory analyses and approval of findings for sharing with the global health community.

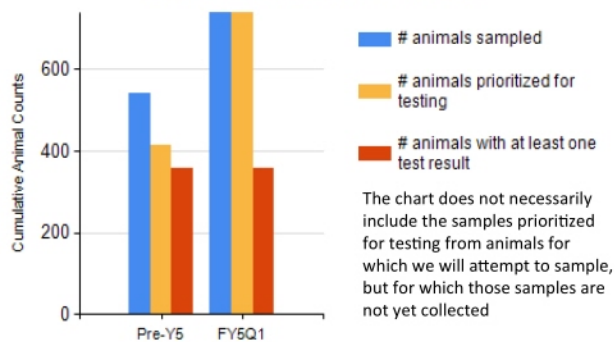
Sampling Locations



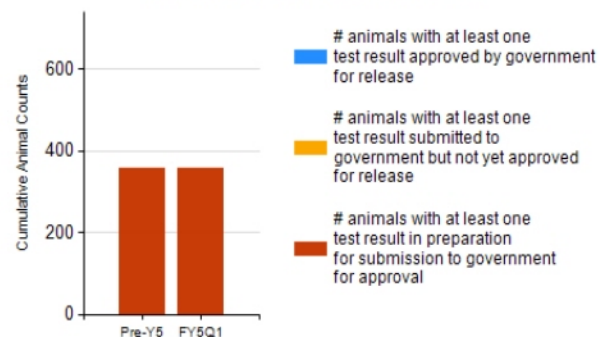
Number of Animals Sampled



Sampling and Testing Progress



Test Results Reporting Progress



For information purposes only - no action required

Significant Highlights, Results, and Success Stories in VIETNAM:

- Completed a large wildlife sampling effort in the Mekong Delta Region of Vietnam in collaboration with the Department of Animal Health (DAH), Ministry of Agriculture and Rural Development; collected a total of 3,236 samples from 301 bats and 574 rodents (of which not all are prioritized for testing); collected fecal samples from bats on guano farms (generally located near human dwellings) and below natural bat roosts at a local religious site; collected oral swabs, urine and tissue samples from rats on sale as food in large markets, restaurants and by private vendors; delivered samples collected to the DAH Regional Animal Health Office No. 6 laboratory in Ho Chi Minh City where they will be screened for viral families.
- Initiated sampling on wildlife farms in Dong Nai Province, Vietnam. Dong Nai Province borders Ho Chi Minh City and is a province with one of the highest densities of wildlife farms in the country; launched wildlife farm surveillance work with a wildlife health training (*wildlife disease management and surveillance on wildlife farms*) co-organized by PREDICT and RESPOND and attended by (b)(6) trained participants on conducting bio-security assessments and collecting samples from wildlife species on three farms, 38 in total, included rangers and officials from the Dong Nai Forest Protection Department (FPD), veterinarians, and animal health officers from the Dong Nai sub-Department of Animal Health and wildlife farm owners. Trainers included lecturers from the Vietnam One Health University Network, PREDICT, and RESPOND staff.

Summary of Surveillance Activities and Testing by Country in GAINS to date:

Taxa	Number animals sampled this quarter	Number animals sampled to date	Number of animals with at least one final test result	Number of animals with at least one test result with interpretation completed	Number of animals with at least one test result cleared for release by govt
Bats	301	366	38	38	0
Non-human Primates	5	7	2	2	0
Other Taxa	8	196	71	71	0
Rodents & Shrews	611	896	245	245	0
High Risk Interface					
Contact with locals for religious activities	12	12	0	0	0
Peri-domestic/in or near human dwelling(s)	289	354	38	38	0

For sale in large market (> 20 vendors)	295	372	69	69	0
For sale in restaurant	90	430	205	205	0
Private sale	189	189	0	0	0
Rehabilitation center	0	42	42	42	0
Sanctuary	6	8	2	2	0
Wild animal farm	44	58	0	0	0
Total	925	1465	356	356	0

PREDICT Test Findings (Q1Y5):

There are no test results to report for Vietnam in Q1Y5.

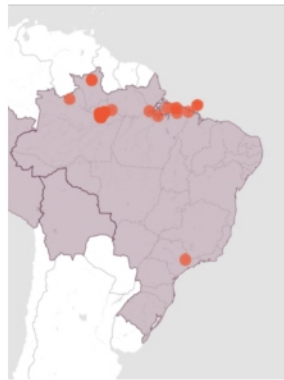
PREDICT Quarter 1 Year 5 Reporting - BRAZIL



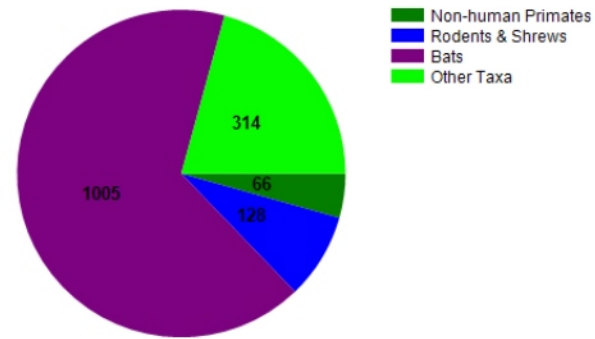
PREDICT Sampling and Testing in Brazil

The USAID Emerging Pandemic Threats PREDICT project has been working with government partners in 20 countries to develop efforts for surveillance, testing, and reporting of potential human pathogens in wildlife. This summary provides a country-level view of where wildlife sampling has been conducted to date, how sampling has been targeted on taxonomic groups of animals of high concern for human pathogens, and progress in laboratory analyses and approval of findings for sharing with the global health community.

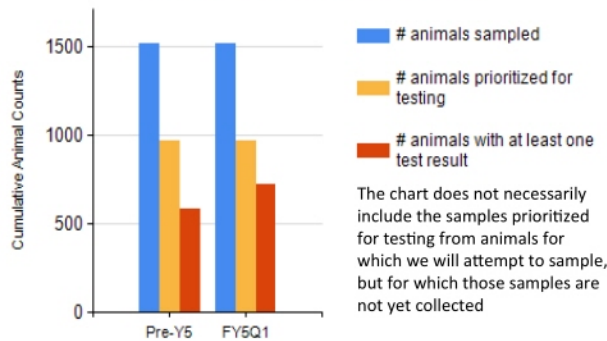
Sampling Locations



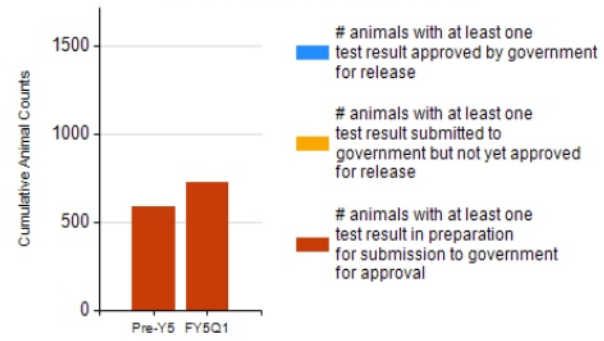
Number of Animals Sampled



Sampling and Testing Progress



Test Results Reporting Progress



For information purposes only - no action required

Significant Highlights, Results, and Success Stories in BRAZIL:

- Initiated Deep Forest wet season fieldwork.
- Completed surveillance activity in the pristine site with a total of 33 bats, 4 rodents, and 10 marsupials sampled.

Summary of Surveillance Activities and Testing in GAINS to date:

Taxa	Number animals sampled this quarter	Number animals sampled to date	Number of animals with at least one final test result	Number of animals with at least one test result with interpretation completed	Number of animals with at least one test result cleared for release by govt
Bats	33	1062	594	594	0
Non-human Primates	0	66	16	16	0
Other Taxa	10	240	28	28	0
Rodents & Shrews	4	129	85	85	0
High Risk Interface					
Contact with locals for religious activities	0	23	8	8	0
Peri-domestic/in or near human dwelling(s)	0	415	195	195	0
Private wildlife collection or pet	0	56	0	0	0
Raiding crops	0	6	0	0	0
Urban forest fragment with recreational activities	0	128	84	84	0
Contact with researchers (other than PREDICT staff)	0	113	86	86	0
Contact with domestic animals or humans NOT likely	47	628	286	286	0
Other	0	128	64	64	0
Total	47	1497	723	723	0

PREDICT Test Findings (Q1Y5):

Number of animals and samples submitted by taxa	Diagnostic lab	Diagnostics method	Pathogen family genus screening or specific virus	Results	Pathogen discovery	Approved by government for release
Bats (178 animals, 701 samples - Skin, Urine, Oral swab, Rectal swab, Anal swab, Blood clot, Serum)	Center for Infection and Immunity, Columbia University	PCR	Alpha, Astro, Bunya, Corona, Entero, Filo, Flavi, Hanta, Influenza, Orbi, Orthopox, Parapox, Pox, Rhabdo viruses	Product for sequencing detected for Astro, Corona, Entero viruses	Interpretation Ongoing	No
Rodents & Shrews (39 animals, 76 samples - Liver, Lung, Serum)	Center for Infection and Immunity, Columbia University	PCR	Alpha, Astro, Bunya, Entero, Filo, Flavi, Hanta, Influenza, Orbi, Orthopox, Paramyxo, Parapox, Pox, Rhabdo viruses	Products for sequencing detected for Astro, Paramyxo viruses	Sequencing Pending	No
Bats (286 animals, 355 samples - Urine/urogenital swab, Feces, Oral swab, Rectal swab, Blood (whole))	ICB II, University of São Paulo	PCR	Arena, Adeno, Corona, Filo, Flavi, Hanta, Henipa, Herpes, Paramyxo viruses	Products for sequencing detected for Arena, Corona, Flavi, Hanta, Herpes, Henipa viruses	Interpretation Ongoing	No
Non-human Primates (12 animals, 24 samples - Oral swab, Rectal swab, red blood cells)	ICB II, University of São Paulo	Conventional and nested RT-PCR	Arena, Boca, Corona, Filo, Flavi, Hanta, Henipa, Paramyxo, Herpes viruses	Products for sequencing detected for Arena, Flavi, Herpes viruses	Interpretation Completed	No
Rodents & Shrews (64 animals, 113 samples - Oral swab, Rectal swab)	ICB II, University of São Paulo	PCR	Arena, Corona, Filo, Flavi, Hanta, Henipa, Herpes, Paramyxo	Products for sequencing detected for Arena, Flavi, Hanta viruses	Interpretation Completed	No
Other Mammals (20 animals, 39 samples - Oral swab, Rectal swab)	ICB II, University of São Paulo	PCR	Arena, Corona, Filo, Flavi, Hanta, Henipa, Paramyxo viruses	All negative		No