

# **Exhibit 13**

1 UNITED STATES DISTRICT COURT  
2 NORTHERN DISTRICT OF CALIFORNIA  
3

4 IN RE: ROUNDUP PRODUCTS )  
LIABILITY LITIGATION, )  
5 )  
\_\_\_\_\_ ) MDL No. 2741  
6 )  
This document relates to: ) Case No.  
7 ) 16-md-02741-VC  
ALL ACTIONS )  
8 )  
\_\_\_\_\_ )

9  
10  
11  
12  
13  
14  
15 VIDEO DEPOSITION OF  
16 BEATE RITZ, MD, PHD  
17 Los Angeles, California  
18 Monday, September 18, 2017  
19  
20  
21

22 Reported by:  
23 LISA MOSKOWITZ, CSR 10816, RPR, CRR, CLR,  
24 NCRA Realtime Systems Administrator  
25 JOB NO. 128477

Page 2

1  
2  
3  
4  
5           September 18, 2017  
6           9:05 a.m.  
7  
8  
9           Video deposition of BEATE RITZ, MD,  
10 PHD, held at the offices of Baum, Hedlund,  
11 Aristei & Goldman, PC, 12100 Wilshire  
12 Boulevard, Suite 950, Los Angeles,  
13 California, before Lisa Moskowitz,  
14 California CSR 10816, RPR, CRR, CLR, NCRA  
15 Realtime Systems Administrator.  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

Page 3

1           A P P E A R A N C E S:  
2  
3           ANDRUS WAGSTAFF ATTORNEYS AT LAW  
4 Attorneys for Plaintiffs  
5 7171 West Alaska Drive  
6 Lakewood, Colorado 80226  
7 BY: KATHRYN FORGIE, ESQ.  
8 BY: DAVID WOOL, ESQ.  
9  
10          BAUM HEDLUND ARISTEI & GOLDMAN  
11 Attorneys for Plaintiffs  
12 12100 Wilshire Boulevard  
13 Los Angeles, California 90025  
14 BY: MICHAEL BAUM, ESQ.  
15 BY: R. BRENT WISNER, ESQ.  
16 BY: PEDRAM ESFANDIARY, ESQ.  
17  
18          THE MILLER FIRM  
19 Attorneys for Plaintiffs  
20 108 Railroad Avenue  
21 Orange, Virginia 22960  
22 BY: MICHAEL MILLER, ESQ.  
23 BY: JEFFREY TRAVERS, ESQ.  
24  
25          ///

Page 4

1           A P P E A R A N C E S:  
2  
3           LOCKRIDGE GRINDAL NAUEN  
4 Attorneys for Plaintiffs  
5 100 Washington Avenue South  
6 Minneapolis, Minnesota 55401  
7 BY: YVONNE FLAHERTY, ESQ.  
8 BY: ROSA TREMBOUR, ESQ.  
9  
10          HOLLINGSWORTH  
11 Attorneys for Defendant Monsanto  
12 1350 I Street, N.W.  
13 Washington, D.C. 20005  
14 BY: ERIC LASKER, ESQ.  
15 BY: ELYSE SHIMADA, ESQ.  
16  
17          ALSO PRESENT:  
18          SCOTT MCNAIR, Videographer  
19          LEEMON McHENRY  
20  
21  
22  
23  
24  
25

Page 5

1           ----- I N D E X -----  
2           WITNESS:       EXAMINATION           PAGE  
3           BEATE RITZ, MD, PhD  
4                        Mr. Lasker           10, 435  
5                        Ms. Forgie           414  
6  
7           ----- E X H I B I T S -----  
8           NUMBER                            MARKED  
9           Exhibit 19-1 Curriculum Vitae       11  
10          Exhibit 19-2 Expert Report of Dr.   39  
11                        Beate Ritz, MD, PhD, in  
12                        Support of General  
13                        Caustion on Behalf of  
14                        Plaintiffs  
15          Exhibit 19-3 Charles Poole Article   86  
16          Exhibit 19-4 Review: Causal       113  
17                        Inference in  
18                        Epidemiology PowerPoint  
19          Exhibit 19-5 Screening/           132  
20                        Misclassification of  
21                        Disease or Exposure  
22                        PowerPoint  
23          Exhibit 19-6 Deposition Transcript   148  
24                        of Aaron Earl Blair,  
25                        PhD

Page 6

----- E X H I B I T S -----

NUMBER		MARKED
Exhibit 19-7	Eriksson Study	155
Exhibit 19-8	Hardell Study	156
Exhibit 19-9	Rebuttal Expert Witness	166
	Report of Beate Ritz, MD, PhD	
Exhibit 19-10	Cantor Study	178
Exhibit 19-11	Letter from United States Environmental Agency, dated 12/22/75	200
Exhibit 19-12	De Roos Study	204
Exhibit 19-13	Zahm Study	223
Exhibit 19-14	Lee Study	235
Exhibit 19-15	McDuffie Study	243
Exhibit 19-16	North American Pooled Project PowerPoint	277
Exhibit 19-17	Introduction to Cohort Studies	313
Exhibit 19-18	De Roos 2005 Study	318
Exhibit 19-19	Draft Lymphoma Risk and Pesticide Use in the Agricultural Health Study	349

Page 7

----- E X H I B I T S -----

NUMBER		MARKED
Exhibit 19-20	Heltshe Study	363
Exhibit 19-21	Alavanja Study	386

  

RECORD MARKED	
PAGE	LINE
125	20
220	15
220	23
225	11
237	24
239	5
242	4
259	11
269	13
270	12
361	15

Page 8

LOS ANGELES, MONDAY, SEPTEMBER 18, 2017  
9:05 A.M.

THE VIDEOGRAPHER: Good morning.  
This is the start of tape labeled 09:04  
number 1 of the videotaped deposition of  
Dr. Beate Ritz in the matter of Roundup  
Products Liability Litigation. This  
case is before the United States  
District Court for the Northern District 09:04  
of California bearing MDL Number 2741  
and Case Number 16-MD-02741-VC. This  
deposition is being held at 12100  
Wilshire Boulevard in Los Angeles,  
California. Today's date is 09:05  
September 18, 2017. The time is  
approximately 9:05 a.m.

My name is Scott McNair from TSG  
Reporting, Incorporated. I'm the legal  
video specialist. The court reporter 09:05  
today is Lisa Moskowitz also in  
association with TSG Reporting.

Will counsel please identify  
yourselves for the record.

MS. FORGIE: Kathryn Forgie for 09:05

Page 9

the plaintiffs with Andrus  
Wagstaff.

MR. BAUM: Michael Baum for  
plaintiffs.

MR. WISNER: Brent Wisner for  
plaintiffs.

MR. ESFANDIARY: Pedram Esfandiary  
for plaintiffs.

MR. McHENRY: Leemon McHenry for  
plaintiffs.

THE VIDEOGRAPHER: On the phone?  
MS. FLAHERTY: Yvonne Flaherty,  
Lockridge, Grindal Nauen for plaintiffs.

THE REPORTER: And the other two  
counsel for the record on the phone?  
MS. FORGIE: Jeff, Mike, you guys?  
Are you there?

THE REPORTER: Can you please  
identify yourselves for the video  
record?

MR. MILLER: Michael Miller and  
Jeff Travers.

MS. FORGIE: For plaintiffs.

MR. LASKER: Eric Lasker for  
Monsanto, Hollingsworth, LLP.

Page 10

1 MS. SHIMADA: Elyse Shimada for  
 2 Monsanto, Hollingsworth, LLP.  
 3 THE VIDEOGRAPHER: Thank you.  
 4 Will the court reporter please  
 5 swear in the witness. 09:06  
 6  
 7 Beate Ritz, MD, PhD,  
 8 called as a witness, having been  
 9 duly sworn, was examined and  
 10 testified as follows:  
 11  
 12 EXAMINATION  
 13 BY MR. LASKER:  
 14 Q. Good morning, Dr. Ritz.  
 15 A. Good morning. 09:07  
 16 Q. As you just heard, my name is Eric  
 17 Lasker. I represent Monsanto. I'll be  
 18 asking you some questions today.  
 19 Have you had your deposition taken  
 20 before? 09:07  
 21 A. Once in, I don't know, 1991 or '2.  
 22 Q. I'm sure your attorneys have told  
 23 you the process, but your deposition is  
 24 being videotaped, and we have a court  
 25 reporter. I will try and speak slowly for 09:07

Page 11

1 the court reporter's benefit, although I'm  
 2 not very good at that. I'll warn you. And  
 3 if we can just wait for the question to be  
 4 completed before you answer, that makes it  
 5 easier for the court reporter. Okay? 09:07  
 6 A. Yes.  
 7 Q. If you have any uncertainties about  
 8 my question or my question is poorly worded,  
 9 just let me know. Okay? Great.  
 10 Let's start by marking your CV. 09:07  
 11 This will be Exhibit 19-1.  
 12 (Exhibit Number 19-1 was marked  
 13 for identification.)  
 14 BY MR. LASKER:  
 15 Q. So Dr. Ritz, you received your 09:08  
 16 medical training in Germany; correct?  
 17 A. Correct.  
 18 Q. And you received what is identified  
 19 on your CV as a medical certificate and then  
 20 a doctoral degree in medical sociology. 09:08  
 21 A. Correct.  
 22 Q. I'm just trying to understand the  
 23 terminology here. What is a doctoral degree  
 24 in medical sociology?  
 25 A. It's a PhD equivalent. 09:08

Page 12

1 Q. What was your specialty? What was  
 2 your area --  
 3 A. Medical sociology which includes  
 4 occupational health. So mine was in  
 5 occupational health. 09:08  
 6 Q. Okay. And the medical certificate,  
 7 is that --  
 8 A. That licenses you to be a  
 9 physician.  
 10 Q. Okay. Did you ever -- have you 09:08  
 11 ever practiced as a clinical physician?  
 12 A. Yes.  
 13 Q. Where did you practice?  
 14 A. At the University Hospital Hamburg  
 15 psychiatric department. 09:09  
 16 Q. Have you ever provided medical care  
 17 for patients with -- well, did you ever  
 18 provide medical care for cancer in patients  
 19 with cancer?  
 20 A. Yes. 09:09  
 21 Q. When was that?  
 22 A. That was during my final year in  
 23 medical school at the University of Hamburg  
 24 pediatrics ward that was filled with  
 25 children with leukemia and brain tumors. 09:09

Page 13

1 Q. And that was somewhere around 1982?  
 2 A. '3.  
 3 Q. '83.  
 4 Other than that, have you provided  
 5 clinical care for patients with cancer? 09:09  
 6 A. No.  
 7 Q. You're not an oncologist; correct?  
 8 A. No.  
 9 Q. You came to UCLA in 1991 to pursue  
 10 a master's degree and then a PhD in 09:09  
 11 epidemiology; correct?  
 12 A. No. 1989.  
 13 Q. 1989. Thank you.  
 14 In 1995, you became an assistant  
 15 professor of epidemiology at UCLA; correct? 09:09  
 16 A. Correct.  
 17 Q. One of your responsibilities in  
 18 that position was advising and mentoring  
 19 doctoral students; correct?  
 20 A. Correct. 09:10  
 21 Q. The first doctoral student you  
 22 mentored was Kurt Straif; correct?  
 23 A. Correct.  
 24 Q. Had you known Dr. Straif before you  
 25 became his mentor in 1997? 09:10

Page 14	Page 16
<p>1 A. I knew him as a student. He was a</p> <p>2 student in the epi department, and he was</p> <p>3 actually mentored by a different faculty,</p> <p>4 Dr. Krause, who left UCLA and because of</p> <p>5 that, Dr. Straif had to be reassigned to 09:10</p> <p>6 another advisor.</p> <p>7 Q. Had you known Dr. Straif back in</p> <p>8 Germany?</p> <p>9 A. No.</p> <p>10 Q. Did you continue to have a 09:10</p> <p>11 professional relationship with Dr. Straif</p> <p>12 after he received his PhD?</p> <p>13 A. Not a professional relationship but</p> <p>14 a personal one.</p> <p>15 Q. Okay. So you and Dr. Straif are 09:10</p> <p>16 friends?</p> <p>17 MS. FORGIE: Objection.</p> <p>18 THE WITNESS: I don't know how you</p> <p>19 would characterize it, but we're</p> <p>20 collegially affiliated. So he invited 09:11</p> <p>21 me, for example, to spend a visiting</p> <p>22 year at IARC.</p> <p>23 BY MR. LASKER:</p> <p>24 Q. Okay. That's where I was going</p> <p>25 next; so you anticipated that. 09:11</p>	<p>1 students but the students of our cancer</p> <p>2 research are at UCLA, Dr. Zhang, and one of</p> <p>3 his former students was actually a member of</p> <p>4 the epidemiology group at IARC at the time,</p> <p>5 Mia Hashibe, and she was the one who was 09:12</p> <p>6 helping all the students integrate into the</p> <p>7 IARC program, and my role as visiting</p> <p>8 scientist was to actually help her but also</p> <p>9 mentor a lot of junior scientists there</p> <p>10 because, at the time, I was considered a 09:12</p> <p>11 senior scientist.</p> <p>12 Q. So I didn't understand this. UCLA</p> <p>13 and IARC have a --</p> <p>14 A. A mentorship program.</p> <p>15 MS. FORGIE: Wait for him to get 09:12</p> <p>16 the question out before you answer,</p> <p>17 please.</p> <p>18 BY MR. LASKER:</p> <p>19 Q. And how long has UCLA had this</p> <p>20 mentoring program with IARC? 09:13</p> <p>21 A. I believe it is as long as</p> <p>22 Dr. Zhang was a faculty member at UCLA</p> <p>23 because he came -- he had a time where he,</p> <p>24 in his own professional career, actually</p> <p>25 spent time at IARC. 09:13</p>
Page 15	Page 17
<p>1 A. Yeah.</p> <p>2 Q. Beyond -- first of all, just so the</p> <p>3 record is clear, Dr. Straif is now the head</p> <p>4 of the IARC Monograph program; correct?</p> <p>5 A. As far as I understand, yes. 09:11</p> <p>6 Q. Was he the head of the Monograph</p> <p>7 program when he invited you to become a</p> <p>8 visiting scientist at IARC?</p> <p>9 A. No.</p> <p>10 Q. What was his position then? 09:11</p> <p>11 A. He was a senior scientist in the</p> <p>12 program, as far as I remember. And he was</p> <p>13 not the official person inviting me. He</p> <p>14 just recommended to me that I should come to</p> <p>15 IARC, and it was Dr. Boffetta who invited me 09:11</p> <p>16 officially.</p> <p>17 Q. What did you do as a visiting</p> <p>18 scientist at IARC?</p> <p>19 A. Well, my role was to work with --</p> <p>20 to mentor and work with junior colleagues 09:11</p> <p>21 who were in the epidemiology program.</p> <p>22 Actually, one of the senior scientists -- we</p> <p>23 have a very regular exchange of doctoral</p> <p>24 students who go for internships to IARC.</p> <p>25 That is actually under the -- not my own 09:12</p>	<p>1 Q. So when would that -- a year, what</p> <p>2 year would that program have started?</p> <p>3 A. 1997.</p> <p>4 Q. Does that continue to the present?</p> <p>5 A. I don't believe so because 09:13</p> <p>6 Dr. Hashibe left IARC, and Dr. Zhang is not</p> <p>7 very active anymore in terms of research.</p> <p>8 Q. Were you paid for your work as a</p> <p>9 visiting scientist at IARC?</p> <p>10 A. I got a stipend that helped me pay 09:13</p> <p>11 for rent. It was not considered pay.</p> <p>12 Q. Did you continue to receive pay</p> <p>13 from UCLA during that period?</p> <p>14 A. I was on a sabbatical officially,</p> <p>15 and yes, during that sabbatical, you're 09:13</p> <p>16 entitled to payment.</p> <p>17 Q. How long did you work as a visiting</p> <p>18 scientist at IARC?</p> <p>19 A. I started, I think, in August of</p> <p>20 2006, and I left to go back to UCLA in July 09:14</p> <p>21 of the next year, 2007.</p> <p>22 Q. I've seen some documents that</p> <p>23 identify you as also serving during this</p> <p>24 period as a member of the IARC secretariat;</p> <p>25 is that right? 09:14</p>

Page 18

1 A. Not that I recall that that was an  
 2 official title, however, I was an  
 3 observer -- a member of the group that was  
 4 in charge of putting the 100s volume  
 5 together or the ideas for the 100s volume, 09:14  
 6 and I was an observer at several events that  
 7 were led by the Monograph group.  
 8 They always have observers from  
 9 visiting professors, junior scientists, but  
 10 I was not a member of any of the groups. 09:14  
 11 Q. And the Volume 100, what is that?  
 12 A. That is -- that was a special  
 13 memorial volume in which they decided which  
 14 agents to re-review that they had previously  
 15 reviewed. So the 100 carcinogenic compounds 09:15  
 16 and groups that were previously reviewed in  
 17 the 100s volume they decided what to  
 18 re-review.  
 19 Q. Gotcha.  
 20 You were working for IARC during 09:15  
 21 the same years that one of the other  
 22 plaintiffs experts Christopher Portier was  
 23 also over at IARC, I believe, working on an  
 24 advisory group to recommend amendments to  
 25 the preamble. 09:15

Page 19

1 Are you familiar with that?  
 2 A. No.  
 3 Q. Did you have any dealings with  
 4 Dr. Portier when you were at IARC?  
 5 A. None. 09:15  
 6 Q. Do you have any professional  
 7 relationship with Dr. Portier?  
 8 A. None.  
 9 Q. Do you have any collegial  
 10 relationship? If that's the word we use -- 09:15  
 11 A. I don't.  
 12 MS. FORGIE: Careful there.  
 13 MR. LASKER: I'm using her word.  
 14 Trying to find the right word there.  
 15 BY MR. LASKER: 09:16  
 16 Q. I take it you did not work on any  
 17 of the amendments to the IARC preamble?  
 18 A. No.  
 19 Q. Now, I was looking at your CV, and  
 20 I don't see it. Maybe it's just an 09:16  
 21 oversight, your work for IARC on your CV.  
 22 Is that listed here, and I just  
 23 missed it?  
 24 A. That was a sabbatical. I don't  
 25 list every sabbatical I take. 09:16

Page 20

1 Q. Okay. So I didn't miss it. It's  
 2 not on your CV?  
 3 A. No.  
 4 Q. Okay.  
 5 A. There may be some talk -- no. I 09:16  
 6 don't know.  
 7 Q. Have you had any discussion with  
 8 Dr. Straif about IARC's review of  
 9 glyphosate?  
 10 A. None. 09:16  
 11 Q. Have you had any discussion with  
 12 Dr. Straif about any of your work as a  
 13 plaintiff's expert in this litigation?  
 14 A. None.  
 15 Q. Your CV mentions that you are a 09:16  
 16 member or originally were a member of the  
 17 external advisory committee for the  
 18 Agricultural Health Study and then in 2005,  
 19 you became the chair of that committee;  
 20 correct? 09:17  
 21 A. Correct.  
 22 Q. And you're currently still serving  
 23 as the chair of the AHS --  
 24 A. Normally but that committee hasn't  
 25 met since. 09:17

Page 21

1 Q. When was the last time that  
 2 committee met?  
 3 A. I think I was the chair once; so it  
 4 must have been in 2006 or '7.  
 5 Q. Okay. How did you first get 09:17  
 6 appointed to the advisory committee?  
 7 A. I was approached, as far as I  
 8 recall, by Dr. Alavanja at a professional  
 9 meeting, and he asked me whether I would be  
 10 interested in this kind of appointment. 09:17  
 11 Q. How were you selected in 2005 to  
 12 become the chair of the committee?  
 13 A. Because the chair stepped down, and  
 14 they thought they needed somebody else to  
 15 chair. So they asked me, but it was, at the 09:17  
 16 time, already not clear whether this  
 17 advisory panel would really have much to do  
 18 in the future.  
 19 That was one reason why I said yes  
 20 because I knew it wouldn't be much work. 09:17  
 21 Q. For the period 2001 to 2005 then,  
 22 was that a period where there was more work  
 23 on the advisory committee?  
 24 A. Yes.  
 25 Q. What was the role of the advisory 09:18

Page 22

1 committee during that period of time?  
 2 A. That was a very active time for the  
 3 cohort because they were in the second phase  
 4 of going out there and interviewing and  
 5 trying to interact with the farmers. 09:18  
 6 And so from year to year, they  
 7 would present their progress, but at the  
 8 same time, they were also using the baseline  
 9 data that they had collected between 1993  
 10 and 1997 to do the first analyses and 09:18  
 11 produce the first results that came out of  
 12 this cohort.  
 13 So it was a very, very busy time of  
 14 investigators presenting first results,  
 15 presenting first ideas on how to do exposure 09:18  
 16 assessments and to bang ideas around, and  
 17 that's what the advisory committee was  
 18 charged to do, which is to not only follow  
 19 the fieldwork and make recommendations that  
 20 was ongoing but also to evaluate those first 09:19  
 21 analyses and results coming out of the  
 22 study.  
 23 Q. So this was during the period of  
 24 time when the De Roos 2005 publication came  
 25 out which looked at glyphosate; correct? 09:19

Page 23

1 A. Correct.  
 2 Q. In your role on the advisory  
 3 committee, would you, then, have received  
 4 the initial results of that analysis? Have  
 5 that presented to you for discussion? 09:19  
 6 A. Not necessarily. That was actually  
 7 up to the authors and depended on whether  
 8 they wanted input from the advisory panel or  
 9 certain members of the advisory panel, and I  
 10 can't remember seeing that manuscript. 09:19  
 11 Q. Would the advisory committee review  
 12 the publications that came out of the AHS  
 13 after they appeared in the --  
 14 A. That was not our task. Our task  
 15 was really to be there for those who wanted 09:20  
 16 a pre-review.  
 17 Q. Did the advisory committee consult  
 18 on the methodologies that were being used by  
 19 the Agricultural Health Study group during  
 20 that period in preparing their analyses for 09:20  
 21 publication?  
 22 MS. FORGIE: Objection.  
 23 You can answer.  
 24 THE WITNESS: There was not one  
 25 publication that we would ever review. 09:20

Page 24

1 Part of what was done at the advisory  
 2 panel meetings was present to us studies  
 3 within the Agricultural Health Study  
 4 that helped us evaluate the exposure  
 5 assessment methods. 09:20  
 6 I remember presentations by  
 7 Dr. Curwin, by the NIOSH group that went  
 8 out and did field measurements, and I  
 9 also remember presentations by  
 10 Dr. Acquavella from Monsanto. They had 09:20  
 11 a relatively close relationship during  
 12 that time in trying to evaluate  
 13 exposures in the field.  
 14 BY MR. LASKER:  
 15 Q. Do you recall then did you review 09:21  
 16 Dr. Acquavella's analyses of urinary  
 17 biomarkers for glyphosate in other  
 18 pesticides?  
 19 A. We did not review it, but we were  
 20 made aware of it. 09:21  
 21 Q. Did you actually have the  
 22 opportunity to question Dr. Acquavella  
 23 about his -- and his team about their  
 24 analyses?  
 25 A. Maybe one or two questions. I 09:21

Page 25

1 mean, we are in a room with 35, 50 people,  
 2 and, you know, if you can get your hand up  
 3 fast enough, you can ask a question.  
 4 Q. Do you recall during that meeting  
 5 whether anybody raised, from the advisory 09:21  
 6 committee, raised any concerns about the  
 7 validity or reliability of the analysis this  
 8 Dr. Acquavella was conducting?  
 9 MS. FORGIE: Objection.  
 10 THE WITNESS: I do not. I cannot 09:21  
 11 remember.  
 12 BY MR. LASKER:  
 13 Q. So that -- you mentioned that was  
 14 from the period before 2005, and you have  
 15 one meeting that you recall after 2005, 09:22  
 16 sometime in 2006 and 2007. Have you had any  
 17 activity as a member of or as a chair of the  
 18 external advisory group for AHS since that  
 19 time?  
 20 A. What would happen is from time to 09:22  
 21 time we would get a small report of  
 22 activities that are ongoing in writing. We  
 23 would have maybe one or two conference calls  
 24 where we could ask questions about the  
 25 ongoing activities, and I've been informed 09:22



Page 26

1 that there will be a two-day meeting coming  
 2 up in February, but I can't attend it  
 3 because I'm teaching.  
 4 Q. Did you have, during that time  
 5 period, calls addressing the second phase 09:22  
 6 questionnaire to gather more information on  
 7 exposure information from the cohort?  
 8 MS. FORGIE: Object to form.  
 9 THE WITNESS: That was done. There  
 10 was no more questions about that. 09:23  
 11 BY MR. LASKER:  
 12 Q. So during the period -- that would  
 13 have been completed in 2003 or 2004.  
 14 A. Yeah, yeah.  
 15 Q. Were you advising, or was your 09:23  
 16 committee advising the AHS on the procedures  
 17 to use during the second phase in gathering  
 18 additional information from the cohort?  
 19 A. Well, that was already decided  
 20 prior to them going out in the field; so 09:23  
 21 there was nothing you could change. You  
 22 don't change methods in the middle of  
 23 assessments in the field because you get in  
 24 trouble.  
 25 Q. We'll be talking a little bit later 09:23

Page 27

1 about the response rate for the exposure  
 2 assessment for the AHS and how the AHS group  
 3 has addressed that in their studies.  
 4 Were there any discussions with  
 5 your group about methods that could be used 09:23  
 6 to address the issue of non-responders in  
 7 phase 2?  
 8 A. Only insofar as they were trying to  
 9 come up with field methods to get more  
 10 people to respond. 09:24  
 11 Q. Have you had any discussions with  
 12 any of the Agricultural Health Study  
 13 scientists regarding any study data on  
 14 glyphosate and non-Hodgkin's lymphoma?  
 15 A. No. 09:24  
 16 Q. Have you had any discussions with  
 17 anyone at the AHS regarding research into  
 18 pesticides more generally?  
 19 A. Oh, yes.  
 20 Q. What discussions -- I know this may 09:24  
 21 be a broad topic. I don't know exactly how  
 22 to break this down. What discussions have  
 23 you had with the AHS group about conducting  
 24 pesticide cancer epidemiology? I assume  
 25 that's the general category. 09:24

Page 28

1 A. That's --  
 2 MS. FORGIE: Wait for the question.  
 3 THE WITNESS: That's very broad; so  
 4 the discussions would have been quite  
 5 broad. 09:25  
 6 BY MR. LASKER:  
 7 Q. I realized that as I was asking the  
 8 question. Have you had conversations with  
 9 the AHS scientists about how to conduct  
 10 their dose response analyses of pesticides 09:25  
 11 and non-Hodgkin's lymphoma?  
 12 A. No.  
 13 Q. Have you had discussions  
 14 regarding -- with the AHS scientists about  
 15 how to deal with issues of selection -- 09:25  
 16 potential selection bias in the -- if there  
 17 is any in the AHS study?  
 18 MS. FORGIE: Object to form.  
 19 THE WITNESS: Selection bias would  
 20 be a differential bias due to loss to 09:25  
 21 follow-up. Are we talking about cancer,  
 22 or are we talking any outcome?  
 23 BY MR. LASKER:  
 24 Q. Cancer.  
 25 A. In terms of cancer we would not 09:25

Page 29

1 necessarily expect selection bias. We would  
 2 expect selection to -- well, we would  
 3 suspect loss to follow-up only if we cannot  
 4 find cancer cases in the registries that  
 5 were being searched for, and that was 09:26  
 6 actually part of the assessments in the --  
 7 when I was in the room at those meetings was  
 8 what search algorithms they were using  
 9 broadly to find cancer cases, and they  
 10 included not only the cancer registries in 09:26  
 11 the States but mortality registries and  
 12 other means including following up with the  
 13 participants. So in terms of cancer, we  
 14 would expect them to have been able to find  
 15 all the cancers. 09:26  
 16 Q. Did you have any discussions with  
 17 AHS scientists about the possibility of  
 18 misclassification -- exposure  
 19 misclassification bias in the study?  
 20 A. The study is a very broad term. 09:27  
 21 The study has many, many sub studies  
 22 including a Parkinson's study I'm very  
 23 interested in because that's what I do. And  
 24 yes, there could be selection bias in that  
 25 Parkinson's study, and it could be very 09:27

Page 30

1 severe so I'm sure we've had a lot of  
 2 discussion around that.  
 3 Q. Let me back up because you used  
 4 selection bias, and I thought we were  
 5 talking about something different but maybe 09:27  
 6 I misstated. I was talking about exposure  
 7 and misclassification bias. That's a  
 8 separate issue than selection bias.  
 9 A. Yes.  
 10 MS. FORGIE: Wait for a question. 09:27  
 11 BY MR. LASKER:  
 12 Q. Have you had conversations with AHS  
 13 scientists about exposure misclassification  
 14 bias particularly with respect to  
 15 pesticides? 09:27  
 16 A. That was an ongoing discussion that  
 17 we had at just about every meeting because  
 18 in pesticide epidemiology, we are generally  
 19 aware that that's a big problem. Exposure  
 20 misclassification is always a problem with 09:28  
 21 when you have time varying exposures, and  
 22 you have lifelong exposure periods that you  
 23 have to evaluate. So it's not like, for  
 24 example, I do a lot of pregnancy studies.  
 25 You have a nine months period, and that's 09:28

Page 31

1 rather easy to recall for the women, or you  
 2 can even sample urine every month from a  
 3 pregnant woman. You cannot sample urine  
 4 over lifetime from the farming population of  
 5 the size of the AHS. So it's an ongoing 09:28  
 6 debate.  
 7 Q. It would be fair to say that the  
 8 Agricultural Health Study has made  
 9 significant efforts through the way it  
 10 interacts with the cohort and the way that 09:28  
 11 it formulates the questionnaires, including  
 12 with advice from your committee to minimize  
 13 the potential for exposure misclassification  
 14 bias?  
 15 MS. FORGIE: Object to form. 09:28  
 16 THE WITNESS: That's a very  
 17 relative term. Again, when it comes to  
 18 lifelong exposures, misclassification of  
 19 exposure gets more and more -- to be  
 20 more and more problem the older the 09:29  
 21 enrollees are and the longer back they  
 22 have to recall. It also is a big  
 23 problem if you're not reassessing  
 24 exposures every single year.  
 25 ///

Page 32

1 BY MR. LASKER:  
 2 Q. Did the advisory committee make  
 3 recommendations to the AHS scientists on  
 4 methods to address exposure  
 5 misclassification or potential for exposure 09:29  
 6 misclassification that the AHS scientists  
 7 did not accept?  
 8 A. I can't recall.  
 9 Q. Dr. Matthew Ross of Mississippi  
 10 State is also a member of your advisory 09:29  
 11 committee for the AHS group; correct?  
 12 A. As far as I remember, yes.  
 13 Q. Have you had any conversation with  
 14 Dr. Ross about glyphosate?  
 15 A. No. 09:29  
 16 Q. Have you followed the AHS outside  
 17 of this litigation -- have you followed the  
 18 AHS's findings with respect to potential  
 19 risk factors in the agricultural community  
 20 for non-Hodgkin's lymphoma? 09:30  
 21 MS. FORGIE: Object to form.  
 22 THE WITNESS: I have been following  
 23 the AHS over many years. The focus for  
 24 me was always my Parkinson's interest.  
 25 However, since Dr. De Roos was a 09:30

Page 33

1 candidate for faculty at UCLA, I have  
 2 been very interested in her publication;  
 3 so I'm very aware of her publications.  
 4 BY MR. LASKER:  
 5 Q. When was Dr. De Roos being 09:30  
 6 considered for a faculty position at UCLA?  
 7 A. A few years ago. Two or three  
 8 years ago right before she went to Drexel.  
 9 Q. And through that process, I take it  
 10 you then reviewed all of her studies for -- 09:30  
 11 A. More or less, yes. Especially the  
 12 ones I'm familiar with.  
 13 Q. What different exposures or risk  
 14 factors has the AHS through its research  
 15 associated with non-Hodgkin's lymphoma that 09:31  
 16 you can recall?  
 17 A. It has found diesel, and it has --  
 18 there's a small risk increase in certain  
 19 animal husbandry and solvent exposures, but  
 20 the one that I recall the most is diesel 09:31  
 21 exposures.  
 22 Q. Your CV also mentions that you are  
 23 a Fellow at the Collegium Ramazzini. I  
 24 guess you became that in 2007; correct?  
 25 A. Correct. 09:31

Page 34

1 Q. What is a Collegium Ramazzini?  
 2 A. It's a boys' club. That's one  
 3 reason why I'm not often there. It is a  
 4 group of occupational and environmentally  
 5 interested health professionals who are 09:32  
 6 meeting once a year in a small place near  
 7 Bologna in Italy. Ramazzini was 1700's the  
 8 first occupational physician credited with  
 9 finding several occupational disorders or  
 10 diagnosing them for the first time. So in 09:32  
 11 his honor, this is a society. You can only  
 12 be invited to become a member, and it has a  
 13 limited number of members. So only when a  
 14 member expires or leaves can a new one be  
 15 inducted. 09:32  
 16 BY MR. LASKER:  
 17 Q. What is the numerical limit?  
 18 A. I think it is 189 for some reason.  
 19 Q. Do you know who invited you for  
 20 membership? 09:32  
 21 A. Yes. It was Dr. Phillip Grandjean  
 22 from Denmark.  
 23 Q. Where does -- to the extent that  
 24 you know the Collegium Ramazzini receive  
 25 funding for its scientific endeavors? 09:32

Page 35

1 A. I'm not sure they even have any  
 2 scientific endeavors, and I wouldn't know  
 3 where they're getting their funding from,  
 4 but certainly they are not paying you to go  
 5 there. 09:33  
 6 Q. Are you aware of that the Collegium  
 7 Ramazzini has announced the intention to  
 8 conduct research into glyphosate?  
 9 MS. FORGIE: Objection.  
 10 THE WITNESS: I have no -- I have 09:33  
 11 not followed them for a while.  
 12 BY MR. LASKER:  
 13 Q. So the answer is no?  
 14 A. No.  
 15 MS. FORGIE: Objection. 09:33  
 16 BY MR. LASKER:  
 17 Q. Dr. Straif is a Fellow of the  
 18 Collegium Ramazzini; correct?  
 19 A. I think he is, but I'm not really  
 20 certain. I've never met him there. 09:33  
 21 Q. Dr. Blair is a Fellow of the  
 22 Collegium Ramazzini; correct?  
 23 A. I think that's true. Again, I  
 24 don't recall seeing him there.  
 25 Q. And Dr. Portier is a fellow of the 09:33

Page 36

1 Collegium Ramazzini; correct?  
 2 A. I wouldn't know that.  
 3 Q. In 2009, you were elected as a  
 4 counselor for the International Society for  
 5 Environmental Epidemiology; correct? 09:33  
 6 A. Correct.  
 7 Q. What is the role of a counselor for  
 8 the ISEE?  
 9 A. Well, that's kind of like a board  
 10 member, and what you do is you're on a phone 09:34  
 11 call once a month with all the other members  
 12 including the president and the president  
 13 elect and the treasurer, and you're  
 14 conducting business of the society.  
 15 Q. One of the things that you've done 09:34  
 16 -- at least I see from your CV -- is that  
 17 you have been a member of the ISEE's  
 18 conference organizing committee.  
 19 A. That's correct.  
 20 Q. What does that committee do? I 09:34  
 21 think it's halfway self-evident but . . .  
 22 A. Yes, it is self-evident. So we are  
 23 the ones who are reviewing the applications  
 24 that come in from members for conducting the  
 25 conference every year, and we also are 09:34

Page 37

1 trying to help the conference organizers in  
 2 every way we can. And we have guidelines  
 3 for conference organizers. So that's pretty  
 4 much it.  
 5 Q. Okay. In your expert report, you 09:34  
 6 discuss what you describe as some of the  
 7 peer review that's conducted in connection  
 8 with abstracts and presentations at the ISEE  
 9 conferences; correct?  
 10 A. Correct. 09:35  
 11 Q. Can you describe that peer review  
 12 process?  
 13 A. Yes. Every year when the  
 14 conferences are being conducted, we elicit  
 15 peer reviewers from among the council as 09:35  
 16 well as from the membership. So we have a  
 17 call for the membership out to nominate peer  
 18 reviewers for the abstracts and then we  
 19 appoint the -- the council appoints these  
 20 peer reviewers with the help of the 09:35  
 21 conference organizers, and they then are  
 22 tasked with peer reviewing the abstracts.  
 23 And there are guidelines for that. There is  
 24 a point system for that, and it's always at  
 25 least three reviewers who review, and then 09:35

Page 38	<p>1 it's being summarized and discussed in the</p> <p>2 conference committee or better with the</p> <p>3 conference organizers.</p> <p>4 Q. So the abstract obviously is going</p> <p>5 to be a fairly short document. Does the 09:36</p> <p>6 peer review process involve reaching out and</p> <p>7 talking to the investigators about their</p> <p>8 work? What actually is done as part of that</p> <p>9 peer review?</p> <p>10 MS. FORGIE: Object to form. 09:36</p> <p>11 THE WITNESS: What we're trying to</p> <p>12 do is match the abstracts with people in</p> <p>13 the specific areas of knowledge so that</p> <p>14 we have expertise in terms of the</p> <p>15 outcomes assessed, the exposures 09:36</p> <p>16 assessed, the type of studies conducted.</p> <p>17 So the peer reviewers are not reaching</p> <p>18 out, but they are to evaluate whether</p> <p>19 there is enough information to make this</p> <p>20 a scientifically solid abstract. 09:36</p> <p>21 BY MR. LASKER:</p> <p>22 Q. And did you attend the ISEE</p> <p>23 conference in Brazil in 2015?</p> <p>24 A. I did.</p> <p>25 Q. Did you sit in on the presentation 09:36</p>	Page 40	<p>1 scientific endeavor seeking to analyze cause</p> <p>2 and effect; correct?</p> <p>3 MS. FORGIE: Object to form.</p> <p>4 THE WITNESS: Yes, we generally</p> <p>5 formulate something of a null hypothesis 09:38</p> <p>6 in science, yes.</p> <p>7 BY MR. LASKER:</p> <p>8 Q. The scientific method is based upon</p> <p>9 generating a hypothesis and then testing to</p> <p>10 see if they can falsify -- if that 09:39</p> <p>11 hypothesis can be found to be not true;</p> <p>12 correct?</p> <p>13 MS. FORGIE: Object to form.</p> <p>14 THE WITNESS: Actually a null</p> <p>15 hypothesis is one specific hypothesis. 09:39</p> <p>16 It's the hypothesis that there's no</p> <p>17 difference.</p> <p>18 BY MR. LASKER:</p> <p>19 Q. Right.</p> <p>20 A. And that is actually in scientific 09:39</p> <p>21 circles being discussed as probably not the</p> <p>22 best way to go about science all the time.</p> <p>23 Sometimes you actually want to specify a</p> <p>24 hypothesis of a certain type of difference.</p> <p>25 However, there is a multitude more 09:39</p>
Page 39	<p>1 or any of the presentations of the NAPP</p> <p>2 investigators?</p> <p>3 A. Unfortunately not.</p> <p>4 Q. Dr. Ritz, let's talk about some</p> <p>5 of -- let's get your expert report as the 09:37</p> <p>6 next document. I don't know that we'll be</p> <p>7 dealing much with your CV so you can set</p> <p>8 that aside.</p> <p>9 (Exhibit Number 19-2 was marked</p> <p>10 for identification.) 09:37</p> <p>11 BY MR. LASKER:</p> <p>12 Q. So this will be Exhibit 19-2.</p> <p>13 Dr. Ritz, on page -- you address some of the</p> <p>14 methodological issues with epidemiology and</p> <p>15 epidemiological studies in your report; 09:38</p> <p>16 correct?</p> <p>17 A. Yes.</p> <p>18 Q. I'd like to take you to page 6 and</p> <p>19 carrying over to page 7 you're discussing</p> <p>20 what you identify as the null hypothesis; 09:38</p> <p>21 correct?</p> <p>22 A. Yes.</p> <p>23 Q. The null hypothesis is an essential</p> <p>24 concept in scientific methodology not only</p> <p>25 in epidemiology but in all areas of 09:38</p>	Page 41	<p>1 ways of specifying that difference in terms</p> <p>2 of size or extent so that people can't</p> <p>3 easily agree to that kind of hypothesis.</p> <p>4 But one in science could decide to</p> <p>5 hypothesize something that's not a null 09:39</p> <p>6 hypothesis, but the convention is to start</p> <p>7 with a null hypothesis.</p> <p>8 Q. If we are using a null hypothesis,</p> <p>9 the process of a scientific method is to</p> <p>10 generate a hypothesis to see if that null 09:40</p> <p>11 hypothesis could be shown to be not true;</p> <p>12 correct?</p> <p>13 A. I would not state it that way. We</p> <p>14 are starting with a null hypothesis, and</p> <p>15 then we are trying to provide data that 09:40</p> <p>16 either confirms or refutes the null</p> <p>17 hypothesis.</p> <p>18 Q. Got it. Better.</p> <p>19 In epidemiology and in cancer</p> <p>20 epidemiology, for example, the null 09:40</p> <p>21 hypothesis would be that an exposure being</p> <p>22 studied is not a cause of cancer; correct?</p> <p>23 MS. FORGIE: Object to form.</p> <p>24 THE WITNESS: We would, yes. A</p> <p>25 null hypothesis we would state as no 09:40</p>

Page 42

1 difference in risk.  
 2 BY MR. LASKER:  
 3 Q. Epidemiologists will then design  
 4 studies to test that null hypothesis;  
 5 correct? 09:41  
 6 A. Well, we are testing the hypothesis  
 7 whether or not that agent contributes to the  
 8 disease. The null hypothesis would be that  
 9 it doesn't.  
 10 Q. And when you design an 09:41  
 11 epidemiological study, you are designing the  
 12 study to be able to test that null  
 13 hypothesis; correct?  
 14 A. We can't really -- as I said, we  
 15 are testing whether an agent adheres or 09:41  
 16 whether the exposure to an agent falls under  
 17 the null hypothesis, or we can generate data  
 18 that refutes that null hypothesis, yes.  
 19 Q. All right. So in designing an  
 20 epidemiologic study, you are designing the 09:41  
 21 study to try and generate data that would at  
 22 least -- would allow you to test the null  
 23 hypothesis?  
 24 A. That would allow me to test whether  
 25 there is a difference or not. 09:41

Page 43

1 Q. Correct. In epidemiologic studies,  
 2 the null hypothesis is reflected in an odd  
 3 ratio or risk ratio of 1.0; correct?  
 4 MS. FORGIE: Object to form.  
 5 THE WITNESS: Well, that is one 09:42  
 6 measure. We are using different  
 7 measures: odds ratio, risk ratios, rate  
 8 ratios. And these ratios have point  
 9 estimates and confidence intervals. The  
 10 null hypothesis is that, yes, there's no 09:42  
 11 difference in the risk among the exposed  
 12 compared to the risk among the unexposed  
 13 or the rate in the exposed compared to  
 14 the rate in the unexposed. And since  
 15 the ratio measure when there's no 09:42  
 16 difference is one, that would be  
 17 considered no effect.  
 18 BY MR. LASKER:  
 19 Q. Epidemiologists will then analyze  
 20 the data to determine whether that null 09:42  
 21 hypothesis can be rejected from that data;  
 22 correct?  
 23 MS. FORGIE: Object to the form.  
 24 THE WITNESS: Modern  
 25 epidemiologists would not go out to test 09:43

Page 44

1 a null hypothesis or that kind of null  
 2 hypothesis in the term of statistical  
 3 testing. What we're trying to do is  
 4 estimate parameters. So we estimate the  
 5 parameter of interest which in this case 09:43  
 6 is the relative risk, the risk ratio, or  
 7 the odds ratio.  
 8 BY MR. LASKER:  
 9 Q. We'll be talking about exactly how  
 10 to test that. I'm not talking about how 09:43  
 11 they would test it, but as a threshold  
 12 epidemiologists using whatever approach --  
 13 and we'll talk about this in a moment. But  
 14 epidemiologists will analyze the data from  
 15 their study to determine whether the null 09:43  
 16 hypothesis can be rejected; correct?  
 17 MS. FORGIE: Objection. Asked and  
 18 answered.  
 19 You can answer it again.  
 20 THE WITNESS: Again, I would not 09:43  
 21 formulate it in this way. It's an  
 22 estimation problem. We are trying to  
 23 estimate a relative risk, a rate ratio,  
 24 or an odds ratio which are parameters  
 25 that tell me something about the risk in 09:43

Page 45

1 the exposed compared to the risk in the  
 2 unexposed. Along with that goes  
 3 statistics, but, in essence, we are  
 4 estimating parameters.  
 5 BY MR. LASKER: 09:44  
 6 Q. The process of estimating  
 7 parameters in epidemiologic study is to  
 8 determine whether that data would provide  
 9 evidence against a null hypothesis; correct?  
 10 MS. FORGIE: Object to form and 09:44  
 11 asked and answered.  
 12 THE WITNESS: Again, I would want  
 13 to estimate this parameter and then also  
 14 see in statistical terms how informative  
 15 this parameter is. 09:44  
 16 BY MR. LASKER:  
 17 Q. Right. And the -- what you're  
 18 looking for with respect to that parameter  
 19 is whether or not the data you are analyzing  
 20 would exclude the null hypothesis, if you're 09:44  
 21 going to reach a causation opinion; correct?  
 22 MS. FORGIE: Object to form, asked  
 23 and answered.  
 24 THE WITNESS: There's a lot more to  
 25 that than just a null hypothesis. 09:44

Page 46

1 There's a lot more that we're doing in  
 2 epidemiology to convince ourselves that  
 3 there is causation.  
 4 BY MR. LASKER:  
 5 Q. That's fair enough. One step in 09:45  
 6 the process to determine whether or not  
 7 there is causation through an epidemiologic  
 8 study is whether or not the data is --  
 9 allows one to exclude the null hypothesis;  
 10 correct? 09:45  
 11 MS. FORGIE: Object to form, asked  
 12 and answered.  
 13 You can answer it again.  
 14 THE WITNESS: Again, we are trying  
 15 to estimate parameters. These 09:45  
 16 parameters have point and interval --  
 17 point and interval estimates, and a lot  
 18 more goes into evaluating the validity  
 19 of that parameter.  
 20 BY MR. LASKER: 09:45  
 21 Q. I agree with that, and we'll be  
 22 talking about that. But the purpose of  
 23 determining the point estimate and the  
 24 parameters for the statistical analysis part  
 25 of that -- and we'll talk about the other 09:45

Page 47

1 parts as well -- is to determine whether or  
 2 not at that step the null hypothesis of 1.0  
 3 is at least not due to chance. Is that  
 4 fair?  
 5 MS. FORGIE: Objection. Wait. 09:46  
 6 Object to form and asked and answered.  
 7 You can do it again.  
 8 THE WITNESS: Chance is one -- is  
 9 just one criterion we are considering as  
 10 epidemiologists, and I teach bias 09:46  
 11 analysis in the basic methods class at  
 12 UCLA. What I teach my students is that  
 13 what we have to make sure is that  
 14 there's no bias and that before  
 15 everything else we are ever considering. 09:46  
 16 So I would not even consider data unless  
 17 we would go through a rigorous analysis  
 18 of all the biases.  
 19 BY MR. LASKER:  
 20 Q. Fair enough. In your analysis of 09:46  
 21 the issues of chance, the issues of bias,  
 22 the issues of confounding, when you're  
 23 looking at all of those issues together,  
 24 what you are trying to, as an  
 25 epidemiologist, is to determine whether or 09:47

Page 48

1 not those factors can be at least addressed  
 2 efficiently so that together that would  
 3 allow you to determine that the null  
 4 hypothesis has been rejected in that study.  
 5 Is that fair? 09:47  
 6 MR. LASKER: Object to form.  
 7 THE WITNESS: I do not formulate my  
 8 research ever in that way. I'm  
 9 estimating parameters, and I'm assessing  
 10 validity of studies. 09:47  
 11 BY MR. LASKER:  
 12 Q. What would you need to -- what  
 13 steps would you need to go through then in  
 14 an epidemiological study in analyzing the  
 15 issues of chance and bias and confounding to 09:47  
 16 reach a conclusion in your mind that that  
 17 study demonstrates a positive association  
 18 between the exposure at interest and the  
 19 outcome at interest?  
 20 MS. FORGIE: Objection to form. 09:48  
 21 THE WITNESS: That is a very long  
 22 lecture. I don't know whether we want  
 23 to have it here. It takes me ten weeks  
 24 and four hours a week to do that. So  
 25 the short form is that you start with 09:48

Page 49

1 the study design, that you start with  
 2 the exposure assessment validity, that  
 3 you start with the outcome assessment  
 4 validity, that you then go into a sample  
 5 size, exposure prevalence, any kind of 09:48  
 6 bias you can think of, and once you have  
 7 wrapped it all together, that's when  
 8 you're doing a lot of sensitivity  
 9 analyses in your data to convince  
 10 yourself that no way -- no matter how 09:48  
 11 you look at your data, there is a  
 12 signal.  
 13 BY MR. LASKER:  
 14 Q. And I think that you mentioned  
 15 this -- you may have mentioned it in your 09:48  
 16 report. I know you mentioned it in some of  
 17 your class materials -- that the fundamental  
 18 question that an epidemiologist must ask  
 19 before reaching a causation opinion is is  
 20 there any other way of explaining the set of 09:49  
 21 facts before us, is there any other answer  
 22 that is equally or more likely than cause  
 23 and effect; correct?  
 24 MS. FORGIE: Object to form.  
 25 THE WITNESS: We generally like to 09:49

Page 50	<p>1 challenge each other. Epidemiologists                  2 are extremely critical of their own work                  3 and that of their colleagues. So we are                  4 asking many, many questions trying to                  5 debunk a positive result that we might 09:49                  6 be seeing in a study. We're coming up                  7 with causal models, with -- yeah, bias                  8 analyses, sensitivity analyses, and                  9 after we've done all of that, there                  10 might be a positive association; there 09:49                  11 might not be a positive association.                  12 Whether that's causal, we would usually                  13 want more than one study to decide.                  14 <b>BY MR. LASKER:</b>                  15 Q. And the underlying -- the 09:50                  16 fundamental question that you're trying to                  17 answer when you look at an epidemiologic                  18 study or a body of epidemiologic literature                  19 is whether there is any other way of                  20 explaining the facts before you other than 09:50                  21 cause and effect; correct?                  22 A. That would be any one way because                  23 there's always one way or another in any                  24 type of study that I can think of that you                  25 can find alternative explanations, but what 09:50</p>	Page 52	<p>1 glyphosate-related formulations.                  2 Q. For epidemiology, it would actually                  3 be glyphosate-based herbicides; correct?                  4 A. Correct.                  5 Q. There are no epidemiology studies 09:51                  6 that are just pure glyphosate. It's all the                  7 formulate herbicide product?                  8 A. Epidemiology is done in the real                  9 world. So what is out in the real world is                  10 what we're studying. 09:51                  11 Q. Okay. And the question, then, on                  12 to the scientific method and the question                  13 for you, I take it, in this case is whether                  14 the epidemiologic studies provide data that                  15 would allow you to exclude -- well, strike 09:52                  16 that.                  17 You have reviewed, as part of your                  18 work in this case, IARC's assessment of the                  19 glyphosate epidemiology; correct?                  20 A. I have read that monograph, yes. 09:52                  21 Q. And in your expert report -- I                  22 think it's on page 16 -- it's actually the                  23 last sentence on page 16, you state that you                  24 "concur with the IARC conclusions after                  25 conducting my own independent analysis of 09:52</p>
Page 51	<p>1 you are looking for then is just as                  2 consistent a pattern that would explain                  3 everything else.                  4 Q. And if you are not -- if you find                  5 that there is some other explanation that 09:50                  6 could explain the findings, then you would                  7 not be able to reach an opinion of cause and                  8 effect. Is that fair?                  9 MS. FORGIE: Object to form.                  10 THE WITNESS: That would depend. 09:50                  11 So I would want to see that -- there                  12 could be an alternative explanation in                  13 one study but not in another. So what                  14 we would like to see is studies done on                  15 different continents, in different 09:51                  16 counties, by different investigators                  17 with different methods. If they all                  18 show the same results, then I'm pretty                  19 happy because there's probably not one                  20 explanation that explains it away. 09:51                  21 <b>BY MR. LASKER:</b>                  22 Q. The null hypothesis in this case is                  23 that glyphosate is not associated with                  24 non-Hodgkin's lymphoma; correct?                  25 A. It's either glyphosate or 09:51</p>	Page 53	<p>1 the studies included in the IARC review";                  2 correct?                  3 A. Yes, that's what it says.                  4 Q. Okay. And that's the opinion that                  5 you are -- you'll be presenting in this 09:53                  6 litigation; correct?                  7 A. I will be presenting my own                  8 conclusions.                  9 Q. And your own conclusions concur                  10 with the IARC's conclusions; correct? 09:53                  11 MS. FORGIE: Object to form.                  12 THE WITNESS: It concurs with the                  13 overall IARC conclusions.                  14 <b>BY MR. LASKER:</b>                  15 Q. And just to be clear, when you're 09:53                  16 talking about the IARC's conclusions in your                  17 report, you're talking about IARC's                  18 conclusions with regard to epidemiology;                  19 correct?                  20 MS. FORGIE: Object to form. 09:53                  21 THE WITNESS: I am meaning the                  22 overall IARC conclusions.                  23 <b>BY MR. LASKER:</b>                  24 Q. Okay. In this section in your                  25 report where you state that you concur with 09:53</p>

Page 54

1 IARC's conclusions after conducting your own  
 2 independent analysis of the studies, first  
 3 of all, what studies did you review in  
 4 connection with your work on this case?  
 5 A. What studies did IARC review? 09:53  
 6 Q. No, did you review. Because you  
 7 state, "After conducting my own independent  
 8 analysis of the studies included in the IARC  
 9 review," which studies are we talking about  
 10 there? 09:54  
 11 A. That overlap with IARC's? They  
 12 should be all in IARC plus I looked at  
 13 several others.  
 14 Q. But IARC looked at studies dealing  
 15 with genotoxicity and dealing with 09:54  
 16 toxicology and all the like.  
 17 A. Yes.  
 18 Q. Did you review the genotoxicology  
 19 studies that IARC reviewed?  
 20 A. I did review several papers on 09:54  
 21 genotoxicity as well as animal studies, yes.  
 22 Q. And did you conduct an analysis,  
 23 your own independent analysis of the animal  
 24 toxicology studies?  
 25 A. As far as I'm able to do that, I 09:54

Page 55

1 did.  
 2 Q. That's not your area of expertise,  
 3 I take it?  
 4 MS. FORGIE: Objection. Object to  
 5 form. 09:54  
 6 THE WITNESS: Well, in effect, I'm  
 7 a member of the interdisciplinary  
 8 program in molecular toxicology at UCLA.  
 9 So I teach toxicologists. So yes, I do  
 10 know how to read toxicology literature. 09:55  
 11 BY MR. LASKER:  
 12 Q. With respect to the conclusions  
 13 that can be reached with respect to the  
 14 animal toxicology studies, would you defer  
 15 to the other experts that have been put 09:55  
 16 forth by the plaintiff's counsel on those  
 17 issues?  
 18 MS. FORGIE: Object to form.  
 19 THE WITNESS: I'm sure that a  
 20 toxicologist can read these papers in 09:55  
 21 different ways, but since I am -- I have  
 22 been working with toxicologists for  
 23 25 years. I'm a member of this teaching  
 24 program, I would say that I have a  
 25 certain ability to draw my own 09:55

Page 56

1 conclusions. Plus I'm medically  
 2 trained, and I know animal pathology  
 3 because it's very close to human  
 4 pathology.  
 5 BY MR. LASKER: 09:55  
 6 Q. So if I were to ask you questions  
 7 about the Sugimoto rodent study, would you  
 8 be in a position to answer those questions  
 9 here today?  
 10 MS. FORGIE: Object to form. 09:56  
 11 THE WITNESS: You would have to  
 12 show me those papers, and I would tell  
 13 you.  
 14 BY MR. LASKER:  
 15 Q. In your expert report up until the 09:56  
 16 line -- up until page 16, you do not discuss  
 17 any studies other than the epidemiologic  
 18 studies; correct?  
 19 A. Correct.  
 20 Q. And in your discussion on page 16 09:56  
 21 when you're talking about the conclusions  
 22 that IARC reached, you are talking about  
 23 IARC's -- the only thing you discussed is  
 24 IARC's conclusion with regard to the  
 25 epidemiology; correct? 09:56

Page 57

1 MS. FORGIE: Object to form.  
 2 THE WITNESS: Well, as a scientist,  
 3 you read everything, and as a scientist,  
 4 I did go back to the toxicology and  
 5 genotoxicity literature, and I did read 09:56  
 6 the IARC Monograph on that. So when I  
 7 come to a conclusion, it's in the  
 8 totality of everything I have reviewed.  
 9 BY MR. LASKER:  
 10 Q. I understand that, but your expert 09:57  
 11 report in discussing the IARC conclusions  
 12 that you concur with, the only conclusions  
 13 that you discussed up to this point in your  
 14 report are IARC's conclusions with respect  
 15 to the epidemiology; correct? 09:57  
 16 MS. FORGIE: Object to form. Asked  
 17 and answered.  
 18 You can answer it again.  
 19 THE WITNESS: Again, I cannot  
 20 exclude what I know and what I've read 09:57  
 21 and what I've evaluated. So even if I  
 22 just refer in this report to the  
 23 epidemiology, which, of course, I  
 24 consider myself most an expert, when I  
 25 make that comment, I'm referring to the 09:57



Page 58

1 whole IARC conclusion which included the  
 2 toxicology and the genotoxicity.  
 3 BY MR. LASKER:  
 4 Q. Do you concur with IARC's  
 5 conclusions with respect to the 09:57  
 6 epidemiology?  
 7 MS. FORGIE: Object to form.  
 8 THE WITNESS: Well, IARC's  
 9 conclusions are IARC's conclusions.  
 10 They are very categorical. As a 09:57  
 11 scientist, I wish it wasn't as  
 12 categorical, and I may or may not confer  
 13 with the way they are drawing these  
 14 categorical conclusions. I think the  
 15 epidemiology is quite strong. 09:58  
 16 BY MR. LASKER:  
 17 Q. Let me be clear, though. When you  
 18 state in your expert report on page 16 that  
 19 you concur with the IARC's conclusions, do  
 20 you concur with IARC's conclusions with 09:58  
 21 respect to the epidemiology?  
 22 MS. FORGIE: Object to form and  
 23 asked and answered.  
 24 You can answer it again.  
 25 THE WITNESS: Well, I'm concurring 09:58

Page 59

1 here with the overall IARC conclusion.  
 2 BY MR. LASKER:  
 3 Q. I understand that, but that's not  
 4 my question.  
 5 MS. FORGIE: Wait, wait. 09:58  
 6 BY MR. LASKER:  
 7 Q. When you state here that you are  
 8 concurring with the IARC's conclusions, you  
 9 state that at page 16 of your expert report,  
 10 after talking to the epidemiological 09:58  
 11 literature, my question to you is: Do you  
 12 concur with the IARC's conclusions regarding  
 13 the glyphosate epidemiology?  
 14 MS. FORGIE: Object to form, asked  
 15 and answered twice before. 09:58  
 16 You can answer it again.  
 17 THE WITNESS: IARC drew conclusions  
 18 based on three criteria. I read the  
 19 IARC Monograph. I went back to some of  
 20 the literature on the genotoxicity and 09:59  
 21 on the animal studies, and I concur with  
 22 IARC's conclusions.  
 23 BY MR. LASKER:  
 24 Q. Okay. Again, I want to be clear  
 25 for the record so that the court understands 09:59

Page 60

1 and the answer can be yes or no. That's  
 2 obviously your answer.  
 3 With respect to IARC's conclusions,  
 4 with respect to the epidemiological  
 5 literature of glyphosate, and you know that 09:59  
 6 IARC separately analyzed the epidemiology;  
 7 correct?  
 8 MS. FORGIE: Object to form.  
 9 THE WITNESS: IARC has several  
 10 groups that are evaluating pieces of 09:59  
 11 science. One is an epidemiology group.  
 12 One is a genotoxicity -- one is a  
 13 mechanistic group. Genotoxicity is part  
 14 of it. One is an animal group. Each of  
 15 them evaluate the literature 09:59  
 16 independently, come up with conclusions,  
 17 but then they are meeting together and  
 18 discussing with each other the  
 19 literature and possible conclusions from  
 20 it. 10:00  
 21 So every scientist in the room gets  
 22 to know what the other group is doing  
 23 and how they are reaching possible  
 24 conclusions, and they may disagree. A  
 25 toxicologist may disagree with an 10:00

Page 61

1 epidemiologist or the epidemiologist  
 2 group and vice versa. But --  
 3 BY MR. LASKER:  
 4 Q. I understand --  
 5 MS. FORGIE: Wait let her finish, 10:00  
 6 please.  
 7 THE WITNESS: In the end, they have  
 8 to come together with a conclusion, and  
 9 the conclusions are very categorical,  
 10 and they are balance of evidence type of 10:00  
 11 conclusions.  
 12 BY MR. LASKER:  
 13 Q. I understand that. But my question  
 14 to you is specific to the epidemiology  
 15 subgroup in IARC, and they reached a 10:00  
 16 conclusion with respect to the  
 17 epidemiological literature; correct?  
 18 MS. FORGIE: Objection. Asked and  
 19 answered.  
 20 You can answer it again. 10:00  
 21 THE WITNESS: Actually, the  
 22 epidemiology group alone isn't who comes  
 23 up with these conclusions. It is  
 24 everybody in the room at the overall  
 25 meetings who agrees on these. 10:00

Page 62

1 BY MR. LASKER:  
 2 Q. Okay. And everybody in the room  
 3 came to a conclusion with respect to the  
 4 epidemiologic literature; correct?  
 5 MS. FORGIE: Object to form. 10:01  
 6 THE WITNESS: They came to a  
 7 balanced evaluation that then was put  
 8 into the Monograph and got a category  
 9 number which is 2A possible carcinogen.  
 10 BY MR. LASKER: 10:01  
 11 Q. Okay. And that is the overall  
 12 assessment of glyphosate. I understand  
 13 that. There is also a separate assessment  
 14 in the Monograph for the epidemiology, and  
 15 there's a separate assessment for the animal 10:01  
 16 toxicology, and there is a separate  
 17 assessment for the mechanisms; correct?  
 18 A. Yes.  
 19 Q. What I am asking you is specific to  
 20 the conclusion that IARC reached with 10:01  
 21 respect to the epidemiology. Okay?  
 22 MS. FORGIE: Objection.  
 23 THE WITNESS: Again, the  
 24 epidemiology group made their  
 25 conclusion. I'm not going to question 10:01

Page 63

1 their conclusion. I make my own  
 2 conclusion, but my conclusion as a  
 3 scientist is based on reviewing all of  
 4 the literature. I'm more than an  
 5 epidemiologist. I have medical 10:02  
 6 training, and I have been working with  
 7 toxicologists and animal  
 8 experimentalists for 25, 30 years.  
 9 BY MR. LASKER:  
 10 Q. Right. I understand all of that, 10:02  
 11 but my question for you is specific to the  
 12 epidemiology. The IARC working group came  
 13 to a conclusion that the glyphosate  
 14 epidemiology with respect to non-Hodgkin's  
 15 lymphoma fit into their category of limited. 10:02  
 16 You understand that; correct?  
 17 MS. FORGIE: Object to form. Asked  
 18 and answered.  
 19 You can answer it again.  
 20 THE WITNESS: I understand the 10:02  
 21 categories that IARC is using, and they  
 22 have some unfortunate language including  
 23 the word "limited" because it's not --  
 24 it's a common language word that is very  
 25 easy to misunderstand. 10:02

Page 64

1 BY MR. LASKER:  
 2 Q. Okay. Well, let's just be clear on  
 3 what IARC means by "limited" with respect to  
 4 epidemiology.  
 5 IARC defines limited as: "A 10:02  
 6 positive association has been observed  
 7 between glyphosate" -- "between exposure to  
 8 glyphosate in this instance and NHL for  
 9 which a causal interpretation is credible  
 10 but chance, bias, or confounding cannot be 10:03  
 11 ruled out with reasonable confidence."  
 12 Correct?  
 13 A. Correct.  
 14 MS. FORGIE: Object to form.  
 15 BY MR. LASKER: 10:03  
 16 Q. And IARC determined that the  
 17 glyphosate epidemiology -- epidemiologic  
 18 literature fit within that definition;  
 19 correct?  
 20 MS. FORGIE: Object to form, asked 10:03  
 21 and answered.  
 22 You can answer it again.  
 23 THE WITNESS: The working group  
 24 gave the label 2A which is this kind of  
 25 definition, yes. 10:03

Page 65

1 BY MR. LASKER:  
 2 Q. Okay. Let's just be clear about  
 3 this. 2A is the overall assessment. We're  
 4 talking about the epidemiologic studies.  
 5 A. Uh-huh. 10:03  
 6 MS. FORGIE: Wait for a question.  
 7 BY MR. LASKER:  
 8 Q. With respect to the epidemiologic  
 9 studies, IARC concluded for glyphosate and  
 10 non-Hodgkin's lymphoma that a positive 10:03  
 11 association has been observed for which a  
 12 causal interpretation is credible but  
 13 chance, bias, or confounding cannot be ruled  
 14 out with reasonable confidence; correct?  
 15 MS. FORGIE: Object to form, asked 10:04  
 16 and answered.  
 17 You can answer it again, but you're  
 18 getting --  
 19 THE WITNESS: That is --  
 20 MS. FORGIE: Wait, let me finish. 10:04  
 21 You're getting to a point where  
 22 you're badgering the witness.  
 23 THE WITNESS: That's the IARC  
 24 definition.  
 25 ///

Page 66	<p>1 BY MR. LASKER:</p> <p>2 Q. And you state in your expert</p> <p>3 report -- and I'm just trying to understand</p> <p>4 what this means -- you state in your expert</p> <p>5 report that you concur with the IARC 10:04</p> <p>6 conclusions.</p> <p>7 My question to you -- and the</p> <p>8 answer can be yes or no -- is whether you</p> <p>9 concur with IARC that for glyphosate and</p> <p>10 non-Hodgkin's lymphoma and the 10:04</p> <p>11 epidemiological studies, a positive</p> <p>12 association has been observed for which a</p> <p>13 causal interpretation is credible but</p> <p>14 chance, bias, or confounding cannot be ruled</p> <p>15 out with reasonable confidence? 10:04</p> <p>16 MS. FORGIE: Object to form. Asked</p> <p>17 and answered. Also mischaracterizes the</p> <p>18 IARC, as you know, the IARC categories.</p> <p>19 THE WITNESS: Again, on page 16 of</p> <p>20 my document what I'm referring to is the 10:04</p> <p>21 overall IARC conclusion.</p> <p>22 BY MR. LASKER:</p> <p>23 Q. My question to you is, independent</p> <p>24 of whatever you mean or you're interpreting</p> <p>25 the sentence on page 16 in your expert 10:05</p>	Page 68	<p>1 disagree, but you haven't told me yet which</p> <p>2 of those things it is. That's all I'm</p> <p>3 trying to find out. It's a simple question,</p> <p>4 and if we need to mark this and the judge</p> <p>5 can answer, that's fine. We'll do that. 10:06</p> <p>6 But it's a simple question, yes or no.</p> <p>7 Do you agree with IARC in its</p> <p>8 review of the glyphosate and Roundup</p> <p>9 epidemiological literature for non-Hodgkin's</p> <p>10 lymphoma that a positive association has 10:06</p> <p>11 been observed for which a causal</p> <p>12 interpretation is credible but chance, bias,</p> <p>13 or confounding could not be ruled out with</p> <p>14 reasonable confidence?</p> <p>15 MS. FORGIE: Objection. Object to 10:06</p> <p>16 the form. You're mischaracterizing and</p> <p>17 misreading the categories of IARC, as</p> <p>18 you know, and it's been asked and</p> <p>19 answered at least five or six times now.</p> <p>20 You may answer it again. 10:06</p> <p>21 THE WITNESS: Again, IARC does</p> <p>22 their evaluation the way they do. I'm a</p> <p>23 scientist. I did my independent</p> <p>24 evaluation. I used my words. They used</p> <p>25 theirs. I may not agree with the kind 10:07</p>
Page 67	<p>1 report to mean, the question to you is very</p> <p>2 simple. Do you agree with IARC in its</p> <p>3 classification of the epidemiological</p> <p>4 literature for glyphosate and non-Hodgkin's</p> <p>5 lymphoma that a positive association has 10:05</p> <p>6 been observed for which a causal</p> <p>7 interpretation is credible but chance, bias,</p> <p>8 or confounding cannot be ruled out with</p> <p>9 reasonable confidence?</p> <p>10 MS. FORGIE: Object to the form, 10:05</p> <p>11 asked and answered. Also you're</p> <p>12 deliberately misreading the IARC</p> <p>13 categories.</p> <p>14 THE WITNESS: Again, IARC has</p> <p>15 unfortunate wording in their categories. 10:05</p> <p>16 One of the unfortunate words is</p> <p>17 "limited." They are expanding on it in</p> <p>18 a way that to non-epidemiologists is</p> <p>19 problematic, and I'm not going to argue</p> <p>20 with IARC about this. 10:05</p> <p>21 BY MR. LASKER:</p> <p>22 Q. My question is not about use of the</p> <p>23 word "limited" or whatever word they use.</p> <p>24 My question is the substance of what IARC</p> <p>25 concluded, and you may agree or you may 10:06</p>	Page 69	<p>1 of wording they are using. I think the</p> <p>2 epidemiology is extremely strong.</p> <p>3 BY MR. LASKER:</p> <p>4 Q. Do you believe based upon your</p> <p>5 review of the epidemiological literature for 10:07</p> <p>6 glyphosate and non-Hodgkin's lymphoma that a</p> <p>7 positive association has been observed for</p> <p>8 which a causal interpretation is credible</p> <p>9 but chance, bias, or confounding could not</p> <p>10 be ruled out with reasonable confidence? 10:07</p> <p>11 MS. FORGIE: Object to form. Asked</p> <p>12 and answered.</p> <p>13 You can answer it again.</p> <p>14 THE WITNESS: My reading of the</p> <p>15 literature is that the epidemiology is 10:07</p> <p>16 very strong especially since there was</p> <p>17 additional literature since IARC</p> <p>18 conferred in 2015.</p> <p>19 BY MR. LASKER:</p> <p>20 Q. Okay. Is your analysis, then, of 10:07</p> <p>21 the epidemiological literature, your</p> <p>22 conclusions, informed by epidemiological</p> <p>23 data that has come out subsequent to the</p> <p>24 IARC working group meeting?</p> <p>25 A. I reviewed the NAPP, yes. 10:08</p>

Page 70

1 Q. Okay. And so in reaching your  
 2 conclusions about the strength of the  
 3 epidemiology for glyphosate and  
 4 non-Hodgkin's lymphoma -- strike that.  
 5 Let me just circle back. Including 10:08  
 6 your analysis of the glyphosate literature  
 7 and the NAPP data, do you believe that a  
 8 positive association has been observed  
 9 between exposure to Roundup and  
 10 non-Hodgkin's lymphoma for which a causal 10:08  
 11 interpretation is credible but chance, bias,  
 12 or confounding could not be ruled out with  
 13 reasonable confidence?  
 14 MS. FORGIE: Object to form. Asked  
 15 and answered. 10:08  
 16 You can answer it again.  
 17 THE WITNESS: I believe there's a  
 18 positive association for which causal  
 19 association is quite credible.  
 20 BY MR. LASKER: 10:08  
 21 Q. Do you believe that chance, bias,  
 22 and confounding can be ruled out with  
 23 reasonable confidence?  
 24 MS. FORGIE: Objection. Asked and  
 25 answered. 10:09

Page 71

1 You can answer it again.  
 2 THE WITNESS: Again, I think that a  
 3 causal association is quite credible,  
 4 and I, as a scientist who is not just an  
 5 epidemiologist, put this in context with 10:09  
 6 everything I know, and I agree with IARC  
 7 that it's a 2A.  
 8 BY MR. LASKER:  
 9 Q. My question, though, is with  
 10 respect to the epidemiologic literature. 10:09  
 11 With respect to the epidemiologic literature  
 12 for the glyphosate and non-Hodgkin's  
 13 lymphoma, do you think that chance, bias, or  
 14 confounding can be ruled out with reasonable  
 15 confidence? 10:09  
 16 MS. FORGIE: Object to form, asked  
 17 and answered. This is like the tenth  
 18 time.  
 19 You can answer it again.  
 20 THE WITNESS: Okay. I think the 10:09  
 21 epidemiology is quite strong. I think  
 22 that there is enough reason to make  
 23 causal associations. However, I put  
 24 this in the context of the animal data  
 25 and the mechanistic data. As a 10:09

Page 72

1 scientist, I cannot split my mind into  
 2 three different parts, and that's also  
 3 not what IARC does.  
 4 IARC sits in a room and discusses  
 5 this with everyone and comes to their 10:10  
 6 conclusion overall. However, there's  
 7 additional data that came out since IARC  
 8 met, and that strengthens the evidence.  
 9 BY MR. LASKER:  
 10 Q. Let's talk about chance. 10:10  
 11 MS. FORGIE: If you're at a  
 12 reasonable breaking point, just let us  
 13 know.  
 14 MR. LASKER: Sure. How long have  
 15 we been? Over an hour? 10:10  
 16 MS. FORGIE: An hour and ten  
 17 minutes.  
 18 MR. LASKER: That'll be fine.  
 19 THE VIDEOGRAPHER: We're off the  
 20 record at 10:10 a.m. 10:10  
 21 (Recess taken from 10:10 a.m.  
 22 to 10:27 a.m.)  
 23 THE VIDEOGRAPHER: We are back on  
 24 the record at 10:27 a.m.  
 25 ///

Page 73

1 BY MR. LASKER:  
 2 Q. Hello, Dr. Ritz. During the break  
 3 I was looking through your expert report,  
 4 and I did not see any mention in your report  
 5 about any of the animal cancer bioassays 10:29  
 6 regarding glyphosate. Am I correct that  
 7 there's no mention of those animal cancer  
 8 bioassays in your expert report?  
 9 MS. FORGIE: Object to the form.  
 10 THE WITNESS: Well, they are 10:29  
 11 mentioned, but I am not critiquing them  
 12 in the way that I would critique an  
 13 epidemiology study. But I certainly  
 14 reviewed them.  
 15 BY MR. LASKER: 10:29  
 16 Q. Can you point in your expert report  
 17 where you mentioned any of the animal cancer  
 18 bioassays?  
 19 A. Under biologic plausibility and  
 20 where I say what I searched. Where is that? 10:29  
 21 Q. I think that's your literature  
 22 review.  
 23 A. Literature search, yeah.  
 24 Q. Okay. So let's start with the  
 25 biological plausibility because I read that 10:29

<p style="text-align: right;">Page 74</p> <p>1 through a number of times. Maybe I missed 2 it. There are some discussions of a handful 3 of genotoxicity studies, and you cite them. 4 But I don't see mentioned anywhere in these 5 two paragraphs of the animal cancer 10:30 6 bioassays. Is that correct? 7 MS. FORGIE: Object to form. 8 THE WITNESS: Well, the animal 9 studies I mention on page 25. 10 BY MR. LASKER: 10:30 11 Q. Which animal studies? 12 A. Animal experiments. 13 Q. With regard to cytotoxic and 14 genotoxic effects. I see that. Where do 15 you mention any animal cancer bioassays? 10:30 16 A. That says models. Correct. What 17 are you referring to now? 18 Q. I'm asking if there's any mention 19 anywhere in this section of biological 20 plausibility to an animal cancer bioassay 10:30 21 because I'm not seeing it. 22 MS. FORGIE: Object to the form. 23 THE WITNESS: Well, has been 24 confirmed by laboratory experiments 25 listed above is what I was referring to, 10:31</p>	<p style="text-align: right;">Page 76</p> <p>1 listed above," and the lab experiments 2 listed above are dealing with cytotoxic and 3 genotoxic effects. 4 MS. FORGIE: Wait. Is there a 5 question? 10:32 6 BY MR. LASKER: 7 Q. Where is there a reference anywhere 8 in these two paragraphs to an animal cancer 9 bioassay? 10 A. No, the listed above does not refer 10:32 11 to the mechanisms. The listed above is in 12 terms of the whole document. 13 Q. Your whole expert report? 14 A. Uh-huh. 15 Q. And you believe that you mentioned 10:32 16 the animal cancer bioassays in your 17 literature search? 18 A. Yes. 19 Q. Let's go to the literature search 20 then. Now, the literature search, just so 10:32 21 the record is clear is at pages 8 and 9 22 which is some 16 -- 15 or 16 pages before 23 that sentence in the biological plausibility 24 section; correct? 25 A. I can't see it right now. Oh, 10:33</p>
<p style="text-align: right;">Page 75</p> <p>1 and the listed above are mentioned in my 2 search algorithm. 3 BY MR. LASKER: 4 Q. First of all, the listed above, 5 just so we're clear in the section of 10:31 6 biological plausibility, is referring to 7 studies of genotoxicity and oxidative 8 stress; correct? 9 MS. FORGIE: Object to the form. 10 THE WITNESS: No, that's a compound 10:31 11 sentence, and what I was referring to 12 here is, one, the oxidative stress and 13 genotoxicity as a mechanism and, two, 14 the lab experiments that also confirmed 15 carcinogenicity. 10:31 16 BY MR. LASKER: 17 Q. Can you point anywhere -- first of 18 all, in biological plausibility -- we'll go 19 to your literature search as well, but 20 anywhere in biological plausibility in those 10:32 21 two paragraphs where you mention an animal 22 cancer bioassay? 23 A. To me the lab experiments are 24 exactly that. That's what they mean. 25 Q. You state, "The lab experiments 10:32</p>	<p style="text-align: right;">Page 77</p> <p>1 here. Yes. Page 8. It starts on page 8. 2 Q. Where in pages 8 and 9 do you 3 mention animal cancer bioassays? 4 A. Animal and mechanistic literature. 5 It's on page 9. 550 articles for animal and 10:33 6 mechanistic literature and 600 citations for 7 cancer. So that includes the oncology of 8 animals. 9 Q. And the bracket after that says, 10 "Most citations were not immediately 10:33 11 relevant to the present question due to 12 their focus on topics such as effects in 13 fish resulting from runoff, effects on 14 present pregnancy and child development, or 15 effects on other cancer types." 10:33 16 Do you see that? 17 A. Yes. 18 Q. In your discussion of the 19 literature search, you stated that you were 20 looking to obtain all published studies on 10:33 21 the relationship between non-Hodgkin's 22 lymphoma and glyphosate; correct? 23 A. Yes. 24 Q. And -- 25 A. And ingredients. The active 10:34</p>

Page 78

1 ingredient in Roundup. So it included  
 2 Roundup.  
 3 Q. And your statement to then is that  
 4 this reference to the fact that you  
 5 conducted a literature search that yielded 10:34  
 6 over 550 articles for animal an mechanistic  
 7 literature was a disclosure that you had  
 8 reviewed the animal cancer bioassays and  
 9 were rendering an opinion on them in this  
 10 case? 10:34  
 11 MS. FORGIE: Object to the form.  
 12 THE WITNESS: This disclosure means  
 13 that yes, everything that's out there in  
 14 the literature I am willing and able to  
 15 look at and select from and form my 10:34  
 16 opinion on. That's what I do as a  
 17 scientist.  
 18 Actually as a scientist I often  
 19 spend Sundays doing exactly this,  
 20 searching the literature broadly to find 10:35  
 21 animal and other types of studies that  
 22 then give me an hint in terms of what  
 23 I'm doing as an epidemiologist, and it's  
 24 great fun. I like it.  
 25 ///

Page 79

1 BY MR. LASKER:  
 2 Q. First of all, is it your  
 3 understanding that you will be proffering  
 4 any opinions in this case with respect to  
 5 animal cancer bioassays? 10:35  
 6 MS. FORGIE: Object to the form.  
 7 THE WITNESS: Well, my -- what I  
 8 understand is that I'm here as an expert  
 9 epidemiologist but also as a scientist.  
 10 As an expert epidemiologist, I rendered 10:35  
 11 you with my evaluation of the  
 12 epidemiology. As a scientist I'm  
 13 curious. I go beyond epidemiology. I  
 14 look at other types of literature. And  
 15 I disclosed this here because I was told 10:35  
 16 that I'm supposed to disclose that.  
 17 MR. LASKER: Okay. For the record  
 18 we'll state there is nothing in this  
 19 expert report that mentions an animal  
 20 cancer bioassay. There is no disclosure 10:35  
 21 as required under the federal rules of  
 22 any opinion being proffered on animal  
 23 cancer bioassays, and unless counsel is  
 24 here to represent that this witness will  
 25 not be offering opinions with respect to 10:36

Page 80

1 animal cancer bioassays, we will  
 2 petition the court for a second  
 3 deposition of this witness because we  
 4 were not prepared to question the  
 5 witness on those issues because of the 10:36  
 6 expert report she submitted. And we  
 7 would also move to strike because those  
 8 opinions have not been properly  
 9 disclosed.  
 10 MS. FORGIE: Well, we're not going 10:36  
 11 to agree to a second deposition, of  
 12 course. I would say she clearly has  
 13 stated in there that she has looked at  
 14 over 550 articles for animal and  
 15 mechanistic literature. There's another 10:36  
 16 reference in there about the effects in  
 17 rodents of glyphosate and she's talked  
 18 about the CARC report and the IARC  
 19 Monograph all of which, as you well  
 20 know, do discuss animal literature. 10:36  
 21 MR. LASKER: Well, to be quite  
 22 clear, that is not what her expert  
 23 report is, and the judge will be able to  
 24 read her expert report; so we don't need  
 25 to debate that. But my question to 10:37

Page 81

1 you just so I understand -- we have to  
 2 have motions practice. Is it  
 3 plaintiff's intention to proffer  
 4 Dr. Ritz to offer expert opinions with  
 5 regard animal cancer bioassays? 10:37  
 6 MS. FORGIE: She intends to give  
 7 her opinion --  
 8 MR. WISNER: Objection. Kathryn,  
 9 you don't have to answer questions in a  
 10 deposition. Are we off the record? 10:37  
 11 MR. LASKER: We are on the record.  
 12 MR. WISNER: You can't question  
 13 attorneys. That's ridiculous. Let's go  
 14 off the record if you want to ask that  
 15 question. 10:37  
 16 MR. LASKER: I certainly can. If  
 17 we have to get on record with the court  
 18 and call the court right now, we can do  
 19 that as well. I need to know right now  
 20 because I'd like to move on. If the 10:37  
 21 plaintiffs' counsel are not willing to  
 22 state on the record that Dr. Ritz will  
 23 not be offering opinions on animal  
 24 cancer bioassays, then we'll have an  
 25 issue with the court including a motion 10:37

Page 82	<p>1 to strike and a motion for leave to seek 2 additional deposition.</p> <p>3 MS. FORGIE: You can bring whatever 4 motions you want. You can bring 5 whatever motions you want. She's made 10:37 6 it very, very clear that she has 7 expertise in toxicology. You have a 8 copy of her CV. She's talked about 9 studies and the effects in rodents of 10 glyphosate which for whatever reasons 10:38 11 you haven't found. She's talked about 12 the IARC Monograph. She's talked about 13 the CARC report. She's talked about the 14 550 articles on rodents, and she's 15 talked about the fact that she intends 10:38 16 as a scientist in epidemiology to look 17 at the totality of sciences, and that's 18 exactly what's in her report. Make 19 whatever motions you want to make. I'm 20 not going to argue about this with you. 10:38 21 MR. LASKER: Just to be clear, the 22 statements in her report with respect to 23 animals which you want to talk about are 24 specific to genotoxicity and 25 cytotoxicity. They do not mention 10:38</p>	Page 84	<p>1 the issue of chance; correct?</p> <p>2 A. Uh-huh. There are definitions in 3 there in terms of chance and bias, yes.</p> <p>4 Q. We'll get to bias. I want to talk 5 about the terms you identify with respect to 10:39 6 chance. You provide definitions of the 7 terms "P-value" I believe on page 11 in your 8 report; correct?</p> <p>9 A. It's the -- the title says 10 "Statistical Significance," but the P-value 10:39 11 is mentioned.</p> <p>12 Q. Okay. And you explain in your 13 expert report -- and we're going to get into 14 some of the issues with this, but 15 epidemiologists at least present P-values in 10:40 16 trying to address the issue of whether or 17 not a reported odds ratio or relative risk 18 might be due to chance; correct?</p> <p>19 MS. FORGIE: Object to form. 20 THE WITNESS: Epidemiologists are 10:40 21 trained -- modern epidemiologists -- and 22 those are the ones who drive the methods 23 in epidemiology -- are trained to at 24 least rely on one parameter. P-value is 25 one parameter. 10:40</p>
Page 83	<p>1 cancer bioassays, and the 550 articles 2 that you are referencing are the ones 3 talks she about from her initial search 4 which she excluded.</p> <p>5 MS. FORGIE: I'm not going to argue 10:38 6 with you.</p> <p>7 MR. WISNER: Objection. How are 8 you testifying? What's going on here?</p> <p>9 MR. LASKER: We will file a motion 10 with the court as necessary to strike 10:38 11 this witness' testimony and also to seek 12 a second deposition.</p> <p>13 MS. FORGIE: You do whatever you 14 think is appropriate. She has clearly 15 stated in her expert report that she 10:38 16 intends to give full opinions including 17 all kinds of science.</p> <p>18 MR. LASKER: We will submit and, in 19 fact, the judge has a full expert report 20 in front of him, and he can look at that 10:39 21 himself.</p> <p>22 BY MR. LASKER: 23 Q. Dr. Ritz, in your report you 24 provide a definition of a number of terms 25 that epidemiologists use to try to address 10:39</p>	Page 85	<p>1 BY MR. LASKER: 2 Q. Okay. 3 A. So epidemiologists are taught what 4 a P-value is and how to evaluate it, but 5 they're also taught never to use just a 10:40 6 P-value to evaluate a study or chance.</p> <p>7 Q. And that's what I'm going to be 8 getting to right now in my next questions. 9 You mention in your report at pages 11 to 12 10 that the -- there is a convention of using a 10:40 11 P-value of less than .05, but some studies 12 will use P-values such as less than .01 or P 13 less than negative 10 to 7 which is one in 14 10 million; right?</p> <p>15 MS. FORGIE: Object to the form. 10:41 16 THE WITNESS: So what is the 17 question?</p> <p>18 BY MR. LASKER: 19 Q. It is correct that epidemiologists 20 in various studies will use different 10:41 21 P-values including P less than .05 but 22 sometimes P less than .01 or P less than 10 23 to negative 7; correct?</p> <p>24 MS. FORGIE: Object to the form. 25 THE WITNESS: These type of 10:41</p>

Page 86	<p>1 P-values have been defined and used in</p> <p>2 studies, but a P-value has a very</p> <p>3 different meaning depending on the type</p> <p>4 of test you are conducting. For</p> <p>5 example, there are test of pair-wise 10:41</p> <p>6 comparisons. There are tests of trends.</p> <p>7 There are tests of heterogeneity. There</p> <p>8 are many, many testing situations in</p> <p>9 which we use P-values, and they have a</p> <p>10 very different meaning. 10:42</p> <p>11 BY MR. LASKER:</p> <p>12 Q. One of the articles that you use in</p> <p>13 teaching your epidemiology students about</p> <p>14 P-values is an article by Charles Poole</p> <p>15 entitled "Low P-values or Narrow Confidence 10:42</p> <p>16 Intervals: Which are More Durable?"</p> <p>17 Correct?</p> <p>18 A. Yes, I love that article.</p> <p>19 Q. Good. I have some questions about</p> <p>20 that. This will be Exhibit 19-3. 10:42</p> <p>21 (Exhibit Number 19-3 was marked</p> <p>22 for identification.)</p> <p>23 BY MR. LASKER:</p> <p>24 Q. In this article, Dr. Poole, as you</p> <p>25 explain in your report, in your expert 10:43</p>	Page 88	<p>1 evaluating data in order to reach causal</p> <p>2 conclusions, but it's really just one.</p> <p>3 It is a knee-jerk reaction in the</p> <p>4 medical field unfortunately, and that's</p> <p>5 what this article is all about, to just 10:44</p> <p>6 look at P-values and not the data</p> <p>7 overall to draw conclusions on the</p> <p>8 validity or reliability of data and come</p> <p>9 to a conclusion.</p> <p>10 And at UCLA we are taught not to do 10:45</p> <p>11 that, and we are teaching our students</p> <p>12 not to do that.</p> <p>13 BY MR. LASKER:</p> <p>14 Q. And you agree that it is not proper</p> <p>15 scientific methodology to point to a P-value 10:45</p> <p>16 alone as providing evidence that data -- of</p> <p>17 the data being analyzed substantiates a</p> <p>18 conclusion of causation?</p> <p>19 A. Well, a P-value alone is nothing</p> <p>20 any epidemiologist worth their salt would 10:45</p> <p>21 consider for coming to causal conclusions.</p> <p>22 What we do is we look at the data overall in</p> <p>23 the context of the study design, the biases,</p> <p>24 the size of the study, the effect we are</p> <p>25 trying to estimate, the effect size. 10:46</p>
Page 87	<p>1 report, talks about the fact that a</p> <p>2 P-value -- and this is on page 293, but</p> <p>3 you've been using this article in your</p> <p>4 teaching for a long time. I think you</p> <p>5 probably know better than I do. 10:43</p> <p>6 Dr. Poole mentions that a P-value</p> <p>7 cannot be read as a probability of obtaining</p> <p>8 a particular result if there is no true</p> <p>9 association between an exposure and disease;</p> <p>10 correct? 10:43</p> <p>11 A. Where is that?</p> <p>12 Q. I may be paraphrasing but hold on a</p> <p>13 second. Well, let me just ask it from your</p> <p>14 report because you state this as well. I</p> <p>15 think it's in here somewhere, but I'm not 10:44</p> <p>16 going to find it as quickly. You state in</p> <p>17 your expert report that a P-value should not</p> <p>18 be interpreted as a probability that</p> <p>19 glyphosate -- in this instance, glyphosate</p> <p>20 causes NHL; correct? 10:44</p> <p>21 MS. FORGIE: Object to the form.</p> <p>22 THE WITNESS: I would never use a</p> <p>23 P-value to say anything about causation.</p> <p>24 A P-value is a parameter, one of many</p> <p>25 types of parameters we are using in 10:44</p>	Page 89	<p>1 So a P-value could be highly</p> <p>2 statistically significant, and that 10 to</p> <p>3 the minus 7 is one of those genomic studies</p> <p>4 have P-values of 10 to the minus 10, and</p> <p>5 still the effect size is an odds ratio of 10:46</p> <p>6 1.03. So that gene contributes 3 percent</p> <p>7 increase to a disease. Is that meaningful</p> <p>8 clinically? Can we do something with that?</p> <p>9 Is that even useful? We need to debate</p> <p>10 that. But the P-value is the P-value. It's 10:46</p> <p>11 10 to the minus 10, and it's huge. Does it</p> <p>12 point to something? We need a lot of other</p> <p>13 reasoning to make use of that.</p> <p>14 Q. I think one of the things that</p> <p>15 Dr. -- first of all, let me make sure that 10:46</p> <p>16 I'm clear. The -- if a test result -- a</p> <p>17 test statistic results in a P-value of .05,</p> <p>18 that does not mean that there's only a</p> <p>19 5 percent likelihood that the null value is</p> <p>20 correct; correct? 10:47</p> <p>21 MS. FORGIE: Object to the form.</p> <p>22 THE WITNESS: A P-value doesn't</p> <p>23 refer to a likelihood. That's a</p> <p>24 likelihood ratio test.</p> <p>25 ///</p>



Page 90

1 BY MR. LASKER:  
 2 Q. So where the test on a glyphosate  
 3 and carcinogenicity, a P statistic of .05  
 4 does not mean that there is a 95 percent  
 5 chance that glyphosate caused the observed 10:47  
 6 cancers; correct?  
 7 A. It means that if you repeat a trial  
 8 a hundred times, 95 percent of the time you  
 9 may find a result as large or larger than  
 10 what you're seeing. 10:47  
 11 Q. Okay. But my question was a little  
 12 bit different. A P-value of .05 in a  
 13 glyphosate cancer study does not mean that  
 14 it is 95 percent likely that glyphosate  
 15 caused the observed cancers; correct? 10:47  
 16 MS. FORGIE: Object to the form.  
 17 Asked and answered.  
 18 Go ahead.  
 19 THE WITNESS: That was a double  
 20 negative; so I have to restate this. A 10:48  
 21 P-value alone will not be used for  
 22 causal evaluation, and a P-value of .05  
 23 means that if a hundred times I repeat  
 24 this experiment in the same population,  
 25 95 percent of the time I would see a 10:48

Page 91

1 result as large or larger than what I've  
 2 seen.  
 3 BY MR. LASKER:  
 4 Q. But a P-value of .05 does not mean  
 5 there's a 95 percent likelihood that 10:48  
 6 glyphosate caused the observed cancer being  
 7 analyzed; correct?  
 8 MS. FORGIE: Object to the form.  
 9 Asked and answered.  
 10 You can answer it again. 10:48  
 11 THE WITNESS: This is not a way I  
 12 would ever express the meaning of a  
 13 P-value.  
 14 BY MR. LASKER:  
 15 Q. And that's because, as I think you 10:48  
 16 explained, the P-value does not tell us  
 17 anything about the study's internal validity  
 18 in being able to accurately identify a  
 19 causal association if it exists; correct?  
 20 MS. FORGIE: Object to the form. 10:48  
 21 THE WITNESS: A P-value is not a  
 22 measure of validity. A P-value is a  
 23 measure of randomness or chance.  
 24 BY MR. LASKER:  
 25 Q. And Dr. Poole explains -- and this 10:49

Page 92

1 time I think I do have the quote for you.  
 2 MS. FORGIE: What page are you?  
 3 MR. LASKER: On page 293.  
 4 BY MR. LASKER:  
 5 Q. That -- and this is on the left 10:49  
 6 column, the second paragraph from the top,  
 7 that "Statisticians who have examined these  
 8 questions in detail have found under widely  
 9 ranging conditions that P-values on the  
 10 order of .05, .01, and even lower provide 10:49  
 11 much less evidence against the null value  
 12 than they appear to provide at face value."  
 13 Correct?  
 14 A. That's what it states.  
 15 Q. And Dr. Poole explains that 10:49  
 16 P-values in the vicinity of .05 provide  
 17 almost no evidence against the null  
 18 hypothesis at all; correct?  
 19 A. It says as a general matter  
 20 P-values in the vicinity of .05 provide 10:49  
 21 almost no evidence against the null  
 22 hypothesis at all.  
 23 Q. And that's what you teach your  
 24 epidemiology students; correct?  
 25 MS. FORGIE: Object to the form. 10:50

Page 93

1 THE WITNESS: What I teach my  
 2 epidemiology students is to take these  
 3 statements and put them in the context  
 4 of how we use P-values in epidemiology  
 5 as one parameter and not the end-all of 10:50  
 6 causal reasoning.  
 7 BY MR. LASKER:  
 8 Q. And you agree with Dr. Poole that a  
 9 P-value in the vicinity of .05 generally  
 10 provide almost no evidence against the null 10:50  
 11 hypothesis -- well, I put the "generally" in  
 12 the wrong place. Let me put it exactly how  
 13 he says it.  
 14 You agree with Dr. Poole that as a  
 15 general matter P-values in the vicinity of 10:50  
 16 .05 provide almost no evidence against the  
 17 null hypothesis at all; correct?  
 18 MS. FORGIE: Objection. Asked and  
 19 answered.  
 20 You can answer it again. 10:50  
 21 THE WITNESS: Well, this sentence  
 22 is taken out of context. What I  
 23 interpret him to be saying here is that  
 24 a threshold of .05 because he continues  
 25 by talking about a P of .04, which is, 10:50

Page 94

1 you know, the next from .05, that  
 2 keeping decision-making at a threshold  
 3 of .05 is a pretty ridiculous  
 4 experiment -- way of arguing.  
 5 What you really want to do is look 10:51  
 6 at the P-value distribution, and that's  
 7 what this sentence refers to that, you  
 8 know, thresholds are thresholds.  
 9 Whatever evidence you think you can draw  
 10 out of them, why this threshold and not 10:51  
 11 the next? So we should look at  
 12 distributions and not thresholds.  
 13 BY MR. LASKER:  
 14 Q. In fact, the next sentence that you  
 15 refer to, Dr. Poole states that a P-value of 10:51  
 16 .04, for instance, is typically found to be  
 17 almost equally probable under the null and  
 18 alternative hypotheses; correct?  
 19 A. Correct. That's what it states.  
 20 Q. And you agree with that; correct? 10:51  
 21 A. It refers to the structure of a  
 22 P-value being a distribution -- coming from  
 23 a distribution, but we are deciding  
 24 arbitrarily what threshold to use, yes.  
 25 Q. And you agree that P-values of .04 10:52

Page 95

1 are typically found to be almost equally  
 2 probable under the null and alternative  
 3 hypotheses; correct?  
 4 MS. FORGIE: Object to the form.  
 5 THE WITNESS: Again, this is taken 10:52  
 6 out of context. This can be  
 7 misunderstood. Since this sentence is  
 8 taken out of context, what I think he's  
 9 referring to is the misuse of thresholds  
 10 such as .05. And what he's trying to 10:52  
 11 argue here is that there's no real  
 12 difference between a P-value of .05 and  
 13 a P-value of .04 or a P-value of .06.  
 14 It's just that we as a scientific  
 15 community or the medical community has 10:52  
 16 agreed that P .05 is it. That does not  
 17 necessarily make sense if you want to  
 18 look at data in a much more  
 19 comprehensive way, you should look at a  
 20 P-value distribution, and the P-value 10:53  
 21 has a continuum.  
 22 And insofar as we're trying to have  
 23 a scientific dialogue, we should use the  
 24 most data we can and not just the  
 25 threshold for decision-making. Human 10:53

Page 96

1 lives are not light bulbs. P-values of  
 2 .05 come out of light-bulb testing that  
 3 statisticians used -- right -- in  
 4 industrial settings. And why it's a  
 5 simple matter. We like to think without 10:53  
 6 having to go back to all the data, and  
 7 that's a bad habit, and we are trying to  
 8 teach our students not to get into those  
 9 bad habits.  
 10 THE REPORTER: Counsel, excuse me. 10:53  
 11 I just had a technical difficulty. I  
 12 need to go off and restart very quickly.  
 13 MR. LASKER: Okay.  
 14 THE VIDEOGRAPHER: We're off the  
 15 record at 10:52 a.m. This marks the end 10:53  
 16 of videotape number 1.  
 17 (Recess taken from 10:52 a.m.  
 18 to 10:57 a.m.)  
 19 THE VIDEOGRAPHER: We are back on  
 20 the record. The time is 10:57 a.m. 10:57  
 21 This marks the beginning of videotape  
 22 number 2 in the deposition of Dr. Beate  
 23 Ritz.  
 24 BY MR. LASKER:  
 25 Q. Dr. Ritz, going back to the Poole 10:57

Page 97

1 paper that you use in teaching your  
 2 epidemiologic students, I'd like to return  
 3 to this sentence that Dr. Poole has in his  
 4 article that P equals .04 is typically found  
 5 to be almost equally probable under the null 10:57  
 6 and alternative hypothesis.  
 7 Do you see that?  
 8 A. Yes.  
 9 Q. And so in our circumstance, in this  
 10 case, the null hypothesis is that glyphosate 10:57  
 11 does not cause non-Hodgkin's lymphoma, and  
 12 the alternate hypothesis would be that  
 13 glyphosate does cause non-Hodgkin's  
 14 lymphoma; correct?  
 15 MS. FORGIE: Object to the form. 10:57  
 16 THE WITNESS: Actually, there's  
 17 usually more than one alternate  
 18 hypothesis. So the alternate hypothesis  
 19 could be it is tenfold more probable to  
 20 suffer from non-Hodgkin's lymphoma. 10:58  
 21 It's twofold more probable. So these  
 22 are all parameter estimates of an effect  
 23 size, meaning the alternative is not  
 24 just one alternative. The alternative  
 25 is a continuum. 10:58

Page 98

1 That's what I tried to explain an  
 2 hour ago when I said why we are usually  
 3 going with the null hypothesis is  
 4 because that is one point while  
 5 alternative hypotheses are many fold. 10:58  
 6 BY MR. LASKER:  
 7 Q. Understood.  
 8 What Dr. Poole is stating then is  
 9 that a P-value of .04 would be almost  
 10 equally probable under the null hypothesis 10:58  
 11 here that glyphosate doesn't cause  
 12 non-Hodgkin's lymphoma and the alternative  
 13 hypotheses of various possible measures in  
 14 which glyphosate does cause non-Hodgkin's  
 15 lymphoma; correct? 10:58  
 16 MS. FORGIE: Object to the form.  
 17 THE WITNESS: Well, what he's  
 18 trying to say here, as I interpret this,  
 19 is that he is emphasizing that we should  
 20 not be using one P-value of .04 or .05 10:59  
 21 or .06, but we should be evaluating the  
 22 data, and that's how I teach it, in  
 23 terms of what the overall picture in  
 24 terms of chance, bias, et cetera, is,  
 25 and if we are just talking P-values, 10:59

Page 99

1 what the picture is in terms of a  
 2 P-value distribution and you can  
 3 actually find that in Dr. Greenland's  
 4 book where he discusses on the P-value  
 5 is the P-value distribution as an 10:59  
 6 alternate to this threshold kind of  
 7 experiment.  
 8 BY MR. LASKER:  
 9 Q. When you use that distribution, you  
 10 find that a P-value of .05 generally 10:59  
 11 provides almost no evidence against the null  
 12 hypothesis; correct?  
 13 MS. FORGIE: Object to the form.  
 14 THE WITNESS: No, that's not the  
 15 right interpretation. It means it's 11:00  
 16 almost equally probable. It doesn't say  
 17 that I'm rejecting or not rejecting  
 18 either the null or the alternative  
 19 hypothesis.  
 20 BY MR. LASKER: 11:00  
 21 Q. Understood.  
 22 Okay. So then if you have a P  
 23 equals -- and to use Dr. Poole's specific  
 24 quote here -- if you have a P equals .04  
 25 then in a study, you will find it is equally 11:00

Page 100

1 probable that here glyphosate, in fact,  
 2 caused the cancer or that glyphosate did not  
 3 cause the cancer; correct?  
 4 MS. FORGIE: Object to the form.  
 5 Mischaracterizes, asked and answered. 11:00  
 6 THE WITNESS: The P-value here says  
 7 nothing about glyphosate. What he says  
 8 here is that a P of .04 is typically  
 9 found to be almost equally probable  
 10 under a null alternative hypothesis. He 11:00  
 11 speaks about a P-value, not about a null  
 12 hypothesis that glyphosate is or isn't  
 13 causing NHL.  
 14 BY MR. LASKER:  
 15 Q. I understand that. We can take it 11:00  
 16 from both steps, but we want to discuss the  
 17 fact that -- and I think you mentioned this  
 18 before -- in the context of this case, the  
 19 null hypothesis that we're looking at is  
 20 whether or not glyphosate causes 11:01  
 21 non-Hodgkin's lymphoma?  
 22 A. And what I would be --  
 23 MS. FORGIE: Wait, wait. There's  
 24 no question.  
 25 ///

Page 101

1 BY MR. LASKER:  
 2 Q. So the null hypothesis would be the  
 3 glyphosate does not cause non-Hodgkin's  
 4 lymphoma here, and the alternative  
 5 hypothesis might be a variety of other 11:01  
 6 things with respect to the nature of  
 7 glyphosate's association with non-Hodgkin's  
 8 lymphoma.  
 9 What I'd like to understand here,  
 10 and I think I'm reading this as it's stated 11:01  
 11 here, but if that is our understanding of  
 12 the null hypothesis here, a P-value of .04  
 13 would typically be found to be almost  
 14 equally probable under that null hypothesis  
 15 or under an alternative causation 11:01  
 16 hypothesis; correct?  
 17 MS. FORGIE: Object to the form.  
 18 Asked and answered.  
 19 And you can answer it again.  
 20 THE WITNESS: This is about the 11:02  
 21 P-value. It's about threshold. It's  
 22 about null hypotheses and alternative  
 23 hypotheses. It's not about how I assess  
 24 causation.  
 25 ///

Page 102

1 BY MR. LASKER:  
 2 Q. I'm not saying it is. I'm just  
 3 trying to understand P-values, and I think  
 4 it's consistent with what you said, but a  
 5 P-value of .04 in the context of a 11:02  
 6 glyphosate study or glyphosate cancer study  
 7 you could be equally likely to find that  
 8 P-value if glyphosate actually was a cause  
 9 of cancer or if glyphosate was not a cause  
 10 of the cancer; correct? 11:02  
 11 MS. FORGIE: Object to the form.  
 12 Asked and answered.  
 13 You can answer it again.  
 14 THE WITNESS: No. It means you  
 15 have to state your null hypothesis or 11:02  
 16 you have to state your alternative  
 17 hypothesis. Under those hypotheses, you  
 18 are able to calculate a P-value. If it  
 19 is .04, then it might be equally  
 20 probable under both types of hypotheses. 11:02  
 21 That what this means.  
 22 BY MR. LASKER:  
 23 Q. Okay. So if you were to do a test,  
 24 and you were testing the null hypothesis of  
 25 whether glyphosate causes cancer and you get 11:03

Page 103

1 a P-value of .04, what Dr. Poole is stating  
 2 is that that result would be equally likely  
 3 if, in fact, the glyphosate had caused those  
 4 cancers or the glyphosate had not caused  
 5 those cancers? 11:03  
 6 MS. FORGIE: Object to the form.  
 7 Asked and answered.  
 8 You can answer it again.  
 9 THE WITNESS: No, that's not how I  
 10 would interpret this. 11:03  
 11 BY MR. LASKER:  
 12 Q. If you're doing a test in which the  
 13 null hypothesis is glyphosate does not cause  
 14 cancer and the alternative hypothesis is  
 15 that glyphosate does cause cancer and you 11:03  
 16 get a P-value of .04, that would make the  
 17 null hypothesis and the alternative  
 18 hypothesis equally likely; correct?  
 19 MS. FORGIE: Object to the form.  
 20 Asked and answered. 11:03  
 21 You can answer it again.  
 22 This is like the fifth time on the  
 23 same question, Eric.  
 24 THE WITNESS: Again, the P-value of  
 25 .04 that he refers to here is the 11:03

Page 104

1 threshold P-value, and he calls this  
 2 threshold P-value equally probable under  
 3 the null and alternative hypotheses. We  
 4 have to state all these hypotheses. We  
 5 then can calculate P-values. 11:04  
 6 We can calculate P-value  
 7 distributions, and we can see how likely  
 8 the P-values are, not the associations,  
 9 not the causation, not everything else.  
 10 BY MR. LASKER: 11:04  
 11 Q. And the P-value is equally likely  
 12 under the null and the alternative  
 13 hypothesis; correct?  
 14 MS. FORGIE: Object to the form.  
 15 Asked and answered. This is like the 11:04  
 16 eighth time.  
 17 You can answer it again.  
 18 THE WITNESS: Again, as I  
 19 understand what Dr. Poole is trying to  
 20 say here is to avoid thresholds such as 11:04  
 21 P-values of .04 because they are always  
 22 referring to one type of hypothesis, and  
 23 we are rarely ever asking the other  
 24 alternative hypotheses. So we are  
 25 usually just testing one hypothesis. We 11:05

Page 105

1 could, of course, then decide to also  
 2 test other hypotheses, and we could get  
 3 for or against those hypotheses with a  
 4 similar equal chance of P-value of .04.  
 5 That's what it says. 11:05  
 6 BY MR. LASKER:  
 7 Q. Dr. Poole also notes that one  
 8 upshot of this work has been a statistical  
 9 research program devoted to calibrating,  
 10 standardizing, conditioning, and adjusting 11:05  
 11 low P-values to make them higher so that  
 12 they reflect more realistically the limited  
 13 statistical evidence they provide against  
 14 null hypothesis; correct?  
 15 MS. FORGIE: Object to the form. 11:05  
 16 That's misread.  
 17 But you can answer.  
 18 THE WITNESS: He's referring to  
 19 Bayesian methods being developed here,  
 20 yes. 11:05  
 21 BY MR. LASKER:  
 22 Q. And you agree that's appropriate;  
 23 correct?  
 24 A. I'm not a Bayesian.  
 25 Q. So you don't know one way or the 11:05

Page 106	Page 108
<p>1 other?</p> <p>2 MS. FORGIE: Object to the form.</p> <p>3 THE WITNESS: No. I'm saying that</p> <p>4 Bayesian versus frequentist</p> <p>5 statisticians have a lot of things in 11:06</p> <p>6 common, and I would not want to be on</p> <p>7 one side or the other. I think they're</p> <p>8 useful for different purposes.</p> <p>9 BY MR. LASKER:</p> <p>10 Q. You do agree, though, that 11:06</p> <p>11 statistical methods devoted to calibrating,</p> <p>12 standardizing, conditioning, and adjusting</p> <p>13 low P-values to make them higher so that</p> <p>14 they reflect more realistically the limited</p> <p>15 statistical evidence they provide against a 11:06</p> <p>16 null hypothesis is a good idea?</p> <p>17 MS. FORGIE: Objection. Asked and</p> <p>18 answered.</p> <p>19 You can answer it again.</p> <p>20 THE WITNESS: I'm saying I'm not of 11:06</p> <p>21 either statistical camp, frequentist or</p> <p>22 Bayesian. I believe that they are both</p> <p>23 useful. They have appropriate purposes</p> <p>24 and when needed, I use either one of</p> <p>25 them, and what he says here is that 11:06</p>	<p>1 .05 is what I'm looking for, then a</p> <p>2 95 percent confidence interval would exclude</p> <p>3 the 1.</p> <p>4 Q. And, again, you would not state</p> <p>5 that a statistical significance -- if a test 11:08</p> <p>6 is significant at the 95 percent confidence</p> <p>7 interval, that would not mean to you that</p> <p>8 you can have 95 percent confidence that the</p> <p>9 value that you see in a given study is not</p> <p>10 due to chance; correct? 11:08</p> <p>11 MS. FORGIE: Object to the form.</p> <p>12 THE WITNESS: That's not how we</p> <p>13 interpret confidence intervals.</p> <p>14 Confidence intervals have similar</p> <p>15 information but also more information 11:08</p> <p>16 than a P-value. So I have to first</p> <p>17 decide on the confidence limit, which is</p> <p>18 95 percent, which is also similar to a</p> <p>19 P-value of .05.</p> <p>20 So if I use a confidence interval 11:08</p> <p>21 in the same bad manner as a P-value,</p> <p>22 meaning as a threshold, then that's all</p> <p>23 I get out of it. However, I teach my</p> <p>24 students that a confidence interval</p> <p>25 actually tells them a lot more than what 11:08</p>
Page 107	Page 109
<p>1 there are developments in statistics</p> <p>2 that, you know, we should be looking out</p> <p>3 for, and this is 2001. So some of these</p> <p>4 might have happened.</p> <p>5 BY MR. LASKER: 11:06</p> <p>6 Q. You also talk about confidence</p> <p>7 intervals in your expert report; correct?</p> <p>8 A. Correct.</p> <p>9 Q. And, again, the standard</p> <p>10 methodology or the standard measure used by 11:07</p> <p>11 epidemiologists to exclude chance using</p> <p>12 confidence intervals is the 95 percent</p> <p>13 confidence interval; correct?</p> <p>14 MS. FORGIE: Object to the form.</p> <p>15 THE WITNESS: The 95 percent 11:07</p> <p>16 confidence interval is a convention just</p> <p>17 like the P-value of .05.</p> <p>18 BY MR. LASKER:</p> <p>19 Q. Under that convention, a confidence</p> <p>20 interval is considered statistically 11:07</p> <p>21 significant if it excludes the null</p> <p>22 hypothesis of 1.0; correct?</p> <p>23 A. The confidence interval projects</p> <p>24 similar types of data as the P-value in this</p> <p>25 case. You are correct that if a P-value of 11:07</p>	<p>1 a P-value would. A singular threshold</p> <p>2 P-value, not a P-value distribution.</p> <p>3 BY MR. LASKER:</p> <p>4 Q. One thing you teach your students</p> <p>5 to look at is what's called the confidence 11:09</p> <p>6 limit ratio; correct?</p> <p>7 A. Yes, we can look at that as well.</p> <p>8 Q. And the confidence limit ratio is</p> <p>9 the ratio between the upper and the lower</p> <p>10 end of the confidence interval; correct? 11:09</p> <p>11 A. Correct.</p> <p>12 Q. So if we have a study that reports</p> <p>13 an odds ratio of 1.5 and, let's say, a</p> <p>14 confidence interval of 0.8 to 3.2 -- do the;</p> <p>15 math work well -- the confidence limit ratio 11:09</p> <p>16 would be 4' correct?</p> <p>17 MS. FORGIE: Object to the form.</p> <p>18 THE WITNESS: What would the ratio</p> <p>19 be.</p> <p>20 BY MR. LASKER: 11:09</p> <p>21 Q. If it's a 95 percent confidence</p> <p>22 level of 0.8 to 3.2, then your confidence</p> <p>23 limit ratio is 3.2 divided by 0.8 or 4;</p> <p>24 correct?</p> <p>25 A. Right. 11:09</p>

Page 110

1 Q. You can use the CLR -- we'll call  
 2 it CLR for confidence limit ratio -- you can  
 3 use the CLR calculation to compare the power  
 4 after the fact of different studies to  
 5 exclude chance as the explanation of a 11:09  
 6 potential association; correct?  
 7 MS. FORGIE: Object to the form.  
 8 THE WITNESS: Well, this is just  
 9 one way of looking at confidence  
 10 intervals again. So what actually 11:10  
 11 Dr. Poole does when he shows his Table 1  
 12 is that he -- that's what I teach my  
 13 students is that you should not use any  
 14 one of these parameters whether it's a  
 15 relative risk, a 95 percent confidence 11:10  
 16 interval, a P-value, or a 95 percent CLR  
 17 as just one piece of information to  
 18 decide anything.  
 19 You should use each piece of that  
 20 puzzle to put it -- and put them 11:10  
 21 together and evaluate the data  
 22 appropriately within that context. And  
 23 these are one, two, three, four types of  
 24 ways of doing that.  
 25 ///

Page 111

1 BY MR. LASKER:  
 2 Q. Right. I understand that.  
 3 But with respect to the CLR, the  
 4 CLR calculation allows you to compare the  
 5 power of the different studies to either 11:10  
 6 exclude or not exclude a potential causal  
 7 association; correct?  
 8 MS. FORGIE: Object to the form and  
 9 asked and answered.  
 10 You can answer it again. 11:11  
 11 THE WITNESS: Actually, it doesn't  
 12 really because the CLR, as we have just  
 13 done here. As an example, you are  
 14 dividing an upper limit above one by a  
 15 lower limit, the low one. So that ratio 11:11  
 16 alone doesn't tell you anything about  
 17 whether the P-value actually would be  
 18 above or below a threshold.  
 19 So his example here is when you see  
 20 the last one, part D, that a relatively 11:11  
 21 narrow confidence limit ratio then  
 22 reflects a P-value that under  
 23 conventional statistics would not be  
 24 considered significant; however, the CLR  
 25 tells you you have a fairly nice 11:11

Page 112

1 confidence interval width.  
 2 BY MR. LASKER:  
 3 Q. Right. I'm just trying to  
 4 understand what that means. I recognize  
 5 it's not going to tell you about statistical 11:11  
 6 significance.  
 7 My understanding of a CLR was that  
 8 it would give you some indication of the  
 9 power of the study to find or not find an  
 10 effect; is that correct? 11:12  
 11 MS. FORGIE: Object to the form.  
 12 Asked and answered.  
 13 You can answer it again.  
 14 THE WITNESS: Again, it is one way  
 15 of looking at the confidence interval 11:12  
 16 widths. That's all it is. However,  
 17 confidence intervals can and cannot  
 18 include the null value. They can be  
 19 close to the null value. They can be  
 20 far away from the null value. They can 11:12  
 21 be very wide but very far from the null  
 22 value, and anybody would then jump and  
 23 say that's a study that proves. Okay.  
 24 So each part of that equation of  
 25 parameters cannot be taken out of 11:12

Page 113

1 context. What I'm trying to teach my  
 2 students is use everything, every bit of  
 3 information you can get. Calculate all  
 4 of these values. Look at them with an  
 5 informed mind and don't exclude one in 11:12  
 6 favor of the other.  
 7 BY MR. LASKER:  
 8 Q. Can we go to the 2010 PowerPoint.  
 9 MS. FORGIE: Are we putting 19-3  
 10 aside? 11:13  
 11 MR. LASKER: We can just keep it.  
 12 We might refer back to it.  
 13 MS. FORGIE: Okay. Thank you.  
 14 (Exhibit Number 19-4 was marked  
 15 for identification.) 11:13  
 16 BY MR. LASKER:  
 17 Q. Dr. Ritz, I'm not sure if you  
 18 remember --  
 19 MS. FORGIE: Is this 4?  
 20 THE REPORTER: 4. 11:13  
 21 MR. LASKER: 19-4.  
 22 BY MR. LASKER:  
 23 Q. Dr. Ritz, these are PowerPoint  
 24 slides of yours we found on the internet.  
 25 One of the slide decks that you use in your 11:13

Page 114	<p>1 lectures, at least this was in 2010; 2 correct?</p> <p>3 A. I imagine. If nobody played with 4 it.</p> <p>5 MS. FORGIE: I don't know about 11:13 6 that.</p> <p>7 BY MR. LASKER: 8 Q. On pages 123 -- actually, 124 and 9 125. The one thing we did do is we put 10 numbers on these slides. So it's actually 11:14 11 in the bottom right-hand corner. It's the 12 only change we made; so we can actually do 13 this in a somewhat efficient manner.</p> <p>14 MS. FORGIE: What number again on 15 what page? 11:14 16 MR. LASKER: 124 and 125. This is 17 the same slide actually that appears in 18 Dr. Poole's article.</p> <p>19 BY MR. LASKER: 20 Q. On page 125, you make the point 11:14 21 that the estimates with a smaller CLR -- 22 here it's B and D -- mean the width of the 23 confidence intervals is tighter -- are 24 findings that stand the best chance of 25 holding up in the context of existing and 11:14</p>	Page 116	<p>1 Q. And you also state that these 2 estimates with the more narrow CLR are the 3 results that should be put forth for 4 emphasis as the most statistically stable 5 results that this study has to offer; 11:15 6 correct?</p> <p>7 MS. FORGIE: Object to the form. 8 THE WITNESS: What was the 9 question? That I state this?</p> <p>10 BY MR. LASKER: 11:15 11 Q. You state that these estimates B 12 and D with the more narrow CLR are the 13 results that should be put forth for 14 emphasis as the most statistically stable 15 results this study has to offer; correct? 11:16 16 MS. FORGIE: Object to the form. 17 THE WITNESS: Actually, it doesn't 18 refer to the CLR. It refers to the 19 whole of the data provided under B and 20 D. 11:16 21 BY MR. LASKER: 22 Q. Okay. And the data with a narrower 23 CLR, one of the points you're making here is 24 that even though, for example, your category 25 C is statistically significant to the P, it 11:16</p>
Page 115	<p>1 future research; correct?</p> <p>2 MS. FORGIE: Object to the form. 3 THE WITNESS: Conditional on their 4 validity.</p> <p>5 BY MR. LASKER: 11:14 6 Q. Correct. 7 A. Uh-huh.</p> <p>8 Q. And those studies with the tighter 9 confidence limit ratio would weigh more 10 heavily into a meta-analysis; correct? 11:15 11 MS. FORGIE: Object to the form. 12 THE WITNESS: Not necessarily. It 13 depends on the study size. So we could 14 have -- it depends.</p> <p>15 BY MR. LASKER: 11:15 16 Q. Okay. In your lecture notes to 17 your class, you state that "Estimates B and 18 D would weigh more heavily into 19 meta-analysis and would exert stronger 20 influences on probability distributions in 11:15 21 properly conducted Bayesian analyses"; 22 correct?</p> <p>23 A. Yes. 24 Q. And that is correct; right? 25 A. Yes, that is correct. 11:15</p>	Page 117	<p>1 was .02 level, because it has a wider CLR 2 than, for example, number D or letter D, 3 which is not statistically significant, it 4 is -- has less chance of holding up 5 conditioned on its validity in the context 11:17 6 of existing and future research; correct?</p> <p>7 MS. FORGIE: Object to the form. 8 THE WITNESS: Indeed that is one 9 thing I try to explain to my students to 10 not rely just on the P-value, P less 11:17 11 than .05, which in the C row, we see is 12 the case, but we also have a wide CLR, 13 and we have a very strong point estimate 14 and a wide confidence interval.</p> <p>15 So when you're taking all of that 11:17 16 into consideration, then the estimate D 17 would be at least, if not more, valid, 18 might prove more valid in the end or 19 more reproducible in the end than the 20 estimate C. However, you know, all this 11:17 21 depends on validity, as I said.</p> <p>22 BY MR. LASKER: 23 Q. Okay. And you state in your expert 24 report -- and it's on page 12 in your expert 25 report -- that -- the last sentence of the 11:18</p>

Page 118	<p>1 first full paragraph that starts</p> <p>2 "Importantly, however."</p> <p>3 A. Which page?</p> <p>4 Q. Page 12.</p> <p>5 A. Yes. 11:18</p> <p>6 Q. And you state that "The odds ratios</p> <p>7 or the risk ratios least likely to be</p> <p>8 influenced by chance are not those with low</p> <p>9 P-values, but those with narrow confidence</p> <p>10 intervals or low CLRs." Correct? 11:18</p> <p>11 MS. FORGIE: Object to the form.</p> <p>12 THE WITNESS: Where was that?</p> <p>13 BY MR. LASKER:</p> <p>14 Q. The last sentence of the second</p> <p>15 paragraph. 11:18</p> <p>16 A. "Importantly, estimates least</p> <p>17 influenced by chance are not those with low</p> <p>18 P-values but those with narrow confidence</p> <p>19 intervals."</p> <p>20 Q. That's correct; right? 11:18</p> <p>21 A. In the context of this, yes.</p> <p>22 Q. Okay. And when we talk about</p> <p>23 narrow confidence intervals, the measurement</p> <p>24 that you provided for us that I'd like to be</p> <p>25 able to use is the CLR; correct? 11:19</p>	Page 120	<p>1 A. Where is this?</p> <p>2 Q. Page 15 in your report.</p> <p>3 A. Yes.</p> <p>4 Q. And just so it's clear, this table</p> <p>5 does not tell you or does not provide you 11:20</p> <p>6 with a -- the relative -- a sense of the</p> <p>7 relative power of the listed studies to</p> <p>8 identify a causal association between</p> <p>9 glyphosate and non-Hodgkin's lymphoma;</p> <p>10 correct? 11:20</p> <p>11 A. This table shows what it says in</p> <p>12 the sentence above. "I show the sample size</p> <p>13 of each human study of glyphosate in NHL."</p> <p>14 That's exactly it. It shows the sample</p> <p>15 size. 11:20</p> <p>16 Q. Okay. This table did not tell</p> <p>17 you -- did not tell you which of these</p> <p>18 studies is the most powerful study in being</p> <p>19 able to assess an association between</p> <p>20 glyphosate and non-Hodgkin's lymphoma; 11:20</p> <p>21 correct?</p> <p>22 MS. FORGIE: Objection. Asked and</p> <p>23 answered. That's the exact question you</p> <p>24 just asked.</p> <p>25 You can answer it again. 11:21</p>
Page 119	<p>1 MS. FORGIE: Object to the form.</p> <p>2 BY MR. LASKER:</p> <p>3 Q. That's a measurement of the width</p> <p>4 of the confidence interval?</p> <p>5 A. It's a measurement of the width of 11:19</p> <p>6 the confidence interval; however, the CLR</p> <p>7 does not tell you anything about the</p> <p>8 placement of the confidence interval.</p> <p>9 Q. Understood.</p> <p>10 MS. FORGIE: Wait. Let her finish. 11:19</p> <p>11 THE WITNESS: What I've been trying</p> <p>12 to say is we should not rely solely on a</p> <p>13 P-value especially a P-value threshold</p> <p>14 or a confidence interval or a CLR or a</p> <p>15 point estimate. 11:19</p> <p>16 So don't be fooled by a high point</p> <p>17 estimate but a confidence interval that</p> <p>18 goes from .5 to 200 because that data is</p> <p>19 pretty much uninformative.</p> <p>20 BY MR. LASKER: 11:19</p> <p>21 Q. Now, on page -- in your expert</p> <p>22 report on page 15, you provide a table</p> <p>23 listing of different publications with</p> <p>24 epidemiological data in glyphosate and</p> <p>25 non-Hodgkin's lymphoma; correct? 11:20</p>	Page 121	<p>1 THE WITNESS: Well, powerful has</p> <p>2 many meanings. If we're talking about</p> <p>3 statistically powerful versus powerful</p> <p>4 in a sense of validity, then, you know,</p> <p>5 those are different discussions. 11:21</p> <p>6 BY MR. LASKER:</p> <p>7 Q. This table does not tell us</p> <p>8 anything about which study is the most</p> <p>9 statistically powerful in determining</p> <p>10 whether there is a causal relationship 11:21</p> <p>11 between glyphosate and non-Hodgkin's</p> <p>12 lymphoma; correct?</p> <p>13 MS. FORGIE: Objection. Asked and</p> <p>14 answered. This is the third time.</p> <p>15 You can answer it again. 11:21</p> <p>16 THE WITNESS: This table was meant</p> <p>17 to show sample size.</p> <p>18 BY MR. LASKER:</p> <p>19 Q. It does not tell you anything about</p> <p>20 the power of the study to determine a causal 11:21</p> <p>21 association between glyphosate and</p> <p>22 non-Hodgkin's lymphoma; correct?</p> <p>23 MS. FORGIE: Objection. Asked and</p> <p>24 answered. This is the fourth time.</p> <p>25 THE WITNESS: Wrong. Sample size 11:21</p>



Page 122

1 is one element of the power of a study.  
 2 BY MR. LASKER:  
 3 Q. Okay. The top listed study on your  
 4 table is the Cocco study 2013; correct?  
 5 A. Yes. 11:21  
 6 Q. And the Cocco study is the least  
 7 powerful of all the epidemiologic studies to  
 8 be able to assess the association between  
 9 glyphosate and non-Hodgkin's lymphoma;  
 10 correct? 11:22  
 11 MS. FORGIE: Object to the form.  
 12 THE WITNESS: This table shows  
 13 sample size. It has nothing to do with  
 14 statistical power in the sense that it's  
 15 a complete evaluation of statistical 11:22  
 16 power. However, sample size is part of  
 17 what we use in calculating statistical  
 18 power.  
 19 BY MR. LASKER:  
 20 Q. My question, though, you have Cocco 11:22  
 21 listed as the top study on this table, and  
 22 the Cocco study is, in fact, the least  
 23 powerful study in assessing a potential  
 24 causal association between glyphosate and  
 25 non-Hodgkin's lymphoma; correct? 11:22

Page 123

1 MS. FORGIE: Objection. I object  
 2 to the form, and asked and answered.  
 3 THE WITNESS: You don't like my  
 4 table?  
 5 BY MR. LASKER: 11:22  
 6 Q. I'm just asking you a question.  
 7 A. The Cocco study is what the Cocco  
 8 study is, and I actually explain the Cocco  
 9 study a few pages later. The study by Cocco  
 10 was limited in how much we can glean from 11:22  
 11 its results as only four cases and two  
 12 controls had ever used glyphosate.  
 13 Q. So the Cocco study is, because of  
 14 that fact, not powerful in assessing an  
 15 association between glyphosate and 11:23  
 16 non-Hodgkin's lymphoma; correct?  
 17 MS. FORGIE: Object to the form and  
 18 asked and answered. This is, like, the  
 19 fifth or sixth time.  
 20 You can answer it again. 11:23  
 21 THE WITNESS: The Cocco study has  
 22 been evaluated by me. It's also been  
 23 listed in this table. This table shows  
 24 sample size. The Cocco study is  
 25 definitely the largest study we have in 11:23

Page 124

1 terms of sample size of cases, not  
 2 controls. The AHS has a lot more  
 3 controls. So in terms of case number,  
 4 it is the most -- it is the study with  
 5 the most cases. However, as I said a 11:23  
 6 few pages after on page 18, it is  
 7 limited because of low exposure  
 8 prevalence.  
 9 BY MR. LASKER:  
 10 Q. And just so I understand, the Cocco 11:23  
 11 study is the, I believe, least powerful  
 12 study in being able to answer the question  
 13 of whether glyphosate is causally associated  
 14 with non-Hodgkin's lymphoma; correct?  
 15 MS. FORGIE: Object to the form. 11:24  
 16 Asked and answered. This is number six.  
 17 You can answer it again.  
 18 THE WITNESS: The Cocco study has a  
 19 large sample size in terms of cases.  
 20 The AHS study has the largest sample 11:24  
 21 size in terms of controls. One is at  
 22 the top; the other is at the bottom. We  
 23 could turn it around if you'd like.  
 24 However, power, statistical power is  
 25 determined by a number of parameters. 11:24

Page 125

1 One of those is the number of cases.  
 2 The other is the number of controls.  
 3 Yet another is the prevalence of  
 4 exposure, and then power cannot be  
 5 distinguished on a playing field without 11:24  
 6 saying what effect size you actually  
 7 want to estimate. So once we have  
 8 agreed what the effect size is, then we  
 9 can talk about power.  
 10 BY MR. LASKER: 11:24  
 11 Q. It would not be appropriate for  
 12 somebody to look at this table on page 15  
 13 and conclude that the Cocco study was more  
 14 powerful than the De Roos study with respect  
 15 to assessing whether there is an association 11:25  
 16 between glyphosate and non-Hodgkin's  
 17 lymphoma; is that fair?  
 18 MS. FORGIE: Object to the form and  
 19 asked and answered.  
 20 THE WITNESS: Again, if we're 11:25  
 21 talking statistical power and not  
 22 validity of the study, which, you know,  
 23 is another criterion that I would put  
 24 actually much higher here, the Cocco  
 25 study has the most cases. The De Roos 11:25

Page 126	<p>1 study has the most controls. Both are</p> <p>2 powerful because of that part of the</p> <p>3 equation that goes into a power</p> <p>4 analysis. However, there are more</p> <p>5 parameters than the number of cases, the 11:25</p> <p>6 number of controls. One of them is</p> <p>7 exposure prevalence. I explain that</p> <p>8 when I talk about the Cocco study as not</p> <p>9 being able to tell us much because it</p> <p>10 has low exposure prevalence. On the 11:25</p> <p>11 other hand, De Roos has a very high</p> <p>12 exposure prevalence.</p> <p>13 BY MR. LASKER:</p> <p>14 Q. Dr. --</p> <p>15 MS. FORGIE: Wait. Let her finish. 11:26</p> <p>16 MR. LASKER: We're going to be here</p> <p>17 all day, and I'm going to have to mark</p> <p>18 this and go to the judge because I can't</p> <p>19 get a yes or no answer to any question I</p> <p>20 ask. I asked a very simple question, 11:26</p> <p>21 and she's going into a monologue. We're</p> <p>22 not going to have that happen here. So</p> <p>23 if the witness is not going to answer</p> <p>24 the questions, then we'll have to go to</p> <p>25 the court again to either get 11:26</p>	Page 128	<p>1 MR. LASKER: I will eventually if</p> <p>2 this keeps up. I'm going to mark them</p> <p>3 and we'll come back to the judge if we</p> <p>4 have to.</p> <p>5 BY MR. LASKER: 11:26</p> <p>6 Q. Table 15, the table you present on</p> <p>7 page 15 of your report. It would not be</p> <p>8 appropriate to look at this table alone to</p> <p>9 reach a conclusion as to the relative power</p> <p>10 of the listed studies to determine whether 11:27</p> <p>11 glyphosate is associated with non-Hodgkin's</p> <p>12 lymphoma; correct?</p> <p>13 MS. FORGIE: Object to the form.</p> <p>14 Asked and answered. This is like</p> <p>15 number 7. 11:27</p> <p>16 You can answer it again.</p> <p>17 THE WITNESS: This is a table that</p> <p>18 refers to sample size. Sample size is</p> <p>19 part of statistical power.</p> <p>20 BY MR. LASKER: 11:27</p> <p>21 Q. It would not be --</p> <p>22 A. So --</p> <p>23 MS. FORGIE: She is entitled to</p> <p>24 finish.</p> <p>25 THE WITNESS: It is appropriate to 11:27</p>
Page 127	<p>1 instruction for the witness to answer</p> <p>2 the questions or to provide us more</p> <p>3 time. I ask yes or no questions and I</p> <p>4 get a speech.</p> <p>5 MS. FORGIE: You know, first of 11:26</p> <p>6 all, part of the problem is you keep</p> <p>7 putting these long declaratory</p> <p>8 statements before everything. She is</p> <p>9 not required to give a yes or no answer.</p> <p>10 She has answered it very clearly -- 11:26</p> <p>11 MR. LASKER: You're not the</p> <p>12 witness.</p> <p>13 MS. FORGIE: Let me finish.</p> <p>14 MR. LASKER: You're not the</p> <p>15 witness. 11:26</p> <p>16 MS. FORGIE: Neither are you. So,</p> <p>17 you know what? If you want to call the</p> <p>18 judge, I think you should go ahead.</p> <p>19 MR. LASKER: Okay. Well, we're</p> <p>20 going to start marking these and at a 11:26</p> <p>21 certain point we'll go -- let me mark</p> <p>22 the last question and answer. I'm going</p> <p>23 to ask the question again.</p> <p>24 MS. FORGIE: Are you going to call</p> <p>25 the judge? 11:26</p>	Page 129	<p>1 show parts of statistical power, but, of</p> <p>2 course, I would not want to infer</p> <p>3 statistical power from just this table.</p> <p>4 But it is part of it.</p> <p>5 BY MR. LASKER: 11:27</p> <p>6 Q. And another way one could look at</p> <p>7 this would be to calculate the CLRs for each</p> <p>8 of these studies; correct?</p> <p>9 MS. FORGIE: Object to the form.</p> <p>10 BY MR. LASKER: 11:27</p> <p>11 Q. For the endpoint of Roundup and</p> <p>12 non-Hodgkin's lymphoma?</p> <p>13 A. CLRs is something that we calculate</p> <p>14 after we have the data and the parameter</p> <p>15 estimates. 11:28</p> <p>16 Q. Right. And we have the data and</p> <p>17 the parameter estimates for each of these</p> <p>18 studies; correct?</p> <p>19 A. Yeah, but that is not how we're</p> <p>20 calculating statistical power. Statistical 11:28</p> <p>21 power is something that we are calculating</p> <p>22 prior to conducting the study.</p> <p>23 Q. Understood. So now it's after the</p> <p>24 fact we have the data. We could actually</p> <p>25 calculate a CLR for each of these studies; 11:28</p>

Page 130	Page 132
<p>1 correct?</p> <p>2 A. If we can agree on which results to</p> <p>3 use and, yeah, we can do that.</p> <p>4 Q. Have you done that exercise?</p> <p>5 A. In my head. 11:28</p> <p>6 Q. With respect to -- let's move on.</p> <p>7 The interpretation of confidence intervals</p> <p>8 in observational studies requires the</p> <p>9 assumption of no bias; correct?</p> <p>10 MS. FORGIE: Object to the form. 11:28</p> <p>11 THE WITNESS: It is correct that</p> <p>12 confidence intervals and observational</p> <p>13 studies do not include -- are not</p> <p>14 estimates of bias.</p> <p>15 BY MR. LASKER: 11:29</p> <p>16 Q. So the interpretation of confidence</p> <p>17 interval and observational studies requires</p> <p>18 the assumption of no bias; correct?</p> <p>19 MS. FORGIE: Object to the form.</p> <p>20 Asked and answered. 11:29</p> <p>21 You can answer it again.</p> <p>22 THE WITNESS: We make assumptions</p> <p>23 when interpreting confidence intervals</p> <p>24 of observational studies, and one of the</p> <p>25 assumptions is no other biases, yes. 11:29</p>	<p>1 (Exhibit Number 19-5 was marked</p> <p>2 for identification.)</p> <p>3 BY MR. LASKER:</p> <p>4 Q. And, Dr. Ritz, I've handed you as</p> <p>5 Exhibit 19-5, I believe this is a slide deck 11:31</p> <p>6 that you used either last year or you're</p> <p>7 using currently with your epi 200 B</p> <p>8 students; correct?</p> <p>9 A. I don't know. I haven't reviewed</p> <p>10 it. It looks like it. 11:31</p> <p>11 Q. This is a document I'll represent</p> <p>12 that you produced in response to our --</p> <p>13 A. Oh, okay. Then it must be.</p> <p>14 MS. FORGIE: Did you add pages to</p> <p>15 it? 11:31</p> <p>16 MR. LASKER: She's updated.</p> <p>17 THE WITNESS: I learn.</p> <p>18 BY MR. LASKER:</p> <p>19 Q. So at page 61 in your slide deck,</p> <p>20 you talk about this issue of recall bias. I 11:31</p> <p>21 just want to make sure I understand the</p> <p>22 terminology. So as you explain --</p> <p>23 MS. FORGIE: Wait a minute. I</p> <p>24 don't see page 61.</p> <p>25 MR. LASKER: It's actually page 60, 11:31</p>
Page 131	Page 133
<p>1 BY MR. LASKER:</p> <p>2 Q. In other words, even if a study</p> <p>3 reports a positive association and reports a</p> <p>4 95 percent confidence interval that excludes</p> <p>5 1.0, that study cannot be interpreted as 11:29</p> <p>6 evidence of a causal association if there is</p> <p>7 bias in the study; correct?</p> <p>8 MS. FORGIE: Object to the form.</p> <p>9 THE WITNESS: It depends on the</p> <p>10 kind of bias, the size of bias. We are 11:29</p> <p>11 talking about bias as a category. We at</p> <p>12 UCLA try to teach bias in terms of</p> <p>13 quantitative and so the bias can be so</p> <p>14 minimal that it's not to be a concern.</p> <p>15 BY MR. LASKER: 11:30</p> <p>16 Q. One type of bias that you identify</p> <p>17 in your expert report is recall bias;</p> <p>18 correct?</p> <p>19 A. Yes.</p> <p>20 Q. And you also teach your students 11:30</p> <p>21 about recall bias, your epidemiology</p> <p>22 students; correct?</p> <p>23 A. Correct.</p> <p>24 Q. Let's get the 2017 slide deck on</p> <p>25 informational bias. 11:30</p>	<p>1 and then there's no page number on 61.</p> <p>2 MS. FORGIE: Right. I don't see</p> <p>3 the pages.</p> <p>4 MR. LASKER: It is the page after</p> <p>5 60 which I've called 61 in my simplistic 11:31</p> <p>6 way of counting.</p> <p>7 BY MR. LASKER:</p> <p>8 Q. So you see the slide that has</p> <p>9 recall bias listed at the top; correct?</p> <p>10 A. Correct. 11:32</p> <p>11 Q. And recall bias is a form of</p> <p>12 differential misclassification bias of</p> <p>13 particular concern in interview-based case</p> <p>14 control studies; correct?</p> <p>15 A. Correct. 11:32</p> <p>16 Q. And the issue with recall bias is</p> <p>17 that cases who are diseased may ruminate</p> <p>18 about prior exposures and report it more</p> <p>19 completely than controls; correct?</p> <p>20 MS. FORGIE: Object to the form. 11:32</p> <p>21 THE WITNESS: It says that that is</p> <p>22 one way how differential recall can</p> <p>23 occur.</p> <p>24 BY MR. LASKER:</p> <p>25 Q. And the other thing that you 11:32</p>

<p style="text-align: right;">Page 134</p> <p>1 mention and you teach your students is that  2 cases might exaggerate exposure while  3 subjects without the disease under  4 investigation. And I guess there's  5 something missing here. 11:32  6 A. Yeah. That's why this --  7 Q. Let me understand this correctly.  8 A. No, this is an appendix to the  9 class, so it's not edited.  10 Q. But I think the point -- and let me 11:33  11 make sure I'm correct -- the point that  12 without the typo you would be making here is  13 that cases might exaggerate exposure  14 compared to subjects without the disease  15 under investigation; correct? 11:33  16 A. Yes.  17 MS. FORGIE: Object to the form.  18 THE WITNESS: Well, that is one way  19 how differential recall bias can occur  20 and why I'm teaching it is to say that 11:33  21 when we do our fieldwork have to avoid  22 that this is going to happen.  23 BY MR. LASKER:  24 Q. And the other issue that you teach  25 your students is that in the case control 11:33</p>	<p style="text-align: right;">Page 136</p> <p>1 case would not want to report but the  2 wife then tells us, it's actually more  3 reliable. So it really depends on the  4 study.  5 BY MR. LASKER: 11:34  6 Q. I'll give you that one. I know  7 that you do this a lot in your work, but  8 with respect to pesticide exposures, as a  9 general matter, exposure data provided by  10 proxies would be considered less reliable 11:35  11 than exposure data provided by the cases or  12 controls themselves; correct?  13 MS. FORGIE: Object to the form.  14 THE WITNESS: Again, it depends on  15 the circumstances. For example, if the 11:35  16 proxy would be a co-worker, he might be  17 just as able to report the work  18 practices and the type of exposures. If  19 the proxy is a son of the farmer who  20 worked alongside the farmer, he would be 11:35  21 very well capable of responding. If it  22 is a wife who never goes out in the  23 fields and doesn't talk to her husband  24 at night at the table -- at the dinner  25 table about what he's been doing all 11:35</p>
<p style="text-align: right;">Page 135</p> <p>1 study, controls might not recall exposures  2 since they do not have an incentive to do  3 so; correct?  4 A. Correct. And, again, that is under  5 the premise that we are doing whatever we 11:33  6 can to have everybody recall in the same  7 way.  8 Q. A recall bias -- well, recall bias  9 can create another -- there can be another  10 issue with recall bias if a study relies 11:34  11 upon next of kin or proxy respondents to  12 provide exposure information; correct?  13 MS. FORGIE: Object to the form.  14 THE WITNESS: That's not -- we can  15 call it recall bias, but it is usually 11:34  16 being less informed about the exposure  17 so it's kind of information bias.  18 BY MR. LASKER:  19 Q. As a general matter, exposure data  20 provided by proxies is considered less 11:34  21 reliable than exposure information provided  22 by the actual cases and controls; correct?  23 MS. FORGIE: Object to the form.  24 THE WITNESS: That is relative.  25 For example, if it is an exposure that a 11:34</p>	<p style="text-align: right;">Page 137</p> <p>1 day, yes. But if it's a wife who  2 quizzes her husband on how did your day  3 go and what did you do and what are the  4 expenses about these kind of pesticides  5 that I'm seeing on the ledger here 11:35  6 because she does the books, she knows  7 very well.  8 BY MR. LASKER:  9 Q. That's why I didn't want to ask in  10 every case because obviously case-by-case 11:36  11 can be different. But as a general matter  12 overall, exposure data provided by proxies  13 is considered at least potentially less  14 reliable than exposure data provided by the  15 cases and controls themselves; correct? 11:36  16 MS. FORGIE: Object to the form and  17 asked and answered.  18 You can answer it again.  19 THE WITNESS: Again, it depends.  20 It depends on who the proxy is, how 11:36  21 close the proxy is to the individual,  22 how much they communicate, how much they  23 work together, and whether it is  24 actually a proxy who counts while the  25 individual doesn't count, meaning, well, 11:36</p>

Page 138	Page 140
<p>1 we paid so much for all of these 2 pesticides in the last year and the 3 husband doesn't care. He just uses 4 what's there. So sometimes we find in 5 our studies of elderly especially that 11:36 6 the wives are much more reliable 7 sources. So you can't really say that 8 it's always the proxy that misreports. 9 BY MR. LASKER: 10 Q. And I understand that. I'm not 11:36 11 trying to nail you down on every instance. 12 MS. FORGIE: There's no question. 13 BY MR. LASKER: 14 Q. But let me -- one of the things 15 you've done, and I've seen this in some of 11:37 16 your publications is you can conduct a 17 sensitivity analysis to determine whether or 18 not the inclusion of proxy data affects the 19 results of the study; correct? 20 A. Correct. 11:37 21 Q. And one of the things you're 22 concerned about when you do that analysis is 23 a possibility that the use of a proxy may 24 have introduced some misclassification bias 25 into a study; correct? 11:37</p>	<p>1 in observational studies is selection bias; 2 correct? 3 A. Correct. 4 Q. And case control studies are 5 vulnerable to selection bias and their 11:39 6 validity to a large degree hinges on the 7 choice of proper controls; correct? 8 MS. FORGIE: Object to the form. 9 THE WITNESS: It is correct that 10 at -- that there is selection bias in 11:39 11 case control studies. There is also 12 selection bias in cohort studies. 13 However, case control studies are 14 usually evaluated more critical in terms 15 of selection bias because we try to 11:39 16 avoid it as much as we can. 17 BY MR. LASKER: 18 Q. And, in fact, in your own 19 publications, you've talked about the fact 20 that this problem of selection bias can be 11:39 21 circumvented in the cohort study; correct? 22 MS. FORGIE: Object to the form. 23 THE WITNESS: It's a different kind 24 of selection bias in a cohort study as 25 well as in a case control study. A 11:39</p>
Page 139	Page 141
<p>1 MS. FORGIE: Object to the form. 2 THE WITNESS: The use of proxies 3 versus the individual themselves may or 4 may not result in information bias, and 5 it may or may not result in differential 11:37 6 information bias. So if we are using 7 proxies in cases and controls, then 8 whatever they misreport for cases and 9 controls might be at the same level, and 10 that would be a non-differential 11:38 11 misclassification. 12 BY MR. LASKER: 13 Q. And when you do your sensitivity 14 analysis, you're looking to see whether 15 there's a differential or non-differential 11:38 16 including the proxy data; correct? 17 MS. FORGIE: Object to the form. 18 THE WITNESS: Not exactly. If I 19 want to establish the validity of a 20 proxy, I would actually need a gold 11:38 21 standard like a record, then interview 22 the case, interview the proxy, and then 23 compare both to the gold standard. 24 BY MR. LASKER: 25 Q. Another type of bias that can arise 11:38</p>	<p>1 cohort study does not have the kind of 2 selection bias that a case control study 3 has. But it has another type of 4 selection bias that a case control study 5 doesn't have. 11:40 6 BY MR. LASKER: 7 Q. And what is that? 8 A. That's loss to follow-up, 9 differential loss to follow-up. 10 Q. With respect to loss to follow-up 11:40 11 for disease outcome, that is not, as I 12 understand it, correct me if I'm wrong, an 13 issue with the Agricultural Health Study; 14 correct? 15 MS. FORGIE: Object to the form. 11:40 16 THE WITNESS: Not necessarily. The 17 Agricultural Health Study may have 18 selection bias depending on whether or 19 not there's differential loss to 20 follow-up with respect to the exposed 11:40 21 and the unexposed. 22 BY MR. LASKER: 23 Q. Okay. 24 A. So it would depend on what the 25 outcome it is we are talking about. 11:40</p>

Page 142

1 Q. The other issue you mention in your  
 2 expert report is confounding. A confounder  
 3 is an exposure that is associated both with  
 4 the exposure of interest and the outcome of  
 5 interest; correct? 11:41  
 6 MS. FORGIE: Object to the form.  
 7 THE WITNESS: That is one part of  
 8 how we define a confounder.  
 9 BY MR. LASKER:  
 10 Q. So, for example, there was a study 11:41  
 11 a few years back now that reported a  
 12 positive association between coffee and  
 13 pancreatic cancer? It's somewhat of a  
 14 well-known --  
 15 A. Favorite example. 11:41  
 16 Q. And when the investigators looked  
 17 more closely at that data, they discovered  
 18 that the reported positive association was  
 19 actually due to the fact that, if I have  
 20 this correctly, coffee drinkers were more 11:41  
 21 likely to be smokers and the smoking  
 22 increased the risk of pancreatic cancer? Do  
 23 I have that right, or do I have it  
 24 backwards?  
 25 MS. FORGIE: Object to the form. 11:41

Page 143

1 THE WITNESS: That was part of the  
 2 argument, however, that's not how we are  
 3 defining confounding. Confounding is an  
 4 independent risk factor for the outcome  
 5 that also has an association with the 11:41  
 6 exposure and is not an intermediate in  
 7 the pathway to disease.  
 8 MS. FORGIE: When you get to a good  
 9 breaking point.  
 10 MR. LASKER: Okay. Let's get 11:41  
 11 through this.  
 12 MS. FORGIE: Thanks.  
 13 BY MR. LASKER:  
 14 Q. With respect to coffee drinkers and  
 15 pancreatic cancer, smoking was a confounder; 11:42  
 16 is that correct?  
 17 A. Assuming that smoking really causes  
 18 pancreatic cancer which I'm not completely  
 19 sure it's true, but I'm not a pancreatic  
 20 cancer researcher, and depending on what 11:42  
 21 population we're talking about, for example,  
 22 there are populations where you have a lot  
 23 of coffee drinking but no smoking, and there  
 24 are populations where you have a lot of  
 25 smoking and no coffee drinking, meaning the 11:42

Page 144

1 two are independent.  
 2 Assuming that we are in a  
 3 population where the two are actually  
 4 dependent and we know that, that coffee  
 5 drinkers smoke more or vice versa, then that 11:42  
 6 could be defined as a confounder. However,  
 7 in a cohort study, you can actually assess  
 8 that.  
 9 Q. In your studies, your epidemiologic  
 10 studies, you will try to address the 11:42  
 11 possibility of confounding; correct?  
 12 A. Definitely.  
 13 MR. LASKER: Why don't we take a  
 14 break now.  
 15 MS. FORGIE: Great. Thank you. 11:43  
 16 THE VIDEOGRAPHER: We are off the  
 17 record at 11:43 a.m.  
 18 (Recess taken from 11:43 a.m.  
 19 to 11:55 a.m.)  
 20 THE VIDEOGRAPHER: We are back on 11:55  
 21 the record at 11:55 a.m.  
 22 BY MR. LASKER:  
 23 Q. Back on the record.  
 24 Dr. Ritz, we were talking about  
 25 confounding, and I think one of the points 11:55

Page 145

1 you made in your report, I think elsewhere,  
 2 is in analyzing or conducting a study, you'd  
 3 want to identify as best you can other risk  
 4 factors for disease that you're studying to  
 5 be able to see whether or not those are 11:56  
 6 confounders; correct?  
 7 A. It is correct that you're always  
 8 very worried about confounding no matter  
 9 what and that you're identifying strong risk  
 10 factors for the disease that also is 11:56  
 11 associated with exposure.  
 12 In the second step, you have to see  
 13 whether there are possibly intermediates in  
 14 the pathway and/or proxies for the exposure,  
 15 and that's a very important assessment. 11:56  
 16 Q. And that can be even more difficult  
 17 in a situation where you have a disease that  
 18 has unknown causes; correct?  
 19 MS. FORGIE: Object to the form.  
 20 THE WITNESS: It's actually not 11:56  
 21 more or less difficult. A disease that  
 22 has known causes such as lung cancer, we  
 23 know that we have to control for  
 24 smoking, and we may or may not have that  
 25 data. So that's a very difficult study 11:56

Page 146	Page 148
<p>1 to do if we don't have smoking data. 2 So difficult in a sense, if I don't 3 have a strong risk factor, then it also 4 cannot be a strong confounder. So I'm 5 actually a little bit out of the woods 11:57 6 when there's no risk factor because I 7 can assume that if there was a really 8 strong risk factor, I would know about 9 it. 10 So if there was a really strong 11:57 11 confounder, I probably would know about 12 it. 13 BY MR. LASKER: 14 Q. You read the deposition of 15 Dr. Blair in this case? 11:57 16 A. Yes. 17 Q. Dr. Blair has been studying 18 agricultural exposures and cancer going back 19 probably 40-some-odd years; right? 20 MS. FORGIE: Object to the form. 11:57 21 THE WITNESS: I'm not sure, but I 22 know that he's been publishing in the 23 '80s on industrial workers, that he's 24 worked at the NCI and that he was 25 generally also interested in 11:57</p>	<p>1 (Exhibit Number 19-6 was marked 2 for identification.) 3 BY MR. LASKER: 4 Q. On page 80 -- 5 A. Is it the page numbers down here? 11:59 6 Q. Yeah, the actual -- 7 A. Yeah, okay. 8 Q. I'm sorry. Page 90. I don't know 9 if you can see the highlighting. And at 10 pages 90, we're talking with Dr. Blair about 11:59 11 this issue of an increased or an association 12 between farming and non-Hodgkin's lymphoma 13 dating back to the 1960s. 14 Do you see that? 15 A. Yes. 11:59 16 Q. And do you agree with Dr. Blair 17 that there was this epidemiological 18 literature pointing to an association 19 between farming and non-Hodgkin's lymphoma 20 dating back to before glyphosate was on the 11:59 21 market? 22 A. Well, he seems to be saying that. 23 I know those very old studies are very, very 24 broad; so they would ask somebody have you 25 ever farmed, and, you know, find an 12:00</p>
<p>1 agricultural work, and he's a coauthor 2 of some of these early papers. 3 BY MR. LASKER: 4 Q. Do you agree with Dr. Blair that 5 there was an association that was found 11:58 6 between farming -- farmers and non-Hodgkin's 7 lymphoma that existed prior to the time that 8 glyphosate was on the market? 9 MS. FORGIE: Object to the form. 10 THE WITNESS: Did he say that 11:58 11 anywhere in the document? 12 BY MR. LASKER: 13 Q. Yeah. If you want, I can show it 14 to you if you want. 15 A. Yeah, yeah, please. 11:58 16 MR. LASKER: We are not going to 17 mark it as an exhibit. It's a 18 transcript. 19 MS. FORGIE: I think we should mark 20 it. 11:58 21 MR. LASKER: You want to mark it? 22 MS. FORGIE: Yeah. 23 MR. LASKER: Where are we then? 24 THE REPORTER: 6. 25 ///</p>	<p>1 association but, yeah, at the level of that 2 broad types of exposure, it might be the 3 case. 4 Q. Okay. So with respect to farmers 5 and non-Hodgkin's lymphoma, there is at 12:00 6 least something going on that would not be 7 related to glyphosate exposure; correct? 8 MS. FORGIE: Object to the form. 9 Asked and answered. 10 You can answer it again. 12:00 11 THE WITNESS: I agree that there is 12 a difficulty in assessing exposures that 13 vary over time. So when have we started 14 in agriculture using chemicals? After 15 World War II. Before that, they used 12:00 16 arsenicals, et cetera; right? But 17 really manmade chemicals for pest 18 control were introduced during World War 19 II and after World War II and took off 20 in the U.S. in the 1950s. So general 12:01 21 exposure to agricultural chemicals dates 22 back to the 1950s. 23 Among those chemicals may have been 24 carcinogens. We know that there were 25 waves of chemicals that were being used. 12:01</p>

Page 150	<p>1 We started with organic chlorines until</p> <p>2 we decided that that was a bad idea</p> <p>3 because they bioaccumulate. And then</p> <p>4 the organic phosphates got their trial</p> <p>5 run almost parallel. They were quite 12:01</p> <p>6 acutely toxic; so there were some</p> <p>7 restrictions on those, and the</p> <p>8 herbicides, the early ones were 2,4-D.</p> <p>9 2,4-D is, for example, a 2B IARC</p> <p>10 possible human carcinogen. So 12:01</p> <p>11 definitely farmers have been exposed to</p> <p>12 carcinogens at least since World War II.</p> <p>13 BY MR. LASKER:</p> <p>14 Q. And you also mentioned earlier that</p> <p>15 diesel fuel might be associated with 12:01</p> <p>16 non-Hodgkin's lymphoma in farmers; correct?</p> <p>17 A. Yes, that has been shown in the</p> <p>18 AHS. I mean, one study does not make a</p> <p>19 summer -- one swallow. So we would never</p> <p>20 just rely on one study, but there's reason 12:02</p> <p>21 to think that certain hematopoietic cancers,</p> <p>22 possibly also some cancer subtypes of NHL</p> <p>23 might be related to what is in diesel.</p> <p>24 Q. And various types of animal</p> <p>25 husbandry like chicken farming or certain 12:02</p>	Page 152	<p>1 Q. In your expert report at page 16 --</p> <p>2 and this is -- if you have your expert</p> <p>3 report in front of you, on page 16. In the</p> <p>4 last paragraph which starts "The IARC</p> <p>5 working group's monograph on glyphosate." 12:03</p> <p>6 Do you see that?</p> <p>7 A. Yeah.</p> <p>8 Q. You state in the second sentence</p> <p>9 "The most highly adjusted estimates, also</p> <p>10 known as fully adjusted models, are the 12:03</p> <p>11 estimates that adjust for as many</p> <p>12 confounding variables as possible such as</p> <p>13 adjusting for age, sex, race, and also</p> <p>14 sometimes other pesticide exposures";</p> <p>15 correct? 12:03</p> <p>16 A. Yes.</p> <p>17 Q. And then you state that "This is</p> <p>18 relevant because these fully adjusted models</p> <p>19 give the reader confidence that the findings</p> <p>20 are most likely due to glyphosate Roundup 12:04</p> <p>21 exposure instead of other potential causes</p> <p>22 that act as a confounder"; correct?</p> <p>23 A. Correct.</p> <p>24 Q. And on page 14 of your report, you</p> <p>25 present what's called a forest plot of the 12:04</p>
Page 151	<p>1 types of farming have been, at least in the</p> <p>2 AHS, associated with non-Hodgkin's lymphoma;</p> <p>3 correct?</p> <p>4 MS. FORGIE: Object to the form.</p> <p>5 THE WITNESS: There could be risk 12:02</p> <p>6 factors for Hodgkin's lymphoma, but it</p> <p>7 has to be reevaluated.</p> <p>8 BY MR. LASKER:</p> <p>9 Q. For non-Hodgkin's?</p> <p>10 A. For non-Hodgkin's lymphoma. 12:02</p> <p>11 However, that doesn't make them a</p> <p>12 confounder. We now have to also consider</p> <p>13 whether or not they're related to the</p> <p>14 exposures.</p> <p>15 MS. FORGIE: Wait, let her finish. 12:02</p> <p>16 MR. LASKER: Understood.</p> <p>17 BY MR. LASKER:</p> <p>18 Q. So an epidemiologic study, and I</p> <p>19 think your studies are like this as well,</p> <p>20 will often report different odds ratios with 12:02</p> <p>21 different levels of adjustment to account</p> <p>22 for potential confounding; correct?</p> <p>23 A. We would try different levels of</p> <p>24 adjustment for multiple reasons, but the</p> <p>25 main reason would be to assess confounding. 12:03</p>	Page 153	<p>1 various odds ratios or rate ratios in some</p> <p>2 of the epidemiological studies for</p> <p>3 glyphosate; correct?</p> <p>4 A. You can call it a forest plot. I</p> <p>5 would just call it a visual representation 12:04</p> <p>6 of results from different studies.</p> <p>7 Q. In your visual depiction of the</p> <p>8 results from different studies, you do not</p> <p>9 provide or list the most highly adjusted</p> <p>10 odds ratios or risk ratios from the studies; 12:04</p> <p>11 correct?</p> <p>12 A. Not correct. De Roos 2003 is a</p> <p>13 very highly adjusted for 43 different</p> <p>14 pesticides.</p> <p>15 Q. The most highly adjusted estimate 12:05</p> <p>16 in the De Roos 2003 paper had a report odds</p> <p>17 ratio of 1.6.</p> <p>18 A. No.</p> <p>19 MS. FORGIE: Object to the form.</p> <p>20 THE WITNESS: Would you show me 12:05</p> <p>21 that?</p> <p>22 MS. FORGIE: I don't think there's</p> <p>23 a question.</p> <p>24 THE WITNESS: Yeah, is there a</p> <p>25 question. 12:05</p>



<p style="text-align: right;">Page 154</p> <p>1 BY MR. LASKER: 2 Q. There is a question. There are 3 two -- actually, three odds ratios in the De 4 Roos 2003 study. 5 A. Yes. 12:05 6 Q. You have reported one of those odds 7 ratios and not the other odds ratio; 8 correct? 9 A. It's the odds ratio from the 10 logistic regression. 12:05 11 Q. We'll come back, and we'll circle 12 back to that later when we talk about De 13 Roos 2003, but with respect to the other 14 studies in this paper, for example, in the 15 Eriksson study, you do not provide the most 12:06 16 highly adjusted odds ratio from the Eriksson 17 study in your chart on page 14; correct? 18 MS. FORGIE: Object to the form. 19 THE WITNESS: I would need to see 20 the Eriksson paper because there was a 12:06 21 multi-varied adjusted odds ratio, and I 22 imagine that we looked at that at some 23 point. 24 BY MR. LASKER: 25 Q. Okay. Well, let's pull out the 12:06</p>	<p style="text-align: right;">Page 156</p> <p>1 Q. And if we look at the Hardell study 2 for 1999 -- you have Hardell 2003 listed for 3 hairy cell leukemia. I'm looking at the 4 bottom of your table here. 5 Do you see that? 12:09 6 A. Yes. 7 MR. LASKER: Let's mark Hardell 8 2002. 9 (Exhibit Number 19-8 was marked 10 for identification.) 12:09 11 MS. FORGIE: Are we done with 12 Eriksson? 13 MR. LASKER: For now. We'll go 14 back to it. 15 BY MR. LASKER: 12:09 16 Q. In your visual depiction for 17 Hardell, you're depicting an odds ratio of 18 slightly above 3. That is listed as 19 statistically significant; correct? 20 MS. FORGIE: Object to the form. 12:09 21 BY MR. LASKER: 22 Q. At least as it's depicted on your 23 page 14? 24 MS. FORGIE: Object to the form. 25 THE WITNESS: It has a wide 12:09</p>
<p style="text-align: right;">Page 155</p> <p>1 Eriksson study right now. 2 MS. FORGIE: Are we done with these 3 guys? 4 MR. LASKER: Yeah, for now. 5 So the Eriksson is -- we'll mark it 12:06 6 as -- 7 MS. SHIMADO: 7. 8 (Exhibit Number 19-7 was marked 9 for identification.) 10 BY MR. LASKER: 12:07 11 Q. I think you're talking about the 12 multi-variate analysis that's on page 1661 13 Table 7; correct? 14 A. Yes. 15 Q. And the multi-variate odds ratio 12:07 16 for glyphosate in the Eriksson study is an 17 odds ratio of 1.51 with a confidence 18 interval of 0.77 to 2.94; correct? 19 MS. FORGIE: Object to the form. 20 THE WITNESS: Correct. 12:07 21 BY MR. LASKER: 22 Q. That is not the odds ratio that you 23 present in your visual depiction on page 14 24 of your expert report; correct? 25 A. That is not. 12:07</p>	<p style="text-align: right;">Page 157</p> <p>1 confidence interval and about 3 from 2 what I see, yes. 3 BY MR. LASKER: 4 Q. And if you look at Exhibit 19-8 and 5 you look at page 1047, which is Table 7, 12:09 6 again, the most adjusted odds ratio in that 7 study is 1.85 with an odds ratio of 0.55 to 8 6.2; correct? 9 A. That's what they call them, 10 multi-variate model. 12:10 11 Q. So again for Hardell, you do not 12 present the most fully adjusted odds ratio 13 according to that study; correct? 14 MS. FORGIE: Object to the form. 15 THE WITNESS: For good reasons. 12:10 16 BY MR. LASKER: 17 Q. I'm just asking the question in 18 your Table 14 -- 19 A. Yes. 20 Q. -- for Hardell, you do not present 12:10 21 the most adjusted -- highly adjusted odds 22 ratio reported by the authors of the study; 23 right? 24 MS. FORGIE: Object to the form. 25 Asked and answered. 12:10</p>

Page 158

1 You can answer it again.  
 2 THE WITNESS: So I'm presenting the  
 3 odds ratio that I believe has the most  
 4 validity given what they presented in  
 5 their paper. 12:10  
 6 BY MR. LASKER:  
 7 Q. And for the NAPP -- and we'll get  
 8 to that in a second -- you also have elected  
 9 in your visual depiction of the study  
 10 results to report an odds ratio that was not 12:11  
 11 adjusted for three pesticides that the NAPP  
 12 investigators adjusted for in their study;  
 13 correct?  
 14 MS. FORGIE: Object to the form.  
 15 THE WITNESS: Again, what I strive 12:11  
 16 to do is present odds ratios on  
 17 confidence interval for what I believe  
 18 the most valid model is because we're  
 19 now talking about evaluating the data  
 20 overall. That does not necessarily mean 12:11  
 21 the most fully adjusted model.  
 22 BY MR. LASKER:  
 23 Q. Just so I understand this, although  
 24 you state in your expert report that the  
 25 most highly adjusted estimates reported in 12:11

Page 159

1 these studies -- just so we're clear, the --  
 2 your comment with respect to the most highly  
 3 adjusted estimates is specific to the  
 4 meta-analysis that were conducted of the  
 5 glyphosate studies; correct? 12:12  
 6 MS. FORGIE: Object to the form.  
 7 THE WITNESS: It refers to what  
 8 others considered as their criteria for  
 9 pulling estimates, not mine, yes.  
 10 BY MR. LASKER: 12:12  
 11 Q. And you were stating in here that  
 12 IARC's adjustment or their analysis -- their  
 13 meta-analysis using these most highly  
 14 adjusted estimates from the studies was  
 15 appropriate because it gave the reader 12:12  
 16 confidence that the findings are most likely  
 17 due to glyphosate Roundup exposure instead  
 18 of another potential cause that acts as a  
 19 confounder; correct?  
 20 A. I'm making no statements about 12:12  
 21 appropriateness of these estimates. What  
 22 I'm saying here is that they did something  
 23 we call conservative, which is throw the  
 24 kitchen sink into a model and see what falls  
 25 out on the other end. 12:12

Page 160

1 That is not what I consider the  
 2 most valid approach.  
 3 Q. Okay. The visual depiction that  
 4 you have of the studies on page 14, you did  
 5 not -- I mentioned it as a forest plot. You 12:13  
 6 weren't --  
 7 A. Happy with it.  
 8 Q. -- happy with that terminology.  
 9 Forest plots, if I understand  
 10 correctly, are usually depicted on a 12:13  
 11 logarithmic scale; correct?  
 12 A. Uh-huh.  
 13 Q. And the issue with a logarithmic  
 14 scale, so, for example, in your visual  
 15 depiction of the Orsi study -- and we can 12:13  
 16 look at the actual odds ratios if you want  
 17 in that study -- but that was a study that  
 18 had an odds ratio of 1.0 and a lower  
 19 confidence interval was about 0.5 and the  
 20 upper confidence interval was about 2.0. 12:13  
 21 If you presented that in a forest  
 22 plot, your line would be about equal  
 23 distance on both sides of --  
 24 A. There --  
 25 Q. -- one; correct? 12:14

Page 161

1 MS. FORGIE: Wait. Object to the  
 2 form.  
 3 THE WITNESS: There are different  
 4 ways of depicting results visually, and  
 5 in a forest plot, you are trying to show 12:14  
 6 confidence intervals that are  
 7 symmetrical, and you can only do that  
 8 when you use a logarithmic scale.  
 9 BY MR. LASKER:  
 10 Q. And by using the depiction that you 12:14  
 11 use, which is not a logarithmic scale, the  
 12 visual effect of that is that the confidence  
 13 intervals will go further out to the right  
 14 or will appear in this depiction to go  
 15 further out to the right than if you were 12:14  
 16 presenting a forest plot on a logarithmic  
 17 scale; correct?  
 18 MS. FORGIE: Object to the form.  
 19 THE WITNESS: That is only the case  
 20 when you go below 1. As long as you're 12:14  
 21 above 1, they are actually symmetric,  
 22 and you can see that down here Eriksson  
 23 2008.  
 24 BY MR. LASKER:  
 25 Q. Right. 12:14

Page 162

1 But with the -- and we have in  
 2 this -- in your visual depiction, numerous  
 3 lines that go below 1 and above 1. When you  
 4 present it the way that you have in a normal  
 5 scale as opposed to the way you do it on a 12:15  
 6 forest plot with a logarithmic scale, that  
 7 has the effect of making those lines extend  
 8 out further or appear further out to the  
 9 right than to the left; correct?  
 10 MS. FORGIE: Object to the form and 12:15  
 11 asked and answered.  
 12 You can answer it again.  
 13 THE WITNESS: This is not a forest  
 14 plot. This is just a visualization.  
 15 I'm giving point estimates and 12:15  
 16 confidence intervals, and the reason for  
 17 doing this is to have an easy reminder  
 18 myself, as well as the reader, what the  
 19 point estimates and the confidence  
 20 interval widths is. 12:15  
 21 It was not to say whether or not it  
 22 is going more or less beyond the null  
 23 value, but it clearly indicates when it  
 24 goes below the null value.  
 25 ///

Page 163

1 BY MR. LASKER:  
 2 Q. With respect to confounding -- and  
 3 this is going to be a general question, I  
 4 think, but epidemiologists use different  
 5 methods to control for potential 12:16  
 6 confounding; correct?  
 7 A. Yes.  
 8 Q. So epidemiologists can control for  
 9 confounders through model fitting techniques  
 10 like a regression analysis; correct? 12:16  
 11 A. That is one way.  
 12 Q. And epidemiologists can also  
 13 control for confounding by conducting a  
 14 stratified analysis; correct?  
 15 MS. FORGIE: Object to the form. 12:16  
 16 THE WITNESS: That is one other way  
 17 of looking at control for confounding.  
 18 BY MR. LASKER:  
 19 Q. So in a stratified analysis, an  
 20 epidemiologist will calculate an odds ratio 12:16  
 21 for subjects with concurrent exposures to  
 22 two potential risk factors, and then they'll  
 23 separately calculate the odds ratios for the  
 24 subjects having only one of those exposures;  
 25 correct? 12:16

Page 164

1 A. Not necessarily. You can subgroup,  
 2 but in the end, you want a summary effect  
 3 estimate that you weigh by the strata. So  
 4 you're standardizing your estimate according  
 5 to the weights of the strata in which these 12:17  
 6 individuals fall.  
 7 Q. So in your stratification, for  
 8 example, you would have if there is current  
 9 exposures or potential for current  
 10 exposures, you would have one strata that is 12:17  
 11 exposed only to one of those risk factors,  
 12 one strata that's exposed to both of those  
 13 risk factors, and one strata that's exposed  
 14 to the other risk factor; correct?  
 15 MS. FORGIE: Object to the form. 12:17  
 16 THE WITNESS: If you're lucky, you  
 17 have people in all of those strata, but  
 18 you have to define the strata, and  
 19 that's one reason why we use that tool  
 20 not necessarily when we have better data 12:17  
 21 that's not categorical because,  
 22 otherwise, within those strata, still  
 23 have confounding because of  
 24 categorization.  
 25 So we're trying to use 12:17

Page 165

1 multi-variate models rather than  
 2 stratification.  
 3 BY MR. LASKER:  
 4 Q. Just so we can agree what -- how  
 5 this works, let's turn back to 19-4 which is 12:18  
 6 your 2010 slide deck.  
 7 MS. FORGIE: Wait. Let me get it.  
 8 Okay.  
 9 THE WITNESS: Page?  
 10 BY MR. LASKER: 12:18  
 11 Q. 98. And as you teach your students  
 12 then, a stratified analysis is a method for  
 13 controlling for confounders. "We estimate  
 14 the exposure disease association within  
 15 categories or strata of the confounders as 12:19  
 16 in the examples given previously or and  
 17 derive a summary estimate of this  
 18 association across the strata which often  
 19 assumes that the association does not vary  
 20 across strata." Correct? 12:19  
 21 A. Correct. That's exactly what I  
 22 just tried to explain.  
 23 Q. In your rebuttal expert report, you  
 24 state that "Controlling for confounding by  
 25 other pesticides in the glyphosate NHL 12:19

Page 166	<p>1 studies could make it harder to identify an 2 association between glyphosate and NHL." 3 Do you recall that? 4 MS. FORGIE: Object to the form. 5 THE WITNESS: Where do I say that? 12:19 6 MS. FORGIE: Are we done with 4? 7 MR. LASKER: For now, yeah. Where 8 are we now? 9 MS. SHIMADO: 9. 10 (Exhibit Number 19-9 was marked 12:20 11 for identification.) 12 BY MR. LASKER: 13 Q. So pages of 6 and 7, I think and 14 maybe I'm misunderstanding, but I thought 15 what you were stating in pages 6 and 7 of 12:20 16 your report is that controlling in the 17 glyphosate NHL studies controlling for 18 confounding by other pesticides can make it 19 harder to identify an association between 20 glyphosate and NHL; correct? 12:20 21 MS. FORGIE: Object to the form. 22 THE WITNESS: Well, it depends on 23 what we mean by "make it harder." So 24 what I am trying to say here, what I do 25 remember -- I'm not reading it right 12:20</p>	Page 168	<p>1 page 7 where you're talking about this issue 2 of smoking, lung cancer and whether or not 3 radon exposure adds to the background 4 instance of lung cancer. So I think we're 5 talking past each other. 12:22 6 A. Yeah. 7 MS. FORGIE: There's no question. 8 BY MR. LASKER: 9 Q. We agree in any event. 10 MS. FORGIE: No, I don't agree that 12:22 11 we agree. All this smoking stuff is 12 just putting me right off smoking. 13 BY MR. LASKER: 14 Q. My question actually goes to the 15 point I think you're trying to make on 12:22 16 page 7, and maybe I'm misunderstanding it. 17 But in your example on page 7, you 18 discuss the possibility of another 19 confounder, in this case, I think it's 20 radon, making it more difficult to identify 12:22 21 an association between an exposure and 22 outcome; correct? 23 MS. FORGIE: Object to the form. 24 THE WITNESS: This is really funny 25 in a way because that's exactly what I'm 12:22</p>
Page 167	<p>1 now -- is that I was trying to identify 2 confounders which is a different 3 concept. 4 It's the underlying scientific 5 concept behind control for confounding. 12:21 6 Confounding is something I can assess in 7 data. Confounder is a scientific 8 concept that I need to presume, and 9 that's what we're doing with directed 10 basic little graphs. You saw a lot of 12:21 11 them in my slides. 12 And so what that means is we have 13 to convince ourselves that a variable is 14 a confounder, meaning, there's an 15 underlying true association between that 12:21 16 variable and the outcome as well as that 17 variable and the exposure of interest 18 and that that variable is not just a 19 proxy measure of the exposure that I'm 20 actually trying to evaluate. 12:21 21 And any kind of proxy measure of 22 the exposure should not be treated as a 23 confounder. 24 BY MR. LASKER: 25 Q. I think I was actually looking at 12:22</p>	Page 169	<p>1 trying to teach my students that they 2 should not confuse confounders and 3 effect modifiers. In this case, it's an 4 effect modification and not a 5 confounding. That said, the same factor 12:23 6 can be an effect modifier and a 7 confounder and/or a proxy. That's why 8 I'm saying confounding is something we 9 do mathematically. We have the data. 10 We throw something in; we take something 12:23 11 out. But confounder is at the 12 conceptual level. I need to decide is 13 this a confounder? Yes or no? We have 14 our rules for that. Is that a proxy for 15 an exposure and not a confounder, or is 12:23 16 it acting as an effect measure modifier, 17 and in this case, that was an effect 18 measure modification. 19 BY MR. LASKER: 20 Q. So if I understand correctly, 12:23 21 effect measure modifier in this case is 22 radon? 23 A. Uh-huh. 24 MS. FORGIE: Object to the form. 25 BY MR. LASKER: 12:23</p>

Page 170	Page 172
<p>1 Q. You have to say yes or no, 2 obviously, for the court reporter. 3 A. Oh, I think that's how I build it. 4 It could be either smoking or radon that 5 I -- but I think it was radon that I called 12:24 6 it the effect measure modifier. I'm not 7 saying it, but I think that's correct. 8 Q. And the reason that in this example 9 radon was an effect measure modifier that 10 could impact the ability to conduct the 12:24 11 analysis of smoking and lung cancer was 12 because in your analysis the radon could 13 result in ten extra cases of lung cancer per 14 100,000 miners; correct? 15 A. Yes. 12:24 16 Q. And it's the size of that 17 association, if you will, that will 18 determine the extent to which this effect 19 modification could be -- could introduce a 20 problem in conducting your epidemiological 12:25 21 analysis; correct? 22 MS. FORGIE: Object to the form. 23 THE WITNESS: It is insofar a 24 problem as effect measure modification 25 comes into play when you're comparing 12:25</p>	<p>1 odds ratio that would be reported for 2 smoking and lung cancer; correct? 3 MS. FORGIE: Object to the form. 4 THE WITNESS: Fairly minimal is 5 relative, but the number would be 12:26 6 smaller. 7 BY MR. LASKER: 8 Q. Okay. And in -- and I think you 9 can probably calculate it. It would 10 probably be -- we'd be looking at -- 12:26 11 A. 5.05. 12 MS. FORGIE: There's no question. 13 BY MR. LASKER: 14 Q. Instead of -- the 20 out of four, 15 you'd be looking at 31 out of 5 over 5; 12:27 16 correct? In that scenario? Or I'm sorry. 17 MS. FORGIE: No, object to the 18 form. 19 THE WITNESS: 31 over -- 20 MR. WISNER: 21 over? 12:27 21 MR. LASKER: I think that's right. 22 MS. FORGIE: What's the question? 23 BY MR. LASKER: 24 Q. Instead of 21 over 4 it would be 31 25 over 5? 12:27</p>
Page 171	Page 173
<p>1 across populations. So you could in one 2 population estimate a relative risk of 2 3 and another relative risk of 5, and we 4 both would probably agree those are very 5 different numbers. In one population 12:25 6 you have an effect modifier present; in 7 another you don't. So it is not that 8 the association was the agent of 9 interest is really different but that 10 the comparison you're making are 12:25 11 comparisons to a population at a 12 different risk, baseline risk. And the 13 extent to which the effect modifier 14 could influence the odds ratio that -- 15 of interest in a study will depend on 12:26 16 how powerful an effect modification you 17 have; correct. 18 MS. FORGIE: Object to the form. 19 BY MR. LASKER: 20 Q. In other words, let me just reword 12:26 21 this. Maybe this would be easier. If the 22 radon exposure added one extra case of lung 23 cancer for 100,000 miners instead of ten 24 extra cases of lung cancer for 100,000, that 25 would have a fairly minimal impact on the 12:26</p>	<p>1 MS. FORGIE: Object to the form. 2 THE WITNESS: Well, 20 over 4 is 3 ignoring radon. 4 BY MR. LASKER: 5 Q. Right. 12:27 6 A. So that's the fivefold increased 7 risk due to smoking. So now if radon 8 affects non smokers and smokers in the same 9 way, then we would be adding one case to 10 each. 12:28 11 Q. Right. 12 A. So we would have 21 over 5. 13 Q. Okay. 21 over 5? 14 A. Uh-huh. 15 Q. So then it would be 4.25 as opposed 12:28 16 to 5. It would be a much smaller 17 difference. 18 MS. FORGIE: Object to the form. 19 THE WITNESS: 4.25 is pretty big, 20 but there's a difference to 5, yeah. 12:28 21 BY MR. LASKER: 22 Q. And so to be able to determine or 23 to be -- if the issue is whether other 24 pesticides are effect modifiers in 25 conducting -- in looking at a glyphosate 12:28</p>

Page 174

1 non-Hodgkin's lymphoma association, one of  
 2 the issues you can look at is how powerful  
 3 of an association there is between these  
 4 other pesticides and non-Hodgkin's lymphoma;  
 5 correct? 12:28  
 6 MS. FORGIE: Object to the form.  
 7 THE WITNESS: That is not the only  
 8 thing I would look at. I would also  
 9 look at how correlated the exposures are  
 10 with glyphosate. 12:29  
 11 BY MR. LASKER:  
 12 Q. But in this instance -- this  
 13 example is not talking about a correlation?  
 14 A. No.  
 15 Q. I'm just trying to get the exposure 12:29  
 16 modification aspect of it.  
 17 MS. FORGIE: There's no question.  
 18 BY MR. LASKER:  
 19 Q. Are we on the same page here?  
 20 MS. FORGIE: Objection. 12:29  
 21 You're asking if you guys are on  
 22 the same page?  
 23 MR. LASKER: I have to be able to  
 24 ask the question without you objecting  
 25 in the middle of it. Let me ask the 12:29

Page 175

1 question again.  
 2 BY MR. LASKER:  
 3 Q. I want to focus on the effect  
 4 modification point that you're making here,  
 5 and that does not rely upon any correlation 12:29  
 6 between, in this case, radon and smoking;  
 7 right?  
 8 MS. FORGIE: Object to the form.  
 9 THE WITNESS: This is an example  
 10 where I'm trying to show in the first 12:29  
 11 part of this example how when you have  
 12 one risk factor only assessment and  
 13 you're comparing -- and you're  
 14 calculating a so-and-so fold risk in the  
 15 exposed over the unexposed, and you're 12:29  
 16 going to another population where now  
 17 you have an additional risk factor for  
 18 the outcome that adds to the baseline  
 19 risk, and it adds in the same way in the  
 20 exposed and the unexposed how you would 12:30  
 21 see a different odds at risk or rate  
 22 ratio.  
 23 BY MR. LASKER:  
 24 Q. And my only point here, I guess --  
 25 and my understanding maybe I'm missing it 12:30

Page 176

1 was that you were raising the possibility  
 2 that other pesticide exposures might have an  
 3 effect modification on glyphosate studies if  
 4 you're looking at a population that has  
 5 those other pesticide exposures and that 12:30  
 6 increases the background instance of NHL; is  
 7 that correct?  
 8 MS. FORGIE: Object to the form.  
 9 THE WITNESS: Well, if we agree  
 10 which pesticides are related to NHL and 12:30  
 11 one population of farmers is exposed to  
 12 those, then we would presume that those  
 13 farmers have a larger background rate of  
 14 NHL.  
 15 BY MR. LASKER: 12:30  
 16 Q. Okay. And to be able to assess the  
 17 extent to which that could create an  
 18 exposure modification, we would need to  
 19 consider the strength of that association  
 20 between the other pesticides and 12:31  
 21 non-Hodgkin's lymphoma; correct?  
 22 MS. FORGIE: Object to the form.  
 23 THE WITNESS: No. What we need is  
 24 enough sample size to then evaluate the  
 25 effect of glyphosate. 12:31

Page 177

1 BY MR. LASKER:  
 2 Q. Okay. But if the other pesticide  
 3 exposures were resulting in one extra case  
 4 of non-Hodgkin's lymphoma over -- out of a  
 5 hundred thousand, that would have less of an 12:31  
 6 effect modification than if they were  
 7 resulting in ten cases of non-Hodgkin's  
 8 lymphoma out of a hundred thousand; correct?  
 9 MS. FORGIE: Object to the form.  
 10 THE WITNESS: That would depend on 12:31  
 11 the correlation of the exposures in this  
 12 dataset. So the correlation of the  
 13 pesticides was glyphosate.  
 14 BY MR. LASKER:  
 15 Q. And I guess so the effect 12:31  
 16 modification you present on page 7 depends  
 17 upon the correlation between radon and  
 18 smoking?  
 19 A. Yes.  
 20 Q. Okay. Moving on, we can take a 12:32  
 21 break for lunch now or go on for a little  
 22 bit longer.  
 23 MS. FORGIE: It's up to you guys.  
 24 I don't eat; so it doesn't matter to me.  
 25 MR. LASKER: Why don't we have 12:32

Page 178

1 lunch now. It's a little bit of a short  
 2 session, but it's probably a good time.  
 3 THE VIDEOGRAPHER: We're off the  
 4 record at 12:32 p.m.  
 5 (Recess taken from 12:32 p.m. 12:32  
 6 to 12:33 p.m.)  
 7 THE VIDEOGRAPHER: We are back on  
 8 the record at 12:33 p.m.  
 9 BY MR. LASKER:  
 10 Q. Dr. Ritz, let's walk through some 12:33  
 11 of the epidemiologic studies that you  
 12 discuss in your report. I think the first  
 13 study you talk about is the Cantor study  
 14 from 1992. Why don't we mark that.  
 15 (Exhibit Number 19-10 was 12:33  
 16 marked for identification.)  
 17 THE WITNESS: Actually, the  
 18 Eriksson study that I mentioned first.  
 19 Doesn't matter.  
 20 BY MR. LASKER: 12:34  
 21 Q. We'll get to Eriksson as well.  
 22 19-10. So the Cantor study reported an odds  
 23 ratio for glyphosate and non-Hodgkin's  
 24 lymphoma, and it's on page 2450 in this  
 25 study in Table 6 of 1.1 with a confidence 12:34

Page 179

1 interval of 0.7 to 1.9; correct?  
 2 A. Correct.  
 3 Q. And the odds ratio was adjusted as  
 4 indicated in the footnote to the table for  
 5 vital status, age, sex, smoking, family 12:34  
 6 history of lymphopoietic cancer, high-risk  
 7 occupations, and high-risk exposures;  
 8 correct?  
 9 A. Yes.  
 10 Q. And as Cantor is defining high-risk 12:35  
 11 exposures, if it meets a certain criteria,  
 12 those could include exposures to other  
 13 pesticides; correct?  
 14 A. As far as I remember, but I'm just  
 15 looking for that definition. 12:35  
 16 Q. I think it is page 2448, top of the  
 17 right-hand column just above "results."  
 18 MS. FORGIE: Where did you see it?  
 19 MR. LASKER: 2448, top of the  
 20 right-hand column. 12:35  
 21 THE WITNESS: Yeah, it's the odds  
 22 ratio of 1.5 plus. Is that it?  
 23 BY MR. LASKER:  
 24 Q. I believe so.  
 25 A. Yeah. 12:35

Page 180

1 MS. FORGIE: Thank you.  
 2 BY MR. LASKER:  
 3 Q. Just so the record is clear, in the  
 4 Cantor study the odds ratio was adjusted for  
 5 vital status, age, sex, smoking, family 12:36  
 6 history of lymphopoietic cancer, high-risk  
 7 occupation and high-risk exposures which can  
 8 include other pesticides; correct?  
 9 A. Other substances it says, but I  
 10 imagine it's pesticides included. 12:36  
 11 Q. And the CLR, if we were to  
 12 calculate that confidence limit ratio for  
 13 the glyphosate and non-Hodgkin's lymphoma,  
 14 is 1.9 to 0.7. So that is slightly below  
 15 3.0; correct? 12:36  
 16 A. Yeah.  
 17 Q. And this is -- and you said you'd  
 18 done this in your head. I don't know if you  
 19 recall it in your head, but the CLR for the  
 20 Cantor study is the smallest CLR for any 12:36  
 21 odds ratio, report odds ratio, where the  
 22 odds ratio has been adjusted for other  
 23 pesticide exposures; correct?  
 24 MS. FORGIE: Object to the form.  
 25 THE WITNESS: I would need to check 12:37

Page 181

1 the other -- De Roos, for example, which  
 2 includes Cantor. I would imagine that  
 3 De Roos is at least as powerful as  
 4 Cantor; so it should actually be  
 5 shorter. 12:37  
 6 BY MR. LASKER:  
 7 Q. If you look in your -- and this is  
 8 an abbreviated short form, but De Roos 2003.  
 9 You have -- we can get to the actual number  
 10 if you want, but you have it on -- the 12:37  
 11 number that you used at least has a CLR that  
 12 is well above 3; correct?  
 13 MS. FORGIE: Object to the form.  
 14 THE WITNESS: I wouldn't be able to  
 15 do that in my head without the numbers 12:37  
 16 right now. I have to guess where this  
 17 is coming out, and I also need to -- oh,  
 18 and this is a differently adjusted  
 19 estimate, plus it's from a larger study.  
 20 So it doesn't just include Cantor. It 12:38  
 21 also includes the Nebraska and some  
 22 other study.  
 23 BY MR. LASKER:  
 24 Q. We'll look at the CLR for De Roos  
 25 when we get there. We can just compare 12:38

Page 182

1 them, but I think you stated that you  
 2 thought the De Roos study might be at least  
 3 as powerful as the Cantor study. Are there  
 4 any other case control studies that you  
 5 believe would be as powerful as the Cantor 12:38  
 6 study, any measuring glyphosate in  
 7 non-Hodgkin's lymphoma?  
 8 MS. FORGIE: Object to the form.  
 9 THE WITNESS: It depends on what  
 10 the comparison is that I want to do. 12:38  
 11 For example, ever handled is a very bad  
 12 exposure assessment. So this 1.1 for  
 13 ever handled I would judge as not very  
 14 valid because the exposure is probably  
 15 strongly misclassified 12:39  
 16 non-differentially.  
 17 BY MR. LASKER:  
 18 Q. Except for three of the studies I  
 19 believe -- let's strike this. Let's strike  
 20 this. The odds ratio that you present in 12:39  
 21 your expert report on page 14 are for  
 22 ever/never exposure; correct?  
 23 MS. FORGIE: Object to the form.  
 24 THE WITNESS: Page 14? Which one?  
 25 This? 12:39

Page 183

1 BY MR. LASKER:  
 2 Q. Yeah.  
 3 A. I have to check it whether it's  
 4 always ever/never. Did I not show any  
 5 others? No, I guess they would be mostly 12:39  
 6 ever/never.  
 7 Q. Okay. So with respect to that  
 8 assessment that you have or that measure  
 9 that you have on page 14 of your expert  
 10 report, are you aware of -- and I'm going to 12:39  
 11 give you -- talk also, and we'll put it in  
 12 the NAPP which is a further pooling of the  
 13 Cantor data and some other data from Canada.  
 14 But other than that, is there any study that  
 15 has greater power than Cantor with respect 12:40  
 16 to the ever/never odds ratio for  
 17 glyphosate-based herbicides in non-Hodgkin's  
 18 lymphoma?  
 19 MS. FORGIE: Object to the form.  
 20 THE WITNESS: Actually I'm 12:40  
 21 realizing something that I didn't  
 22 realize before. This table actually  
 23 says "odds ratios for ever having  
 24 handled specific herbicides prior to  
 25 1965." I thought glyphosate was not 12:40

Page 184

1 available prior to 1965.  
 2 BY MR. LASKER:  
 3 Q. That would be the right column of  
 4 the table, the left table. Left column is  
 5 upper. 12:40  
 6 A. Oh, okay.  
 7 Q. Going back to the question then,  
 8 other than the subsequent studies that  
 9 pooled Cantor and included Cantor in the  
 10 pooling, which would be De Roos 2003 and the 12:41  
 11 NAPP, are you -- are you aware of any study  
 12 that had a greater power to assess  
 13 ever/never exposure to glyphosate in  
 14 non-Hodgkin's lymphoma?  
 15 MS. FORGIE: Object to the form. 12:41  
 16 THE WITNESS: I wouldn't be able to  
 17 tell off my head because I consider  
 18 ever/never the lowest common denominator  
 19 across all these studies, and I would  
 20 hope that we have better measures to 12:41  
 21 assess exposure than ever/never.  
 22 MS. FORGIE: Just so you know, it  
 23 looks like the lunch is here. I'm not  
 24 saying we have to break now.  
 25 MR. LASKER: We'll probably just 12:41

Page 185

1 continue through this.  
 2 MS. FORGIE: I agree.  
 3 BY MR. LASKER:  
 4 Q. And if I understand you correctly,  
 5 that is because it's your opinion that 12:41  
 6 ever/never analyses are not as informative  
 7 on whether or not there is an association  
 8 between glyphosate and non-Hodgkin's  
 9 lymphoma as measures that try to look at the  
 10 amount of exposure of glyphosate; correct? 12:42  
 11 MS. FORGIE: Object to the form.  
 12 THE WITNESS: An ever/never  
 13 exposure presumes that any type of  
 14 exposure I had can be handled in the  
 15 same way. So somebody looking at a 12:42  
 16 bottle of pesticides and spraying it  
 17 once gets to be thrown in the same  
 18 category as somebody applying pesticides  
 19 on a regular basis in an occupation.  
 20 And that is the least informative and 12:42  
 21 the most capable of inducing  
 22 non-differential exposure  
 23 misclassification by people recalling  
 24 wrongly.  
 25 ///



Page 186	<p>1 BY MR. LASKER:</p> <p>2 Q. The -- in your expert report you</p> <p>3 opine, and I think this is at page 17 of</p> <p>4 your report. I'm sorry. On page 18 of your</p> <p>5 report. At the bottom of page 18 -- and you 12:43</p> <p>6 were right. This is the bottom of my head.</p> <p>7 I got it backwards as to which study you</p> <p>8 were doing first in your report. So bottom</p> <p>9 of page 18 you're talking about the Cantor</p> <p>10 study, going over to page 19; correct? 12:43</p> <p>11 A. Yes.</p> <p>12 Q. And you state that the Cantor study</p> <p>13 is less informative because the cases are</p> <p>14 diagnosed with non-Hodgkin's lymphoma</p> <p>15 between 1980 and 1983 which you state was at 12:43</p> <p>16 most only six to ten years from the first</p> <p>17 potential glyphosate exposure; correct?</p> <p>18 A. Correct.</p> <p>19 Q. And you explain that this would</p> <p>20 be -- and just so the record is clear, we 12:44</p> <p>21 are talking about here is the concept of</p> <p>22 latency; correct?</p> <p>23 A. This talks about latency, yes.</p> <p>24 Q. And the issue of latency is that</p> <p>25 you would need to have a certain period of 12:44</p>	Page 188	<p>1 about in the middle paragraph -- I'm sorry,</p> <p>2 in the first paragraph about halfway down,</p> <p>3 you state that typically we would generally</p> <p>4 expect a five to ten-year minimum latency</p> <p>5 between exposure and disease onset for blood 12:45</p> <p>6 system-related cancers; correct?</p> <p>7 A. That's read correctly.</p> <p>8 Q. So what that means is even if you</p> <p>9 have -- let's say if you have a known</p> <p>10 carcinogen that causes NHL, it would take a 12:46</p> <p>11 minimum of five to ten years from the date</p> <p>12 of exposure for the regression from cellular</p> <p>13 insult to result in a diagnosable case of</p> <p>14 non-Hodgkin's lymphoma; correct?</p> <p>15 MS. FORGIE: Object to the form. 12:46</p> <p>16 THE WITNESS: No. I'm using this</p> <p>17 in terms of epidemiologic latency time</p> <p>18 which we are estimating was in groups.</p> <p>19 So we are never estimating for one</p> <p>20 person. So in one person, it could be 12:46</p> <p>21 happening within a year or two. In</p> <p>22 another person, it might not be</p> <p>23 happening until 35 years out. That's</p> <p>24 why I also refer to age. For example,</p> <p>25 somebody who is already age 60 and is 12:46</p>
Page 187	<p>1 time elapse from the time of exposure until</p> <p>2 the measure of non-Hodgkin's lymphoma for</p> <p>3 the biological process to take place that</p> <p>4 would lead to exposure to diagnose disease;</p> <p>5 correct? 12:44</p> <p>6 MS. FORGIE: Object to the form.</p> <p>7 THE WITNESS: Latency -- the word</p> <p>8 "latency" is used in different ways and</p> <p>9 in epidemiology we are trying to figure</p> <p>10 out the minimum time between an exposure 12:44</p> <p>11 happening and causing the disease. So</p> <p>12 in a time-changing exposure and a</p> <p>13 cumulative or a -- not an exposure like</p> <p>14 the A bomb that's one time -- right? --</p> <p>15 you kind of have to decide when the 12:45</p> <p>16 potential for carcinogenicity has</p> <p>17 occurred, and from that point of time to</p> <p>18 when you're actually diagnosing the</p> <p>19 disease. That may be very different</p> <p>20 depending on many factors including age 12:45</p> <p>21 of the subject.</p> <p>22 BY MR. LASKER:</p> <p>23 Q. Right. And the point that you're</p> <p>24 making with respect to Cantor, and I think</p> <p>25 you state this on page 17 of your report 12:45</p>	Page 189	<p>1 more susceptible to exposures, that</p> <p>2 cancer might just happen earlier after</p> <p>3 exposure than in somebody where the</p> <p>4 cancer cell is dormant and kept in check</p> <p>5 by the immune system and other factors 12:47</p> <p>6 for 20 more years. So the latency</p> <p>7 period is really an average or minimum</p> <p>8 dependent on what population I'm looking</p> <p>9 at and whether I allow for that</p> <p>10 population to age into the time when the 12:47</p> <p>11 cancers would occur.</p> <p>12 So mostly I would imagine I have</p> <p>13 higher power in my study when the people</p> <p>14 are aged into that age when they</p> <p>15 actually have cancer. 12:47</p> <p>16 BY MR. LASKER:</p> <p>17 Q. And the concern that you're raising</p> <p>18 with respect to the Cantor study is that --</p> <p>19 well, actually let me just take a step back</p> <p>20 here. You state -- and I think this is on 12:47</p> <p>21 page 19. You state that one would prefer</p> <p>22 for NHL cancer epidemiology study, one would</p> <p>23 prefer a minimum latency period of on</p> <p>24 average ten years; correct?</p> <p>25 MS. FORGIE: Object to the form. 12:48</p>

Page 190

1 THE WITNESS: That's what this  
 2 says.  
 3 BY MR. LASKER:  
 4 Q. This is you.  
 5 A. Yes, yes, this is what the sentence 12:48  
 6 says. So what I was meaning by this is that  
 7 a study would be more powerful if we allowed  
 8 for longer latency because we then would  
 9 capture more cases due to the exposure.  
 10 Because if you're only allowing for two 12:48  
 11 years, you would only capture those people  
 12 who was in those two years come down with  
 13 the cancer. If you allowing for five years,  
 14 you can see how that number would increase  
 15 and then ten years, 20 years out. 12:49  
 16 So depending on how long we have  
 17 between the first exposure or the minimum  
 18 exposure necessary to cause cancer and the  
 19 events that later occur, the longer the  
 20 latency, the more chance I have to capture 12:49  
 21 every single case that was actually caused  
 22 by the exposure because there are these  
 23 dormant cells.  
 24 Q. Just so I understand also because I  
 25 think there's a couple things going on, but 12:49

Page 191

1 correct me if I'm wrong. One issue is that  
 2 you want to be measuring the exposures that  
 3 could have, in fact, resulted in the  
 4 outcome; correct?  
 5 MS. FORGIE: Object to the form. 12:49  
 6 THE WITNESS: I'm not sure I  
 7 understand, but yes, we want to measure  
 8 exposures as carefully as we can to  
 9 estimate whether they are causing the  
 10 outcome. 12:49  
 11 BY MR. LASKER:  
 12 Q. So, for example, and just take an  
 13 extreme example, if you were to do an  
 14 epidemiologic study and you measured an  
 15 exposure on Tuesday and the individual 12:50  
 16 came -- was diagnosed with non-Hodgkin's  
 17 lymphoma on Wednesday, whatever the exposure  
 18 was on Tuesday wouldn't have been a cause of  
 19 the NHL because there hasn't been a  
 20 sufficient time that has elapsed for the 12:50  
 21 causal mechanism to take place; correct?  
 22 A. If I'm assuming that the only  
 23 exposure the person ever had was on Tuesday.  
 24 Q. Right?  
 25 A. Yes. 12:50

Page 192

1 Q. And one of the issues you're  
 2 raising in the Cantor study is if you're not  
 3 looking back sufficiently far in time, then  
 4 you are not capturing exposures that could  
 5 have had sufficient time to go through that 12:50  
 6 process whereby they would result in a  
 7 diagnosable non-Hodgkin's lymphoma; correct?  
 8 MS. FORGIE: Object to the form.  
 9 THE WITNESS: So what I'm trying to  
 10 say here is that exposures have to occur 12:50  
 11 a certain number of, let's say, days,  
 12 years, months prior to the onset of a  
 13 cancer before I would think that it is  
 14 biologically possible or plausible. But  
 15 that could be a year in a certain 12:51  
 16 circumstance, two years in another, and  
 17 on average, it might be very different  
 18 depending on the population I'm looking  
 19 at.  
 20 BY MR. LASKER: 12:51  
 21 Q. And the point you make here on  
 22 page 19 is you could have traits that vary  
 23 but for a study of non-Hodgkin's lymphoma,  
 24 you'd prefer a minimum latency period of on  
 25 average ten years to make sure that you are 12:51

Page 193

1 capturing the biologically plausible  
 2 exposures that could account for any  
 3 reported non-Hodgkin's lymphoma; correct?  
 4 MS. FORGIE: Object to the form.  
 5 THE WITNESS: That's not correct. 12:51  
 6 That's really not what this says. What  
 7 this says is that there is an exposure  
 8 lag time that I would like in order to  
 9 capture every single case and not just  
 10 the ones that are the early birds. 12:52  
 11 BY MR. LASKER:  
 12 Q. If you have, though, an early bird  
 13 if you will, one of the issues that you're  
 14 trying to account for is the possibility  
 15 that that earlier diagnosed non-Hodgkin's 12:52  
 16 lymphoma would have been related to  
 17 something that predates any exposure;  
 18 correct?  
 19 MS. FORGIE: Object to the form.  
 20 THE WITNESS: Well, when I have a 12:52  
 21 study that only has a two-year minimum  
 22 follow-up and no more, then I always  
 23 have to raise that possibility. That's  
 24 why I would like a study that has a  
 25 longer period of time between the 12:52

Page 194	<p>1 exposure and the outcome so I can 2 estimate what an average mild latency 3 might be. And if I have a study that 4 only follows for one year, I would 5 probably be concerned. With a study 12:53 6 following two years, less, three years, 7 less, et cetera, et cetera.</p> <p>8 BY MR. LASKER:</p> <p>9 Q. What you're mentioning here with 10 respect to Cantor is that you have a concern 12:53 11 because only six to ten years have elapsed 12 between a potential first glyphosate 13 exposure and an NHL diagnosis; correct?</p> <p>14 A. Well, my concern is not with 15 respect to the biologically relevant latency 12:53 16 period but with respect to having really 17 captured all NHLs that might have been 18 caused by the exposure because I presume 19 that, in this case, I only captured the 20 early birds, the people who got their cancer 12:53 21 relatively soon after exposure.</p> <p>22 Q. You would have to, though, in 23 determining that those non-Hodgkin's 24 lymphomas that you see are attributable to 25 the exposure, one factor that you would also 12:54</p>	Page 196	<p>1 don't see something after two years. 2 And in epidemiology, what we often 3 do in order to remove exposures that are 4 irrelevant is we are discounting 5 exposures within the year before 12:55 6 diagnosis, and that's a tool one can 7 use.</p> <p>8 BY MR. LASKER:</p> <p>9 Q. And one of the things that you talk 10 about with another study, with the Eriksson 12:55 11 study is a lag period of ten years because 12 in that study, that was the demarcation; 13 correct?</p> <p>14 A. Yes, that's correct.</p> <p>15 Q. Okay. And that goes to the same 12:55 16 issue that you're raising which is that for 17 hematopoietic cancers, you might need a 18 period of ten years before the exposure 19 could actually give rise to diseases so that 20 you can actually measure an effect; correct? 12:55</p> <p>21 MS. FORGIE: Object to the form.</p> <p>22 THE WITNESS: That's incorrect. 23 That's actually stating the opposite of 24 what I said. What I'm saying is that 25 you want that -- actually for 12:55</p>
Page 195	<p>1 want to consider is whether or not those 2 exposures took place during the time period 3 sufficiently before the diagnosis that you 4 could attribute the exposure to the outcome; 5 correct? Because before you did the study, 12:54 6 you don't know there's an association; 7 right?</p> <p>8 MS. FORGIE: Object to the form.</p> <p>9 THE WITNESS: Well, it depends on 10 which study I'm conducting, but before 12:54 11 this study was conducted, I don't think 12 there was much known about glyphosate. 13 So I agree. So this is certainly a 14 study that is trying to evaluate 15 something we know very little about, and 12:54 16 of course, we always want the most 17 information we can get and the longest 18 period between exposures.</p> <p>19 But as a public health official, I 20 want to look right away. I want to look 12:54 21 after two years and three years and four 22 years, but if I don't see something 23 after two years or three years, then I 24 want to look after five years because it 25 doesn't mean there's nothing when I 12:55</p>	Page 197	<p>1 hematopoietic cancers, it's generally in 2 the radiation literature -- and that's 3 where I wrote my dissertation in -- 4 assume that it's two-year minimum. And 5 so what we would do is we would look 12:56 6 carefully and critically maybe at around 7 one year or two year, but these are all 8 presumed.</p> <p>9 And they come from the medical 10 literature on radiation effects -- side 12:56 11 effects. They are not coming from 12 population studies and workers and the 13 general population. So what we think 14 the case is is that if you say one day 15 or a month, everybody would shake their 12:56 16 head. Maybe even one year we would 17 shake our heads and say I'm not really 18 sure. But anything beyond one year 19 would definitely raise concern.</p> <p>20 Because we are also now talking 12:56 21 about initiation of cancer or promotion 22 of cancer, and initiation of cancer 23 might take longer than promotion. 24 Promotion might be the last step in the 25 chain of events, and that might be very 12:57</p>

Page 198

1 soon.

2 So again, what I'm saying is that I

3 would like to move out from the time of

4 exposure that is relevant for the cause

5 of the disease. I would like to move 12:57

6 out as long as I can in order to capture

7 as many cases caused by that exposure as

8 possible.

9 So ten years out is a good time

10 frame because it makes me more 12:57

11 comfortable that I'm not only capturing

12 early birds but that I'm really looking

13 at the chronic consequences of that

14 exposure.

15 BY MR. LASKER: 12:57

16 Q. Understood.

17 So with respect to the Cantor study

18 then, if I'm understanding you correctly,

19 your concern was -- with respect to latency

20 was solely a concern about power? 12:57

21 MS. FORGIE: Object to the form.

22 THE WITNESS: No, it was not about

23 power, but it was a concern about this

24 study not -- being a little bit early in

25 the sense that the chronic effects could 12:58

Page 199

1 not be assessed as comprehensively as I

2 would have liked to and later studies do

3 a better job.

4 MR. BAUM: Is this a good time to

5 switch over to lunch? 12:58

6 MR. LASKER: Almost.

7 BY MR. LASKER:

8 Q. Now, in your analysis, you were

9 assessing the start date, if you will, of

10 glyphosate as a potential exposure in 1974; 12:58

11 is that correct?

12 MS. FORGIE: Object to the form.

13 THE WITNESS: Well, we don't really

14 know unless the author tells us exactly

15 when the exposure happened, but the 12:58

16 potential for exposure starts in '74,

17 yes.

18 BY MR. LASKER:

19 Q. Do you know when glyphosate was

20 first approved for use in agricultural 12:59

21 settings?

22 A. I thought that was about that time.

23 MR. LASKER: Let's just mark the

24 next exhibit in line.

25 MR. BAUM: Eric, it's 1 o'clock. 12:59

Page 200

1 MR. LASKER: We're going to be

2 about five minutes. It's still all in

3 the context of this.

4 (Exhibit Number 19-11 was

5 marked for identification.) 12:59

6 MS. FORGIE: What number are we on?

7 MS. SHIMADO: 11.

8 BY MR. LASKER:

9 Q. And this will be, and I'll --

10 obviously, you're going to have to -- well, 12:59

11 I'll represent and I'm going to ask you a

12 question on the assumption my representation

13 is correct. I'll represent to you that this

14 December, 1975, letter from EPA marks the

15 first date on which glyphosate-based 01:00

16 formulation was approved for use in

17 agricultural settings.

18 A. Uh-huh.

19 MS. FORGIE: There's no question.

20 BY MR. LASKER: 01:00

21 Q. If that assumption is correct for

22 farming studies, and these are -- the Cantor

23 study was specific to farming exposures in

24 calculating that latency period, would I be

25 correct, then, that December, 1975, would be 01:00

Page 201

1 the starting point for that calculation?

2 MS. FORGIE: Object to the form.

3 THE WITNESS: We are presuming that

4 this is the only way to get glyphosate

5 use. 01:00

6 BY MR. LASKER:

7 Q. This is the first approval for

8 agricultural settings. It would be used as

9 sort of right of way and roadways for road

10 crews. It could have been used before then, 01:00

11 but the first approval for farmers for use

12 of glyphosate was in December of 1975.

13 A. And that --

14 MS. FORGIE: Wait. There's no

15 question pending. 01:01

16 BY MR. LASKER:

17 Q. With that assumption in mind, if

18 you're trying to measure farming exposures,

19 which was the exposures in the Cantor study

20 which was the farmers exposure, I think by 01:01

21 its definition and by its terms, would

22 December of 1975, then, be the proper start

23 point for determining the potential latency

24 period between exposure and disease outcome?

25 MS. FORGIE: Object to the form. 01:01

Page 202

1 Asked and answered. She just answered  
2 that exact question.

3 You can answer it again.

4 THE WITNESS: Well, I have to make  
5 certain assumptions. One was that they 01:01  
6 actually didn't ask other occupations,  
7 such as road worker, and also that these  
8 farmers weren't given glyphosate in  
9 trial runs because there's a difference,  
10 and I thought I'd seen that somewhere 01:01  
11 listed that actually glyphosate was  
12 being tried out in certain farming  
13 populations prior to general approval.

14 BY MR. LASKER:

15 Q. Okay. I'm not sure where you've 01:02  
16 seen that, but for the purpose of this  
17 question, if we assume that December, 1975,  
18 was the first date where glyphosate was  
19 approved for agricultural uses, for farm  
20 uses, and that none of the farmers here were 01:02  
21 using it for some trial purposes before its  
22 official approval, would December, 1975,  
23 then, be the proper starting point for then  
24 calculating the latency period for the  
25 Cantor study? 01:02

Page 203

1 MS. FORGIE: Object to the form.  
2 Asked and answered.

3 You can answer it again.

4 THE WITNESS: Well, if that is what  
5 they are actually assessing, then you 01:02  
6 would have potential exposure starting  
7 at the time this agent became available  
8 to the farmers, and then you could use  
9 that for a latency period calculation.

10 MR. LASKER: Why don't we take a 01:03  
11 break for lunch.

12 THE VIDEOGRAPHER: This marks the  
13 end of videotape number 2 in the  
14 deposition of Dr. Beate Ritz. We're off  
15 the record at 1:03 p.m. 01:03  
16 (Lunch recess taken from  
17 1:03 p.m. to 1:46 p.m.)

18 THE VIDEOGRAPHER: We are back on  
19 the record at 1:46 p.m. This marks the  
20 beginning of videotape number 3 in the 01:46  
21 deposition of Dr. Beate Ritz.

22 BY MR. LASKER:

23 Q. Dr. Ritz, let's move on to the  
24 De Roos 2003-case control study. We'll mark  
25 that as the next exhibit in line. 01:46

Page 204

1 (Exhibit Number 19-12 was  
2 marked for identification.)

3 BY MR. LASKER:

4 Q. Dr. Ritz, we can walk through this  
5 if you'd like, but I feel you probably 01:47  
6 already have done that. The median latency  
7 time for the NHL cases in this study is  
8 roughly equivalent to the median latency  
9 time for the cases in the Cantor study;  
10 correct? 01:47

11 A. As far as I know, it went out a  
12 little bit longer in Minnesota.

13 Q. No, I think you're talking Nebraska  
14 was longer and Kansas City was shorter.

15 MS. FORGIE: Wait. Is there a 01:48  
16 question?

17 MR. LASKER: I'm working my way  
18 through it.

19 THE WITNESS: Nebraska is the  
20 longest followed by Minnesota and then 01:48  
21 Kansas.

22 BY MR. LASKER:

23 Q. And Kansas was shorter?

24 A. Correct.

25 Q. And Nebraska was longer. So 01:48

Page 205

1 roughly the median -- most of the data was  
2 the same as Cantor, and then you have some  
3 shorter and some longer; right?

4 MS. FORGIE: Object to the form.

5 THE WITNESS: It depends on how 01:48  
6 many people were in each of those  
7 studies.

8 BY MR. LASKER:

9 Q. You can look on Table 2.

10 A. Yeah, Iowa and Minnesota is the 01:48  
11 biggest chunk of it.

12 Q. And then the other two are both  
13 about the same?

14 A. Yeah.

15 Q. So can we agree the median latency 01:48  
16 period for the De Roos 2003 study is roughly  
17 equivalent to the median latency period for  
18 the Cantor study?

19 MS. FORGIE: Object to the form.

20 THE WITNESS: We can calculate it, 01:48  
21 but it probably would come out  
22 similarly, but it's important that we  
23 also have longer latency in there, in  
24 Nebraska.

25 ///

Page 206

1 BY MR. LASKER:  
 2 Q. Right. But the median latency is  
 3 the same. We have shorter latency for the  
 4 roughly 15 or 16 percent from Kansas and  
 5 slightly longer latency for the 17.4 percent 01:49  
 6 in Nebraska; correct?  
 7 MS. FORGIE: Object to the form.  
 8 THE WITNESS: 21.5 percent in  
 9 Nebraska.  
 10 BY MR. LASKER: 01:49  
 11 Q. I was looking at the analysis of  
 12 multiple pesticides.  
 13 A. Oh.  
 14 Q. Correct?  
 15 MS. FORGIE: Object to the form. 01:49  
 16 THE WITNESS: 17.4, yes.  
 17 BY MR. LASKER:  
 18 Q. Okay. With respect to the Nebraska  
 19 data which is, as you mentioned, is data  
 20 that's somewhat longer, that goes out from 01:49  
 21 July 1983 to June 1986?  
 22 A. Correct.  
 23 Q. Even in that sub population  
 24 litigation --  
 25 (Interruption in the 01:50

Page 207

1 proceedings.)  
 2 MR. LASKER: Back on the record.  
 3 BY MR. LASKER:  
 4 Q. Even for the 17 percent of the data  
 5 that came from Nebraska, you still would not 01:50  
 6 have a median latency period for glyphosate  
 7 for ten years; correct?  
 8 MS. FORGIE: Object to the form.  
 9 THE WITNESS: That makes  
 10 assumptions that we're starting to count 01:50  
 11 in 1975 which may or may not be correct.  
 12 But that gives us eight years, I guess.  
 13 BY MR. LASKER:  
 14 Q. Whether it's '74 or '75, the  
 15 maximum latency period would be -- maybe the 01:50  
 16 maximum would be 12 years, but we're talking  
 17 the median latency period. The median  
 18 latency period even for this Nebraska  
 19 subgroup would be less than ten years;  
 20 correct? 01:50  
 21 MS. FORGIE: Object to the form.  
 22 THE WITNESS: About ten years.  
 23 BY MR. LASKER:  
 24 Q. Let me make sure I understand the  
 25 median latency period. This would allow -- 01:51

Page 208

1 if everybody had taken glyphosate the very  
 2 first day that it was available, that would  
 3 be the latency period, but, of course,  
 4 that's not going to be the reality in the  
 5 study; correct? 01:51  
 6 A. I don't know --  
 7 MS. FORGIE: Object to the form.  
 8 THE WITNESS: I don't know what the  
 9 reality in the study is because it's not  
 10 stated exactly when these farmers 01:51  
 11 started, and if we are presuming that  
 12 the EPA date is the earliest one, and  
 13 you said yourself there were other uses  
 14 for glyphosate, so who knows? Farmers  
 15 do all sorts of things including buying 01:51  
 16 things that are not EPA approved. So I  
 17 don't know.  
 18 BY MR. LASKER:  
 19 Q. So there are two parts of this:  
 20 When you talk about median latency, there 01:51  
 21 is, in this case, a maximum latency period  
 22 of whenever you want to start measuring  
 23 1974, 1975 through to the date of diagnosis.  
 24 That would be the maximum latency period  
 25 possible. 01:52

Page 209

1 A. Correct.  
 2 Q. The actual median latency for the  
 3 population that's being studied would be  
 4 less than the maximum latency period;  
 5 correct? 01:52  
 6 A. It would be somewhere in between  
 7 the diagnosis dates, and the diagnosis dates  
 8 are July, '83, through June, '86.  
 9 Q. I understand that. That would be  
 10 when diagnosis was. The exposure -- the 01:52  
 11 median period of exposure would not be ten  
 12 years before that. It would be somewhat  
 13 less. At some point in time prior to  
 14 diagnosis that they're exposed, not the very  
 15 first day; correct? 01:52  
 16 MS. FORGIE: Object to the form and  
 17 asked and answered.  
 18 You can answer again.  
 19 THE WITNESS: Well, it depends what  
 20 we are presuming about the exposure. So 01:52  
 21 if we are presuming that they really  
 22 only started using in 1975, and they  
 23 were using a certain amount of  
 24 glyphosate that needed to be used in a  
 25 certain way, they might have used, you 01:53

Page 210

1 know, a huge amount the first time  
 2 around because they were told it's very  
 3 non-toxic and maybe all of the relevant  
 4 exposure were in the first year. I  
 5 don't know. They did not investigate 01:53  
 6 that.  
 7 BY MR. LASKER:  
 8 Q. Okay. I understand that.  
 9 But with respect to, as an  
 10 epidemiologist if you're looking at this 01:53  
 11 study and you don't have the data on when  
 12 exposures took place, would you assume then  
 13 in your analysis of the Nebraska data for  
 14 purposes of assessing the data that all of  
 15 the exposures to Roundup took place on the 01:53  
 16 first date that exposures were possible?  
 17 MS. FORGIE: Object to the form.  
 18 Asked and answered.  
 19 You can answer it again.  
 20 THE WITNESS: Well, I would 01:53  
 21 probably look at a range of possible  
 22 times, and then you can, you know, use  
 23 that in your analysis.  
 24 BY MR. LASKER:  
 25 Q. Okay. And if you were to do that 01:53

Page 211

1 analysis, the median latency period, even of  
 2 the Nebraska data, would be less than ten  
 3 years; correct?  
 4 MS. FORGIE: Object to the form.  
 5 Asked and answered. 01:54  
 6 THE WITNESS: Not necessarily  
 7 because the Nebraska diagnosis median is  
 8 1985. So that's ten years after 1975.  
 9 BY MR. LASKER:  
 10 Q. I understand that. Let me just 01:54  
 11 make sure I understand this. You mentioned  
 12 that you had used some sort of range that  
 13 determined likely first exposure date.  
 14 It wouldn't all be assumed to be  
 15 1975; correct? 01:54  
 16 MS. FORGIE: Object to the form.  
 17 Asked and answered. She's testified --  
 18 THE WITNESS: That would be a kind  
 19 of sensitivity analysis you might want  
 20 to play with. 01:54  
 21 BY MR. LASKER:  
 22 Q. And if that analysis were  
 23 conducted, the median latency period for  
 24 even the Nebraska, 17 percent in this study  
 25 could be less than ten years; correct? 01:54

Page 212

1 MS. FORGIE: Object to the form.  
 2 Asked and answered.  
 3 You can answer it again.  
 4 THE WITNESS: Well, I could define  
 5 a range that would make it less than ten 01:54  
 6 years, but if I subtract 1985 and 1975,  
 7 I have ten years on average.  
 8 BY MR. LASKER:  
 9 Q. Okay. And you talked earlier about  
 10 the issue -- we were talking about this in 01:55  
 11 connection with the Cantor study about the  
 12 power of this study to be able to identify  
 13 association. So I'd like to ask you about  
 14 that.  
 15 I'd asked you about the CLR for De 01:55  
 16 Roos, and we now have that data; so I'd like  
 17 to return to that discussion. The  
 18 glyphosate data is presented on Table 3;  
 19 correct?  
 20 A. Correct. 01:55  
 21 Q. And for the logistical regression  
 22 analysis which is the analysis that you  
 23 report on in your expert report, we have a  
 24 confidence interval that ranges from 1.1 to  
 25 4.0; correct? 01:56

Page 213

1 A. Yes.  
 2 Q. So that confidence interval is --  
 3 I'm sorry, the CLR for that, and I've done  
 4 the math, but it's going to be about 3.6,  
 5 and you can sort of eyeball that; right? 01:56  
 6 A. Yeah.  
 7 MS. FORGIE: Object to the form.  
 8 BY MR. LASKER:  
 9 Q. And for the hierarchical regression  
 10 odds ratio, we have 2.8 over 0.9; so the CLR 01:56  
 11 for the hierarchical regression would be  
 12 slightly above 3; correct?  
 13 A. Yes.  
 14 Q. So the CLR for both of the De Roos  
 15 2003 odds ratios for glyphosate are larger 01:56  
 16 than the CLR for the Cantor 1992 study;  
 17 correct?  
 18 A. What did we have for that again?  
 19 Q. You can go back. It's 2.7, but why  
 20 don't you look at it just to confirm for 01:56  
 21 yourself.  
 22 MS. FORGIE: Do you remember what  
 23 exhibit it is?  
 24 MR. LASKER: It's probably the last  
 25 one we just did. 01:56

Page 214	Page 216
<p>1 MS. SHIMADO: 10. Exhibit 10.                  2 BY MR. LASKER:                  3 Q. You should have it right there.                  4 A. Yeah.                  5 Q. For the record, I'll ask the 01:57                  6 question again while you're looking at this.                  7 The CLR for both of the logistic                  8 regression analysis and the hierarchical                  9 regression analysis in the De Roos 2003                  10 study is actually larger than the CLR for 01:57                  11 the Cantor study; correct?                  12 A. That is correct.                  13 Q. Am I correct, though, in my                  14 understanding that the -- your concern --                  15 while you're concerned about the latency 01:57                  16 period in the Cantor study as making that                  17 study less informative, you do not have that                  18 same concern for the De Roos 2003 study?                  19 A. Well, first to the '95 percent                  20 confidence interval, the confidence interval 01:57                  21 widens with the number of adjustments I                  22 make. Obviously, De Roos makes a lot more                  23 co-adjustments than Cantor, and that's                  24 probably the reason why these confidence                  25 intervals are wider. So in a way, actually 01:58</p>	<p>1 the first people to ever use                  2 hierarchical regression in a systematic                  3 way in the literature.                  4 There are a few more papers here                  5 and there. I did it myself in 2002. 01:59                  6 Somehow hierarchical regression has                  7 fallen out of favor because you have to                  8 make a lot of assumptions, and reviewers                  9 actually constantly fight with you over                  10 those assumptions whether they're 01:59                  11 correct or not. So generally, we would                  12 go back in a consensus manner to a                  13 normal logistic regression in which we                  14 are adjusting for as many variables that                  15 we think make validly sense to adjust 01:59                  16 for.                  17 And this estimate of 2.1 was the                  18 confidence interval of 1.1 to 4, had                  19 wider confidence interval even though                  20 there are more cases and more controls 02:00                  21 in the analysis. The only way this                  22 happens is if there is more full                  23 adjustment for cofactors to widen these                  24 confidence intervals.                  25 So from that, I conclude that she 02:00</p>
Page 215	Page 217
<p>1 her estimate would be the more fully                  2 adjusted compared to the Cantor.                  3 With respect to latency, the same                  4 rules apply. However, she added some                  5 studies that actually had longer latency. 01:58                  6 Again, the latency issue is an issue because                  7 I'm missing cases that are truly caused by                  8 the exposure, if I believe exposure causes                  9 disease, and so it has to do with early                  10 studies where I'm catching these early cases 01:58                  11 and not yet the later ones.                  12 Q. Let me just sort of step back,                  13 though, because there's a lot in that                  14 answer, and I want to make sure I understand                  15 that fully. 01:58                  16 Is it your testimony that the                  17 logistical regression analysis in De Roos                  18 2003 had more controls, adjusted for more                  19 factors than the hierarchical regression?                  20 MS. FORGIE: Object to the form. 01:59                  21 THE WITNESS: No, that's not what I                  22 said. The hierarchical regression makes                  23 additional assumptions that we can                  24 debate and that are debated. You will                  25 not see many -- she is actually one of 01:59</p>	<p>1 must have adjusted for a lot more than                  2 Cantor.                  3 BY MR. LASKER:                  4 Q. Let me just step back here because                  5 that was my question. The confidence 02:00                  6 interval for the hierarchical regression is                  7 narrower than the confidence interval for                  8 the logistic regression analysis?                  9 A. Correct, and that's by method. By                  10 making more assumptions, you're narrowing 02:00                  11 confidence intervals. That's how                  12 hierarchical regression works.                  13 Q. Let me step back so I make sure I                  14 understand the question -- understand the                  15 answer to my question. 02:00                  16 In the Cantor 1992 study, you                  17 raised concerns about a median latency                  18 period of less than ten years as making that                  19 study which had a 1.1 adjusted odds ratio,                  20 in your mind, less informative. And I'm 02:01                  21 just trying to understand if that same                  22 concern about the median latency period of                  23 less than ten years makes the De Roos 2003                  24 study which has that hierarchy ratio that                  25 you cite less informative. 02:01</p>



Page 218

1 MS. FORGIE: Objection. Object to  
 2 the form. Asked and answered.  
 3 You can answer.  
 4 THE WITNESS: Cantor is part of the  
 5 study; however, the beauty of pooled 02:01  
 6 studies is that they pool across  
 7 different studies with different  
 8 strengths and different weaknesses. It  
 9 helps for the sample size. It helps for  
 10 the statistical power. In this case, it 02:01  
 11 helps even to adjust for more variables  
 12 that you would be happy to adjust for,  
 13 and overall, it's more powerful because  
 14 of all of these reasons.  
 15 BY MR. LASKER: 02:02  
 16 Q. That wasn't my question. My  
 17 question was that you, in your expert  
 18 report, cited to a median latency period for  
 19 NHL of less than ten years as a reason why  
 20 the Cantor study was less informative, and 02:02  
 21 the 1.1 odds ratio in that study was less  
 22 informative to you.  
 23 The De Roos 2003 study has a median  
 24 latency period of less than ten years. My  
 25 question to you is whether that fact makes 02:02

Page 219

1 the De Roos 2003 study less informative?  
 2 MS. FORGIE: Object to the form.  
 3 Mischaracterizes her testimony and asked  
 4 and answered.  
 5 You can answer it again. 02:02  
 6 THE WITNESS: Again, the latency  
 7 period in Cantor cannot be different  
 8 from what the latency period of the part  
 9 of the data that is Cantor data in this  
 10 pooled analysis is. So it is what it 02:02  
 11 is.  
 12 However, adding additional states  
 13 and additional data improves what this  
 14 study can do over the Cantor study.  
 15 Plus it overall increases the latency 02:02  
 16 because we have the Nebraska study as  
 17 well.  
 18 BY MR. LASKER:  
 19 Q. Okay. But we also have the  
 20 Minnesota study which has a shorter latency 02:03  
 21 period; correct?  
 22 MS. FORGIE: Object to the form.  
 23 THE WITNESS: It's likely shorter.  
 24 Yes.  
 25 ///

Page 220

1 BY MR. LASKER:  
 2 Q. Just to clarify, the Kansas study  
 3 has a shorter period?  
 4 A. Kansas, yes.  
 5 Q. So again, my question is -- and it 02:03  
 6 may or may not -- but does the fact that the  
 7 De Roos 2003 study has a median latency  
 8 period of less than ten years, in your  
 9 assessment, does that, in your mind, make  
 10 the De Roos 2003 study less informative? 02:03  
 11 MS. FORGIE: Object to the form.  
 12 Mischaracterizes her testimony. Asked  
 13 and answered.  
 14 You can answer it again.  
 15 THE WITNESS: I think De Roos is a 02:03  
 16 really excellent study that did  
 17 everything we can do in terms of pooling  
 18 data in terms of relating the exposures  
 19 that she had access to to the outcomes  
 20 in adjusting and trying different 02:03  
 21 methods and in actually lengthening the  
 22 overall latency by including Nebraska.  
 23 MR. LASKER: Mark that answer. I'm  
 24 going to ask the question again.  
 25 ///

Page 221

1 BY MR. LASKER:  
 2 Q. In your opinion, does the fact that  
 3 the De Roos 2003 study has a median latency  
 4 of less than ten years make that study less  
 5 informative? 02:04  
 6 MS. FORGIE: Objection. Object to  
 7 the form. Mischaracterizes her prior  
 8 testimony, asked and answered. This is,  
 9 like, the fifth time you've asked the  
 10 same question. 02:04  
 11 THE WITNESS: Now I'm really  
 12 confused because I don't know anymore  
 13 what you mean by "less informative."  
 14 BY MR. LASKER:  
 15 Q. Okay. Well, that was your 02:04  
 16 terminology with respect to the Cantor  
 17 study.  
 18 A. Correct.  
 19 Q. And you stated that the Cantor  
 20 study was less informative because it had a 02:04  
 21 median latency period of less than ten  
 22 years. My question is: Do you believe that  
 23 the De Roos study is less informative  
 24 because it has a median latency period of  
 25 less than ten years? 02:04

<p style="text-align: right;">Page 222</p> <p>1 MS. FORGIE: Objection. Object to 2 the form. I object to the 3 mischaracterization of her prior 4 testimony. Asked and answered six 5 times. 02:05 6 You can answer it again. 7 THE WITNESS: So the De Roos study 8 generally is a better study than the 9 Cantor study because it pools data. So 10 it's not less informative. It's 02:05 11 actually more informative, that it 12 cannot go beyond the latency period of 13 one of the studies included for that 14 data is a no-brainer. 15 However, she added data with a 02:05 16 longer latency; so she is actually now 17 covering all sorts of latency periods 18 that we can look at. And the longer, of 19 course, we would have a latency period, 20 the more powerful. If she had another 02:05 21 study to add, it would become more 22 powerful, but it is an incremental step 23 going from one study that may be less 24 informative to two studies that are more 25 informative to three studies that are 02:05</p>	<p style="text-align: right;">Page 224</p> <p>1 exposures. 2 BY MR. LASKER: 3 Q. My question to you is: In the 4 published paper addressing the Nebraska data 5 that was pooled in De Roos 2003, the 02:07 6 investigators, Zahm, et al., do not report 7 any association between glyphosate and 8 non-Hodgkin's lymphoma; correct? 9 MS. FORGIE: Objection. Object to 10 the form, and asked and answered. 02:08 11 You can answer it again. 12 THE WITNESS: So the beauty of 13 pooled studies is that I can do things 14 that I can't do in a single study. I 15 presume that Sheila thought she could 02:08 16 not analyze certain types of pesticide 17 based on what is 201 cases. 18 So that would be normal procedure 19 to then make this data available for a 20 larger pooled study for pesticide 02:08 21 exposures that are less common. 22 BY MR. LASKER: 23 Q. My question was -- and I still I'm 24 not sure I've gotten -- I still haven't 25 gotten an answer. Dr. Zahm, in her 02:08</p>
<p style="text-align: right;">Page 223</p> <p>1 even more informative. 2 BY MR. LASKER: 3 Q. And the Nebraska data is from a 4 case control study that was published by 5 Dr. Zahm; correct? 02:06 6 A. Yes, Sheila. 7 Q. And Dr. Zahm in her published case 8 control study did not report any association 9 between glyphosate and non-Hodgkin's 10 lymphoma, did she? 02:06 11 A. Can you show me that? 12 Q. Sure. 13 (Exhibit Number 19-13 was 14 marked for identification.) 15 BY MR. LASKER: 02:06 16 Q. Again, my question is Dr. Zahm, in 17 her paper, does not report any -- 18 specifically any association or positive 19 association between glyphosate and 20 non-Hodgkin's lymphoma; correct? 02:07 21 MS. FORGIE: Take as much time as 22 you want reading it. 23 THE WITNESS: It looks like this is 24 a study specifically analyzed for 2,4-D 25 and some more general pesticide 02:07</p>	<p style="text-align: right;">Page 225</p> <p>1 published case control study, looking at 2 that Nebraska data that was then pooled into 3 De Roos 2003, does not report any 4 association between glyphosate-based 5 herbicides and non-Hodgkin's lymphoma; 02:08 6 correct? 7 MS. FORGIE: Objection. Object to 8 the form, asked and answered. This is 9 the fifth time she's answered. 10 You can answer it again. 02:09 11 THE WITNESS: So the pooled data is 12 not what is being reported on here. 13 There's a difference between a study and 14 a study report. Usually when you do 15 these studies, they're very expensive. 02:09 16 You collect a lot more data than what 17 you can report in one paper, and for 18 your career, you better publish more 19 than one paper. 20 There's always the issue of common 02:09 21 and less common exposures; so when I 22 collect as extensively as I can any kind 23 of occupational exposure, I might or 24 might not have the statistical power to 25 investigate every of those exposures in 02:09</p>

Page 226	Page 228
<p>1 my study that is relatively limited                  2 since there are only 201 white males as                  3 cases.                  4 So in that case, I provide this                  5 data for a collaborative effort and 02:10                  6 Dr. De Roos' paper is such a                  7 collaborative effort where then I                  8 provide them with a lot more data than I                  9 would be -- you see that she is the                  10 second author here, and Dr. Blair is the 02:10                  11 last author. So they would have had                  12 access to more data than this paper is                  13 actually reporting on.                  14 MR. LASKER: I'm going to have the                  15 reporter mark that answer again. I'm 02:10                  16 going to ask the question one more time                  17 to see if I can get an answer. If not,                  18 we'll just have to address this with the                  19 Court later.                  20 MS. FORGIE: I object to the 02:10                  21 statements about not getting an                  22 answer --                  23 MR. LASKER: That's fine. Just                  24 object.                  25 MS. FORGIE: It's unfair. 02:10</p>	<p>1 A. 113, yes.                  2 Q. And the Zahm published paper had,                  3 would you say, over 200 cases of                  4 non-Hodgkin's lymphoma; correct?                  5 A. 201. 02:11                  6 Q. Okay. De Roos and her                  7 co-investigators in the 2003 paper discuss                  8 their findings with respect to glyphosate in                  9 their conclusion -- in the concluding                  10 section; correct? Or I guess in their 02:12                  11 discussion section?                  12 A. Yes.                  13 Q. And on page 7 of 9, the                  14 paragraph -- sort of the second                  15 paragraph from the end of the bottom of the 02:12                  16 second column on page 7 is where De Roos and                  17 her co-investigators discuss their findings                  18 with respect to glyphosate; correct?                  19 A. This one? The second to the last.                  20 Q. Glyphosate -- 02:12                  21 A. Yeah, yeah.                  22 Q. In that discussion, they talk about                  23 the -- they cite to the Hardell paper, and                  24 they cite to the McDuffie paper; correct?                  25 MS. FORGIE: Objection. 02:13</p>
Page 227	Page 229
<p>1 BY MR. LASKER:                  2 Q. Dr. Ritz, in her published paper,                  3 case controlled paper, looking at the                  4 Nebraska data that was subsequently pulled                  5 into De Roos 2003, Dr. Zahm does not report 02:10                  6 any association between glyphosate and                  7 non-Hodgkin's lymphoma; correct?                  8 MS. FORGIE: Objection. Object to                  9 the form and asked and answered. This                  10 will be, like, the eighth or ninth time 02:10                  11 she's answered the same question.                  12 You can answer it again.                  13 THE WITNESS: This data in the Zahm                  14 publication from 1990 is not the data                  15 that was pooled into this pooled study. 02:11                  16 This is data specifically for one type                  17 of application. What I imagine Dr. Zahm                  18 provided to Dr. De Roos is a much more                  19 extensive dataset and the De Roos study                  20 is based on that more extensive dataset. 02:11                  21 BY MR. LASKER:                  22 Q. The De Roos study is looking at                  23 187 cases in its pooled analysis and                  24 113 cases in its analysis of multiple                  25 pesticides from Nebraska; correct? 02:11</p>	<p>1 THE WITNESS: I see a citation to a                  2 Williams paper and a Hardell paper.                  3 BY MR. LASKER:                  4 Q. Number 51 --                  5 A. And 51. 02:13                  6 Q. -- and number 8 is the McDuffie                  7 paper; correct?                  8 A. Oh, 8, yes.                  9 Q. So they cite to the McDuffie paper                  10 and the Hardell paper; correct? 02:13                  11 A. Yes.                  12 MS. FORGIE: Objection.                  13 BY MR. LASKER:                  14 Q. And they state that these few                  15 suggested findings provide some impetus for 02:13                  16 further investigation into the potential                  17 health effects of glyphosate; correct?                  18 A. It seems like they are citing                  19 Williams here.                  20 Q. I understand that. 02:13                  21 The conclusion that De Roos and her                  22 co-investigators provide in their discussion                  23 in their paper after reviewing the other                  24 epidemiological studies they cite, Hardell                  25 and McDuffie, after they've done their 02:14</p>

Page 230

1 analysis as well for the pooled data from  
 2 the U.S. case controlled studies, was that  
 3 these were suggested findings that provide  
 4 some impetus for further investigation into  
 5 the potential health effects of glyphosate; 02:14  
 6 correct?  
 7 MS. FORGIE: Object to the form.  
 8 THE WITNESS: The way I read this  
 9 is that they are commenting on Hardell  
 10 and McDuffie. 02:14  
 11 BY MR. LASKER:  
 12 Q. They do not -- De Roos and her  
 13 co-authors do not anywhere in their paper  
 14 state that their study in combination with  
 15 the earlier epidemiological studies supports 02:14  
 16 a conclusion that there has been shown a  
 17 causal association between glyphosate and  
 18 NHL, do they?  
 19 MS. FORGIE: Object to the form.  
 20 THE WITNESS: Well, they're 02:14  
 21 actually saying, "Our results indicate  
 22 increased NHL incidents by number of  
 23 pesticides used only for the subgroup of  
 24 potentially carcinogenic ones," and then  
 25 they list them. 02:15

Page 231

1 BY MR. LASKER:  
 2 Q. They do not list glyphosate; right?  
 3 MS. FORGIE: Wait. She hasn't  
 4 finished her answer. Please let her  
 5 finish. 02:15  
 6 THE WITNESS: I'm looking for the  
 7 glyphosate. No, that's the general  
 8 statement.  
 9 BY MR. LASKER:  
 10 Q. Okay. 02:15  
 11 A. But you would need to look at the  
 12 list of what she considers potentially  
 13 carcinogenic which is on Table 1, and you  
 14 will see that glyphosate was one of them  
 15 because it got a .3. 02:15  
 16 Q. In her -- in De Roos' discussion,  
 17 if I can direct you to page 6 of 9, she has  
 18 data there for combined pesticide use,  
 19 Table 5.  
 20 Do you see that? 02:16  
 21 A. Yes.  
 22 Q. And one of the analyses that they  
 23 conduct is a combined analysis of atrazine  
 24 and dicamba; correct?  
 25 A. Yes. 02:16

Page 232

1 Q. And as it happens, their findings  
 2 for their logistic regression and their  
 3 hierarchical regression for atrazine and  
 4 dicamba combined are almost identical to  
 5 their findings for glyphosate alone; 02:16  
 6 correct?  
 7 MS. FORGIE: Object to the form.  
 8 THE WITNESS: I don't know what you  
 9 mean by "identical."  
 10 BY MR. LASKER: 02:16  
 11 Q. Well, for atrazine and dicamba in  
 12 their logistical regression, they had an  
 13 odds ratio of 2.1 which is the same odds  
 14 ratio as glyphosate had in logistical  
 15 regression; correct? 02:17  
 16 A. Yes, but odds ratio of 2.1 or .7 or  
 17 .3 you can find all over this table.  
 18 Q. And the confidence interval for the  
 19 logistic regression analysis for 2.1 was  
 20 marginally significant and very similar to 02:17  
 21 the confidence interval for glyphosate  
 22 alone; correct?  
 23 A. Correct. But you can see that it  
 24 is based on very different data. It's based  
 25 on 31 cases and 60 controls in that category 02:17

Page 233

1 versus 36 and 61 for glyphosate. So it's  
 2 not the same people.  
 3 Q. Right. I wasn't suggesting it's  
 4 the same people.  
 5 The hierarchical regression 02:17  
 6 analysis, the conclusion for atrazine and  
 7 dicamba combined was a 1.6 odds ratio which  
 8 is the same odds ratio reported for  
 9 glyphosate; correct?  
 10 MS. FORGIE: Object to the form. 02:17  
 11 THE WITNESS: Well, yeah, I mean,  
 12 when we do these kind of analyses, a lot  
 13 of odds ratios might be the same.  
 14 BY MR. LASKER:  
 15 Q. And the confidence interval for the 02:18  
 16 hierarchical regression analysis for  
 17 atrazine and dicamba combined is, again,  
 18 virtually identical to the odds ratio for  
 19 the hierarchical regression analysis for  
 20 glyphosate; correct? 02:18  
 21 MS. FORGIE: Object to the form.  
 22 THE WITNESS: Not surprising given  
 23 the assumptions they made for the  
 24 hierarchical regression.  
 25 ///

Page 234

1 BY MR. LASKER:  
 2 Q. And in discussing those odds  
 3 ratios, 2.1 for the logistic regression  
 4 analysis that is just statistically  
 5 significant and a 1.6 for the hierarchical 02:18  
 6 regression analysis that's not significant  
 7 in connection with atrazine and dicamba on  
 8 page 6 in their study, and it is in the text  
 9 right above the words "Discussion," De Roos  
 10 states that those findings were "probably 02:18  
 11 misleading due to imprecision of estimates  
 12 noting that these results did not hold up  
 13 following shrinkage and hierarchical  
 14 regression analysis according to our prior  
 15 distribution of complete exchangeability"; 02:19  
 16 correct?  
 17 A. That's what this says. I mean, the  
 18 text.  
 19 Q. And to the extent that -- I take it  
 20 you would not view the identical -- or not 02:19  
 21 nearly identical odds ratios reported for  
 22 glyphosate in the same study as being  
 23 probably misleading; correct?  
 24 MS. FORGIE: Object to the form.  
 25 THE WITNESS: You are comparing two 02:19

Page 235

1 tables you absolutely cannot compare.  
 2 The result for atrazine and dicamba  
 3 both, it's what we call an interaction  
 4 term, and what she is comparing here is  
 5 they seem to be indicative super 02:19  
 6 additivity and results from logistic  
 7 regression.  
 8 And what this next sentence is  
 9 referring to, such as for atrazine and  
 10 dicamba, were probably misleading. So 02:19  
 11 the misleading is the super additivity  
 12 and not the effect estimate.  
 13 BY MR. LASKER:  
 14 Q. Let's go on to the Lee study just  
 15 briefly. That's Lee 2004. 02:20  
 16 MS. FORGIE: Are we putting these  
 17 away?  
 18 MR. LASKER: For now, yes.  
 19 (Exhibit Number 19-14 was  
 20 marked for identification.) 02:20  
 21 BY MR. LASKER:  
 22 Q. The Lee study is another pooled  
 23 analysis here using two of the three studies  
 24 that were used in De Roos 2003; correct?  
 25 A. Correct. 02:20

Page 236

1 Q. The Lee study reporting its results  
 2 does not adjust for exposures to other  
 3 pesticides; correct?  
 4 MS. FORGIE: Object to the form.  
 5 THE WITNESS: I have to check that. 02:21  
 6 BY MR. LASKER:  
 7 Q. Table 3 on page 300.  
 8 A. The Lee study does not give you an  
 9 effect estimate for glyphosate. It gives  
 10 you a stratified analysis by asthmatics and 02:21  
 11 non-asthmatics for glyphosate.  
 12 Q. And in that stratified analysis,  
 13 they do not adjust for exposures to other  
 14 pesticides; correct?  
 15 MS. FORGIE: Object to the form. 02:21  
 16 Asked and answered.  
 17 You can answer it again.  
 18 THE WITNESS: That seems to be  
 19 correct, and I would be very surprised  
 20 if they did because they had only six 02:21  
 21 cases among asthmatics. If you throw  
 22 any more variable into that model, you  
 23 will explode it.  
 24 BY MR. LASKER:  
 25 Q. Well, the adjustment model is based 02:22

Page 237

1 upon all the exposures. It's not specific  
 2 to glyphosate; correct?  
 3 A. No. The one for glyphosate has six  
 4 exposed cases and 12 exposed controls, and  
 5 you already have age, vital status, and 02:22  
 6 state in there. So if you do it two by two  
 7 by two table, then you have no more  
 8 subjects --  
 9 Q. I'm sorry --  
 10 A. -- in one of these. 02:22  
 11 Q. We're not connecting here --  
 12 A. Table number 3.  
 13 MS. FORGIE: Wait, let her finish.  
 14 BY MR. LASKER:  
 15 Q. All of the adjustments in this 02:22  
 16 entire study, and there's a whole lot of  
 17 adjustments they do with stratification on  
 18 Tables 2 and Table 3, none of the odds  
 19 ratios anywhere in this study are adjusted  
 20 for exposures to other pesticides; correct? 02:22  
 21 MS. FORGIE: Objection. Object to  
 22 form. Asked and answered.  
 23 You can answer it again.  
 24 THE WITNESS: The glyphosate  
 25 estimates are estimates among 02:22

Page 238

1 non-asthmatics and asthmatics. When you  
 2 split your data in that way, you limit  
 3 the way you can adjust. In this case,  
 4 when you have asthmatics with six  
 5 glyphosate exposed cases and 12 02:23  
 6 controls, there's absolutely no way -- I  
 7 don't even know how they adjust for age  
 8 vital status and state without exploding  
 9 their model.  
 10 BY MR. LASKER: 02:23  
 11 Q. Okay. Dr. Ritz, that wasn't my  
 12 question, and that doesn't answer my  
 13 question in the slightest.  
 14 MS. FORGIE: I object to that  
 15 commentary. She's answered it twice. 02:23  
 16 MR. LASKER: We'll mark this answer  
 17 as well.  
 18 BY MR. LASKER:  
 19 Q. It's a very simple question.  
 20 There's two tables here, Table 2 and Table 3 02:23  
 21 with a whole lot of reported odds ratios,  
 22 not only for glyphosate, but for other  
 23 pesticides, for other exposures, for  
 24 combined herbicides. None of those odds  
 25 ratios include any adjustment for exposure 02:23

Page 239

1 to other pesticide; correct?  
 2 MS. FORGIE: Objection. Object to  
 3 the form. Asked and answered.  
 4 You can answer it again.  
 5 THE WITNESS: None of the pesticide 02:23  
 6 results are concomitantly adjusted, and  
 7 it's not a surprise because they are  
 8 stratifying by asthma status, and in  
 9 order to compare one model with another,  
 10 they have to adjust for exactly the same 02:24  
 11 variables or else you can't compare the  
 12 models.  
 13 And the intent here is to compare  
 14 models for asthmatics with models for  
 15 non-asthmatics. If you put different 02:24  
 16 adjustments variables in there, you  
 17 don't know whether you see a difference  
 18 or not.  
 19 MR. LASKER: We're going to have to  
 20 mark that answer again and ask one more 02:24  
 21 time because I can't get a yes or no  
 22 answer to a question. I'll ask it one  
 23 more time.  
 24 BY MR. LASKER:  
 25 Q. None of the odds ratios in the Lee 02:24

Page 240

1 study were adjusted for exposure to other  
 2 pesticides; correct?  
 3 MS. FORGIE: Objection. Object to  
 4 the form. Asked and answered. As you  
 5 just stated, this is like the seventh 02:24  
 6 time.  
 7 You can answer it again.  
 8 THE WITNESS: This study intends to  
 9 look at a stratified analysis of  
 10 non-asthmatics and asthmatics. If I 02:24  
 11 really want to compare the effects  
 12 estimates between these two groups of  
 13 people and I want to assess whether  
 14 glyphosate has the same effect in one  
 15 group than in the other, I have to 02:25  
 16 automatically adjust for the same  
 17 variables. They already are adjusting  
 18 for age, vital status, and state,  
 19 therefore, there is no way they could  
 20 also adjust for everything else. 02:25  
 21 BY MR. LASKER:  
 22 Q. So if the answer is, yes, that's  
 23 fine, but I need an answer for the record.  
 24 Am I correct that the Lee study does not  
 25 adjust for exposure to other pesticides? 02:25

Page 241

1 Yes or no?  
 2 MS. FORGIE: Objection.  
 3 No. She's not required to give a  
 4 yes or no answer, and you know that.  
 5 MR. LASKER: Frankly, she is. 02:25  
 6 MS. FORGIE: No, she's not. Don't  
 7 do this. Objection. Object to the  
 8 form. Object to asked and answered for  
 9 the seventh time.  
 10 You're not required to give a yes 02:25  
 11 or no answer. You can answer again.  
 12 BY MR. LASKER:  
 13 Q. I'm asking for a yes or no answer.  
 14 If you can't give a yes or no answer, you  
 15 can just state that and we'll move on and 02:25  
 16 we'll deal with it later for the judge.  
 17 MS. FORGIE: Objection.  
 18 THE WITNESS: My answer will not  
 19 change.  
 20 BY MR. LASKER: 02:25  
 21 Q. My question to you is am I correct  
 22 that the Lee study in reporting the odds  
 23 ratios for all the odds ratios reported does  
 24 not adjust for the exposure to other  
 25 pesticides? 02:25

Page 242

1 MS. FORGIE: Objection. Object to  
 2 the form and asked and answered.  
 3 You can answer it again.  
 4 THE WITNESS: This is such a  
 5 general question that it's not 02:26  
 6 answerable. But in order to inform you  
 7 what is done in this study, I state it  
 8 again. This study intends to compare  
 9 effect estimates between asthmatics and  
 10 non-asthmatics. In order to do so, the 02:26  
 11 authors had to adjust for exactly the  
 12 same variables in the pesticide models.  
 13 The variables they adjusted for are age,  
 14 vital status, and state.  
 15 MR. LASKER: Mark that and we'll 02:26  
 16 move on.  
 17 BY MR. LASKER:  
 18 Q. The issue with latency that you  
 19 raised and we've discussed before from the  
 20 same pool data would also exist to the 02:26  
 21 extent that it concerns you or not with the  
 22 Lee study; correct?  
 23 MS. FORGIE: Object to the form.  
 24 THE WITNESS: I'm not sure what you  
 25 mean by issue. However, this study 02:26

Page 243

1 includes Nebraska and we seem to have  
 2 agreed that that has a longer latency  
 3 and gives you more opportunity to  
 4 investigate this question.  
 5 BY MR. LASKER: 02:27  
 6 Q. And it also includes the data in  
 7 Cantor that has the latency period that you  
 8 believe is too short; correct?  
 9 A. I never said that I believed it is  
 10 too short, but it does include the Iowa and 02:27  
 11 Minnesota data that's in the Cantor study.  
 12 Q. Let's move on to the McDuffie  
 13 study.  
 14 MS. FORGIE: Are we finished with  
 15 this? 02:27  
 16 MR. LASKER: Yeah.  
 17 (Exhibit Number 19-15 was  
 18 marked for identification.)  
 19 BY MR. LASKER:  
 20 Q. Dr. Ritz, for the record this is 02:27  
 21 the McDuffie study which is the case control  
 22 study from Canada; correct?  
 23 A. Yes.  
 24 Q. And the authors describe McDuffie,  
 25 et al., describe their analysis in this 02:28

Page 244

1 study as exploratory; correct?  
 2 MS. FORGIE: Object to the form.  
 3 THE WITNESS: Where do they say  
 4 that?  
 5 BY MR. LASKER: 02:28  
 6 Q. On page 1161 in the second  
 7 column about two-thirds of the way down. Do  
 8 you see the sentence starting "We report  
 9 results"?  
 10 A. Yes. 02:28  
 11 Q. "We reported results."  
 12 A. Uh-huh.  
 13 Q. And McDuffie, et al., describe  
 14 their analysis in this study as exploratory;  
 15 correct? 02:28  
 16 MS. FORGIE: Objection. Object to  
 17 the form.  
 18 THE WITNESS: What they're stating  
 19 is that they investigated a number of  
 20 different chemicals and exposures and, 02:28  
 21 therefore, some of the analyses to  
 22 unspecified agents should be considered  
 23 exploratory. I don't know what they  
 24 mean by unspecified agents.  
 25 ///

Page 245

1 BY MR. LASKER:  
 2 Q. During the point in time, and I  
 3 think you mentioned this -- well, at -- in  
 4 the method section -- strike that.  
 5 Do you know based upon your review 02:29  
 6 of this study whether glyphosate was  
 7 specified in the hypothesis when they were  
 8 conducting this study?  
 9 MS. FORGIE: Object to the form.  
 10 THE WITNESS: I wouldn't know that. 02:29  
 11 BY MR. LASKER:  
 12 Q. Okay. So you cannot state, then,  
 13 whether or not the glyphosate findings would  
 14 be considered by the investigators McDuffie,  
 15 et al., to be exploratory; correct? 02:29  
 16 MS. FORGIE: Object to the form.  
 17 THE WITNESS: That's not correct  
 18 because what I -- when I design a study  
 19 and a study questionnaire, I have to  
 20 decide which chemical agents to specify, 02:29  
 21 meaning, to name or to want to  
 22 investigate. So in my preparation for a  
 23 study, I have to be very clear about  
 24 what kinds of pesticides I'm asking  
 25 about, and I would call that 02:30

<p style="text-align: right;">Page 246</p> <p>1 specification.</p> <p>2 So if they hadn't been interested</p> <p>3 in glyphosate, they wouldn't have</p> <p>4 investigated it, and they wouldn't have</p> <p>5 asked it in a questionnaire. 02:30</p> <p>6 BY MR. LASKER:</p> <p>7 Q. They state, however, in presenting</p> <p>8 the data, and they do present data on</p> <p>9 various different chemical agents, and they</p> <p>10 have a whole list of them, that they are 02:30</p> <p>11 presenting results for chemical agents and</p> <p>12 exposures that were not specified in the</p> <p>13 hypothesis; correct?</p> <p>14 MS. FORGIE: Object to the form.</p> <p>15 Asked and answered. You can answer it 02:30</p> <p>16 again.</p> <p>17 THE WITNESS: They refer to a</p> <p>18 number of chemical agents and exposures</p> <p>19 that were not specified. The way that</p> <p>20 might happen is that when you have a 02:30</p> <p>21 questionnaire, you have open questions</p> <p>22 and you don't specify the name of the</p> <p>23 chemical, but people decide to write</p> <p>24 them in. I have no idea what they mean</p> <p>25 by unspecified, but that's one way of 02:30</p>	<p style="text-align: right;">Page 248</p> <p>1 Q. With respect to the tables that</p> <p>2 report any findings with respect to</p> <p>3 glyphosate, none of those findings are</p> <p>4 adjusted for exposures to other pesticides;</p> <p>5 correct? 02:32</p> <p>6 MS. FORGIE: Object to the form.</p> <p>7 THE WITNESS: Which table are we</p> <p>8 talking about?</p> <p>9 BY MR. LASKER:</p> <p>10 Q. Well, for glyphosate, it would be 02:32</p> <p>11 Tables 2 and Table 8 as far as I know. But</p> <p>12 you should make sure that you agree with</p> <p>13 that. Take your time.</p> <p>14 A. 2 and --</p> <p>15 MS. FORGIE: 8. 02:33</p> <p>16 THE WITNESS: These tables seem to</p> <p>17 adjust for age and province.</p> <p>18 BY MR. LASKER:</p> <p>19 Q. Just so the record is clear in the</p> <p>20 odds ratios that are reported for glyphosate 02:33</p> <p>21 in the McDuffie study, the investigators do</p> <p>22 not adjust for exposure to other pesticides;</p> <p>23 correct?</p> <p>24 A. That seems correct.</p> <p>25 Q. The -- as you note in your expert 02:33</p>
<p style="text-align: right;">Page 247</p> <p>1 reading it.</p> <p>2 BY MR. LASKER:</p> <p>3 Q. And you don't know sitting here</p> <p>4 today whether or not based upon this and</p> <p>5 based upon however they prepared this 02:31</p> <p>6 information, whether the findings that they</p> <p>7 report with respect to glyphosate should be</p> <p>8 considered exploratory; correct?</p> <p>9 MS. FORGIE: Objection. Asked and</p> <p>10 answered. Object to the form. 02:31</p> <p>11 You can answer it again.</p> <p>12 THE WITNESS: All I can tell you I</p> <p>13 don't consider this exploratory.</p> <p>14 BY MR. LASKER:</p> <p>15 Q. Okay. The McDuffie case control 02:31</p> <p>16 study did not adjust for exposure to other</p> <p>17 pesticides; correct?</p> <p>18 A. In what table?</p> <p>19 Q. Any of the tables.</p> <p>20 A. That's not correct. Table 6 and 7 02:31</p> <p>21 seem to be adjusting for chemicals.</p> <p>22 Q. 6 and 7 are dealing with various</p> <p>23 medical variables?</p> <p>24 A. And dicamba and Aldrin and</p> <p>25 Mecoprop. 02:32</p>	<p style="text-align: right;">Page 249</p> <p>1 report and just so the record is clear, for</p> <p>2 the two ever/never odds ratios for the</p> <p>3 glyphosate that McDuffie reports, they find</p> <p>4 odds ratios of 1.26 in one model and 1.2 in</p> <p>5 the other model, and neither of those odds 02:34</p> <p>6 ratios are statistically significant by the</p> <p>7 95 percent confidence interval; correct?</p> <p>8 A. Well, if we want to play the</p> <p>9 P-value game, that's correct, but the values</p> <p>10 are 1.26 and 1.20. One adjusted; one not. 02:34</p> <p>11 But that's an ever/never.</p> <p>12 Q. Right. And the -- you mention in</p> <p>13 your report that there was separate analyses</p> <p>14 of the McDuffie data that, first of all,</p> <p>15 separated out association for glyphosate 02:34</p> <p>16 with and without malathion; correct? I</p> <p>17 think that's your expert report at page 18.</p> <p>18 A. Where's that?</p> <p>19 Q. In your expert report at page 18.</p> <p>20 MR. WISNER: Do you want to go off 02:35</p> <p>21 the record while we fix this?</p> <p>22 MR. LASKER: If we can. I don't</p> <p>23 know that we can. Let's wait until the</p> <p>24 end of this question.</p> <p>25 MS. FORGIE: What was the question 02:35</p>



<p style="text-align: right;">Page 250</p> <p>1 again?</p> <p>2 MR. LASKER: Now I'm losing track</p> <p>3 of these things. Oh, okay.</p> <p>4 BY MR. LASKER:</p> <p>5 Q. So in your expert report you note 02:35</p> <p>6 that there was a separate analysis of the</p> <p>7 McDuffie data that separated out the</p> <p>8 association for glyphosate with and without</p> <p>9 co-exposure to malathion; correct?</p> <p>10 A. Yes, that's the Hohenadel paper. 02:36</p> <p>11 Q. The Hohenadel study is a stratified</p> <p>12 analysis like we were discussing earlier in</p> <p>13 your testimony here today; correct?</p> <p>14 MS. FORGIE: Object to the form.</p> <p>15 THE WITNESS: It's not a stratified 02:36</p> <p>16 analysis. It's what we would call an</p> <p>17 interaction model testing.</p> <p>18 BY MR. LASKER:</p> <p>19 Q. In that interaction model testing</p> <p>20 when, and I think you report this, you note 02:36</p> <p>21 this in your expert report, when Hohenadel</p> <p>22 looked at the McDuffie data and looked at</p> <p>23 exposures -- farmers who were exposed to</p> <p>24 glyphosate alone without co-exposure to</p> <p>25 malathion, they found or they reported an 02:36</p>	<p style="text-align: right;">Page 252</p> <p>1 Q. So in your report when you are</p> <p>2 stating that there was an elevated odds</p> <p>3 ratio for dicamba exposure mixed with</p> <p>4 glyphosate exposure, that is relying upon</p> <p>5 that footnote G in Table 2; correct? 02:38</p> <p>6 A. Correct. That's what it was.</p> <p>7 Q. And footnote G states that the odds</p> <p>8 ratio that you cite for mixed exposure for</p> <p>9 dicamba and glyphosate also involves mixed</p> <p>10 exposures to dicamba and 2,4-D and Mecoprop; 02:39</p> <p>11 correct?</p> <p>12 A. That's what it says in the</p> <p>13 footnote.</p> <p>14 Q. And unlike for glyphosate, McDuffie</p> <p>15 reported statistically significant increased 02:39</p> <p>16 risks of non-Hodgkin's lymphoma separately</p> <p>17 associated with exposures to each of the</p> <p>18 three pesticides 2,4-D, dicamba, and</p> <p>19 Mecoprop; correct?</p> <p>20 A. That's in table -- 02:39</p> <p>21 Q. It's actually in Table 2. They</p> <p>22 have separate odds ratios reported for 2,4-D</p> <p>23 that is statistically significant in</p> <p>24 their --</p> <p>25 A. Yes. 02:39</p>
<p style="text-align: right;">Page 251</p> <p>1 odds ratio of 0.92 with a confidence</p> <p>2 interval of 0.54 to 1.55; correct?</p> <p>3 A. Correct.</p> <p>4 Q. And in your report you also point</p> <p>5 to a separate analysis that you say McDuffie 02:37</p> <p>6 conducted which looked at glyphosate</p> <p>7 exposure mixed with dicamba exposure;</p> <p>8 correct, in your expert report?</p> <p>9 A. Where is that?</p> <p>10 Q. Right above -- 02:37</p> <p>11 A. Above? Yes.</p> <p>12 Q. Okay. And I take it that that --</p> <p>13 your discussion there is based upon -- and</p> <p>14 correct me if I'm wrong -- Table 2 in the</p> <p>15 McDuffie paper? 02:37</p> <p>16 A. It's the McDuffie paper.</p> <p>17 Q. Look at Table 2.</p> <p>18 MS. FORGIE: You can look at</p> <p>19 whatever you want.</p> <p>20 BY MR. LASKER: 02:38</p> <p>21 Q. You'll see the numbers that you</p> <p>22 cite in your expert report on Table 2 for</p> <p>23 dicamba and dicamba individual. Do you see</p> <p>24 those?</p> <p>25 A. Yes. 02:38</p>	<p style="text-align: right;">Page 253</p> <p>1 Q. -- model, second model for</p> <p>2 Mecoprop?</p> <p>3 A. Yeah, but it's an effect estimate</p> <p>4 of 1.26 and 1.32, and it's only</p> <p>5 statistically significant after the 02:39</p> <p>6 adjustment.</p> <p>7 Q. Okay. And then for Mecoprop there</p> <p>8 is a 2.23 or 2.33 odds ratio --</p> <p>9 A. Correct.</p> <p>10 Q. -- statistically significant to 02:39</p> <p>11 both measure and for dicamba even in the</p> <p>12 dicamba alone for their more highly adjusted</p> <p>13 odds ratio it's 1.68 marginally</p> <p>14 statistically significant; correct?</p> <p>15 A. Yes. 02:40</p> <p>16 Q. And you cannot tell from this data</p> <p>17 when you're looking at the mixed exposures</p> <p>18 for dicamba when they're mixed for 2,4-D</p> <p>19 Mecoprop and glyphosate, you cannot</p> <p>20 attribute the difference between dicamba 02:40</p> <p>21 alone and this dicamba mixture to</p> <p>22 glyphosate, can you?</p> <p>23 MS. FORGIE: Object to the form.</p> <p>24 THE WITNESS: You can never do that</p> <p>25 in an individual anyhow. When you're 02:40</p>

Page 254

1 doing these kind of analyses, you have  
 2 mixed exposures. If a person is exposed  
 3 to two compounds, then it can be either  
 4 one compound or the other or both  
 5 together that are responsible for the 02:40  
 6 event.  
 7 BY MR. LASKER:  
 8 Q. But in this case, it's not one or  
 9 the other or two. There's actually four  
 10 different chemicals when you're stating that 02:41  
 11 there was in your expert report -- and let's  
 12 go back to your expert report. You state  
 13 that McDuffie reported that when glyphosate  
 14 exposure was mixed with dicamba, the risk  
 15 was increased. 02:41  
 16 Do you see that?  
 17 A. Yes.  
 18 Q. And, in fact, what McDuffie was  
 19 reporting is that when dicamba exposure also  
 20 included mixed exposures to glyphosate, 02:41  
 21 2,4-D and Mecoprop, there was an increase as  
 22 compared to the dicamba alone; correct?  
 23 MS. FORGIE: Object to the form.  
 24 Mischaracterizes.  
 25 THE WITNESS: That's not what I'm 02:41

Page 255

1 saying. I'm saying there is dicamba  
 2 that is of the kind Banvel and Target  
 3 which includes glyphosate and then  
 4 there's dicamba overall. So one is a  
 5 subgroup of the other. And you can 02:41  
 6 actually see that when you're looking at  
 7 the number of exposed cases and exposed  
 8 controls. Dicamba is the  
 9 all-encompassing over label and then  
 10 they're breaking it down with and 02:42  
 11 without glyphosate, et cetera, mixtures.  
 12 BY MR. LASKER:  
 13 Q. The et cetera is the important  
 14 point, but let me make sure I understand.  
 15 Is it your testimony that or Banvel or 02:42  
 16 Target is a mixed exposure with glyphosate?  
 17 MS. FORGIE: Objection. Object to  
 18 the form and mischaracterizes her  
 19 testimony.  
 20 THE WITNESS: So it says in the 02:42  
 21 footnote, "dicamba is a major chemical  
 22 class, includes Banvel and Target and a  
 23 mixture of dicamba glyphosate, Rustler,  
 24 or a mixture of dicamba 2,4-D and  
 25 Mecoprop. 02:42

Page 256

1 BY MR. LASKER:  
 2 Q. And then Dynel, Killex; correct?  
 3 MS. FORGIE: Object to the form.  
 4 THE WITNESS: Dynel DS, and Killex.  
 5 BY MR. LASKER: 02:42  
 6 Q. So the mixed exposure would be in  
 7 Rustler for dicamba and glyphosate; correct?  
 8 A. There are several mixtures.  
 9 There's the mixture of dicamba and  
 10 glyphosate in Rustler and then there's the 02:42  
 11 mixture of dicamba with 2,4-D and Mecoprop.  
 12 Q. So for the 1.68 odds ratio, that's  
 13 dicamba alone; correct?  
 14 A. That's the overall dicamba. That's  
 15 not dicamba alone. That's not -- that's 02:43  
 16 dicamba with everything.  
 17 Q. And your understanding is dicamba  
 18 with everything is 1.68 and dicamba alone is  
 19 the 1.88?  
 20 A. No. 02:43  
 21 MS. FORGIE: Object to the form.  
 22 THE WITNESS: It's the opposite.  
 23 MS. FORGIE: Okay. That's what I  
 24 thought.  
 25 THE WITNESS: Dicamba overall is 02:43

Page 257

1 1.88, and the dicamba, Banvel and Target  
 2 is 1.68.  
 3 BY MR. LASKER:  
 4 Q. And the difference -- in your  
 5 expert report you state that the difference 02:43  
 6 going up to that higher number is because  
 7 there was including mixtures with  
 8 glyphosate, but that higher number actually  
 9 also reflects exposures to 2,4-D and  
 10 Mecoprop; correct? 02:43  
 11 MS. FORGIE: Objection. Object to  
 12 the form and asked and answered.  
 13 You can answer it again.  
 14 THE WITNESS: I'm not sure that I  
 15 understand what you're trying to get at. 02:43  
 16 In this table, dicamba exposure was the  
 17 footnote G is the overall  
 18 encompassing -- all-encompassing  
 19 exposure. The individual dicamba  
 20 herbicide Banvel or Target is the one 02:44  
 21 that's reported below. The number of  
 22 cases is lower, and the number of  
 23 controls is lower, but, in essence, the  
 24 number of 26 and 50s included in the  
 25 larger category above which is 73 and 02:44

Page 258

1 131.  
 2 BY MR. LASKER:  
 3 Q. My question is very simple. In  
 4 your expert report, you state that the odds  
 5 ratio of 1.92 was an odds ratio of 02:44  
 6 glyphosate exposure mixed with dicamba. And  
 7 am I correct in my reading of this table  
 8 that that 1.92 odd ratio is, in fact,  
 9 dicamba with mixtures that include  
 10 glyphosate but also Mecoprop and 2,4-D? 02:44  
 11 MS. FORGIE: Objection. Object to  
 12 the form and also asked and answered.  
 13 You can answer it again.  
 14 THE WITNESS: The larger group  
 15 encompasses everything including 02:44  
 16 glyphosate.  
 17 BY MR. LASKER:  
 18 Q. And Mecoprop and 2,4-D; correct?  
 19 A. It's the largest group.  
 20 Q. Yes. And you have to answer the 02:45  
 21 question or there's no answer on the record.  
 22 A. Yes. It's the larger group.  
 23 MS. FORGIE: Wait, wait. So get a  
 24 format back that's question and answer  
 25 so I can get my objections in. 02:45

Page 259

1 BY MR. LASKER:  
 2 Q. So the odds ratio of 1.92 that you  
 3 cite in your expert report as glyphosate  
 4 exposure mixed with dicamba is the odds  
 5 ratio that McDuffie reports for dicamba and 02:45  
 6 dicamba mixtures including glyphosate 2,4-D  
 7 and Mecoprop; correct?  
 8 MS. FERGIE: Objection. Object to  
 9 the form. Also asked and answered.  
 10 You can answer it again. 02:45  
 11 THE WITNESS: Dicamba here is a  
 12 super category for several mixtures, and  
 13 it's stated under footnote G. And we  
 14 can see that that's the case because  
 15 there are more NHL cases and more 02:45  
 16 controls in that category than in the  
 17 category below.  
 18 MR. LASKER: I'm going to mark this  
 19 answer as well.  
 20 BY MR. LASKER: 02:45  
 21 Q. I'm going to ask the question again  
 22 because I think it's a simple question, but  
 23 I'm not getting an answer?  
 24 MS. FORGIE: I'm objecting to that  
 25 commentary. You're badgering the 02:46

Page 260

1 witness when you do that.  
 2 MR. LASKER: You can object as much  
 3 as you want.  
 4 MS. FORGIE: I will.  
 5 BY MR. LASKER: 02:46  
 6 Q. The odds ratio of 1.92 that you  
 7 report in your expert report as the odds  
 8 ratio for glyphosate mixed with dicamba is  
 9 as reported, in fact, in the study McDuffie  
 10 an odds ratio for dicamba and dicamba 02:46  
 11 mixtures with glyphosate but also with 2,4-D  
 12 and Mecoprop; correct?  
 13 MS. FORGIE: Objection. And I  
 14 object to the form. And I object to the  
 15 fact this is the eighth time you've 02:46  
 16 asked her. You're badgering this  
 17 witness. It's not fair.  
 18 You can answer again.  
 19 THE WITNESS: The reason why I'm  
 20 referring to this is because this is a 02:46  
 21 mixture exposure, and that's very  
 22 clearly stated in my report.  
 23 BY MR. LASKER:  
 24 Q. Your report --  
 25 A. The mixture includes dicamba and 02:46

Page 261

1 glyphosate under heading G in this footnote.  
 2 Q. The mixture also includes which you  
 3 don't mention in your report 2,4-D and  
 4 Mecoprop; correct?  
 5 MS. FORGIE: Objection. Asked and 02:46  
 6 answered. Object to the form.  
 7 You can answer again.  
 8 THE WITNESS: It is a mixture  
 9 exposure. Some people were exposed to a  
 10 mixture of dicamba and glyphosate. 02:47  
 11 Others might have been exposed to a  
 12 mixture of dicamba with something else,  
 13 but it says the major chemical classes  
 14 included Banvel and Target, and it  
 15 refers to these two as major and being a 02:47  
 16 mixture of dicamba and glyphosate.  
 17 BY MR. LASKER:  
 18 Q. Banvel and Target do not have  
 19 glyphosate in them, do they?  
 20 MS. FORGIE: Objection. Asked and 02:47  
 21 answered.  
 22 You can answer it again.  
 23 THE WITNESS: The way it states it  
 24 dicamba is a major chemical class,  
 25 includes Banvel and Target and a mixture 02:47

<p style="text-align: right;">Page 262</p> <p>1 of dicamba and glyphosate. That's what 2 I said.</p> <p>3 BY MR. LASKER:</p> <p>4 Q. So is it your understanding and the 5 basis of your expert report that Banvel and 02:47 6 Target include glyphosate?</p> <p>7 MS. FORGIE: Objection. Object to 8 the form. Asked and answered. You're 9 badgering the witness. This is 10 completely unfair. 02:47</p> <p>11 I'll let you answer it again.</p> <p>12 THE WITNESS: What I said is that 13 dicamba is a major chemical class and 14 what they refer to here is that dicamba 15 wasn't dicamba alone, but it was under 02:47 16 this rubric of dicamba G exposed. They 17 subsumed multiple agents that were mixed 18 with dicamba.</p> <p>19 BY MR. LASKER:</p> <p>20 Q. McDuffie provides an analysis in 02:48 21 her expert report. I'm not sure that fully 22 answered on the last question but I'm going 23 to move on so I can get through this 24 deposition for now at least.</p> <p>25 McDuffie provides an analysis on 02:48</p>	<p style="text-align: right;">Page 264</p> <p>1 A. I guess I didn't.</p> <p>2 MS. FORGIE: When you get to a good 3 breaking point, let's take a short 4 break, please.</p> <p>5 MR. LASKER: Okay. Let's just get 02:50 6 through this.</p> <p>7 MS. FORGIE: That's fine.</p> <p>8 BY MR. LASKER:</p> <p>9 Q. In your opinion, does this analysis 10 on Table 8 of less than or equal to two days 02:50 11 versus greater than two days provide 12 evidence of a dose response for glyphosate?</p> <p>13 A. This is not supposed to give a dose 14 response. This is an analysis where you're 15 trying to separate out people who are 02:50 16 completely unexposed to this agent and 17 people who had minimal exposure versus 18 reasonable exposure two days per year. And 19 in doing so, you can actually see that 20 there's very little confounding due to any 02:50 21 other variable because for minimal exposure 22 the effect estimate is 1. So even if I 23 would compare as done in De Roos, the people 24 with more than two days of exposure to the 25 people of less than two days, I would still 02:51</p>
<p style="text-align: right;">Page 263</p> <p>1 Table 8, I believe, of exposures based upon 2 days, less than two days or more than two 3 days for purposes for glyphosate; correct?</p> <p>4 A. Yes.</p> <p>5 Q. You do not cite to this analysis, 02:48 6 unless I missed it, anywhere in your expert 7 report; correct?</p> <p>8 A. I think I'm referring to it in my 9 Bradford Hill analyses. Yes. However, the 10 effect as to -- 02:49</p> <p>11 Q. Can you show me where you are?</p> <p>12 A. Yes. Page 23. Bradford Hill 13 evaluations.</p> <p>14 However, the effect estimates for 15 longer or more extensive use in several 02:49 16 studies were larger between two and three, 17 and that includes this estimate.</p> <p>18 Q. So if you were referring to this at 19 page 23, you would need to refer to the 20 McDuffie paper? 02:49</p> <p>21 A. Yes.</p> <p>22 Q. You do not in your discussion of 23 the McDuffie paper --</p> <p>24 A. Point that out.</p> <p>25 Q. Point that out; correct? 02:49</p>	<p style="text-align: right;">Page 265</p> <p>1 get the same kind of effect estimate.</p> <p>2 Q. I'm not sure I got the answer to my 3 question, though.</p> <p>4 In your opinion, does the analysis 5 that McDuffie provides in Table 8 of less 02:51 6 than or equal to two days' exposure versus 7 greater than two days, in your opinion, does 8 that provide evidence of a dose response for 9 glyphosate?</p> <p>10 MS. FORGIE: Objection. Object to 02:51 11 the form. Also asked and answered. She 12 just answered that.</p> <p>13 You can answer it again.</p> <p>14 THE WITNESS: The intent of this 15 analysis is not dose response. The 02:51 16 intent of this analysis is to 17 distinguish between types of people who 18 use and did not use glyphosate.</p> <p>19 BY MR. LASKER:</p> <p>20 Q. And do I understand correctly then 02:51 21 that you do not interpret the data reported 22 in this table as providing evidence of a 23 dose response?</p> <p>24 MS. FORGIE: Objection. Asked and 25 answered. 02:51</p>

<p style="text-align: right;">Page 266</p> <p>1 You can answer it again.</p> <p>2 THE WITNESS: I see this as an</p> <p>3 indicator that a better exposure</p> <p>4 assessment that defines glyphosate use</p> <p>5 not as ever/never which is the worst or 02:51</p> <p>6 the most simple category you can get but</p> <p>7 as a reasonable amount, more than two</p> <p>8 days per year, we don't know how many</p> <p>9 days those are, but that that category</p> <p>10 provides you with some indication that 02:52</p> <p>11 there is an effect.</p> <p>12 BY MR. LASKER:</p> <p>13 Q. So I think I understand you, but I</p> <p>14 just want to make sure that I'm clear. Am I</p> <p>15 correct then in my understanding that you do 02:52</p> <p>16 not interpret the data on Table 8 in</p> <p>17 McDuffie as presenting evidence of a dose</p> <p>18 response glyphosate and non-Hodgkin's</p> <p>19 lymphoma?</p> <p>20 MS. FERGIE: Objection. Object to 02:52</p> <p>21 the form. Also asked and answered.</p> <p>22 You can answer it again.</p> <p>23 A. There's no formal analysis of a</p> <p>24 dose response. However, the more than two</p> <p>25 days per year category suggests that there 02:52</p>	<p style="text-align: right;">Page 268</p> <p>1 In your opinion, does the data</p> <p>2 presented in Table 8 in the McDuffie paper</p> <p>3 provide evidence of a dose response for</p> <p>4 glyphosate and non-Hodgkin's lymphoma?</p> <p>5 MS. FORGIE: Objection. I object 02:53</p> <p>6 to the form, and especially I object to</p> <p>7 the fact that she's answered this five</p> <p>8 or six times now. Again, you're</p> <p>9 badgering the witness just because you</p> <p>10 don't like the answer. 02:54</p> <p>11 You can answer it again.</p> <p>12 THE WITNESS: Okay. So clever</p> <p>13 analysis, splitting up unexposed and</p> <p>14 exposed, selecting out people who are</p> <p>15 maybe occasional users, looking at those 02:54</p> <p>16 who have probably regular intense use.</p> <p>17 Among those with regular and intense</p> <p>18 use, we see an effect for glyphosate.</p> <p>19 BY MR. LASKER:</p> <p>20 Q. That wasn't my question. My 02:54</p> <p>21 question is: Does this data in Table 8 from</p> <p>22 McDuffie, in your opinion, present evidence</p> <p>23 of a dose response for glyphosate?</p> <p>24 MS. FORGIE: Objection. Asked and</p> <p>25 answered. 02:54</p>
<p style="text-align: right;">Page 267</p> <p>1 is a dose effect.</p> <p>2 BY MR. LASKER:</p> <p>3 Q. And so I get your opinions because</p> <p>4 that what we're here for. In your opinion,</p> <p>5 does the data presented on Table 8 for 02:52</p> <p>6 glyphosate provide evidence of a dose</p> <p>7 response for glyphosate and non-Hodgkin's</p> <p>8 lymphoma?</p> <p>9 MS. FERGIE: Objection. Asked and</p> <p>10 answered. This is the fifth time. 02:53</p> <p>11 You can answer it again.</p> <p>12 A. So, again, this is not a formal</p> <p>13 dose response analysis, but it is a very</p> <p>14 clever analysis and one that I really enjoy</p> <p>15 looking at because, first of all, they are 02:53</p> <p>16 splitting up people who don't use glyphosate</p> <p>17 and then the group of people who do use it</p> <p>18 and the casual users, whether -- versus the</p> <p>19 more frequent or more intense users, and in</p> <p>20 that sense, you can say that at the higher 02:53</p> <p>21 doses there is actually an effect.</p> <p>22 BY MR. LASKER:</p> <p>23 Q. Okay. I'm still trying to get an</p> <p>24 answer to this question because I don't</p> <p>25 think I have it. 02:53</p>	<p style="text-align: right;">Page 269</p> <p>1 THE WITNESS: I have criteria for</p> <p>2 those response. You may have your own.</p> <p>3 In this case, there is a high use of</p> <p>4 glyphosate associated clearly with an</p> <p>5 odds ratio of 2.12 with NHL. 02:54</p> <p>6 BY MR. LASKER:</p> <p>7 Q. Does this Table 8 in the McDuffie</p> <p>8 meet your criteria to be interpreted as</p> <p>9 providing evidence of a dose response for</p> <p>10 the glyphosate in non-Hodgkin's lymphoma? 02:55</p> <p>11 MS. FORGIE: Objection. Asked and</p> <p>12 answered.</p> <p>13 THE WITNESS: This results provides</p> <p>14 evidence that with intensity and</p> <p>15 frequency, whatever this means, two days 02:55</p> <p>16 per year, there is indeed an effect for</p> <p>17 glyphosate compared to people who are</p> <p>18 using either none or using occasionally</p> <p>19 less than two times a year.</p> <p>20 MR. LASKER: I'm going to mark this 02:55</p> <p>21 answer, and again, I'm going to ask the</p> <p>22 question again because I still don't get</p> <p>23 answers to my questions.</p> <p>24 BY MR. LASKER:</p> <p>25 Q. Based upon your criteria, whatever 02:55</p>

Page 270

1 criteria you use in your professional work,  
 2 does the data presented in Table 8 in the  
 3 McDuffie paper provide evidence of a dose  
 4 response effect for glyphosate in  
 5 non-Hodgkin's lymphoma? 02:55  
 6 MS. FORGIE: Objection. This is,  
 7 like, the eighth time you've asked the  
 8 same exact question, and she's answered  
 9 it seven or eight times. This is really  
 10 badgering the witness. I'm going to let 02:55  
 11 her answer it one more time.  
 12 THE WITNESS: I just repeat myself.  
 13 We are distinguishing unexposed people  
 14 from irregular users, minimal users, and  
 15 regular users. In the regular use 02:56  
 16 group, we see an effect.  
 17 MR. LASKER: Okay. Mark that  
 18 answer.  
 19 Let's take a break.  
 20 THE VIDEOGRAPHER: We are off the 02:56  
 21 record at 2:56 p.m.  
 22 (Recess taken from 2:56 p.m. to  
 23 3:13 p.m.)  
 24 THE VIDEOGRAPHER: We are back on  
 25 the record at 3:13 p.m. 03:13

Page 271

1 BY MR. LASKER:  
 2 Q. Dr. Ritz, we were talking about  
 3 Table 8 in the McDuffie paper, and I'm  
 4 correct, am I not, that the McDuffie paper  
 5 does not provide any analysis of the 03:13  
 6 intensity of the exposures to glyphosate in  
 7 this population; correct?  
 8 MS. FORGIE: Object to form.  
 9 THE WITNESS: That is incorrect.  
 10 They are actually distinguishing between 03:14  
 11 irregular and regular users, and in the  
 12 category of regular users, they see an  
 13 increased risk.  
 14 BY MR. LASKER:  
 15 Q. So regular users is greater than 03:14  
 16 two days per year; correct?  
 17 A. Yes.  
 18 Q. So if somebody were to use  
 19 glyphosate for a half-hour in the spring in  
 20 the driveway and then a half-hour in the 03:14  
 21 fall and another half-hour in the summer,  
 22 that would be three times a year, and they  
 23 would be greater than two days a year;  
 24 correct?  
 25 A. I don't venture to say that because 03:14

Page 272

1 they're measuring here in days, and when I  
 2 do my pesticide studies, we actually ask how  
 3 many hours per day, and then we average  
 4 across to come to eight-hour workday and add  
 5 all of that up. How they exactly did that 03:14  
 6 is not described here, but that's how we  
 7 would do it.  
 8 Q. Okay. But you don't know how the  
 9 investigators in this study calculated day  
 10 of exposure; correct? 03:15  
 11 MS. FORGIE: Objection. Asked and  
 12 answered.  
 13 THE WITNESS: These investigators  
 14 give you a more than two day per year  
 15 category, and I imagine they did this in 03:15  
 16 order to distinguish between irregular  
 17 users who they classify as more than  
 18 zero and less than two days.  
 19 BY MR. LASKER:  
 20 Q. My question, though, is these 03:15  
 21 investigators do not indicate and you don't  
 22 have any information as to how they  
 23 determine a day of exposure; correct?  
 24 MS. FORGIE: Objection. Asked and  
 25 answered. 03:15

Page 273

1 You can answer it again.  
 2 THE WITNESS: These investigators  
 3 asked people to report occupational  
 4 exposures, and when you ask about  
 5 occupational exposures, you usually 03:15  
 6 refer to a workday. So I would  
 7 interpret this as two workdays per year.  
 8 BY MR. LASKER:  
 9 Q. Okay. So your interpretation --  
 10 it's not set forth in the study, but your 03:15  
 11 interpretation of this table is that greater  
 12 than two days means a full two-day -- each  
 13 day would be a full workday of exposure?  
 14 MS. FORGIE: Objection. Asked and  
 15 answered. Also mischaracterizes her 03:16  
 16 testimony.  
 17 THE WITNESS: I, as a pesticide  
 18 exposure assessment epidemiologist,  
 19 would specifically ask people to report  
 20 how many hours, how many days, how many 03:16  
 21 weeks, how many years they would be  
 22 having used these specific agents and  
 23 then categorize it according to the days  
 24 or hours or years.  
 25 ///

Page 274

1 BY MR. LASKER:  
 2 Q. I understand what you would do.  
 3 That's not my question. I'm trying to find  
 4 out what McDuffie and her group did.  
 5 They do not state in their paper -- 03:16  
 6 they do not define a day as being an  
 7 eight-hour exposure day, do they?  
 8 MR. FORGIE: Objection. Asked and  
 9 answered.  
 10 THE WITNESS: I have to check. 03:16  
 11 They actually asked extensive questions  
 12 including histories, pesticide spill,  
 13 protective equipment, et cetera. So  
 14 given that they asked all this, and they  
 15 were after workplace exposures, I would 03:17  
 16 interpret this as two workdays.  
 17 BY MR. LASKER:  
 18 Q. McDuffie does not, anywhere in this  
 19 paper, state that they define a day as a  
 20 workday of exposure, do they? 03:17  
 21 MS. FORGIE: Objection. Asked and  
 22 answered. She just testified as to  
 23 exactly how she interprets that meaning.  
 24 MR. LASKER: Okay. That's not the  
 25 question I asked. I'll ask the question 03:17

Page 275

1 again.  
 2 MS. FORGIE: Yes, it is.  
 3 BY MR. LASKER:  
 4 Q. McDuffie and her investigators in  
 5 this published paper never state that they 03:17  
 6 defined a day of exposure as a full workday  
 7 of exposure; correct?  
 8 MS. FORGIE: Objection. Asked and  
 9 answered. You're badgering the witness.  
 10 She's already told you how she 03:17  
 11 interprets it.  
 12 You can answer it again.  
 13 THE WITNESS: Yes, actually they're  
 14 saying on page 1157, "We created dose  
 15 response levels based on days per year 03:17  
 16 of personally mixing or applying  
 17 selected herbicides, insecticide,  
 18 fungicides, and fumigants."  
 19 So days per year of personally  
 20 mixing or applying, that's workplace 03:18  
 21 types of exposures.  
 22 BY MR. LASKER:  
 23 Q. I understand, but they don't state  
 24 a minimum time period in a day for it to be  
 25 quantified as a day of exposure; correct? 03:18

Page 276

1 MS. FORGIE: Objection. Asked and  
 2 answered. She's told you exactly two or  
 3 three times how she interprets that.  
 4 You can answer it again.  
 5 THE WITNESS: I think I answered 03:18  
 6 it.  
 7 MS. FORGIE: You can answer it  
 8 again.  
 9 THE WITNESS: So they are trying to  
 10 distinguish between regular users and 03:18  
 11 occupational regular users who are  
 12 mixing and applying pesticides and  
 13 people who might be for one day in their  
 14 life applying glyphosate.  
 15 BY MR. LASKER: 03:18  
 16 Q. Dr. Ritz, let's talk about the  
 17 North American pooled project analysis by  
 18 Pahwa in 2015.  
 19 MS. FORGIE: Are we putting this  
 20 away? 03:18  
 21 MR. LASKER: For now, yeah.  
 22 BY MR. LASKER:  
 23 Q. And this is analysis which was a  
 24 pooled analysis of the case control studies  
 25 that were pooled in De Roos 2003 and also 03:19

Page 277

1 the Canadian case control study that was  
 2 analyzed by McDuffie; correct?  
 3 A. Can I have the exhibit?  
 4 Q. Sure.  
 5 A. Thank you. 03:19  
 6 Q. This is 19-16.  
 7 (Exhibit Number 19-16 was  
 8 marked for identification.)  
 9 THE WITNESS: It's called the North  
 10 American Pooled Project. On page 5, we 03:19  
 11 see that it is encompassing those  
 12 states, yes.  
 13 BY MR. LASKER:  
 14 Q. And this is the analysis at that  
 15 2015 ISEE conference that you cite to in 03:19  
 16 your expert report; correct?  
 17 A. Yes.  
 18 Q. When did you -- you provided this  
 19 slide deck or at least it was provided to us  
 20 as an additional material considered after 03:20  
 21 your rebuttal expert report.  
 22 When did you first see this slide  
 23 deck?  
 24 A. I saw it after the deposition of  
 25 Dr. Blair, and there was reference to this. 03:20

Page 278	Page 280
<p>1 Q. Did you -- had you seen this slide 2 deck prior to the time you prepared your 3 initial expert report in this case? 4 A. No. 5 Q. Okay. And I take it you saw it 03:20 6 then sometime before you reviewed the 7 rebuttal -- I'm sorry, before you prepared 8 your rebuttal expert report, your second 9 expert report? 10 A. Yes. 03:20 11 Q. Have you read Dr. Neugut's 12 deposition? 13 A. Yes. 14 Q. Did you see this slide deck before 15 you read Dr. Neugut's deposition or after? 03:20 16 A. I wouldn't be able to tell. 17 Q. So may have been before or may have 18 been after, you're not sure? 19 A. I don't know. 20 Q. If I can refer you to page 10 of 03:21 21 this presentation, the NAPP presentation, 22 they provide data or odd ratios for their 23 ever/never analysis both overall for the 24 glyphosate and non-Hodgkin's lymphoma and 25 also for various subtypes of NHL; correct? 03:21</p>	<p>1 dicamba, and malathion, they report varying 2 odds ratios, one of which is below 1, three 3 of which are above 1, but all of which are 4 not statistically significant; correct? 5 A. Well, I wouldn't evaluate this 03:23 6 according to statistical significance 7 especially in a subgroup analysis where I'm 8 splitting the data in this way. The way I 9 would evaluate it is whether there's 10 considerable change in effect estimates and 03:23 11 width of the confidence interval. 12 Q. Okay. So follicular lymphoma for 13 their odds ratio that's adjusted for the use 14 of 2,4-D, dicamba, and malathion, they find 15 an odds ratio of 0.69; correct? 03:23 16 A. That's what they state, yes. 17 Q. And that was a reduction in the 18 odds ratio when they adjusted for these 19 exposures to other pesticides; correct? 20 A. Correct. 03:23 21 Q. For diffuse large B cell lymphoma 22 when they adjusted for 2,4-D, dicamba, and 23 malathion, they report an odds ratio of 24 1.23. That's not statistically significant; 25 correct? 03:24</p>
Page 279	Page 281
<p>1 A. Correct. 2 Q. And they have two analyses that 3 they present in this table. Their odds 4 ratio A which is adjusted for age, sex, 5 state, province, emphatic or hematopoietic 03:21 6 cancer in a first-degree relative, use of a 7 proxy respondent, and use of personal 8 protective equipment; correct? 9 A. Yes. 10 Q. And then odds ratio B would adjust 03:22 11 for those factors just listed and also 12 adjusts for 2,4-D, dicamba and malathion; 13 correct? 14 A. Correct. 15 Q. For the ever/never analysis of the 03:22 16 pooled data from the U.S.-based and 17 Canadian-based case control studies, when 18 adjusted for the use of 2,4-D, dicamba and 19 malathion, they report an odds ratio of 1.13 20 with a confidence interval of 0.84 to 1.51; 03:22 21 correct? 22 A. Yes. 23 Q. And for their various subtypes of 24 non-Hodgkin's lymphoma, in their adjusted 25 model adjusting for the use of 2,4-D, 03:22</p>	<p>1 MS. FORGIE: Objection. I object 2 to the form. 3 MR. LASKER: That's fine. 4 THE WITNESS: That's an odds ratio 5 that's lower than 1.6 and the confidence 03:24 6 interval includes the 1. 7 BY MR. LASKER: 8 Q. Okay. So when they adjusted for 9 the use of 2,4-D, dicamba, and Malathion, 10 their odds ratio for diffuse large B cell 03:24 11 lymphoma went down and was no longer 12 statistically significant; correct? 13 MS. FORGIE: Objection. Object to 14 the form. 15 THE WITNESS: It fluctuated. It 03:24 16 went from 1.6 to 1.23, but the 17 confidence interval basically 18 overlapping. 19 BY MR. LASKER: 20 Q. And for the odds ratio with 03:24 21 adjustment for 2,4-D, dicamba, and 22 Malathion, the confidence interval went from 23 .81 to 1.88 including a null hypothesis of 24 1.0; correct? 25 A. Including the null value in a 03:24</p>



Page 282

1 formal statistical test.  
 2 Q. And SLL, I knew I was going to get  
 3 to this one. What does SLL stand for?  
 4 A. Small lymphocytic lymphoma.  
 5 Q. For that odds ratio there is not a 03:25  
 6 meaningful change when they adjusted for  
 7 exposures to other pesticides; correct?  
 8 MS. FORGIE: Objection. Object to  
 9 the form.  
 10 THE WITNESS: It almost -- it 03:25  
 11 basically stays the same. The  
 12 confidence interval widens as one would  
 13 expect when you put additional variables  
 14 in a model.  
 15 BY MR. LASKER: 03:25  
 16 Q. And then for the other category you  
 17 have an odds ratio that drops from 1.66 to  
 18 1.51 with adjustments for 2,4-D, dicamba,  
 19 and Malathion, and that adjusted odds ratio  
 20 is 0.87 to 2.6 which includes the null value 03:25  
 21 of 1.0; correct?  
 22 MS. FORGIE: Object to the form.  
 23 THE WITNESS: Well, the odds ratio  
 24 changes from 1.66 to 1.51 which is  
 25 almost the same. And as I stated 03:26

Page 283

1 before, the confidence intervals widen  
 2 when you add other variables into the  
 3 model, and it does include null to null  
 4 value.  
 5 BY MR. LASKER: 03:26  
 6 Q. And in your original expert report  
 7 before you had seen this data, you had  
 8 discussed the fact that the Pahwa NAPP data  
 9 should be considered in conducting any  
 10 meta-analysis of the website data; correct? 03:26  
 11 MS. FORGIE: Object to the form.  
 12 THE WITNESS: Where is that stated?  
 13 BY MR. LASKER:  
 14 Q. That is on page 16, 15 and 16,  
 15 where you're talking about the NAPP data. 03:26  
 16 And, first of all, just to be clear, in your  
 17 expert report for the NAPP data you are  
 18 reporting data that is not adjusted for  
 19 exposures to 2,4-D, dicamba, and Malathion;  
 20 correct? 03:27  
 21 A. I have to go to the abstract to  
 22 confirm that.  
 23 So what's the question?  
 24 Q. In your expert report before you  
 25 had seen the data adjusted for exposures to 03:27

Page 284

1 2,4-D, dicamba, and Malathion, you had  
 2 suggested that the NAPP data had not been  
 3 included in the meta-analysis that had been  
 4 performed for glyphosate and non-Hodgkin's  
 5 lymphoma; correct? 03:27  
 6 A. That is correct. They have not  
 7 been included anywhere, and that's what this  
 8 sentence says.  
 9 Q. And under the methodology that both  
 10 Chang and Delzell used and that the IARC 03:28  
 11 scientists used in conducting their  
 12 meta-analyses, when there was a subsequent  
 13 pooled analysis of case control data, they  
 14 included that subsequent study, and they  
 15 removed the earlier studies from their 03:28  
 16 meta-analysis; correct?  
 17 MS. FORGIE: Object to the form.  
 18 THE WITNESS: That would usually be  
 19 how you do it.  
 20 BY MR. LASKER: 03:28  
 21 Q. And in both the Chang and Delzell  
 22 meta-analysis and the analysis that IARC did  
 23 with its working group for their  
 24 meta-analysis, they used the odds ratios  
 25 that were -- where they had them that were 03:28

Page 285

1 adjusted for exposures to other pesticides;  
 2 correct?  
 3 A. I think they did, but can you show  
 4 me where that's stated.  
 5 Q. In your expert report actually at 03:29  
 6 page 16. We went through that earlier.  
 7 A. Okay.  
 8 Q. Correct?  
 9 A. Yes.  
 10 Q. If we were to conclude the NAPP 03:29  
 11 data into the meta-analysis using the  
 12 methodology that was used by Chang and  
 13 Delzell and using the methodology that was  
 14 used by IARC, we would use the odds ratio  
 15 for the NAPP of 1.13; correct? 03:29  
 16 MS. FORGIE: Object to the form.  
 17 THE WITNESS: No. This is not a  
 18 valid model in my mind because you have  
 19 to show me that 2,4-D, dicamba, and  
 20 Malathion are actually related to 03:29  
 21 glyphosate use and also are independent  
 22 risk factor for NHL. So if you're  
 23 telling me dicamba is an independent  
 24 risk factor for NHL, then yes. Also it  
 25 should be removed. 03:30

<p style="text-align: right;">Page 286</p> <p>1 Also I would not accept this model 2 because we would not want to adjust for 3 the use of proxy respondents or personal 4 protective equipment because those two 5 variables are indicators for exposure 03:30 6 mismeasurement. You cannot adjust a 7 model for exposure mismeasurement. 8 These are confounded and shouldn't be in 9 the models. 10 BY MR. LASKER: 03:30 11 Q. I understand, and I'm going to get 12 to your opinions about the NAPP and how they 13 did their analysis. The IARC in conducting 14 its meta-analysis did not reach any 15 conclusions with respect to the individual 03:30 16 studies as to whether or not they found 17 those studies to be internally valid; 18 correct? They just used the data that was 19 presented? 20 A. I don't -- 03:30 21 MS. FORGIE: Object to the form. 22 THE WITNESS: I don't believe that 23 IARC would use estimates that they don't 24 believe are valid. I wouldn't. 25 ///</p>	<p style="text-align: right;">Page 288</p> <p>1 MS. FORGIE: Object to the form. 2 THE WITNESS: I don't want to 3 venture into what people would be doing 4 if. I would not recommend to use this 5 preliminary data that has obvious 03:32 6 problems to replace studies that have 7 been published and peer-reviewed. 8 BY MR. LASKER: 9 Q. I'm sorry. This is the data except 10 for the fact that we now have adjusted odds 03:32 11 ratios which you had not seen when you 12 prepared your expert report. This is the 13 same NAPP analysis that you had put forth as 14 a basis for your expert opinion; correct? 15 MS. FORGIE: Objection. 03:32 16 Mischaracterizes her report. 17 THE WITNESS: I have not used these 18 slides. I have used an abstract. 19 BY MR. LASKER: 20 Q. But it was an abstract that 03:32 21 resulted in the presentation at the exact 22 same conference where the abstract was 23 presented, and this is -- the exhibit we 24 have, 19-16, is a presentation that went 25 along with that abstract at that conference; 03:32</p>
<p style="text-align: right;">Page 287</p> <p>1 BY MR. LASKER: 2 Q. In their methodology the both for 3 the IARC meta-analysis and for the NAPP, 4 they used the data point presented in each 5 of the studies that were available for 03:31 6 glyphosate and non-Hodgkin's lymphoma; 7 correct? 8 A. That's how you conduct 9 meta-analysis. 10 Q. They did not exclude any of the 03:31 11 analyses; correct? 12 MS. FORGIE: Object to the form. 13 THE WITNESS: They did not exclude 14 one of the studies. 15 BY MR. LASKER: 03:31 16 Q. And they did not -- so for their 17 purposes -- and I understand you will have 18 your own interpretation how you do a 19 meta-analysis when we talk about that in a 20 moment, but following their methodology, if 03:31 21 this study was available to them, they would 22 use as they did with every other study what 23 was reported as the most adjusted odds ratio 24 which in this case was reported as 1.13; 25 correct? 03:31</p>	<p style="text-align: right;">Page 289</p> <p>1 correct? 2 MS. FORGIE: Object to the form. 3 Mischaracterizes. 4 THE WITNESS: When we are 5 scientists to present results, we 03:32 6 sometime like to present results that 7 are provocative and also have 8 discussions. So I would consider this 9 one of those slides where we can then 10 discuss how to run the analysis one way 03:33 11 or another. 12 These kind of discussions often 13 feed into final analyses that are 14 published in the literature because the 15 authors then are aware of criticism from 03:33 16 the scientific community. That's the 17 whole reason to present these. 18 BY MR. LASKER: 19 Q. I'm just a little confused now 20 because prior to seeing this data adjusted 03:33 21 for the pesticides, you were opining, and 22 you had earlier in this deposition I 23 thought, that the NAPP data presented at 24 Brazil at that ISEE conference should be 25 considered as part of the analysis of the 03:33</p>

Page 290

1 epidemiologic literature, didn't you?  
 2 A. The abstract I saw, yes. But I'm  
 3 not referring to this table.  
 4 Q. Okay. So while you believe that  
 5 the NAPP data that was prepared and 03:33  
 6 presented in a one-paragraph abstract for  
 7 this presentation should be considered, you  
 8 do not believe that it would be appropriate  
 9 to consider the full data that was actually  
 10 presented at that conference because it is 03:34  
 11 preliminary; is that correct?  
 12 MS. FORGIE: Object to the form.  
 13 THE WITNESS: So any data that we  
 14 are presenting and not putting into a 03:34  
 15 paper version is preliminary including  
 16 the abstract that went to this  
 17 conference. The only reason why I like  
 18 the abstract is because it referred to  
 19 existing data, existing studies that I  
 20 had read that I understood. The 03:34  
 21 methodology and the way they were  
 22 performed. However, when we are  
 23 presenting tables at conferences, what  
 24 we are doing is allowing input into  
 25 analyses from a scientific audience that 03:34

Page 291

1 is informed. That's what this table is  
 2 all about, and had I been there, I would  
 3 have made comments about this kind of  
 4 table.  
 5 BY MR. LASKER: 03:35  
 6 Q. I just want to be clear now if I  
 7 understand your position. Is it your  
 8 position, then, that the NAPP data is too  
 9 preliminary to be considered as part of an  
 10 expert analysis, or is it your opinion that 03:35  
 11 the NAPP data in the abstract that came out  
 12 before this conference should be considered  
 13 but that the data presented at the  
 14 conference should not?  
 15 MS. FORGIE: Objection. 03:35  
 16 Mischaracterizes her testimony.  
 17 THE WITNESS: It's all the same  
 18 data. It's just a question of which  
 19 analyses you believe more or not.  
 20 BY MR. LASKER: 03:35  
 21 Q. And is it my -- is it your  
 22 testimony then that while you believe in the  
 23 data that was presented in the abstract and  
 24 you think that should be considered as  
 25 reliable evidence, epidemiological evidence 03:35

Page 292

1 for glyphosate and non-Hodgkin's lymphoma,  
 2 you do not believe that the data that was  
 3 actually presented at that conference should  
 4 be considered as reliable evidence, separate  
 5 epidemiological evidence regarding 03:35  
 6 glyphosate and NHL?  
 7 MS. FORGIE: Object to the form.  
 8 THE WITNESS: Again, I want to say  
 9 the same data.  
 10 BY MR. LASKER: 03:36  
 11 Q. So in your expert report, you  
 12 stated that we should consider the NAPP data  
 13 in our analysis; correct?  
 14 A. Yes.  
 15 Q. Okay. And so it's fair to say that 03:36  
 16 you also agree that we should consider the  
 17 data that was actually presented from the  
 18 NAPP in its conference in our analysis;  
 19 correct?  
 20 MS. FORGIE: Object to the form. 03:36  
 21 THE WITNESS: That's different.  
 22 The data, the way it's presented,  
 23 contains a lot of what we would call  
 24 sensitivity analyses and ways of  
 25 presenting the data that I would as a 03:36

Page 293

1 reviewer agree or not agree with.  
 2 BY MR. LASKER:  
 3 Q. And am I correct in my  
 4 understanding that your concern with respect  
 5 to presenting the data from the NAPP for -- 03:36  
 6 as compared to data that controls for 2,4-D,  
 7 dicamba, and Malathion versus data that does  
 8 not control for 2,4-D, dicamba, and  
 9 Malathion, that you believe it is more  
 10 reliable to look to the data that does not 03:37  
 11 control for 2,4-D, dicamba, and Malathion?  
 12 MS. FORGIE: Object to the form and  
 13 object to mischaracterizing her  
 14 testimony.  
 15 THE WITNESS: I never talked about 03:37  
 16 reliability. That's not at issue here.  
 17 What is at issue is validity of the  
 18 model, and I disagree with the validity  
 19 of this model, and I would suggest  
 20 additional sensitivity analyses 03:37  
 21 concerning this.  
 22 BY MR. LASKER:  
 23 Q. And am I correct in my  
 24 understanding that -- well, let me ask this:  
 25 Do you have concerns of the validity of the 03:37

Page 294	Page 296
<p>1 NAPP model for all of the data presented or                  2 only for the data presented that adjusts for                  3 exposures to 2,4-D, dicamba, and Malathion?                  4 MS. FORGIE: Object to the form.                  5 THE WITNESS: I have validity 03:37                  6 concerns about this one table, and I                  7 would like to see additional analyses                  8 before I would make up my mind.                  9 BY MR. LASKER:                  10 Q. Do you have validity concerns for 03:38                  11 the data presented in the abstract that you                  12 relied upon in your expert report before you                  13 saw this data?                  14 A. The validity concerns are not                  15 considering the data. The validity concerns 03:38                  16 are with respect to this one subanalyses                  17 that I consider a sensitivity analysis.                  18 Q. Which subanalyses are you talking                  19 about?                  20 A. The one adjusting for three 03:38                  21 additional pesticides.                  22 Q. So that's -- so I understand. So                  23 you do not have -- I'm just making sure I                  24 understand this. You do not have validity                  25 concerns with respect to the NAPP data that 03:38</p>	<p>1 reviewer to remove these two variables                  2 and tell me whether it makes a                  3 difference.                  4 BY MR. LASKER:                  5 Q. And do you have greater concern for 03:39                  6 the validity of the odds ratios that adjusts                  7 for 2,4-D, dicamba, and Malathion than for                  8 the odds ratios that do not?                  9 MS. FORGIE: Objection. Object to                  10 the form. Asked and answered. 03:39                  11 You can answer it again.                  12 THE WITNESS: That's a question I                  13 cannot answer because I don't know what                  14 the results would be if we did this                  15 differently. 03:39                  16 BY MR. LASKER:                  17 Q. Okay.                  18 A. And that's what we do in                  19 epidemiology. We try all sorts of things                  20 and see how the data behaves. 03:39                  21 Q. Okay. For the analysis for                  22 duration of exposure and days of exposure,                  23 the NAPP basically had data on duration --                  24 if you look at page 7.                  25 A. Page 7? 03:40</p>
Page 295	Page 297
<p>1 does not adjust for dicamba, 2,4-D, and                  2 Malathion; is that correct?                  3 MS. FORGIE: Object to the form.                  4 THE WITNESS: I have validity                  5 concerns about this whole table as I 03:38                  6 just told you because I would suggest                  7 that, first of all, proxy respondents                  8 and personal protective equipment should                  9 not be entered in the model to begin                  10 with. 03:38                  11 BY MR. LASKER:                  12 Q. That information, and I'll just --                  13 I don't have time to go through this, but if                  14 that information was in the abstract that                  15 they controlled for that, would you have 03:39                  16 concerns with the data and the information                  17 presented in the abstract that you relied                  18 upon in your original expert report?                  19 MS. FORGIE: Object to the form and                  20 also asked and answered. 03:39                  21 You can answer it again.                  22 THE WITNESS: I can only refer to                  23 this table in front of me that states                  24 very clearly what they adjusted for, and                  25 I would have asked as a conscientious 03:39</p>	<p>1 Q. Yeah.                  2 A. Oh, yeah.                  3 Q. So the duration and frequency and                  4 lifetime days analysis for the NAPP is drawn                  5 from the Nebraska and the Canadian case 03:40                  6 control data because we don't have all -- we                  7 don't have the full data for Iowa,                  8 Minnesota. We don't have any data for                  9 Kansas to conduct those analyses; correct?                  10 MS. FORGIE: Object to the form. 03:40                  11 THE WITNESS: If those Xs mean                  12 there's no data, then that seems to be                  13 the case.                  14 BY MR. LASKER:                  15 Q. Okay. If we can go then to 03:41                  16 page 26, and I want to start just with the                  17 first column which is proxy and                  18 self-respondents, and we'll talk about the                  19 self-respondents only in a second. But for                  20 the -- they provide information in this 03:41                  21 table for frequency with respect to days per                  22 year, duration, and also lifetime days;                  23 correct?                  24 A. Yes.                  25 Q. And when we do the frequency 03:41</p>

Page 298	<p>1 analysis -- and this is not particularly</p> <p>2 surprising since the Canadian case control</p> <p>3 study was a large driver of this -- we have</p> <p>4 a somewhat similar finding to what is</p> <p>5 reported in the McDuffie paper; correct? 03:42</p> <p>6 MS. FORGIE: Object to the form.</p> <p>7 THE WITNESS: Frequency more than</p> <p>8 two days per year and odds ratio of 1.73</p> <p>9 or 1.77 counts as similar to 2, yes.</p> <p>10 BY MR. LASKER: 03:42</p> <p>11 Q. For duration -- so it's a different</p> <p>12 measure -- correct? -- of how many years</p> <p>13 they actually used glyphosate; correct?</p> <p>14 A. Yes.</p> <p>15 Q. McDuffie does not provide any 03:42</p> <p>16 indication of the duration of use in her</p> <p>17 analysis in her study; correct?</p> <p>18 MS. FORGIE: Object to the form.</p> <p>19 THE WITNESS: She doesn't provide</p> <p>20 tables. That doesn't mean that they 03:42</p> <p>21 didn't have it. Did they have it?</p> <p>22 BY MR. LASKER:</p> <p>23 Q. In the McDuffie paper?</p> <p>24 A. No. In the data.</p> <p>25 Q. They did have it in the data, yes. 03:42</p>	Page 300	<p>1 lifetime days analysis is less than seven</p> <p>2 days in a lifetime of exposure to glyphosate</p> <p>3 or greater than seven days of exposure to</p> <p>4 glyphosate in the lifetime; correct?</p> <p>5 MS. FORGIE: Object to the form. 03:44</p> <p>6 THE WITNESS: What they call</p> <p>7 lifetime days is similar to pack years.</p> <p>8 So it's a product of the number of years</p> <p>9 times the days per year.</p> <p>10 BY MR. LASKER: 03:44</p> <p>11 Q. And when they did this analysis</p> <p>12 using that same McDuffie data and also the</p> <p>13 Nebraska data was added to it, and they</p> <p>14 looked at total lifetime days of exposure to</p> <p>15 glyphosate and they looked at that higher 03:44</p> <p>16 category, the highest category they reported</p> <p>17 of greater than seven lifetime days of</p> <p>18 exposure to glyphosate, they had an odds</p> <p>19 ratio of either 1.08 or 1.06 for glyphosate</p> <p>20 and non-Hodgkin's lymphoma; correct? 03:44</p> <p>21 A. They call it lifetime days, but</p> <p>22 it's not days in a lifetime. It's this</p> <p>23 product of years times number of days per</p> <p>24 year; so it's more like a pack year, and I'm</p> <p>25 not surprised because duration, number of 03:45</p>
Page 299	<p>1 A. Yes.</p> <p>2 Q. But in the McDuffie paper they</p> <p>3 don't report duration; correct?</p> <p>4 A. No.</p> <p>5 Q. When they look at that data for 03:42</p> <p>6 duration, we find that there is a lower</p> <p>7 incidence of NHL with a, at least</p> <p>8 numerically, with greater duration of use of</p> <p>9 glyphosate; correct? Goes from either 1.28</p> <p>10 to 0.94 or 1.17 to 0.78; correct? 03:43</p> <p>11 A. There's basically no difference.</p> <p>12 Q. When we look at lifetime days, so</p> <p>13 this is actually figuring out the total</p> <p>14 amount of exposure that an individual in the</p> <p>15 study would have -- correct? -- that last 03:43</p> <p>16 category?</p> <p>17 A. It's not the total amount. It's</p> <p>18 duration times intensity, and that could be</p> <p>19 seven years used minimally or -- and that</p> <p>20 would give you a seven or seven days used at 03:43</p> <p>21 the two workdays per year as we discussed.</p> <p>22 We don't know.</p> <p>23 Q. Just to be clear because your</p> <p>24 answer had the word "seven years," and I</p> <p>25 want to make sure we understand this. The 03:44</p>	Page 301	<p>1 years, had no effect. So if you're using</p> <p>2 duration as number of years, you are very</p> <p>3 likely to wipe out any intensity effect.</p> <p>4 Q. Well, the intensity just to be</p> <p>5 fair, the duration would include all the 03:45</p> <p>6 days within each year -- the lifetime days</p> <p>7 has both factored into it. It has the days</p> <p>8 per year, and it has the duration of time;</p> <p>9 correct?</p> <p>10 MS. FORGIE: Objection. Object to 03:45</p> <p>11 the form.</p> <p>12 THE WITNESS: It's not correct</p> <p>13 because number of days per year has two</p> <p>14 categories. It has the greater than</p> <p>15 zero and less than two which we agreed 03:45</p> <p>16 on were the occasional users and then</p> <p>17 the two or more or better two -- more</p> <p>18 than two. So when you're calculating</p> <p>19 number of years times number of day per</p> <p>20 year, you're actually mixing a lot of 03:45</p> <p>21 different things together. It's a</p> <p>22 really bad measure. So if you don't</p> <p>23 believe it is duration low level chronic</p> <p>24 exposure, if you think it's intensity,</p> <p>25 you have to have a high level of 03:46</p>

Page 302

1 exposure, then lifetime days is really  
 2 not a good measure.  
 3 BY MR. LASKER:  
 4 Q. Is it your opinion that there could  
 5 be intense exposure to glyphosate that is 03:46  
 6 less than seven days of exposure in a  
 7 lifetime?  
 8 A. Yes.  
 9 Q. And, in your opinion, when you look  
 10 at this analysis -- 03:46  
 11 A. It's not seven days per lifetime.  
 12 It's seven lifetime days as defined by this  
 13 product.  
 14 Q. Okay. And you would agree that  
 15 when this data is analyzed for pack year 03:46  
 16 type analysis or lifetime days analysis,  
 17 there's no indication of any greater risk of  
 18 non-Hodgkin's lymphoma in the group that has  
 19 the greater than seven days lifetime  
 20 exposure; correct? 03:47  
 21 MS. FORGIE: Object to the form.  
 22 Mischaracterizes her testimony.  
 23 THE WITNESS: Well, lifetime days  
 24 seem to be a measure that doesn't show a  
 25 dose response here. However, frequency 03:47

Page 303

1 of years -- days per year which is not  
 2 really a frequency but an intensity,  
 3 seems to have an effect.  
 4 BY MR. LASKER:  
 5 Q. And your belief that this is an 03:47  
 6 intensity is based upon your understanding  
 7 of what a day of exposure means?  
 8 A. Correct.  
 9 MS. FORGIE: Objection.  
 10 BY MR. LASKER: 03:47  
 11 Q. And for day of exposure, would that  
 12 be different -- defined differently for a  
 13 lifetime day, each day and that day of  
 14 exposure as compared to a frequency day?  
 15 MS. FORGIE: Object to the form. 03:47  
 16 THE WITNESS: So these frequencies  
 17 go from zero to who knows what; correct?  
 18 Number of days per year. And when you  
 19 multiply those by years, then you could  
 20 have very high intensity days with a low 03:48  
 21 number of years landing in the lower  
 22 category, or you could have the  
 23 opposite. So there's a lot of potential  
 24 for exposure misclassification in terms  
 25 of who's a regular user and who is not. 03:48

Page 304

1 BY MR. LASKER:  
 2 Q. And without knowing more about how  
 3 a defined exposure for frequency days, there  
 4 could be exposure misclassification  
 5 throughout this entire analysis in duration, 03:48  
 6 in frequency, and in lifetime days; correct?  
 7 MS. FORGIE: Object to the form.  
 8 THE WITNESS: Well, duration is  
 9 defined as duration, but we don't know  
 10 what the intensity is. So that would 03:48  
 11 just be a measure of duration. It could  
 12 be a very low intensity; it could be a  
 13 very high intensity. It's just  
 14 duration.  
 15 On the other hand, frequency which 03:48  
 16 I call intensity in this case  
 17 distinguishes the high use from the low  
 18 occasional use. There's no duration in  
 19 this. We can only assume how it relates  
 20 to duration, but they're not showing us 03:49  
 21 data that relates frequency and  
 22 duration. And then this made-up  
 23 lifetime days is a product of years,  
 24 number of years times number of days per  
 25 year. So a product of the two above. 03:49

Page 305

1 And the one with the larger span will  
 2 weight the other to nothing or to  
 3 whatever that is.  
 4 So what we're seeing in duration  
 5 year gets reflected in lifetime years 03:49  
 6 only in lifetime years it's even more  
 7 misclassified because it mixes intensity  
 8 with duration.  
 9 BY MR. LASKER:  
 10 Q. At the time you prepared your 03:49  
 11 original expert report in this case, were  
 12 you aware of the fact that the NAPP had  
 13 conducted this further analysis of duration  
 14 and lifetime days exposure to glyphosate?  
 15 MS. FORGIE: Object to the form. 03:49  
 16 THE WITNESS: At what time?  
 17 MS. FORGIE: Asked and answered.  
 18 BY MR. LASKER:  
 19 Q. At the time you prepared your  
 20 expert report in this case. 03:49  
 21 A. I hadn't seen this.  
 22 Q. Okay. Also on this page there is a  
 23 sensitivity analysis for proxy respondents,  
 24 use of proxy respondents; correct?  
 25 A. You mean the same table? 03:50

Page 306

1 Q. Yes.

2 A. The same table distinguishes

3 between proxy and self and self-respondents.

4 So it's not really a stratified analysis.

5 It's a sensitivity analysis. 03:50

6 Q. Right. That's what I said. It's a

7 sensitivity analysis; correct?

8 A. Yeah, yeah.

9 Q. When they conducted their

10 sensitivity analysis, they found that for 03:51

11 the never/ever category the odds ratio for

12 self-respondents only for glyphosate and

13 non-Hodgkin's lymphoma and all of the case

14 control studies pooled in North America,

15 U.S. and Canada, was 0.95 with a confidence 03:51

16 interval of 0.69 to 1.32; correct?

17 A. That's what they're reporting.

18 Q. And that is, in fact, the -- if

19 we're looking at the -- just a second.

20 Okay. Let's talk about the Eriksson paper. 03:52

21 Let's change. I'm sorry. I got

22 this note. I just completely ignored it.

23 THE VIDEOGRAPHER: This marks the

24 end of videotape number 3 in the

25 deposition of Dr. Beate Ritz. We're off 03:52

Page 307

1 the record at 3:51 p.m.

2 (Recess taken from 3:51 p.m. to

3 4:02 p.m.)

4 THE VIDEOGRAPHER: We are back on

5 the record at 4:02 p.m. This marks the 04:03

6 beginning of videotape number 4 in the

7 deposition of Beate Ritz.

8 BY MR. LASKER:

9 Q. Dr. Ritz, I'd like to direct you to

10 Exhibit 19-7, which is the Eriksson study. 04:04

11 I just have a few questions.

12 MS. FORGIE: Do we have it?

13 MR. LASKER: She's got it.

14 BY MR. LASKER:

15 Q. We previously discussed the fact 04:04

16 that --

17 MS. FORGIE: Hold on a second.

18 MR. LASKER: Let's go off the

19 record.

20 THE VIDEOGRAPHER: We're off the 04:04

21 record at 4:03 p.m.

22 (Recess taken from 4:03 p.m. to

23 4:03 p.m.)

24 THE VIDEOGRAPHER: We are back on

25 the record at 4:03 p.m. 04:04

Page 308

1 BY MR. LASKER:

2 Q. Dr. Ritz, we were talking about the

3 Eriksson study. I think earlier we

4 established that the only odds ratio in this

5 paper or the only table that includes odds 04:04

6 ratios in this paper that were adjusted for

7 the pesticide exposure is table 7 where the

8 multi-variate analysis is presented on

9 page 1661; correct?

10 A. Yes. 04:05

11 Q. Now, when you look at the other

12 odds ratios in these other tables that are

13 not adjusted for other pesticide exposures,

14 virtually every odds ratio for every

15 compound and every chemical that is analyzed 04:05

16 is reported at above 1.0; is that correct?

17 A. That's a very simplified statement

18 because a lot of the odds ratios are right

19 around 1.

20 Q. Virtually every single one of the 04:05

21 odds ratios that are reported in this paper

22 are above 1.0; correct?

23 MS. FORGIE: Object to the form.

24 THE WITNESS: Again, there are lots

25 of odds ratio hover above 1. There are 04:05

Page 309

1 odds ratio below 1, and there are odds

2 ratios above 1, and there are lots of

3 analyses that are including the same

4 subjects. So if you want to do odds

5 ratio counting, you need to discount the 04:06

6 ones that are using the exact same data

7 on the exact same people.

8 BY MR. LASKER:

9 Q. Correct. And when you do that, the

10 vast majority of these odds ratios reported 04:06

11 in Eriksson are above 1.0; correct?

12 MS. FORGIE: Object to the form.

13 THE WITNESS: Again, that's not how

14 I look at this. I look at this as odds

15 ratios reported for different agents for 04:06

16 different purposes. One is a yes/no,

17 ever/never. Other purposes are

18 intensity or duration measures, and

19 splitting up groups into less and higher

20 intensity, you can see how nicely dose 04:06

21 response patterns are starting to

22 emerge. And the lower odds -- the lower

23 exposure odds ratios usually include a

24 close to 1, and the confidence intervals

25 include 1. 04:07

Page 310	<p>1 BY MR. LASKER:</p> <p>2 Q. Let me ask you this question</p> <p>3 generally: If you have a case control</p> <p>4 study, and you are -- I think you refer to</p> <p>5 this in your expert report at page 8 when 04:07</p> <p>6 you're talking about the fact that the De</p> <p>7 Roos 2003 study had odds ratios below 1 and</p> <p>8 above 1. And one of the things you stated</p> <p>9 there is that if you have odds ratios in a</p> <p>10 case control study for multiple agents and 04:07</p> <p>11 they're all above 1, you would have a</p> <p>12 concern for -- about recall bias; is that</p> <p>13 correct?</p> <p>14 MS. FORGIE: Object to the form.</p> <p>15 BY MR. LASKER: 04:07</p> <p>16 Q. And you can look at page 8 on your</p> <p>17 expert report.</p> <p>18 A. Where is it?</p> <p>19 Q. At the very top you stated, "If</p> <p>20 recall bias existed, you would expect all 04:07</p> <p>21 pesticides reported to show an association</p> <p>22 with the outcome and not just one among many</p> <p>23 since the tendencies to recall better and</p> <p>24 more exposures than controlled would not be</p> <p>25 expected to be specific to one chemical." 04:08</p>	Page 312	<p>1 intensity or duration of use, and that's</p> <p>2 informative. When it doesn't, then it</p> <p>3 actually dissuades me that this agent is</p> <p>4 actually contributing.</p> <p>5 BY MR. LASKER: 04:09</p> <p>6 Q. Dr. Ritz, if you look at Table 5 in</p> <p>7 the Eriksson study which looks at</p> <p>8 insecticides total, DDT, mercurial seed</p> <p>9 dressing, pyrethrin, other, every single</p> <p>10 odds ratio reported in that table is above 04:09</p> <p>11 1; correct?</p> <p>12 MS. FORGIE: Object to the form.</p> <p>13 THE WITNESS: The confidence</p> <p>14 intervals, many of them include the 1,</p> <p>15 and it is a table of subtypes meaning 04:10</p> <p>16 we're now going into very, very small</p> <p>17 subgroups with very low exposures. So</p> <p>18 essentially a lot of these estimates are</p> <p>19 non-informative.</p> <p>20 BY MR. LASKER: 04:10</p> <p>21 Q. Let's skip over to --</p> <p>22 A. And some are actually below 1.</p> <p>23 Clearly below 1.</p> <p>24 Q. Let's skip over to the De Roos 2005</p> <p>25 cohort study. First of all, I'd like to 04:10</p>
Page 311	<p>1 Correct?</p> <p>2 A. Yes.</p> <p>3 Q. So if you have all chemicals in a</p> <p>4 study where you have elevated odds ratios,</p> <p>5 one of the things you would be concerned 04:08</p> <p>6 about, in general, is the possibility of</p> <p>7 recall bias; correct?</p> <p>8 MS. FORGIE: Object to the form.</p> <p>9 THE WITNESS: In general, if it's</p> <p>10 all chemicals, yes, but in this study I 04:08</p> <p>11 see a lot of odds ratios that are around</p> <p>12 1 or even below 1 reported, and many of</p> <p>13 the odds ratios are duplicate analyses</p> <p>14 in terms of a dose response. So there's</p> <p>15 an analysis of an ever/never, and then 04:08</p> <p>16 for the same people we are now</p> <p>17 categorizing them in several categories</p> <p>18 to explore a dose response.</p> <p>19 In that case I would expect that</p> <p>20 the overall estimate is somewhere a 04:09</p> <p>21 weighted average of the categories that</p> <p>22 I'm looking at. And in many cases you</p> <p>23 can see that the specificity increases.</p> <p>24 That's why we do this. So the</p> <p>25 specificity of exposure increases with 04:09</p>	Page 313	<p>1 mark as --</p> <p>2 MS. FORGIE: Are we putting this</p> <p>3 away?</p> <p>4 MR. LASKER: Yeah.</p> <p>5 MS. FORGIE: Thank you. 04:10</p> <p>6 MR. LASKER: So this is 19-17.</p> <p>7 (Exhibit Number 19-17 was</p> <p>8 marked for identification.)</p> <p>9 BY MR. LASKER:</p> <p>10 Q. Dr. Ritz, this is a slide deck that 04:11</p> <p>11 unfortunately we received in this form.</p> <p>12 It's a little bit difficult to read, but</p> <p>13 this is a slide deck you produced to us in</p> <p>14 response to our document subpoena.</p> <p>15 I take it this is a slide deck 04:11</p> <p>16 you've used in training in teaching of your</p> <p>17 class; correct?</p> <p>18 A. Yes.</p> <p>19 Q. And the glyphosate case control</p> <p>20 studies that we've been discussing are what 04:11</p> <p>21 are called retrospective in that they take</p> <p>22 individuals with NHL or without NHL, and</p> <p>23 then they look back in time and ask them</p> <p>24 about their prior exposures; correct?</p> <p>25 MS. FORGIE: Object to the form. 04:11</p>



Page 314	Page 316
<p>1 THE WITNESS: They are case control 2 studies in which cases and controls 3 report their lifetime use of pesticides. 4 BY MR. LASKER: 5 Q. So retrospective analyses; correct? 04:12 6 MS. FORGIE: Object to the form. 7 THE WITNESS: It's not an analysis 8 that's retrospective. It's the exposure 9 assessment that's retrospective. 10 BY MR. LASKER: 04:12 11 Q. So the exposure amendment in the 12 case control studies are retrospective; 13 right? 14 A. Correct. Not always. In this one. 15 In these because they're questionnaire 04:12 16 based. They're case control studies that 17 follow records, and they not retrospective. 18 Q. In the case control studies, is it 19 your testimony that there are glyphosate 20 case control studies that are not 04:12 21 retrospective in their gathering of exposure 22 data? 23 A. Not in the literature that I 24 reviewed. 25 Q. Okay. Strike that. Or don't 04:12</p>	<p>1 A. Where is it? 2 Q. -- to your students. It is the top 3 slide on the left on page 2. "Retrospective 4 is often considered a less reliable design." 5 Is that correct? 04:13 6 A. Yes. And that does not refer as a 7 judgment to case control studies but to the 8 term "retrospective," and this is not to say 9 that it really is a lesser way and a less 10 reliable design. That's why it's in quotes. 04:14 11 This is to stimulate my students to think 12 about the advantages of this kind of 13 exposure assessment. 14 Q. And on page 5 in your slide deck 15 for your students in the top right for 04:14 16 discussing cohort studies, you state that 17 cohort studies are generally most accepted 18 in scientific community; correct? 19 A. Again, that is to stimulate 20 discussion about is that really a criterion 04:14 21 we should be using as epidemiologists even 22 if the scientific community equates cohort 23 studies with higher study quality. One of 24 the things I do in my class is I start with 25 this where there is that validity ranking 04:14</p>
Page 315	Page 317
<p>1 strike that. Let me just make clear. In 2 the literature you reviewed, in the case 3 control studies you reviewed for glyphosate, 4 are all of those containing exposure 5 information retrospective? 04:12 6 MS. FORGIE: Object to form. Asked 7 and answered. 8 You can answer it again. 9 THE WITNESS: They had 10 questionnaire that were sent out to 04:13 11 cases and controls asking them about 12 lifetime exposure. In that sense it's a 13 retrospective exposure assessment. 14 BY MR. LASKER: 15 Q. And it is true as you teach your 04:13 16 students -- and this is on page 2. It's the 17 top slide on the right -- that retrospective 18 often is considered a less reliable design 19 in an epidemiologist study; correct? 20 MS. FORGIE: Object to the form. 04:13 21 THE WITNESS: Well, that is a very 22 broad statement. 23 BY MR. LASKER: 24 Q. I'm just asking about the statement 25 you make in your slide presentation -- 04:13</p>	<p>1 highest to lowest, and I try to debunk it. 2 Q. And just to be clear, the "this" 3 because that won't be on the record, you 4 start on page 1 with your Table 1, which is 5 a listing of validity ranking from highest 04:15 6 to lowest, and this is, I take it, what is 7 generally presented in the scientific 8 literature as the ranking of study designs 9 by validity; correct? 10 A. Correct. 04:15 11 MS. FORGIE: Object to the form. 12 THE WITNESS: Well, this is how 13 many people think about epidemiologic or 14 medical trials and designs, yes. 15 BY MR. LASKER: 04:15 16 Q. And in this ranking, randomized 17 clinical trials are the highest, and 18 prospective cohort studies are directly 19 below that; correct? 20 A. That's correct. 04:15 21 Q. And there is a term for "nested 22 case control study." That is a case control 23 study that is conducted within a cohort; 24 correct? 25 A. Yes. Sometimes it's used for 04:15</p>

<p style="text-align: right;">Page 318</p> <p>1 population-based case control study as long 2 as you know what the source of controls was. 3 Q. Okay. And in this sort of general 4 ranking in the scientific community of 5 design validity, where would a non-nested 04:16 6 case control study fit in this ranking? 7 A. Right below case control study. 8 Q. So a case control study would be 9 below nested case control study and above 10 time series analysis? 04:16 11 A. Correct. 12 Q. Okay. The one cohort study that we 13 have for glyphosate and non-Hodgkin's 14 lymphoma or the one cohort analysis is from 15 the Agricultural Health Study; correct? 04:16 16 A. Correct. 17 Q. So let's look to that now. 18 A. Just for the record, I'm using this 19 to stimulate discussion because I disagree 20 with this ranking presented in Table 1. 04:16 21 Q. So this is 19-18. 22 (Exhibit Number 19-18 was 23 marked for identification.) 24 BY MR. LASKER: 25 Q. And for -- so Exhibit 19-18 is the 04:17</p>	<p style="text-align: right;">Page 320</p> <p>1 Q. And this confidence interval, if 2 you were to calculate the CLR for the De 3 Roos study to measure the width of the 4 confidence interval, for the De Roos study 5 1.9 to 0.7. That is, again, somewhat below 04:19 6 3; correct? 7 A. Slightly, yeah. 8 Q. And that confidence limit ratio is 9 actually narrower than the CLR for the case 10 control studies for adjusted odds ratios 04:19 11 that we've been reporting that we've been 12 talking about; correct? 13 MS. FORGIE: Object to the form. 14 THE WITNESS: Again, that's not the 15 only criteria to evaluate statistical 04:19 16 significance or confidence interval or 17 any meaning that these estimates might 18 have. 19 BY MR. LASKER: 20 Q. I understand. I'm just trying to 04:19 21 get an understanding because in your report 22 you discuss this confidence interval as 23 being wide, and, in fact, this confidence 24 interval is narrower than the confidence 25 interval that appears in the case control 04:19</p>
<p style="text-align: right;">Page 319</p> <p>1 2005 published AHS study of glyphosate by De 2 Roos; correct? 3 A. Yes. 4 Q. You mentioned this study in your 5 report at page 21. You can go to that. And 04:17 6 you present right above that chart the odds 7 ratio for the De Roos 2005 study for 8 glyphosate and non-Hodgkin's lymphoma as 9 1.2; correct? 10 A. Yes. 04:17 11 Q. And if you look at De Roos in 12 Table 2 on page 51, the odds ratio that you 13 report in your expert report is the odds 14 ratio that is minimally adjusted, only 15 adjusted for age; correct? 04:18 16 A. I report two -- I report 1.2 and 17 next to it the 1.1. 18 Q. I'm sorry. Got it. My mistake. 19 And you mention in your expert 20 report that the confidence interval for the 04:18 21 finding in the De Roos study is wide, 0.7 to 22 1.9, which you describe as a wide confidence 23 interval; correct? 24 A. Yeah. And they're exactly the 25 same. 04:18</p>	<p style="text-align: right;">Page 321</p> <p>1 studies that we've been discussing; correct? 2 MS. FORGIE: Object to the form. 3 THE WITNESS: For a cohort study 4 this is a rather wide confidence 5 interval especially if you look at some 04:19 6 more common cancers. It should be 7 better. Yes, the one for all cancer. 8 It's .9 to 1.1. That's a nice 9 confidence interval. 10 BY MR. LASKER: 04:20 11 Q. I understand that. But I'd like to 12 ask you with respect to the case control 13 studies. Would it be correct to my 14 understanding that the confidence interval 15 for glyphosate and non-Hodgkin's lymphoma in 04:20 16 the De Roos 2005 study is not wide as 17 compared to the odds ratios for glyphosate 18 and non-Hodgkin's lymphoma reported in the 19 case control studies? 20 MS. FORGIE: Object to the form. 04:20 21 Asked and answered. 22 You can answer it again. 23 THE WITNESS: These confidence 24 intervals might be comparable. However, 25 it's even more important that the 04:20</p>

Page 322

1 confidence interval safely includes the  
 2 overall meta-analytic point estimate of  
 3 1.45.  
 4 BY MR. LASKER:  
 5 Q. I'm sorry. I have no idea what 04:20  
 6 that is. It seems like a meta conference  
 7 interval that was reported by --  
 8 A. No, I'm talking about the point  
 9 estimate falling nicely into this wide  
 10 confidence interval for NHL. So this study 04:21  
 11 does not contradict the meta-analysis.  
 12 That's what I'm saying.  
 13 Q. So the meta-analysis number you're  
 14 reporting, you're discussing here, is the  
 15 meta-analysis number from the -- 04:21  
 16 A. From several --  
 17 MS. FORGIE: Wait for the question.  
 18 BY MR. LASKER:  
 19 Q. -- from the IARC meta-analysis and  
 20 the Chang and Delzell meta-analysis that did 04:21  
 21 not include the NAPP data; correct?  
 22 MS. FORGIE: Object to the form.  
 23 THE WITNESS: Yes, that's correct.  
 24 BY MR. LASKER:  
 25 Q. And the De Roos 2005 study in and 04:21

Page 323

1 of itself fair to say does not report a  
 2 positive association between glyphosate and  
 3 non-Hodgkin's lymphoma; correct?  
 4 MS. FORGIE: Object to the form.  
 5 THE WITNESS: A 1.2 to 1.1 is still 04:21  
 6 a positive association.  
 7 BY MR. LASKER:  
 8 Q. In your opinion, does the De Roos  
 9 2005 cohort study provide evidence that  
 10 supports the hypothesis that glyphosate 04:22  
 11 causes non-Hodgkin's lymphoma?  
 12 A. It contributes very little.  
 13 Q. Okay. But that's not quite  
 14 answering my question.  
 15 Do you believe that the De Roos 04:22  
 16 2005 cohort study provides some evidence,  
 17 even if you think it's little, in favor of  
 18 an opinion that there's an association  
 19 between glyphosate and non-Hodgkin's  
 20 lymphoma? 04:22  
 21 MS. FORGIE: Object to the form.  
 22 Also, asked and answered.  
 23 You can answer it again.  
 24 THE WITNESS: This study does not,  
 25 in the way it's reported here and in the 04:22

Page 324

1 way I see these data, does not  
 2 contribute very much to the discussion.  
 3 BY MR. LASKER:  
 4 Q. Okay. And the Table 3 analysis, I  
 5 take it, which sets forth the various risk 04:22  
 6 ratios based upon two measures of exposure,  
 7 either cumulative exposure days or intensity  
 8 weighted exposure days, am I correct in my  
 9 understanding that you do not believe this  
 10 data contributes much to the analysis of 04:23  
 11 glyphosate and non-Hodgkin's lymphoma?  
 12 MS. FORGIE: Object to the form.  
 13 Also, asked and answered.  
 14 You can answer it again.  
 15 THE WITNESS: These tables are much 04:23  
 16 more complex to analyze because we're  
 17 now getting into a discussion over  
 18 appropriate exposure assessment which I  
 19 don't think is -- the exposure measures  
 20 that are used here to derive these total 04:23  
 21 cut points are most likely  
 22 misclassified.  
 23 BY MR. LASKER:  
 24 Q. Now, these exposure measures are  
 25 the same exposure measures the Agricultural 04:23

Page 325

1 Health Study has used in numerous different  
 2 epidemiological studies that were being  
 3 published at the same time that you were  
 4 serving on that outside advisory committee;  
 5 correct? 04:23  
 6 MS. FORGIE: Object to the form.  
 7 THE WITNESS: An exposure measure  
 8 for one pesticide is not exactly the  
 9 same as an exposure measure for another  
 10 pesticide, and I think we agreed today 04:24  
 11 that it depends on when these pesticides  
 12 were used and where they were used and  
 13 whether use changed. There's no other  
 14 pesticide for which use changed in the  
 15 same way that I can think of, at least 04:24  
 16 as for glyphosate, during the general  
 17 baseline enrollment of these farmers.  
 18 THE REPORTER: I'm so sorry. My  
 19 computer just rebooted.  
 20 MR. LASKER: How much did we miss  
 21 and what do we have to do?  
 22 THE REPORTER: No, I've got it all  
 23 the writer. I just need to go off and  
 24 reboot.  
 25 MS. FORGIE: Why don't we take a

Page 326

1 short break.

2 THE VIDEOGRAPHER: We're off the at

3 4:23 p.m.

4 (Recess taken from 4:23 p.m. to

5 4:47 p.m.) 04:47

6 THE VIDEOGRAPHER: We are back on

7 the record at 4:47 p.m.

8 BY MR. LASKER:

9 Q. Dr. Ritz, we were looking at De

10 Roos 2005. I'd like to actually direct you 04:47

11 to Table 1 on page 50.

12 A. Yeah, I'm there.

13 Q. And that table, at the bottom,

14 presents data from this cohort on

15 co-exposures for glyphosate and other common 04:47

16 pesticides or exposures in individuals not

17 exposed to glyphosate; correct?

18 A. Yes.

19 Q. Okay. And for every pesticide in

20 this cohort, they found that as there was 04:48

21 increased use of glyphosate, there was also

22 increased use of these other pesticides;

23 correct?

24 MS. FORGIE: Object to the form.

25 THE WITNESS: I'm confused. Should 04:48

Page 327

1 I answer.

2 BY MR. LASKER:

3 Q. Yes.

4 MS. FORGIE: If you understand the

5 question, you can answer. 04:48

6 THE WITNESS: So you're saying

7 there's correlation between pesticide

8 use and the AHS?

9 BY MR. LASKER:

10 Q. I'm saying that for every pesticide 04:48

11 that they looked at, and there's, I think,

12 ten pesticides listed on Table 1, they found

13 that with glyphosate use and with greater

14 glyphosate use, there was greater use of

15 these other pesticides; correct? 04:48

16 MS. FORGIE: Object to the form.

17 THE WITNESS: These pesticides

18 correlate with glyphosate, yes.

19 BY MR. LASKER:

20 Q. So you have a correlation between 04:49

21 increased glyphosate use and use of these

22 other pesticides; correct?

23 A. That's how it looks like.

24 Q. And if I understand correctly, if

25 any of these other pesticides are, in fact, 04:49

Page 328

1 risk factors for NHL, that would introduce a

2 differential confounding so that you'd have

3 a greater confounding of your glyphosate

4 measure with higher glyphosate exposure as

5 compared to lower glyphosate exposure; 04:49

6 correct?

7 MS. FORGIE: Object to the form.

8 THE WITNESS: Not necessarily.

9 This really depends on how you look at

10 glyphosate data in terms of, first of 04:49

11 all, is it -- is any of these other

12 pesticides really a -- you said that,

13 NHL risk factor.

14 (Simultaneous cross-talk

15 interrupted by the reporter.) 04:50

16 MS. FORGIE: Wait, wait.

17 THE WITNESS: Are they correlated

18 with glyphosate exposure, but then

19 couldn't you imagine that even a true

20 risk factor for NHL that's correlated 04:50

21 with glyphosate has two different

22 meanings. One, it might be a risk

23 factor that's on its own, but it also

24 could be an indicator for pesticide use,

25 glyphosate, and that's what this is also 04:50

Page 329

1 showing.

2 So all of these pesticides are

3 perfect indicators of glyphosate use.

4 BY MR. LASKER:

5 Q. Okay. My question -- I'm going to 04:50

6 try to understand this, your answer, but let

7 me just make sure I understand this.

8 Given this data showing that there

9 is increased correlation between glyphosate

10 exposure and exposure -- strike that. 04:50

11 Given this data that there's an

12 increased correlation with use of other

13 pesticides and glyphosate with increasing

14 use of glyphosate, is one possibility given

15 this data that there is -- if any of these 04:51

16 other pesticides are associated with

17 non-Hodgkin's lymphoma, that there is

18 increased confounding for higher doses of

19 glyphosate exposure?

20 MS. FORGIE: Object to the form. 04:51

21 THE WITNESS: So it's not increased

22 confounding. It's some -- it can be

23 some type of confounding. It can also

24 be a proxy for the exposure. It was all

25 highly correlated exposures. That's the 04:51

Page 330	Page 332
<p>1 case. You have to decide whether it's a                  2 confounder or a proxy.                  3 BY MR. LASKER:                  4 Q. Okay. And if the pesticides are                  5 confounders and we determined that, for the 04:51                  6 purposes of this question, that they are                  7 independent causes of non-Hodgkin's                  8 lymphoma, and you were to compare the odds                  9 ratio for glyphosate exposure for the lowest                  10 exposed to the highest exposed, you could 04:51                  11 have confounding -- if you don't control --                  12 adjust for those other exposures, you could                  13 have confounding that would inflate the odds                  14 ratio for the higher glyphosate exposure as                  15 compared to the lower glyphosate exposure. 04:52                  16 That's possible; correct?                  17 MS. FORGIE: Object to the form.                  18 THE WITNESS: So confounding is                  19 always a possibility especially with                  20 highly correlated exposures. So the 04:52                  21 intellectual challenge here is to decide                  22 how to treat these variables. Are they                  23 truly confounders in the sense that we                  24 are assuming that glyphosate has no                  25 effect and all the effect comes from the 04:52</p>	<p>1 saying. I'm saying that the data and                  2 the mass will not help you. What you                  3 have to do is design a study in which                  4 you can distinguish between these three                  5 exposures -- four exposures, and make up 04:53                  6 your mind what to call these individual                  7 agents. Are they truly risk factors                  8 increasing the risk of NHL, or are they                  9 not.                  10 If all four of them are risk 04:54                  11 factors, and they are highly correlated                  12 so every time one person is exposed to                  13 one, they're also exposed to all three                  14 others, then you don't have a study that                  15 you can actually -- from which you then 04:54                  16 can come with a conclusion on one of                  17 them.                  18 All you can say is all four of them                  19 seem to increase risk of NHL.                  20 BY MR. LASKER: 04:54                  21 Q. And has there been a study, to your                  22 mind, that has allowed -- that would allow                  23 one to parse that out?                  24 A. Yes.                  25 Q. Which study would that be? 04:54</p>
Page 331	Page 333
<p>1 other pesticide, or are there one or two                  2 or three carcinogens, all of them                  3 contributing to the risk of NHL, and how                  4 do we put those together in a model if                  5 we -- if they're highly correlated, we 04:52                  6 put them all three in the model, then                  7 they will just split variance, and none                  8 of them will show anything.                  9 BY MR. LASKER:                  10 Q. And if we have that situation, the 04:52                  11 real challenge we have, if I understand you                  12 correctly, is, let's say, if we have four                  13 pesticides, we have glyphosate and we have                  14 three other pesticides, and they are often                  15 used together, and you have this situation 04:53                  16 with a correlated, and you have positive                  17 associations popping out with each of the                  18 different chemicals, then am I correct in my                  19 understanding that it is difficult to reach                  20 a determination as to whether all of them 04:53                  21 are, in fact, associated with increased risk                  22 of NHL or one of them is and which one is;                  23 correct?                  24 MS. FORGIE: Object to the form.                  25 THE WITNESS: That's not what I'm 04:53</p>	<p>1 A. That would be the hypothetical                  2 study in glyphosate production workers.                  3 Q. I'm sorry. I misspoke. My                  4 question was: Has there been, in fact, an                  5 epidemiological study conducted that you've 04:54                  6 reviewed that would allow you to tease out                  7 that fact between the different pesticide                  8 exposures?                  9 MS. FORGIE: Object to the form.                  10 THE WITNESS: That depends on which 04:54                  11 study we are talking about because                  12 confounding is a study-specific issue.                  13 So in some studies, one of these                  14 pesticides may be a confounder. In                  15 another study, it might not be, and that 04:55                  16 would depend on the timing of exposure.                  17 So for this study, the AHS where we                  18 only have farmers who are coming for a                  19 pesticide exam at baseline. Right?                  20 That's how they were enrolled. They 04:55                  21 came to an exam in Iowa or North                  22 Carolina to get their pesticide                  23 application license.                  24 So we know from the beginning that                  25 this is a cohort that will have multiple 04:55</p>

<p style="text-align: right;">Page 334</p> <p>1 pesticide exposures, and a lot of them 2 will be highly correlated. In other 3 populations, it might not be as much of 4 a problem because certain farmers may 5 just use glyphosate and nothing else. 04:55 6 BY MR. LASKER: 7 Q. I understand. 8 My question to you, though, is: 9 You've reviewed all the epidemiologic 10 literature; so if there is a study, that's 04:55 11 fine. You can let me know what study that 12 is. 13 Is there an epidemiological study 14 that you've identified in the literature 15 that allows you to distinguish between 04:55 16 glyphosate and other pesticides that are 17 potentially being used by that population to 18 determine whether all of them are risk 19 factors, one of them is a risk factor, or 20 distinguish between them? 04:56 21 MS. FORGIE: Object to the form. 22 Also asked and answered. 23 THE WITNESS: Well, I think the De 24 Roos 2003 study is actually a very good 25 example where even after we adjust for 04:56</p>	<p style="text-align: right;">Page 336</p> <p>1 reported risk ratios of below 1 for the 2 higher tertiles of exposure for cumulative 3 exposure days and also intensity-weighted 4 exposure days; correct? 5 A. That's how it looks like. 04:57 6 Q. The number of days of exposure to 7 glyphosate in the exposed members of the AHS 8 cohort in the highest exposure group was 9 significantly higher than the reported days 10 of exposure to glyphosate in any of the case 04:58 11 control studies; correct? 12 MS. FORGIE: Object to the form. 13 THE WITNESS: I'm actually very 14 surprised to see this number. I can't 15 imagine anybody was spraying glyphosate 04:58 16 on a daily basis for seven years. 17 BY MR. LASKER: 18 Q. The data in this study for De Roos 19 would span 27 years of potential glyphosate 20 use; correct? 04:58 21 MS. FORGIE: Object to the form. 22 THE WITNESS: It would be -- no. 23 It would be use between -- let's see. 24 BY MR. LASKER: 25 Q. Between -- 04:58</p>
<p style="text-align: right;">Page 335</p> <p>1 40-some pesticides, the effect of 2 glyphosate is still apparent. 3 BY MR. LASKER: 4 Q. And is that in the hierarchical 5 regression analysis? 04:56 6 A. That is in the logistic regression, 7 and I stated before that I do not think that 8 the hierarchical is the way to go for many 9 reasons because it makes all these 10 assumptions about carcinogenicity of 04:56 11 substances we don't know anything about. 12 Q. Other than De Roos 2003, is there a 13 study that you believe allows you to tease 14 out the effects of glyphosate versus another 15 pesticide to determine which of those are 04:56 16 risk factors and which of those are just 17 correlated? 18 A. I believe that the Eriksson study 19 also made multiple adjustments and 20 glyphosate survived those, but it is real 04:57 21 study to study. We could go through all of 22 them. 23 Q. The De Roos 2005, in their dose 24 response analysis, as they performed their 25 analysis for cumulative exposure days, they 04:57</p>	<p style="text-align: right;">Page 337</p> <p>1 MS. FORGIE: Wait, let her finish. 2 THE WITNESS: -- whatever we're 3 assuming is the introduction of 4 glyphosate and the first person in this 5 cohort having used it. Some of these 04:58 6 farmers -- or actually the bulk of these 7 farmers were less than 45 -- 40 years -- 8 50 years of age when they were enrolled. 9 So I don't think they might have used 10 glyphosate -- well, depends on the age 04:59 11 they started farming; right? 12 BY MR. LASKER: 13 Q. Yes. 14 A. So it could be 1975 to enrollment. 15 So that would be -- the latest enrollment is 04:59 16 1997; so we have 22 years maximum. 17 Q. Okay. And is it your testimony 18 that you believe that the data presented in 19 this table with the maximum, and it is the 20 single maximum exposure of 2,678 days, do 04:59 21 you believe that that data point is 22 incorrect? 23 MS. FORGIE: Object to the form. 24 THE WITNESS: I have no idea, but 25 I'm very surprised to see it. On the 04:59</p>

<p style="text-align: right;">Page 338</p> <p>1 other hand, these are farmers who are 2 high intensive users of pesticides; so 3 maybe there's something to it. 4 BY MR. LASKER: 5 Q. Am I correct that the 2005AHS data 04:59 6 presents data for exposures that are 7 significantly more intense than any of the 8 exposures that are assessed in any of the 9 case control studies that we've talked 10 about; correct? 05:00 11 MS. FORGIE: Object to the form. 12 A. So now we are coming to the 13 exposure assessment that was done in 1993 to 14 1997. As we know in 1995-'6 there was a big 15 change in glyphosate use due to genetically 05:00 16 modified crops. So the individuals who were 17 enrolled in 1993 would report general use 18 among farmers where glyphosate is just one 19 among several herbicides; right? Could be 20 2,4-D. Could be atrazine, could be all 05:00 21 sorts of thing. And then we have this big, 22 big switch in 1995, and you're still 23 enrolling these farmers, and now they have 24 started to use modified crops, and they're 25 using glyphosate at a huge amount. And what 05:00</p>	<p style="text-align: right;">Page 340</p> <p>1 could also be a hundred days; right? So 2 plus those were days per year. Here we 3 have a cumulative exposure meaning this 4 could be an average that's actually less 5 than what was reported in the other 05:02 6 studies depending on the number of 7 years. 8 BY MR. LASKER: 9 Q. The two data points we have from 10 Eriksson, it was ten days -- more than ten 05:02 11 days or less than ten days; correct? 12 A. Yes, but I'm not sure that it was 13 ten days per year or ten days cumulative. 14 Q. Okay. I'll represent, and if I'm 15 wrong, the court will know and everybody 05:02 16 will know that it was ten days cumulative. 17 The NAPP data we just looked at 18 reported seven days cumulative as the cutoff 19 point; correct? 20 MS. FORGIE: Object to the form. 05:02 21 THE WITNESS: That was the 22 cumulative, yes. 23 BY MR. LASKER: 24 Q. So we have a cutoff of seven days 25 cumulative for the NAPP U.S.-based case 05:03</p>
<p style="text-align: right;">Page 339</p> <p>1 you're now having is a situation where you 2 don't know anything about what people in 3 1993 did. You know who changed in 1995 to 4 glyphosate-intensive farming, but you would 5 not know who was interviewed in 1993 also 05:01 6 changed to glyphosate-intensive farming. 7 You would keep them in the low exposure even 8 though they may have changed to a much 9 higher level. 10 Q. My question was not that, though; 05:01 11 so let me ask my question again and see what 12 the answer is. Am I correct in my 13 understanding that the cohort that was 14 analyzed in the De Roos study had 15 significantly more intense exposures both by 05:01 16 cumulative exposure days and to intensity 17 measure to glyphosate than any of the 18 individuals who were assessed in the case 19 control studies we've been discussing? 20 MS. FORGIE: Object to the form. 05:01 21 Also asked and answered. 22 You can answer again. 23 THE WITNESS: So I'm having a hard 24 time comparing them because the other 25 studies had more than two days. That 05:02</p>	<p style="text-align: right;">Page 341</p> <p>1 controls. We have a cutoff of 10 days 2 cumulative for the Eriksson study, and we 3 have a cutoff in the De Roos 2005 cohort 4 that goes 1 to 20 days cumulative for the 5 low exposure group, 21 days to 56 days for 05:03 6 the mid exposure group, and 57 days to 7 2,678 days in the high exposure group; 8 correct? 9 A. Correct. 10 MS. FORGIE: Object to the form. 05:03 11 THE WITNESS: Over 22 years. 12 BY MR. LASKER: 13 Q. And my question -- and for the 14 Eriksson study, you'd have that same time 15 period generally, the number of years of 05:03 16 exposure -- of potential exposure; correct? 17 MS. FORGIE: Object to the form. 18 THE WITNESS: That was -- 19 BY MR. LASKER: 20 Q. The 2008 study? 05:03 21 A. I have to look. When did they get 22 their cases? 1993? So it's shorter. It's 23 actually shorter because the cases were 24 ascertained in the early '90s and these 25 cases were ascertained after. 05:04</p>

Page 342	<p>1 Q. And we're not going to go back. I</p> <p>2 don't think that's correct, but we'll move</p> <p>3 on and address that later.</p> <p>4 The cumulative exposure in the</p> <p>5 De Roos study, measured in the De Roos study 05:04</p> <p>6 for glyphosate associated with non-Hodgkin's</p> <p>7 lymphoma was significantly greater than the</p> <p>8 cumulative exposure measures in any of the</p> <p>9 case control studies; correct?</p> <p>10 MS. FORGIE: Object to the form. 05:04</p> <p>11 THE WITNESS: Again, this is a</p> <p>12 measure that's cumulative over 22 years,</p> <p>13 and it is not a measure of intensity.</p> <p>14 BY MR. LASKER:</p> <p>15 Q. Okay. And the intensity-weighted 05:04</p> <p>16 exposure days that was presented, that is</p> <p>17 based upon an analysis of intensity in the</p> <p>18 AHS that looks at mixing status, application</p> <p>19 method, equipment repair status, and</p> <p>20 personal protective equipment; correct? 05:04</p> <p>21 A. Yes.</p> <p>22 Q. And that is a measure that has been</p> <p>23 looked at and validated through the</p> <p>24 De Roos -- through the AHS to try and</p> <p>25 measure the intensity of exposures not only 05:05</p>	Page 344	<p>1 measures. So we went through all the</p> <p>2 trouble of weighing in exactly the same</p> <p>3 way. We asked the same questions, and</p> <p>4 it made just about no difference whether</p> <p>5 you used a very simple measure such as 05:06</p> <p>6 in Eriksson and Hardell, et cetera, or</p> <p>7 you used this very complicated measure.</p> <p>8 BY MR. LASKER:</p> <p>9 Q. When you say the measure that was</p> <p>10 used in Eriksson and Hardell you're assuming 05:06</p> <p>11 the measure they used because they don't</p> <p>12 report it in those studies; correct?</p> <p>13 MS. FORGIE: Object to the form.</p> <p>14 Mischaracterizes her prior testimony.</p> <p>15 Asked and answered. 05:06</p> <p>16 You can answer it again.</p> <p>17 THE WITNESS: No, because what</p> <p>18 Eriksson describes is very similar to</p> <p>19 the methods that I know I used. So we</p> <p>20 had several measures that we tried with 05:06</p> <p>21 and without protective equipment, with</p> <p>22 and without frequency of applications,</p> <p>23 et cetera. We are using -- we tried to</p> <p>24 use everything in the same way as the</p> <p>25 AHS and going back to fairly simple 05:06</p>
Page 343	<p>1 to glyphosate but to all the pesticides that</p> <p>2 they analyzed; correct?</p> <p>3 MS. FORGIE: Object to the form.</p> <p>4 THE WITNESS: What was that.</p> <p>5 BY MR. LASKER: 05:05</p> <p>6 Q. The measure of intensity that the</p> <p>7 Agricultural Health Study uses is a measure</p> <p>8 that they have validated not only for</p> <p>9 glyphosate but for all the different</p> <p>10 pesticides that they're analyzing; correct? 05:05</p> <p>11 MS. FORGIE: Object to the form.</p> <p>12 THE WITNESS: They actually did not</p> <p>13 validate that for all the pesticides.</p> <p>14 They used two or three pesticides for</p> <p>15 the validation procedure, and I wouldn't 05:05</p> <p>16 call that validated because they are</p> <p>17 only measuring biomarkers over a very</p> <p>18 short period of time, and they are</p> <p>19 saying that these short time periods</p> <p>20 cannot be set to be the same as a 05:05</p> <p>21 lifetime exposure.</p> <p>22 In fact, we tried in my own studies</p> <p>23 for occupational exposures to pesticides</p> <p>24 to reproduce these intensity measures</p> <p>25 and compared them with very simple 05:06</p>	Page 345	<p>1 measures of, you know, how many times</p> <p>2 per year did you apply, or how many days</p> <p>3 per year did you apply made no</p> <p>4 difference.</p> <p>5 BY MR. LASKER: 05:07</p> <p>6 Q. In your discussion of the 2005</p> <p>7 De Roos dose response analysis in your</p> <p>8 expert report at page 23, you state that the</p> <p>9 investigators' decision to conduct their</p> <p>10 dose response analysis with comparisons only 05:07</p> <p>11 between low, mid, and high exposure without</p> <p>12 an unexposed group reduces the exposure</p> <p>13 contrast between the three dose groups;</p> <p>14 correct?</p> <p>15 A. Where do I say that? 05:07</p> <p>16 Q. Page 23. Right above</p> <p>17 industry-sponsored studies.</p> <p>18 A. Yes.</p> <p>19 Q. "This type of approach also reduces</p> <p>20 any remaining exposure contrast." 05:08</p> <p>21 A. Yes.</p> <p>22 Q. The exposure contrast, though, in</p> <p>23 the De Roos study were greater than the</p> <p>24 contrast between the exposure groups in the</p> <p>25 McDuffie study and the Eriksson study; 05:08</p>



Page 346

1 correct?

2 MS. FORGIE: Object to the form.

3 THE WITNESS: That's an assumption,

4 and the assumption is that there's not a

5 major exposure misclassification in the 05:08

6 way I described before.

7 BY MR. LASKER:

8 Q. Okay. This exposure

9 misclassification, to the extent that

10 Eriksson analyzed data exposures going into 05:08

11 the 1990s, if that's the case, they gathered

12 their data after 1997, would that same issue

13 arise with the Eriksson study?

14 A. If they gathered it after 1997, no,

15 because then they would have actually 05:09

16 already gotten past the change.

17 Q. Well, they --

18 MS. FORGIE: Wait. Let her finish.

19 THE WITNESS: The problem is that

20 this study had the change happen in the 05:09

21 middle of the enrollment period.

22 BY MR. LASKER:

23 Q. The Eriksson study would be looking

24 back over time so it would be a

25 questionnaire and be asking about prior 05:09

Page 347

1 exposures over time; right?

2 MS. FORGIE: Object to the form.

3 THE WITNESS: It's a case control

4 study so they would ask cases and

5 controls to remember their lifetime 05:09

6 exposure which, by definition, would be

7 prior to the onset of the cancer, yeah.

8 BY MR. LASKER:

9 Q. So if the Eriksson study is asking

10 that question after 1997 for all past 05:09

11 exposures and using that data for their

12 analysis, would they have the same

13 misclassification problem that you believe

14 exists for the AHS study?

15 A. No, it would not. 05:09

16 Q. The -- there has been a further

17 analysis of the Agricultural Health Study

18 data, and you address this in your rebuttal

19 report. This is the document we received

20 from Dr. Blair presenting data from 2013. 05:10

21 Let me ask first at the time that

22 you prepared your initial expert report in

23 this matter, had you seen that 2013AH

24 analysis?

25 A. First time I was aware of it was in 05:10

Page 348

1 that attachment to Dr. Blair's statements.

2 Q. Okay. But were you -- did you see

3 that attachment -- had you seen that

4 attachment at the time you prepared your

5 initial expert report in this matter? 05:10

6 MS. FORGIE: Object to the form.

7 THE WITNESS: I don't believe so or

8 else I would have known because the

9 deposition was after -- when was it? Do

10 we have a date? 05:10

11 BY MR. LASKER:

12 Q. We do have a date. I'll represent,

13 and counsel can correct me if I'm wrong, the

14 deposition was taken before your expert

15 report was submitted. That doesn't mean you 05:11

16 saw it then?

17 A. No, exactly. I don't think I saw

18 any depositions prior to my expert report,

19 so that's fine.

20 Q. And do you recall whether you saw 05:11

21 the AHS2013 data prior to -- you obviously

22 saw it prior to the time you did your

23 rebuttal report.

24 A. Yes.

25 Q. Do you recall if you saw it prior 05:11

Page 349

1 to the time you read Dr. Neugut's

2 deposition?

3 MS. FORGIE: Object to the form.

4 THE WITNESS: I really don't know.

5 BY MR. LASKER: 05:11

6 Q. The 2013 -- why don't we mark that

7 analysis.

8 (Exhibit Number 19-19 was

9 marked for identification.)

10 MS. FORGIE: Tell me which version

11 you're using.

12 MR. LASKER: March, 2013.

13 MS. FORGIE: So the earlier one.

14 MR. LASKER: The later one.

15 MS. FORGIE: Oh, the later one, I'm

16 sorry.

17 THE WITNESS: Are there more than

18 one.

19 MR. LASKER: There's February and

20 March. The data doesn't change. 05:12

21 MS. FORGIE: I object to that

22 comment. It does change. You know it.

23 MR. LASKER: I don't think it

24 changes actually, but maybe I'm wrong.

25 ///

Page 350

1 BY MR. LASKER:  
 2 Q. The -- Dr. Blair in his deposition  
 3 testified that the 2013 data, although for  
 4 the glyphosate it is reported in a  
 5 dose-response analysis that includes a never 05:12  
 6 exposure category and then three exposure  
 7 categories, he calculated that the  
 8 ever/never risk ratio for glyphosate and NHL  
 9 in this 2013 data would be about 0.9. Do  
 10 you recall that? 05:13  
 11 MS. FORGIE: Object to the form.  
 12 Mischaracterizes the testimony.  
 13 THE WITNESS: I don't recall that.  
 14 BY MR. LASKER:  
 15 Q. Okay. Let's look at Dr. Blair's 05:13  
 16 deposition. I think we marked it as an  
 17 exhibit.  
 18 MS. SHIMADO: 6.  
 19 BY MR. LASKER:  
 20 Q. I'm going to hand it to you. It's 05:13  
 21 Exhibit 6 after we find it.  
 22 And Dr. Blair on page -- it's 172.  
 23 We're looking at the 2013 cohort study data;  
 24 correct?  
 25 MS. FORGIE: Well, she's not there 05:14

Page 351

1 yet. She needs some time to read a  
 2 couple pages before and after, so give  
 3 her a minute, please.  
 4 THE WITNESS: What are we talking  
 5 about? 05:14  
 6 BY MR. LASKER:  
 7 Q. On page 172 Dr. Blair is -- I'm  
 8 asking him some questions about the 2013  
 9 data.  
 10 Do you see that? 05:14  
 11 A. Yes.  
 12 Q. I ask him the question at line 11.  
 13 "This 2013 cohort study finds no  
 14 association -- no evidence of association  
 15 between exposure to glyphosate and 05:14  
 16 non-Hodgkin's lymphoma; correct?"  
 17 And Dr. Blair answers, "Correct."  
 18 Do you see that?  
 19 A. Yes.  
 20 Q. And then I ask Dr. Blair, "And 05:14  
 21 based upon the data that's set forth here,  
 22 if you look at individuals who had no  
 23 exposure to glyphosate, which is that first  
 24 row, and you look at the three categories of  
 25 individuals who did have exposure to 05:14

Page 352

1 glyphosate, if we were to do an ever/never  
 2 analysis of glyphosate and non-Hodgkin's  
 3 lymphoma, the relative risk here would be  
 4 something below 1.0; correct? About 0.9?"  
 5 "Answer: That's a reasonable guess 05:15  
 6 I think, yes."  
 7 Do you see that?  
 8 A. Yes.  
 9 Q. Do you have any reason to disagree  
 10 that if one were to do an ever/never 05:15  
 11 analysis of the 2013AHS data for glyphosate,  
 12 the risk ratio that would be reported would  
 13 be something on the order of 0.9?  
 14 MS. FORGIE: Object to the form.  
 15 THE WITNESS: I would have to look 05:15  
 16 at the data, but, in general, I don't  
 17 believe any of those analyses because I  
 18 don't believe the exposure assessment.  
 19 So it doesn't matter.  
 20 BY MR. LASKER: 05:15  
 21 Q. I understand that, but let me just  
 22 make sure I understand and see if you agree  
 23 with what the numbers would be, and  
 24 obviously others will decide whether or not  
 25 those numbers are the -- the significance of 05:15

Page 353

1 those numbers. But if we were to look at  
 2 page 34 in the 2013 study for glyphosate, do  
 3 you see that data?  
 4 A. Yes.  
 5 Q. And if we were to calculate from 05:15  
 6 this data an ever/never risk ratio for  
 7 glyphosate and non-Hodgkin's lymphoma, do  
 8 you agree with Dr. Blair that the risk ratio  
 9 would be about 0.9?  
 10 MS. FORGIE: Object to the form. 05:16  
 11 Asked and answered.  
 12 You can answer again.  
 13 THE WITNESS: Again, it would be  
 14 hovering somewhere around the 1.  
 15 However, I don't think that these 05:16  
 16 categories are sufficiently well  
 17 established to even make this  
 18 comparison.  
 19 BY MR. LASKER:  
 20 Q. Okay. But just so the record is 05:16  
 21 clear, we have the non- -- the never use is  
 22 the reference of 1.0; correct?  
 23 A. That's the reference, correct.  
 24 Q. And in the exposure groups, we have  
 25 odds ratios of either below 1 or just at 1; 05:16

Page 354	<p>1 correct?</p> <p>2 MS. FORGIE: Object to the form.</p> <p>3 Asked and answered.</p> <p>4 You can answer it again.</p> <p>5 THE WITNESS: Well, the relative 05:16</p> <p>6 risks here which they are not odds</p> <p>7 ratios --</p> <p>8 BY MR. LASKER:</p> <p>9 Q. I'm sorry.</p> <p>10 A. -- are actually hovering around the 05:16</p> <p>11 1.</p> <p>12 Q. So the relative risks are either</p> <p>13 0.8, 0.9, or 1.0 for use of glyphosate as</p> <p>14 compared to non-use of glyphosate as the</p> <p>15 data is reported here; correct? 05:17</p> <p>16 MS. FORGIE: Object to the form.</p> <p>17 Asked and answered.</p> <p>18 You can answer again.</p> <p>19 THE WITNESS: Well, the relative</p> <p>20 risks are rate ratios hover around the 1 05:17</p> <p>21 and the confidence intervals include the</p> <p>22 1, but they go out to 1.4.</p> <p>23 BY MR. LASKER:</p> <p>24 Q. The -- in your rebuttal report, you</p> <p>25 state one of the main concerns you have 05:17</p>	Page 356	<p>1 yes, among those that they reached</p> <p>2 again, that was about 62 percent.</p> <p>3 BY MR. LASKER:</p> <p>4 Q. And because of that, the AHS</p> <p>5 investigators used an imputation method to 05:19</p> <p>6 impute what the values would be, the</p> <p>7 exposure values would be for the individuals</p> <p>8 who did not respond to the second phase</p> <p>9 questionnaire based upon the prior</p> <p>10 information that they had from those 05:19</p> <p>11 individuals and the information they had</p> <p>12 from the 60 plus percent of subjects who</p> <p>13 responded to both questionnaires; correct?</p> <p>14 MS. FORGIE: Object to the form.</p> <p>15 THE WITNESS: From what I 05:19</p> <p>16 understand is they basically used the</p> <p>17 baseline information to impute the</p> <p>18 follow-up.</p> <p>19 BY MR. LASKER:</p> <p>20 Q. So is it your understanding then 05:19</p> <p>21 that they did not use data from the 60 some</p> <p>22 odd percent who responded to both</p> <p>23 questionnaires --</p> <p>24 A. Oh, yes, because they used the</p> <p>25 baseline for all of them. 05:19</p>
Page 355	<p>1 about the 2013 analysis relates to the</p> <p>2 imputation method that was used; correct?</p> <p>3 A. That's correct.</p> <p>4 Q. And the AHS investigators -- and</p> <p>5 just to be clear, the issue with the 05:17</p> <p>6 imputation method is in their second phase</p> <p>7 of gathering information on pesticide</p> <p>8 exposures. They had, I think, 36 percent of</p> <p>9 individuals who responded to the first</p> <p>10 survey who didn't respond to the second; 05:18</p> <p>11 correct?</p> <p>12 MS. FORGIE: Object to the form.</p> <p>13 THE WITNESS: So the AHS is a</p> <p>14 cohort study that has, because there's</p> <p>15 so many people to be interviewed, a long 05:18</p> <p>16 period of enrollment which is about four</p> <p>17 or five years. And by the time the last</p> <p>18 person was enrolled, they pretty much</p> <p>19 decided they had to update their</p> <p>20 exposures because they realized that 05:18</p> <p>21 exposures change.</p> <p>22 So in the next phase starting in</p> <p>23 1999, I believe, through 2003, they</p> <p>24 tried to recontact all these farmers who</p> <p>25 they enrolled in the first phase, and 05:18</p>	Page 357	<p>1 Q. Used that as well to impute for</p> <p>2 them?</p> <p>3 A. Yes.</p> <p>4 Q. And the AHS investigators have used</p> <p>5 that same imputation method for every 05:19</p> <p>6 pesticide study that they have published</p> <p>7 that includes data from the phase 2 surveys;</p> <p>8 correct?</p> <p>9 MS. FORGIE: Object to the form.</p> <p>10 THE WITNESS: Yes. They used a 05:20</p> <p>11 general method of imputation for all</p> <p>12 pesticides, whether or not these</p> <p>13 pesticides were actually still in use or</p> <p>14 not, and whether or not the use changed</p> <p>15 over time specifically between the first 05:20</p> <p>16 and the second survey.</p> <p>17 BY MR. LASKER:</p> <p>18 Q. So every publication that has come</p> <p>19 out of the AHS that looks at pesticides</p> <p>20 since they've had this phase 2 exposure 05:20</p> <p>21 information, all of the published studies,</p> <p>22 all the peer-reviewed published studies from</p> <p>23 the AHS have used this same imputation</p> <p>24 method that was used in the 2013 analysis</p> <p>25 included glyphosate; correct? 05:20</p>

Page 358

1 MS. FORGIE: Object to the form.  
 2 Asked and answered. It mischaracterizes  
 3 her prior testimony.  
 4 You can answer it again.  
 5 THE WITNESS: They used one single 05:21  
 6 imputation method to apply to every  
 7 single pesticide whether the pesticide  
 8 has been banned and supposedly not been  
 9 used since '72 which is DDT and lindane  
 10 shortly after, or whether it's a 05:21  
 11 pesticide that came on the market and  
 12 went and was gone by 1993 when they  
 13 started this study or whether it's a  
 14 pesticide which is unique such as  
 15 glyphosate that changed use in the 05:21  
 16 middle of their inrollment period. And  
 17 they're using the same method for all of  
 18 these pesticides.  
 19 BY MR. LASKER:  
 20 Q. Just so I understand, every 05:21  
 21 publication that's come out of the AHS since  
 22 the second phase data was incorporated into  
 23 their analysis, every peer-reviewed  
 24 published study has made use of this general  
 25 imputation method that was used in the 2013 05:21

Page 359

1 study; is that correct?  
 2 MS. FORGIE: Object to the form.  
 3 Also asked and answered. She's answered  
 4 this twice.  
 5 You can answer it a third time. 05:22  
 6 THE WITNESS: Again, this  
 7 imputation method is one and the same  
 8 imputation method for every single  
 9 exposure, and there are big differences  
 10 between the exposures, the timing of the 05:22  
 11 exposure and, therefore, the validity of  
 12 this method. So every other paper that  
 13 comes out has to be judged by how valid  
 14 this method is, not only for the  
 15 pesticide but also the outcome. 05:22  
 16 BY MR. LASKER:  
 17 Q. I understand that. But I just want  
 18 to make sure that I'm clear that every paper  
 19 that has come out of the AHS and including  
 20 all the papers that have been peer-reviewed 05:22  
 21 and published from the AHS have used the  
 22 same imputation method that is used in the  
 23 2013 study; is that correct?  
 24 MS. FORGIE: Object to the form.  
 25 Asked and answered. She's answered it 05:22

Page 360

1 four times now.  
 2 You can answer it again.  
 3 THE WITNESS: So it's a perfectly  
 4 fine imputation method for something  
 5 like DDT that supposedly hasn't changed 05:22  
 6 since 1972, and it's a perfectly fine  
 7 method for any pesticide that was  
 8 discontinued in use since 1993 because  
 9 what would change over time since 1993?  
 10 Nothing. Right? Because supposedly all 05:23  
 11 the exposures you could ever have had  
 12 for this pesticide would have been  
 13 recorded at baseline. This is not the  
 14 case for any exposure that changed and  
 15 especially not for an exposure that 05:23  
 16 changed dramatically. There's only one  
 17 I'm aware of in this study, and that was  
 18 glyphosate for which that changed.  
 19 BY MR. LASKER:  
 20 Q. Just so I understand this 05:23  
 21 correctly, and I think you'll agree with me  
 22 on this, but I just need to understand this  
 23 for the record, am I correct that every  
 24 study that has been published by the AHS,  
 25 every peer-reviewed published paper from the 05:23

Page 361

1 AHS looking at pesticides since that second  
 2 survey was conducted has used the imputation  
 3 methodology that is used in the 2013 study?  
 4 MS. FORGIE: Objection. I object  
 5 to the form also. You are badgering the 05:24  
 6 witness now. This is the sixth time  
 7 you've asked the exact same question,  
 8 the exact same question.  
 9 MR. LASKER: And one of these times  
 10 I'll get an answer. 05:24  
 11 MS. FORGIE: Wait. Don't do that.  
 12 You've gotten answers. You're badgering  
 13 the witness. I object to that. Don't  
 14 do that.  
 15 MR. LASKER: Mark the record here. 05:24  
 16 MS. FORGIE: Good. Please do.  
 17 MR. LASKER: I'm going to ask it  
 18 again because it's a pretty simple  
 19 question.  
 20 BY MR. LASKER: 05:24  
 21 Q. Am I correct -- and it's a question  
 22 that has a yes or no. There may be an  
 23 explanation you want to give afterwards.  
 24 But it's a yes or no question. Am I correct  
 25 that every peer-reviewed publication from 05:24

<p style="text-align: right;">Page 362</p> <p>1 the AHS that has come out since that phase 2 2 exposure data was collected has used the 3 same imputation that is used in the 2013 4 study that included the glyphosate data? 5 MS. FORGIE: Objection. You are 05:24 6 really badgering this witness. This is 7 now like the eighth time. I'm counting. 8 Objection. Asked and answered. 9 You can answer it again. 10 THE WITNESS: There is no yes or no 05:25 11 answer to this. And, also, I don't 12 know. Because, for example, if you're 13 assessing lindane and DDT, you don't 14 need an imputation method because you 15 have all the data you want which is the 05:25 16 data you collected at baseline. 17 However, for any pesticide still in 18 use where you have no updated pesticide 19 information, you would use this 20 imputation method. Whether that's an 05:25 21 appropriate method is a totally 22 different question. For glyphosate, I 23 don't believe so. 24 BY MR. LASKER: 25 Q. And the AHS investigators actually 05:25</p>	<p style="text-align: right;">Page 364</p> <p>1 report this in their abstract, that the 2 distribution of prevalence and days per year 3 of use for specific pesticides were similar 4 across observed and imputed in the holdout 5 sample. 05:26 6 Do you see that? 7 MS. FORGIE: Take your time. 8 BY MR. LASKER: 9 Q. It's towards the bottom in the 10 abstract. 05:27 11 A. Oh, in the abstract. 12 Yes, they're using the data to 13 predict the data. 14 Q. Right. And what they did in this 15 analysis is they took of the people who had 05:27 16 responded to the second phase, they randomly 17 selected 20 percent of them; correct? 18 MS. FORGIE: Object to the form. 19 THE WITNESS: Yes. 20 BY MR. LASKER: 05:27 21 Q. And then they used their imputation 22 method to predict what the imputation method 23 would say was the exposure experience of 24 that 20 percent holdout sample; correct? 25 A. That's correct. 05:27</p>
<p style="text-align: right;">Page 363</p> <p>1 did a study in which they tried to test 2 their imputation methodology and to look at 3 how well it performed with respect to the 4 different pesticides; correct? 5 MS. FORGIE: Object to the form. 05:25 6 THE WITNESS: It was a very special 7 type of pesticide they looked at. It 8 wasn't glyphosate from what I recall. 9 BY MR. LASKER: 10 Q. Let me ask you about the study. 05:25 11 Maybe we're not talking about the same 12 study. The Heltshe study? 13 A. Yeah, Heltshe. 14 (Exhibit Number 19-20 was 15 marked for identification.) 05:26 16 BY MR. LASKER: 17 Q. This will be Exhibit 19-20. This 18 Exhibit 19-20 by Heltshe entitled, "Using 19 Multiple Imputation to Assign Pesticide Use 20 for Non-Responders in the Follow-Up 05:26 21 Questionnaire in the Agricultural Health 22 Study"; correct? 23 A. Yes. 24 Q. And in this study, they reported 25 that their imputation methodology, and they 05:26</p>	<p style="text-align: right;">Page 365</p> <p>1 Q. And they compared that to the 2 actual data because they had actual data 3 from those individuals; correct? 4 MS. FORGIE: Object to the form. 5 THE WITNESS: They have actual data 05:27 6 from those individuals that they are 7 putting in the holdout sample, correct. 8 BY MR. LASKER: 9 Q. And they then used that analysis to 10 check on the accuracy of their imputation 05:27 11 method. And if you look at figure 2 on 12 page 414, they measure the relative errors 13 on page 414 for -- it's got to be 40 maybe, 14 I didn't count them, but 40 different 15 pesticides starting with methyl bromide on 05:28 16 the top down to coumaphos on the bottom; 17 correct? 18 A. Yes. 19 Q. And for each of those pesticides 20 they checked to see how well their 05:28 21 imputation methodology worked; correct? 22 A. Correct. 23 Q. And for glyphosate, they found that 24 their imputation methodology worked about in 25 the middle of the pack for all of these 05:28</p>

Page 366

1 specifically identified pesticides as far as  
 2 how well their imputation methodology works;  
 3 correct?  
 4 MS. FORGIE: Object to the form.  
 5 THE WITNESS: Well, it's not the 05:28  
 6 middle of the pack. It's in relative  
 7 error on the left of the zero. So they  
 8 are underestimating.  
 9 BY MR. LASKER:  
 10 Q. But there's also one, two, three, 05:29  
 11 four, five at the top. I've done the  
 12 counting. I think there's maybe 17 that are  
 13 more relative error, maybe 20 that have less  
 14 relative error. But if you want to do the  
 15 counting, you can. 05:29  
 16 A. But this is a prevalence, and we  
 17 are talking about a relative error to  
 18 predict a ever/never, and 75 percent of all  
 19 people at baseline already reported use. So  
 20 you can get, you know, this number very 05:29  
 21 easily just because of the high prevalence.  
 22 Q. But my question to you is: In this  
 23 published paper from the AHS in which  
 24 they're checking the validity of their  
 25 imputation methodology for the individual 05:29

Page 367

1 pesticides that they were analyzing, they  
 2 found that glyphosate was about in the  
 3 middle of the pack for prevalence as far as  
 4 how well the imputation methodology worked;  
 5 correct? 05:29  
 6 MS. FORGIE: Object to the form and  
 7 asked and answered.  
 8 You can answer it again.  
 9 THE WITNESS: I don't think this  
 10 answers to what I've just tried to 05:29  
 11 explain. They can only use to predict  
 12 from data they actually have; so we  
 13 don't still know anything about the  
 14 people for whom they don't have the  
 15 follow-up data. 05:30  
 16 They are just assuming that those  
 17 people behaved in the same way as the  
 18 people they have data for.  
 19 BY MR. LASKER:  
 20 Q. I understand. 05:30  
 21 And the people they have data for  
 22 would be people who cover this period that  
 23 you're concerned about where glyphosate  
 24 exposure increased. The folks who responded  
 25 to the second survey and the first survey, 05:30

Page 368

1 that's the hold-out sample; correct? The  
 2 20 percent?  
 3 MS. FORGIE: Objection. Object to  
 4 the form. And asked and answered.  
 5 You can answer it again. 05:30  
 6 THE WITNESS: This was done within  
 7 the 62 percent who answered twice.  
 8 BY MR. LASKER:  
 9 Q. Right.  
 10 A. These 62 percent, as they describe 05:30  
 11 in here, are actually different in many ways  
 12 from the 30-some percent that did not --  
 13 38 percent that did not answer. So they are  
 14 using the 62 percent who are very different  
 15 in many ways, and they actually 05:30  
 16 acknowledging that they're also different in  
 17 pesticide use to predict what would have  
 18 happened to 38 percent that they did not  
 19 have that second answer from.  
 20 It's easy to predict from people 05:31  
 21 who are answering and are -- and are  
 22 captured because they want to be captured.  
 23 They could be younger. They could be more  
 24 educated. All of that is described in here.  
 25 So the people, 62 percent is not a 05:31

Page 369

1 representative sample of the 38 percent.  
 2 Q. Okay. I understand that. That's a  
 3 different question, but I want to get at  
 4 this issue of changes in glyphosate use over  
 5 time. 05:31  
 6 The individuals who responded to  
 7 the first survey and the second survey would  
 8 obviously have gone through that period for  
 9 glyphosate -- correct? -- where there was  
 10 expanded use? 05:31  
 11 A. Only a small number would have gone  
 12 through -- no. Okay. We have 1993 through  
 13 1997. So the 62 percent supposedly come  
 14 from that whole time period; correct?  
 15 Q. And the second phase because they 05:32  
 16 responded to the second phase as well.  
 17 A. Right.  
 18 Q. So '97 to 2001 as well. So for  
 19 62 percent, they have exposure data that  
 20 spans before that first phase period and 05:32  
 21 then also into the 1990s during that period  
 22 where glyphosate use was impacted by GMOs;  
 23 correct?  
 24 A. So some of these people, at  
 25 baseline, would have reported use prior to 05:32

Page 370	Page 372
<p>1 1995, and some would have responded past 2 1995.</p> <p>3 Q. And they had that data?</p> <p>4 MS. FORGIE: Wait. Let her finish 5 her answer. 05:32</p> <p>6 MR. LASKER: Well, I mean --</p> <p>7 MS. FORGIE: No. She gets to 8 finish her answer.</p> <p>9 THE WITNESS: So some people 10 changed, and other people didn't. Some 05:32 11 of this error is because some people 12 changed, and it was a very simple 13 change. So what they're talking about 14 here is a change from yes, no.</p> <p>15 There's only 25 percent at baseline 05:32 16 who did not report glyphosate use. So 17 that's the only group that could have 18 actually reported a change. Everybody 19 else stayed the same if you say yes, no. 20 That tells us nothing about the amount 05:33 21 of use.</p> <p>22 BY MR. LASKER:</p> <p>23 Q. Okay. Let me just break this down. 24 First of all, in the original phase I study, 25 we are looking at exposures over -- for 05:33</p>	<p>1 enormously and then responds again. 2 Right.</p> <p>3 BY MR. LASKER:</p> <p>4 Q. And so for the 62 percent that 5 responded to the questionnaire, that would 05:34 6 be information that you'd get from their 7 second survey response; correct?</p> <p>8 MS. FORGIE: Objection. Asked and 9 answered and object to the form as well.</p> <p>10 You can answer again. 05:34</p> <p>11 THE WITNESS: You get updated 12 information from these people who 13 respond. However, to then use that data 14 to predict how many people would use 15 what who did not respond is a big step. 05:34</p> <p>16 BY MR. LASKER:</p> <p>17 Q. And I understand that step, and 18 that's a step that we have for all of the 19 pesticides, but for glyphosate, in looking 20 at the individuals who responded at least 05:34 21 and who had gone through that period of 22 increased use that you're talking about, 23 that introduced whatever error it would 24 introduce into the imputation methodology, 25 and for those people, that error is 05:35</p>
Page 371	Page 373
<p>1 glyphosate, potentially, I think we talked 2 about 20-plus years; correct?</p> <p>3 MS. FORGIE: Objection. 4 Mischaracterizes the testimony, and I'll 5 object to the form. 05:33</p> <p>6 THE WITNESS: So potential for 7 exposure. We really don't know how far 8 it goes back because none of the Eghal 9 study papers actually describe for 10 glyphosate how much in, you know, the 05:33 11 past these people reported use.</p> <p>12 BY MR. LASKER:</p> <p>13 Q. Okay. And what they're trying to 14 measure in the second phase is how much 15 exposure there was from the end of the first 05:33 16 phase to the second phase -- correct? -- 17 which is a much shorter time period?</p> <p>18 MS. FORGIE: Objection. 19 Mischaracterizes the study itself.</p> <p>20 THE WITNESS: So what they're 05:33 21 trying to do is to update the exposure 22 information. Of course, the update is 23 much more drastic in terms of amounts 24 that somebody who reported in 1993 still 25 use glyphosate but increased use in 1995 05:34</p>	<p>1 reflected in Table -- or Figure 2 on 2 page 414; correct?</p> <p>3 MS. FORGIE: Objection. Object to 4 the form. Also asked and answered. 5 She's answered this question at least 05:35 6 three times.</p> <p>7 You can answer again.</p> <p>8 THE WITNESS: And there are at 9 least two wrong statement here. First 10 of all, that's not correct for all the 05:35 11 pesticides. The pesticides that did not 12 have this extreme change don't have this 13 problem. This problem only has occurred 14 because glyphosate use changed 15 dramatically. 05:35</p> <p>16 Second, this imputation method is a 17 method that not only is used for a 18 prevalence of glyphosate yes/no, but to 19 also impute the amount used. And what 20 they're showing you in this little graph 05:35 21 is just a prevalence yes/no. That's the 22 least you could do and the least piece 23 of information you can have about this 24 method actually working.</p> <p>25 Plus it makes the assumption that 05:36</p>

Page 374

1 the 62 percent are representative of the  
 2 38 percent, and we have to make that  
 3 assumption, and it's not right. They're  
 4 stating that in this paper that it's not  
 5 correct. 05:36  
 6 BY MR. LASKER:  
 7 Q. Within the 62 percent that  
 8 responded when the AHS investigators looked  
 9 to see for prevalence how well the  
 10 imputation methodology worked, including the 05:36  
 11 fact that for those 62 percent, it spanned  
 12 over that period when glyphosate use was  
 13 expanding, the -- they found that the error  
 14 in that 62 percent through the use of that  
 15 imputation method when they tested it for 05:36  
 16 glyphosate was somewhere in the middle of  
 17 the pack for all the pesticides that they  
 18 analyzed, and that's reflected on Figure 2;  
 19 correct?  
 20 MS. FORGIE: Objection. Object to 05:36  
 21 the form. You're badgering the witness.  
 22 This is now about the fifth time you've  
 23 asked that same exact question.  
 24 You can answer it again.  
 25 THE WITNESS: I don't believe you 05:37

Page 375

1 can say that because when you have such  
 2 a high prevalence of use to begin with,  
 3 75 percent, then it is like a couple  
 4 value where you're asking, well, how  
 5 much agreement is there in a measure 05:37  
 6 when 98 percent say no, I never used  
 7 this pesticide, and 2 percent do use it,  
 8 and then you're, you know, getting --  
 9 okay, now next time around 4 percent say  
 10 yes, but the 94 percent or the 05:37  
 11 75 percent are the overwhelming group  
 12 that is consistent.  
 13 So because they already said yes at  
 14 the baseline, they will consistently be  
 15 predicted in the future because a yes is 05:37  
 16 a yes.  
 17 BY MR. LASKER:  
 18 Q. The concern that you are raising  
 19 now about glyphosate and this imputation  
 20 methodology is not raised as a concern by 05:37  
 21 the investigators, Dr. Heltshe and others,  
 22 who presented the data for their validation  
 23 study of the imputation method in which they  
 24 presented glyphosate data along with the  
 25 other pesticides; correct? 05:38

Page 376

1 MS. FORGIE: Object to the form.  
 2 THE WITNESS: I don't understand  
 3 this question. Could you repeat?  
 4 BY MR. LASKER:  
 5 Q. The AHS investigators, including 05:38  
 6 Dr. Heltshe, conducted a validation test of  
 7 their imputation methodology in this  
 8 publication; correct?  
 9 MS. FORGIE: Object to the form.  
 10 THE WITNESS: What? A validation 05:38  
 11 method? No.  
 12 BY MR. LASKER:  
 13 Q. The investigators of the AHS study,  
 14 including Dr. Heltshe, published this paper  
 15 in 2002 presenting their data on how well 05:38  
 16 the imputation methodology worked through  
 17 the analyses that they conducted in this  
 18 paper for various pesticides; correct?  
 19 MS. FORGIE: No. Object to the  
 20 form. 05:38  
 21 THE WITNESS: This is a 2012 paper.  
 22 BY MR. LASKER:  
 23 Q. Sorry.  
 24 A. And they conducted this method  
 25 under lots of assumptions. The assumptions 05:39

Page 377

1 they made might be holding for most of these  
 2 pesticide, but they themselves actually say  
 3 that certain assumptions might be incorrect,  
 4 including the missing at random assumption  
 5 that they're making in this imputation, and 05:39  
 6 I'm saying that for glyphosate because of  
 7 the time -- the exposure period change and  
 8 the huge increase in glyphosate and that  
 9 happening in the middle of the first  
 10 enrollment period, this is not the method to 05:39  
 11 test this.  
 12 Q. I understand that that's what  
 13 you're saying.  
 14 My question is: Dr. Heltshe and  
 15 the other investigators who published this 05:39  
 16 analysis and presented the data on  
 17 glyphosate in Figure 2 and also the findings  
 18 for the other pesticides -- so in glyphosate  
 19 relative error to be in the middle of the  
 20 pack, they do not anywhere in this 05:39  
 21 publication state that this finding for  
 22 glyphosate alone is not reliable; correct?  
 23 MS. FORGIE: Objection. That's the  
 24 exact question you just asked twice.  
 25 She's answered -- 05:40



Page 378

1 MR. LASKER: It's not the exact  
 2 question. You're coaching the witness.  
 3 You're coaching witness. I'm asking a  
 4 different question.  
 5 MS. FORGIE: I'm not coaching the 05:40  
 6 witness. I object. I object to the  
 7 form. Asked and answered.  
 8 You can answer it again.  
 9 MR. LASKER: I'll ask the question  
 10 again because I can't imagine how you're 05:40  
 11 going to remember it at this point.  
 12 BY MR. LASKER:  
 13 Q. Dr. Heltshe and her  
 14 co-investigators who presented this analysis  
 15 in checking on the validation -- checking on 05:40  
 16 the imputation methodology that they used  
 17 and reported the relative errors for all of  
 18 these various pesticides, including  
 19 glyphosate, showing glyphosate to be in the  
 20 middle of the pack for the different 05:40  
 21 pesticides looked at in the AHS, nowhere in  
 22 this publication do they state that there is  
 23 a different concern about glyphosate that  
 24 should be taken into account in analyzing  
 25 the results that they present; correct? 05:41

Page 379

1 MS. FORGIE: Objection. Object to  
 2 the form. Asked and answered.  
 3 You can answer again.  
 4 THE WITNESS: These authors  
 5 investigated lots of pesticides. They 05:41  
 6 are not making any reference to any  
 7 single pesticide. They are just  
 8 treating them as if they are equal in  
 9 terms of their method.  
 10 BY MR. LASKER: 05:41  
 11 Q. They do not state that their method  
 12 does not work for glyphosate in this  
 13 analysis; correct?  
 14 MS. FORGIE: Objection. Asked and  
 15 answered. 05:41  
 16 You can answer again.  
 17 THE WITNESS: In this paper, they  
 18 are not stating anything specific for  
 19 any of the pesticides.  
 20 BY MR. LASKER: 05:41  
 21 Q. Well, that's not true. In  
 22 Figure 2, they have specific information on  
 23 each of the pesticides. In Figure 1, they  
 24 report specific information -- or Table 3,  
 25 I'm sorry. They present specific 05:41

Page 380

1 information for specific pesticides;  
 2 correct?  
 3 MS. FORGIE: Objection. It's not  
 4 appropriate to tell the witness one of  
 5 her answers is not true. 05:41  
 6 Objection. Also object to the  
 7 form. Asked and answered.  
 8 You can answer again.  
 9 THE WITNESS: I may have misspoken.  
 10 What I tried to do is answer your 05:42  
 11 questions in terms of whether the  
 12 authors actually commented on glyphosate  
 13 being different. They did not comment  
 14 on these pesticides being one or the  
 15 other different. They are, of course, 05:42  
 16 producing all of these data for all of  
 17 the pesticides they imputed.  
 18 BY MR. LASKER:  
 19 Q. And the data that they presented  
 20 and they decided to present to the world in 05:42  
 21 this peer-reviewed publication so that  
 22 people could understand their imputation  
 23 methodology when they're reading these AHS  
 24 studies that all now use this imputation  
 25 methodology, the data they presented showed 05:42

Page 381

1 a relative error for glyphosate that was in  
 2 the middle of the pack for all the  
 3 pesticides that they are -- for which  
 4 they're using the imputation methodology;  
 5 correct? 05:42  
 6 MS. FORGIE: Objection. You're  
 7 badgering the witness. You've asked her  
 8 the same question so many times.  
 9 You may answer it again.  
 10 THE WITNESS: I think you don't 05:42  
 11 understand what I'm getting at, and I'm  
 12 sorry that I can't express myself in  
 13 more lay terms or whatever I need to do,  
 14 but this is not the same as a validation  
 15 study of the imputation method, and the 05:43  
 16 authors clearly state that this multiple  
 17 imputation makes lots assumptions and  
 18 that, you know, for simplicity of  
 19 modeling, they only used a single set of  
 20 observed complete data, et cetera, 05:43  
 21 et cetera.  
 22 So it is not -- and they also say  
 23 that some of these assumptions may not  
 24 be correct and may have to be updated.  
 25 ///

Page 382

1 BY MR. LASKER:  
 2 Q. Can you point to anything in the  
 3 published literature, in the AHS website,  
 4 anywhere, anyone other than you has stated  
 5 that the imputation methodology that the AHS 05:43  
 6 study is using is uniquely inappropriate for  
 7 glyphosate?  
 8 MS. FORGIE: Object to the form.  
 9 THE WITNESS: Well, I haven't  
 10 looked; so I don't know. 05:43  
 11 BY MR. LASKER:  
 12 Q. You're not aware of any statement  
 13 from any of the AHS investigators that the  
 14 imputation method that they are using for  
 15 their phase 2 results are not appropriate 05:44  
 16 for glyphosate; correct?  
 17 MS. FORGIE: Object to the form.  
 18 THE WITNESS: I don't understand  
 19 why they should be doing this if they  
 20 haven't published on glyphosate. 05:44  
 21 BY MR. LASKER:  
 22 Q. Are you aware -- and I deposed  
 23 Dr. Blair. In Dr. Blair's deposition when I  
 24 deposed him, did he at any point state that  
 25 the imputation method that was being used in 05:44

Page 383

1 the 2013 study was not appropriate for  
 2 glyphosate?  
 3 MS. FORGIE: Object to the form.  
 4 THE WITNESS: I can't remember.  
 5 BY MR. LASKER: 05:44  
 6 Q. In the -- in your role on the  
 7 executive -- I'm sorry. Not the executive,  
 8 the external advisory committee for the AHS  
 9 to the present, have you ever heard anybody  
 10 say that the imputation method that they're 05:45  
 11 using for the phase 2 respondents is not  
 12 appropriate for glyphosate?  
 13 MS. FORGIE: Object to the form.  
 14 THE WITNESS: This is a 2012 paper.  
 15 We have not met since they started doing 05:45  
 16 this. So nobody could have objected.  
 17 BY MR. LASKER:  
 18 Q. And there is nothing in the draft,  
 19 the 2013 document that you've reviewed, that  
 20 includes the glyphosate data that says 05:45  
 21 anything about the imputation methodology  
 22 being inappropriate for glyphosate; correct?  
 23 MS. FORGIE: Objection to the form.  
 24 Mischaracterizes the draft manuscript.  
 25 THE WITNESS: As far as I know, 05:45

Page 384

1 this manuscript actually does refer back  
 2 to the imputation method, and there was  
 3 some back and forth between authors  
 4 about how to present it.  
 5 BY MR. LASKER: 05:45  
 6 Q. Right.  
 7 But in that back and forth, is  
 8 there any specific discussion that for  
 9 glyphosate the method is not appropriate?  
 10 MS. FORGIE: Objection. Do you 05:46  
 11 want her to review to find it?  
 12 MR. LASKER: If you want to take a  
 13 break, we can do that.  
 14 MS. FORGIE: No, we're not going to  
 15 take a break. 05:46  
 16 THE WITNESS: So am I supposed to  
 17 look.  
 18 MR. LASKER: Let's take a break.  
 19 MS. FORGIE: You're not going to  
 20 look during the break, though. 05:46  
 21 THE VIDEOGRAPHER: We're off the  
 22 record at 5:46 p.m.  
 23 (Recess taken from 5:46 p.m. to  
 24 5:54 p.m.)  
 25 THE VIDEOGRAPHER: We are back on 05:54

Page 385

1 the record at 5:54 p.m.  
 2 BY MR. LASKER:  
 3 Q. Dr. Ritz, in your role as the chair  
 4 of the external advisory committee to the  
 5 AHS, have you spoken with anyone at the AHS 05:54  
 6 to share the opinion that you've been  
 7 offering here today that the imputation  
 8 method that they're using is inappropriate  
 9 for glyphosate?  
 10 MS. FORGIE: Objection. Asked and 05:54  
 11 answered.  
 12 You can answer again.  
 13 THE WITNESS: I have not talked to  
 14 them about glyphosate.  
 15 BY MR. LASKER: 05:55  
 16 Q. In your rebuttal report at page 7,  
 17 you're talking about -- bottom of page 7,  
 18 you're talking about the differences between  
 19 peer-reviewed and unpublished -- a  
 20 peer-reviewed paper and the unpublished 05:55  
 21 manuscript for the Agricultural Health Study  
 22 2013 analysis; correct?  
 23 A. I think I do. Where is it?  
 24 Q. Bottom of page 7, continuing to  
 25 page 8. 05:55

Page 386	Page 388
<p>1 A. Oh, yes.</p> <p>2 Q. All right. One of the things that</p> <p>3 you state is that there is a footnote in the</p> <p>4 2013 AHS analysis that includes glyphosate</p> <p>5 that states that numbers do not sum to 05:55</p> <p>6 totals due to missing data; correct?</p> <p>7 A. Correct.</p> <p>8 Q. Now, the manuscript that was the</p> <p>9 2013 draft was subsequently published</p> <p>10 without herbicide data, so without the 05:55</p> <p>11 glyphosate data in 2014; correct?</p> <p>12 A. There is a 2014 paper, and I went</p> <p>13 to that, yes.</p> <p>14 MR. LASKER: So let's mark that.</p> <p>15 This is 19-21. 05:56</p> <p>16 (Exhibit Number 19-21 was</p> <p>17 marked for identification.)</p> <p>18 BY MR. LASKER:</p> <p>19 Q. And 19-21 -- Exhibit 19-21 is the</p> <p>20 2014 publication that was the subsequent 05:56</p> <p>21 revisions to the actual -- the 2013 study</p> <p>22 but without the herbicide data and</p> <p>23 substituted in fungicide and fumigant data;</p> <p>24 correct?</p> <p>25 MS. FORGIE: Object to the form. 05:56</p>	<p>1 both in the peer-reviewed published 2014</p> <p>2 paper and the 2013 draft; correct?</p> <p>3 MS. FORGIE: Object to the form.</p> <p>4 THE WITNESS: Well, it probably</p> <p>5 refers to different types of data 05:58</p> <p>6 because missing data are defined by what</p> <p>7 you're looking at, and this manuscript</p> <p>8 looked at the subpopulation of</p> <p>9 pesticides; so the missing data must be</p> <p>10 different. 05:58</p> <p>11 BY MR. LASKER:</p> <p>12 Q. This study looked at some of the</p> <p>13 same pesticides -- I know that the</p> <p>14 herbicides are dropped out, but it looked at</p> <p>15 some of the same pesticides as the 2013 05:58</p> <p>16 draft; correct?</p> <p>17 A. Yes. It overlaps in terms of all</p> <p>18 pesticides, but this paper should have less</p> <p>19 missing data because it dropped out the</p> <p>20 herbicides. The missing herbicide data 05:58</p> <p>21 should not be affecting this.</p> <p>22 Q. So is it your testimony, just so I</p> <p>23 understand, is that you think that the</p> <p>24 herbicide, there's more missing data for the</p> <p>25 glyphosate than there were for other 05:59</p>
Page 387	Page 389
<p>1 THE WITNESS: This is the</p> <p>2 insecticide paper. Fungicide and</p> <p>3 fumigant, right.</p> <p>4 BY MR. LASKER:</p> <p>5 Q. And if you look at the 05:56</p> <p>6 corresponding tables in the peer-reviewed</p> <p>7 published literature -- published study in</p> <p>8 2014 and you look at the same footnotes that</p> <p>9 you were looking at in the 2013 study on</p> <p>10 those same tables, the peer-reviewed 05:57</p> <p>11 published article in 2014 likewise has the</p> <p>12 footnote that says that the number of cases</p> <p>13 do not total -- do not equal the total NHL</p> <p>14 cases because of missing data; correct?</p> <p>15 A. Where is that? 05:57</p> <p>16 Q. If you look at page 6, footnote 2.</p> <p>17 A. The subtype, yeah. The subtypes</p> <p>18 due to missing data.</p> <p>19 Q. If you look at page 10 for the dose</p> <p>20 response analyses of NHL, in general, 05:57</p> <p>21 footnote 2, the same statement, "The number</p> <p>22 of cases do not sum the total number of NHL</p> <p>23 cases because of missing data"; correct?</p> <p>24 A. Yes.</p> <p>25 Q. So that statement which appears 05:58</p>	<p>1 pesticides that stayed in the analysis?</p> <p>2 MS. FORGIE: Object to the form.</p> <p>3 THE WITNESS: That's not what I</p> <p>4 said. I said that it's not exactly</p> <p>5 referring to the same data or missing 05:59</p> <p>6 data because, by definition, they have</p> <p>7 to be different.</p> <p>8 BY MR. LASKER:</p> <p>9 Q. Okay. But the fact that there is</p> <p>10 missing data noted in the 2013 paper is not 05:59</p> <p>11 something that will prevent that paper from</p> <p>12 being published in a peer-reviewed</p> <p>13 literature; correct?</p> <p>14 MS. FORGIE: Object to the form.</p> <p>15 THE WITNESS: It depends on what 05:59</p> <p>16 missing data does, and obviously here</p> <p>17 nobody in the peer review community</p> <p>18 thought that it was an issue.</p> <p>19 BY MR. LASKER:</p> <p>20 Q. Okay. You also state in your 05:59</p> <p>21 expert report on page 8, you talk about</p> <p>22 page 19 in the March 15, 2013, draft, and if</p> <p>23 you can go to that --</p> <p>24 A. Well, we --</p> <p>25 Q. I'm sorry. In your rebuttal report 05:59</p>

<p style="text-align: right;">Page 390</p> <p>1 on page 8 as another concern that you raise 2 about the unpublished 2013 paper, you point 3 to a comment that appears on page 19 4 about -- in the section that starts 5 "although this is a large prospective study, 06:00 6 there are limitations," and then there is a 7 reference in the 2013 draft that you talk 8 about need to add a paragraph of exposure 9 assessment, discuss the information on our 10 exposure scale in relation to the monitoring 06:00 11 work, discuss the likely magnitude of 12 misclassification and its likely impact on 13 the estimates of relative risk"; correct. 14 A. Correct. 15 Q. And you mention this as another 06:00 16 indication of why the 2013 analysis was not 17 something that would have withstood peer 18 review; correct? 19 MS. FORGIE: Objection. 20 THE WITNESS: This I cite because 06:00 21 I'm asked to review glyphosate. 22 BY MR. LASKER: 23 Q. Okay. You stated that in the next 24 paragraph for the above-stated reasons 25 including the fact that there's this 06:00</p>	<p style="text-align: right;">Page 392</p> <p>1 probably more general, but my idea is 2 that they took glyphosate out because 3 that was the one that had most of the 4 problems. 5 BY MR. LASKER: 06:02 6 Q. And if you can look at the 2014 7 paper again, and you can go to the very end 8 of the paper on page 15 above the section -- 9 above the conclusion, do you see where 10 conclusion is in the same column? 06:02 11 A. Yeah, uh-huh. 12 Q. The paragraph above that which 13 starts, "Although this is a large 14 prospective study." 15 Do you see that? 06:02 16 A. Yes. 17 Q. And that is the same language that 18 appeared in the draft in 2013, the same 19 start of that paragraph; correct? 20 MS. FORGIE: Object to the form. 06:02 21 THE WITNESS: What was the 22 question? 23 BY MR. LASKER: 24 Q. The phrase that starts in the 25 peer-reviewed published study, "Although 06:02</p>
<p style="text-align: right;">Page 391</p> <p>1 question raised in the draft if you would 2 have pointed out the above-mentioned 3 problems -- and let me make sure, let me see 4 if this is one of them. This data I had 5 gotten closer to publication. So let me 06:01 6 first ask this. The comment that you're 7 pointing out in the March 15, 2013, draft 8 following "although this is a large 9 prospective study," is that a comment that 10 in your mind will lead you to conclude that 06:01 11 this study should not be published in 12 peer-reviewed literature, specifically that 13 comment? 14 MS. FORGIE: Object to the form. 15 Asked and answered. 06:01 16 You can answer it again. 17 THE WITNESS: This statement was 18 specific to glyphosate, not to anything 19 that's published. 20 BY MR. LASKER: 06:01 21 Q. The comment in the draft that 22 you're referring to is not discussing 23 glyphosate; correct? 24 MS. FORGIE: Object to the form. 25 THE WITNESS: The comment is 06:01</p>	<p style="text-align: right;">Page 393</p> <p>1 this is a large prospective study" is the 2 same statement that appears in the draft at 3 page 19 where you are mentioning this 4 concern that was being raised -- this 5 comment that was raised in the draft 06:02 6 document; correct? 7 MS. FORGIE: Object to the form. 8 Misstates the draft. 9 THE WITNESS: There are two things 10 conflated: One is the statement that 06:03 11 was commented on, and the other is the 12 comment. 13 BY MR. LASKER: 14 Q. The comment that you note that 15 appears in the draft of potential limitation 06:03 16 in the 2013 study, that is, in fact, 17 discussed in the peer-reviewed published 18 study in 2014; correct? 19 MR. BAUM: Object to the form. 20 Again, mischaracterizes the draft. 06:03 21 THE WITNESS: So, again, the 22 statement I pulled out, I'm referencing 23 this early -- this sentence that starts 24 on this paragraph in order to tell you 25 which comment I'm referring to. The 06:03</p>

<p style="text-align: right;">Page 394</p> <p>1 comment I'm referring to states, "Need 2 to add a paragraph of exposure 3 assessment, discuss the information on 4 exposure scale in relation to monitoring 5 work, discuss the likely magnitude of 06:03 6 misclassification and its likely impact 7 on the estimates of RR." None of that 8 could be done in this publication 9 because they're not publishing on 10 glyphosate. 06:04 11 BY MR. LASKER: 12 Q. But the comment that they're saying 13 -- the note they're saying about what needs 14 to be added to the manuscript was, in fact, 15 added to the manuscript as it was published 06:04 16 in 2014; correct? That's what the rest of 17 that paragraph does. It responds exactly to 18 that comment. 19 MS. FORGIE: Object to the form. 20 THE WITNESS: I have -- 06:04 21 MS. FORGIE: Wait. Also asked and 22 answered. 23 You may answer it again. 24 THE WITNESS: I can't read it this 25 fast. I would have to read the whole 06:04</p>	<p style="text-align: right;">Page 396</p> <p>1 detail. But am I correct that that case 2 control population in France, the 3 investigators reported an odds ratio for 4 glyphosate of 1.0 that was not statistically 5 significant? 06:05 6 MS. FORGIE: Object to the form. 7 THE WITNESS: They are reporting 8 that for NHL. They also had other 9 outcomes for which the odds ratios were 10 slightly different including multiple 06:05 11 myeloma and some sub groups. 12 BY MR. LASKER: 13 Q. But for NHL in the French case 14 control study, they reported an odds ratio 15 of 1.0; is that correct? 06:05 16 A. With a wide confidence interval and 17 very few exposed subjects. 18 Q. Okay. And then for the NAPP data 19 which would be the pooled data of all the 20 case control studies in Canada and the U.S. 06:06 21 for their ever/never analysis when they 22 adjusted for three pesticides, they reported 23 an odds ratio for glyphosate and 24 non-Hodgkin's lymphoma of 1.13 or for 25 self-respondents only an odds ratio of 0.95; 06:06</p>
<p style="text-align: right;">Page 395</p> <p>1 paragraph, plus what this statement or 2 this comment requests inserts in the 3 message section, and I haven't reviewed 4 the message section. 5 BY MR. LASKER: 06:04 6 Q. In making this criticism in your 7 expert rebuttal report of the 2013 draft, am 8 I correct that you did not compare this 9 comment with what was actually included in 10 the 2014 peer-reviewed published study? 06:04 11 MS. FORGIE: Object to the form. 12 THE WITNESS: I would not need to 13 do that because the peer-reviewed study 14 does not address glyphosate, and it is 15 with glyphosate that I have this problem 06:04 16 and not with these other pesticides. 17 BY MR. LASKER: 18 Q. Okay. The -- I want to make sure I 19 talked about it. I think there's one study 20 that I did not talk about. I don't think 06:05 21 I'm going to have time to go through it in 22 detail, but there was a case control study 23 in France by Dr. Orsi, and that I know you 24 have certain concerns about that I don't 25 think we'll have time to go through in 06:05</p>	<p style="text-align: right;">Page 397</p> <p>1 correct? 2 MS. FORGIE: Object to the form. 3 THE WITNESS: I remember that 4 table, and my problem was that self -- 5 was excluding the proxies is that you're 06:06 6 actually excluding the sickest 7 individuals who died before they could 8 be interviewed. So the difference 9 between the two estimates might be that 10 you're actually throwing out the people 06:06 11 who are the sickest. 12 BY MR. LASKER: 13 Q. Just so I understand for the NAPP 14 data for pooling together all the case 15 control studies in U.S. and Canada control 06:07 16 adjusted for those three other pesticides, 17 the odds ratios and the two ways that they 18 reported it were either 1.13 or 0.95; 19 correct? 20 MS. FORGIE: Object to the form. 06:07 21 Asked and answered. 22 You can answer it again. 23 A. Those are reported for models that 24 included three pesticides that I am 25 questioning whether or not they should be 06:07</p>

<p style="text-align: right;">Page 398</p> <p>1 included, and the model that didn't include 2 these pesticides was 1.43 and also for a 3 subgroup analysis with intensity of 4 exposures more than two days per year it 5 actually didn't change at all. 06:07 6 Q. I understand that you have -- 7 MS. FORGIE: Let me ask a question. 8 How much time do we have left, please? 9 THE VIDEOGRAPHER: 11 minutes. 10 MS. FORGIE: Okay, so you'll let us 06:07 11 know when seven hours is up, please. 12 BY MR. LASKER: 13 Q. For the De Roos 2005 cohort study, 14 they reported a never/ever use risk ratio 15 adjusted for other exposures of 1.1; 06:07 16 correct? 17 A. Yes. 18 Q. And in the 2013 AHS data the 19 never/ever odds ratio, you said, would be 20 somewhere around 1.0. Dr. Blair said it 06:08 21 would be around 0.9; correct? 22 MS. FORGIE: Objection. 23 Mischaracterizes her testimony. 24 THE WITNESS: So I would not rely 25 on De Roos, and I would not rely on the 06:08</p>	<p style="text-align: right;">Page 400</p> <p>1 BY MR. LASKER: 2 Q. We discussed now there was -- the 3 Cocco study very small. The Hardell study 4 was very small. But the four largest study 5 populations then would be that French study, 06:09 6 the NAPP study, the Eriksson study, and the 7 De Roos or the AHS cohort. Those are the 8 four largest datasets; correct? 9 MS. FORGIE: Object to the form. 10 THE WITNESS: Orsi is the wrong one 06:09 11 to mention. I don't think that Orsi is 12 one we should be looking because the 13 power was very low and it's a case 14 control study that's hospital-based. 15 There are lots of problems with 06:09 16 hospital-based controls. 17 BY MR. LASKER: 18 Q. Okay. You would -- and I know you 19 don't agree with -- you have concerns about 20 all of those numbers. But for all of these 06:09 21 adjusted odds ratios you have as they're 22 reported by the investigators, you have odds 23 ratios that are bordering around 1.0 when 24 adjusted for other exposures to pesticides; 25 correct? 06:10</p>
<p style="text-align: right;">Page 399</p> <p>1 new data unless somebody can show me 2 that the exposure assessment for 3 glyphosate was not severely 4 misclassified. 5 BY MR. LASKER: 06:08 6 Q. I understand that. But the odds 7 ratio reported in that data, and I 8 understand you have reasons why you don't 9 want to rely upon that was, according to 10 Dr. Blair, around 0.9 and you agree it's 06:08 11 somewhere around 1.10; correct? 12 MS. FORGIE: Object to the form. 13 Also asked and answered. 14 You can answer it again. 15 THE WITNESS: That was my answer. 06:08 16 I don't think I have to repeat myself. 17 BY MR. LASKER: 18 Q. And for the Swedish study for 19 Eriksson in the multi-regressional analysis, 20 they had an odds ratio of glyphosate 06:09 21 non-Hodgkin's lymphoma of 1.5; correct? 22 MS. FORGIE: Object to the form. 23 THE WITNESS: It was about 1.5 in a 24 multi-variates adjusted, yes. 1.53, 25 yes. 06:09</p>	<p style="text-align: right;">Page 401</p> <p>1 MS. FORGIE: Object to the form. 2 Mischaracterizes the testimony -- the 3 studies. 4 THE WITNESS: That's not correct. 5 We would have to go study by study. For 06:10 6 example, 1.35 is not hovering around 1. 7 BY MR. LASKER: 8 Q. 1.13, 1.0, 1.1 -- 9 A. There was a 2 -- 10 MS. FORGIE: Wait, wait. There's 06:10 11 no question. 12 BY MR. LASKER: 13 Q. For ever/never use; correct? 14 MS. FORGIE: Object to the form. 15 Asked and answered. 06:10 16 THE WITNESS: Can we go back to De 17 Roos 2003 and check that? 18 BY MR. LASKER: 19 Q. Let's -- well, the NAPP includes -- 20 pools all the data that's in De Roos and in 06:10 21 McDuffie; correct? 22 A. Well, you asked me about all these 23 substudies before. 24 Q. In your expert report you discuss 25 biological plausibility; correct? 06:10</p>

<p style="text-align: right;">Page 402</p> <p>1 A. Yes.</p> <p>2 Q. And you discuss in there data</p> <p>3 points for some studies on genotoxicity and</p> <p>4 oxidative stress; correct?</p> <p>5 A. Where's that? 06:11</p> <p>6 Q. It's the last page of your expert</p> <p>7 report, I believe.</p> <p>8 A. It's the regular expert?</p> <p>9 Q. Yes.</p> <p>10 A. The first one. 06:11</p> <p>11 MR. WISNER: Second to last page?</p> <p>12 MR. LASKER: Yes.</p> <p>13 THE WITNESS: Yes.</p> <p>14 MR. WISNER: Page 24.</p> <p>15 BY MR. LASKER: 06:11</p> <p>16 Q. First of all, let me ask you, and I</p> <p>17 don't know if you've read Dr. Portier's</p> <p>18 deposition. He goes through the genotox</p> <p>19 studies in some detail. Dr. Portier</p> <p>20 testified that in his review of all of the 06:11</p> <p>21 glyphosate studies, he did not find evidence</p> <p>22 from those studies showing that glyphosate</p> <p>23 is mutagenic. Do you agree with his</p> <p>24 assessment?</p> <p>25 MS. FORGIE: Object to the form, 06:11</p>	<p style="text-align: right;">Page 404</p> <p>1 You can answer it again.</p> <p>2 THE WITNESS: It's beside the point</p> <p>3 because the topic here is genotoxicity</p> <p>4 and oxidative stress and not</p> <p>5 mutagenicity. 06:12</p> <p>6 BY MR. LASKER:</p> <p>7 Q. Do you have an opinion as to</p> <p>8 whether glyphosate is mutagenic?</p> <p>9 MS. FORGIE: Objection. Asked and</p> <p>10 answered. 06:12</p> <p>11 You can answer it again.</p> <p>12 THE WITNESS: Mutagenicity is</p> <p>13 affect in bacteria. Genotoxicity we can</p> <p>14 assess in human cells and animals, and I</p> <p>15 believe that the studies that looked at 06:12</p> <p>16 genotoxicity showed that there is</p> <p>17 genotoxicity as I report.</p> <p>18 BY MR. LASKER:</p> <p>19 Q. Do you have any opinion one way or</p> <p>20 the other as to whether or not glyphosate is 06:12</p> <p>21 mutagenic? Yes or no.</p> <p>22 MS. FORGIE: Objection. She</p> <p>23 doesn't need to give yes or no. You're</p> <p>24 badgering the witness. You've asked her</p> <p>25 three times now. 06:13</p>
<p style="text-align: right;">Page 403</p> <p>1 and I believe that mischaracterizes the</p> <p>2 deposition testimony, but you can show</p> <p>3 her a portion from that.</p> <p>4 THE WITNESS: Do you want to show</p> <p>5 me? 06:11</p> <p>6 BY MR. LASKER:</p> <p>7 Q. No.</p> <p>8 MS. FORGIE: Object to the form.</p> <p>9 THE WITNESS: Then I can't comment.</p> <p>10 BY MR. LASKER: 06:11</p> <p>11 Q. Do you have an independent opinion</p> <p>12 as to whether or not the glyphosate</p> <p>13 mutagenicity studies present evidence that</p> <p>14 glyphosate or glyphosate-based formulations</p> <p>15 is mutagenic? 06:12</p> <p>16 MS. FORGIE: Object to the form.</p> <p>17 THE WITNESS: It has never been a</p> <p>18 point of discussion. It's genotoxicity,</p> <p>19 not mutagenicity.</p> <p>20 BY MR. LASKER: 06:12</p> <p>21 Q. So sitting here today, do you have</p> <p>22 any opinion one way or the other as to</p> <p>23 whether or not glyphosate is mutagenic?</p> <p>24 MS. FORGIE: Object to the form.</p> <p>25 Asked and answered. 06:12</p>	<p style="text-align: right;">Page 405</p> <p>1 You can answer it again.</p> <p>2 A. I was not evaluating mutagenicity</p> <p>3 here. I was evaluating genotoxicity, and my</p> <p>4 statement is about genotoxicity, not</p> <p>5 mutagenicity. 06:13</p> <p>6 Q. Okay. And last document I'll show</p> <p>7 you -- and we'll have a statement for the</p> <p>8 record -- is the 2017 slide deck.</p> <p>9 MR. LASKER: Has been marked as an</p> <p>10 exhibit? 06:13</p> <p>11 MS. SHIMADO: Yes.</p> <p>12 MR. LASKER: This will be my last</p> <p>13 question. I have a question on one of</p> <p>14 the slides in there.</p> <p>15 MR. WISNER: Exhibit 5. 06:13</p> <p>16 MR. LASKER: Yeah, 19-5.</p> <p>17 THE WITNESS: My slide deck?</p> <p>18 BY MR. LASKER:</p> <p>19 Q. Yeah, it's this one.</p> <p>20 A. Got it. 06:13</p> <p>21 Q. And slide 16 in your slide deck --</p> <p>22 MS. FORGIE: You mean page 16?</p> <p>23 MR. LASKER: Page 16, slide 16.</p> <p>24 The number 16 on the slide.</p> <p>25 THE WITNESS: Oh, yeah, the Ames 06:14</p>

Page 406	Page 408
<p>1 test.</p> <p>2 BY MR. LASKER:</p> <p>3 Q. Right.</p> <p>4 So you present data here on the</p> <p>5 Ames test for assessing carcinogens, and you 06:14</p> <p>6 report data that for truly carcinogenic</p> <p>7 compounds and truly non-carcinogenic</p> <p>8 compounds and positive and negative on the</p> <p>9 Ames test; correct?</p> <p>10 A. That's correct. 06:14</p> <p>11 Q. My question is: The data in this</p> <p>12 table, is that data that you made up, or is</p> <p>13 that data --</p> <p>14 A. Not even my data. It's actually</p> <p>15 Dr. Olson who loves to make these up. 06:14</p> <p>16 Q. So this is all made-up data?</p> <p>17 A. Yes.</p> <p>18 MR. LASKER: Okay. Let's take a</p> <p>19 break. I've got about four minutes</p> <p>20 left. I'm going to see if I've got any 06:14</p> <p>21 questions after that point, and I've got</p> <p>22 a comment for the record.</p> <p>23 THE VIDEOGRAPHER: We're off the</p> <p>24 record at 6:14 p.m.</p> <p>25 (Recess taken from 6:14 p.m. to 06:14</p>	<p>1 mechanism, and human studies, and I</p> <p>2 would never start with a genotoxicity</p> <p>3 study. Because I'm an epidemiologist, I</p> <p>4 always start with human data.</p> <p>5 MR. LASKER: I want to make a 06:33</p> <p>6 statement for the record, and then I'll</p> <p>7 suspend my questioning. There's a</p> <p>8 couple of issues here.</p> <p>9 One is I mentioned earlier on the</p> <p>10 record, Dr. Ritz earlier in the 06:33</p> <p>11 deposition suggested, and I don't know</p> <p>12 whether she does or she does not, that</p> <p>13 she might have opinions regarding the</p> <p>14 animal cancer bioassays.</p> <p>15 I have reviewed her expert reports 06:33</p> <p>16 multiple times. I don't see any mention</p> <p>17 of animal cancer bioassays. To the</p> <p>18 extent that plaintiff's counsel -- and</p> <p>19 we don't have to discuss this now -- but</p> <p>20 if there's going to be the position of 06:33</p> <p>21 plaintiffs that they're reserving the</p> <p>22 right for Dr. Ritz to offer opinion</p> <p>23 testimony regarding animal cancer</p> <p>24 bioassays, we'll move to strike all that</p> <p>25 testimony. 06:33</p>
Page 407	Page 409
<p>1 6:32 p.m.)</p> <p>2 THE VIDEOGRAPHER: We are back on</p> <p>3 the record at 6:32 p.m.</p> <p>4 BY MR. LASKER:</p> <p>5 Q. Dr. Ritz, in your opinion, can 06:32</p> <p>6 scientific studies looking at the issues of</p> <p>7 genotoxicity and oxidative stress standing</p> <p>8 alone provide evidence that can establish</p> <p>9 that a compound causes cancer in humans?</p> <p>10 MS. FORGIE: Object to the form. 06:32</p> <p>11 THE WITNESS: These are two</p> <p>12 criteria that are used by IARC to</p> <p>13 establish carcinogenicity, but they are</p> <p>14 just two criteria within the animal</p> <p>15 study -- within the mechanistic study 06:32</p> <p>16 section. There are several others.</p> <p>17 BY MR. LASKER:</p> <p>18 Q. And you would agree that</p> <p>19 genotoxicity and oxidative stress studies by</p> <p>20 themselves would not be sufficient for you 06:32</p> <p>21 to be comfortable reaching an opinion of</p> <p>22 carcinogenicity; correct?</p> <p>23 MS. FORGIE: Object to the form.</p> <p>24 THE WITNESS: I cannot subtract</p> <p>25 from what I know about animal studies, 06:32</p>	<p>1 MS. FORGIE: I'm not going to</p> <p>2 respond to that. I believe her expert</p> <p>3 report speaks for itself.</p> <p>4 MR. LASKER: You just responded.</p> <p>5 MS. FORGIE: That's not a response. 06:34</p> <p>6 Just a statement.</p> <p>7 MR. LASKER: Second, we marked a</p> <p>8 number of points in the transcript where</p> <p>9 the witness would not respond to a</p> <p>10 simple yes-or-no question and kept going 06:34</p> <p>11 into soliloquies on issues that were not</p> <p>12 part of the question. We marked that in</p> <p>13 the transcript numerous times.</p> <p>14 By doing so, the witness, I think,</p> <p>15 intentionally was eating into our 06:34</p> <p>16 questioning time. As a result of that,</p> <p>17 we have not had sufficient time to</p> <p>18 explore Dr. Ritz's opinions both on the</p> <p>19 studies that we actually at least</p> <p>20 mentioned or discussed somewhat in 06:34</p> <p>21 passing or in connection with some of</p> <p>22 the studies, some of the smaller studies</p> <p>23 like Hardell and Cocco and also the Orsi</p> <p>24 study where we did not have time to ask</p> <p>25 questions pretty much at all, and also 06:34</p>



Page 410	Page 412
<p>1 the numerous issues dealing with the</p> <p>2 Eriksson study in particular and the</p> <p>3 other studies where because of the</p> <p>4 witness' refusal to answer questions, we</p> <p>5 did not have time to go through all 06:35</p> <p>6 those questions.</p> <p>7 I will raise an option for</p> <p>8 plaintiff's counsel that if plaintiff's</p> <p>9 counsel is agreeing to further</p> <p>10 questioning at this time for us to ask 06:35</p> <p>11 those questions, we are prepared to stay</p> <p>12 longer to do so.</p> <p>13 If plaintiff's counsel is not</p> <p>14 prepared to provide us the time</p> <p>15 necessary to ask those questions and get 06:35</p> <p>16 Dr. Ritz's opinions, we reserve our</p> <p>17 right, and I'm only going to be</p> <p>18 suspending my questioning at this point</p> <p>19 in time to go back to the Court to get</p> <p>20 additional time because significant 06:35</p> <p>21 portions of time, in our opinion, were</p> <p>22 taken up because the witness would not</p> <p>23 answer a simple yes-or-no question, and</p> <p>24 we've marked those in the record, and</p> <p>25 the Court can reach its own conclusions 06:35</p>	<p>1 will be able to look at the transcript.</p> <p>2 The witness didn't answer the questions;</p> <p>3 so of course, I had to ask them again.</p> <p>4 MR. WISNER: Just for the record, a</p> <p>5 large portion of the time during this 06:36</p> <p>6 deposition was eaten up by yourself</p> <p>7 commenting on the proprietary or</p> <p>8 responsiveness of the witness' answer,</p> <p>9 which, quite frankly, is both</p> <p>10 argumentative, a waste of the testimony 06:36</p> <p>11 because it would never be admissible in</p> <p>12 court, and a large portion of your</p> <p>13 commentary was also eaten up.</p> <p>14 So I think at this point -- how</p> <p>15 much time are you saying you want? Just 06:36</p> <p>16 curious. What's the amount of time</p> <p>17 you're asking for?</p> <p>18 MR. LASKER: I probably need</p> <p>19 another two hours or so.</p> <p>20 MR. WISNER: Okay. 06:37</p> <p>21 MS. FORGIE: All right. So I have</p> <p>22 a few questions.</p> <p>23 MR. LASKER: And further</p> <p>24 commentary, I'm going to respond to.</p> <p>25 It's in the transcript. The Court will 06:37</p>
Page 411	Page 413
<p>1 about them.</p> <p>2 MS. FORGIE: And for the record,</p> <p>3 how much time is left of his seven</p> <p>4 hours, or has he used it all? He's out.</p> <p>5 Could I just have a statement on the 06:35</p> <p>6 record that he's out?</p> <p>7 THE VIDEOGRAPHER: Yeah. He's at</p> <p>8 seven hours.</p> <p>9 MS. FORGIE: Okay. Of course, we</p> <p>10 don't agree at all with your 06:36</p> <p>11 characterization. In fact, there were</p> <p>12 multiple times, I would guess hundreds</p> <p>13 of times where you asked the same</p> <p>14 question over and over and over again,</p> <p>15 and that's what ate up into your time. 06:36</p> <p>16 I wrote down at least three times where</p> <p>17 you asked the same question ten times.</p> <p>18 Simply because you don't like the</p> <p>19 answer doesn't give you the right to ask</p> <p>20 the same question over and over again. 06:36</p> <p>21 That's what ate up your time, and I'm</p> <p>22 not going to agree to any further time.</p> <p>23 You can do whatever you want.</p> <p>24 That's outrageous.</p> <p>25 MR. LASKER: As I said, the Court 06:36</p>	<p>1 be able to read that, and the Court will</p> <p>2 be able to decide whether or not the</p> <p>3 witness was responsive to questions.</p> <p>4 MS. FORGIE: The court certainly</p> <p>5 will. 06:37</p> <p>6 MR. LASKER: Also one more thing I</p> <p>7 want on the record as well. There was</p> <p>8 objections to virtually every question,</p> <p>9 other than what is your name, by</p> <p>10 plaintiff's counsel which also ate into 06:37</p> <p>11 the time.</p> <p>12 MS. FORGIE: And I'll respond to</p> <p>13 that. You make incredibly compound,</p> <p>14 complex questions which are</p> <p>15 objectionable. I have to object to 06:37</p> <p>16 questions as to form if I want to</p> <p>17 preserve them, which I do, and you make</p> <p>18 these declaratory statements beforehand</p> <p>19 about all kinds of things; so that's why</p> <p>20 I had to object, and the Court can look 06:37</p> <p>21 at that as well.</p> <p>22 Okay. I have a few questions,</p> <p>23 Doctor.</p> <p>24</p> <p>25 EXAMINATION 06:37</p>

<p style="text-align: right;">Page 414</p> <p>1 BY MS. FORGIE: 2 Q. Dr. Ritz, can you explain how you 3 went about arriving at your opinions as 4 expressed in your report? 5 A. Yes. When I'm asked to write a 06:38 6 report of a review paper, I use standard 7 methods common to epidemiology which is I go 8 to PubMed, and I put in search terms, 9 multiple search terms to find the biggest 10 amount of literature that I can on PubMed. 06:38 11 However, I know that certain search 12 terms don't work as well on PubMed; so we 13 also go to Google Scholar which usually 14 gives you a larger number of papers, and a 15 lot of those then have to be weeded out 06:38 16 because they're not relevant for the 17 question, but it at least allows you to 18 check the literature very thoroughly. So 19 it's a lot of work, but you, you know, go 20 through it. 06:38 21 Then in addition, you're going to 22 the published literature that is 23 meta-analyses, pooled analyses to 24 cross-reference and make sure you haven't 25 missed anything that's mentioned in one of 06:39</p>	<p style="text-align: right;">Page 416</p> <p>1 criteria that were contradictory in terms of 2 which studies they were throwing out or 3 throwing in, but it stimulated me to go back 4 to some of the original studies they are 5 citing, but overall, it did not make a big 06:40 6 impact on my assessment. 7 Q. You mentioned you reviewed the IARC 8 monograph; is that correct? 9 A. That's correct. 10 Q. Did you rely on the IARC monograph, 06:40 11 or did you form your own opinions? 12 A. I formed my own opinion. It is 13 very interesting to read the IARC monograph 14 because it summarizes information in an 15 interesting way. However -- and I use it to 06:40 16 cross check, and I use it to understand 17 their argumentation. 18 It was published in 2015. There is 19 additional data that came out since. 20 Q. Are you familiar with something 06:40 21 known as the Bradford Hill analysis? 22 A. Of course, yes. We teach that. 23 Q. Can you explain briefly what it is? 24 A. Well, Dr. Bradford Hill in the 25 early 1960s, wrote a commentary in which he 06:41</p>
<p style="text-align: right;">Page 415</p> <p>1 the meta-analyses pooled analyses. You also 2 go to the original literature and check all 3 the references they have because normally 4 every paper refers to papers in this same 5 area prior -- that was published prior. So 06:39 6 you do that to make sure that you have all 7 the information that you need. 8 In addition, I, of course, read not 9 only the meta-analyses, the pooled analyses 10 but also previous reports. I also read all 06:39 11 of the different meta-analyses that kind of 12 keep repeating information about the 13 singular studies. I read the singular 14 studies. I read the IARC report, and I read 15 the EPA CARC report, and all of it together 06:39 16 I used for my opinion. 17 Q. And you mentioned that you read the 18 CARC report. How did you decide how much 19 weight, for example, to give the CARC 20 report? 06:39 21 A. The CARC report was not weighted 22 very heavily because the epidemiology 23 section was rather cursory, and the animal 24 section, that one I actually studied more 25 intensively, seemed to make a lot of use of 06:40</p>	<p style="text-align: right;">Page 417</p> <p>1 describes viewpoints, he calls them, 2 according to which one can review the 3 scientific literature. It's not just 4 epidemiology. It's all of science more or 5 less. 06:41 6 Although he meant it for 7 observational studies in order to help us 8 gauge how the data is performing, how the 9 studies are performing in terms of causal 10 assessments because, as you may have 06:41 11 gathered while I was talking today, there is 12 more to data than just, you know, numbers. 13 We have to put these data into context, and 14 that's what his viewpoints do. They put 15 these data into context of validity, 06:41 16 biologic plausibility, et cetera. 17 Q. And with regard to glyphosate-based 18 formulations and non-Hodgkin's lymphoma, did 19 you perform a Bradford Hill analysis? 20 A. I did, and I talked about it in my 06:42 21 report. 22 Q. And what conclusion did you reach 23 after performing your Bradford Hill 24 analysis? 25 A. After that, I concluded that there 06:42</p>

Page 418

1 is reasonable scientific certainty that NHL  
 2 is associated with glyphosate use in these  
 3 data.  
 4 Q. And did you also -- are you aware  
 5 as to whether or not IARC also performed a 06:42  
 6 Bradford Hill analysis?  
 7 A. I would presume they did.  
 8 Actually, they are talking about it; so I  
 9 think they did.  
 10 Q. Okay. And what is your 06:42  
 11 understanding of the conclusion that the  
 12 IARC reached with regard to their Bradford  
 13 Hill analysis?  
 14 A. Well, they used their Bradford Hill  
 15 analysis in the way I just described to put 06:42  
 16 the different pieces together. First, they  
 17 might have done it work group for work  
 18 group, but they also do this as a whole  
 19 group in which they are putting together the  
 20 human data, the animal data, the mechanistic 06:42  
 21 data and put that in context of these  
 22 criteria that Bradford Hill suggested.  
 23 Q. Is there a difference between  
 24 hazard assessment and risk assessment?  
 25 A. Absolutely. 06:43

Page 419

1 Q. What is the difference?  
 2 A. So a hazardous assessment is an  
 3 assessment in which we are categorizing an  
 4 agent according to its ability to be toxic  
 5 including being carcinogenic, but you can 06:43  
 6 also assess reproductive toxicity or other  
 7 types of toxicity.  
 8 While a risk assessment is  
 9 something that regulatory agencies use in  
 10 order to come up with standard setting 06:43  
 11 methods.  
 12 Q. So would it be accurate --  
 13 THE VIDEOGRAPHER: I'm going to  
 14 have to change tapes.  
 15 This marks the end of videotape 06:43  
 16 number 4 in the deposition of Dr. Beate  
 17 Ritz. We're off the record at 6:43 p.m.  
 18 (Recess taken from 6:43 p.m. to  
 19 6:45 p.m.)  
 20 THE VIDEOGRAPHER: We are back on 06:45  
 21 the record at 6:45 p.m. This marks the  
 22 beginning of videotape number 5 in the  
 23 deposition of Dr. Beate Ritz.  
 24 BY MS. FORGIE:  
 25 Q. Doctor, we are discussing the 06:46

Page 420

1 difference between -- we were discussing  
 2 what a hazardous assessment is.  
 3 Do you recall that before we  
 4 changed tapes?  
 5 A. Yes, I do. 06:46  
 6 Q. Would it be fair to say that a  
 7 hazardous assessment gives you an idea, in  
 8 general, as to whether or not a particular  
 9 product is capable of causing a disease?  
 10 MR. LASKER: Object to the form. 06:46  
 11 THE WITNESS: A hazard assessment  
 12 is a general evaluation of an agent's  
 13 potential to be toxic in different ways.  
 14 BY MS. FORGIE:  
 15 Q. And in this case, would it be 06:46  
 16 accurate to say that a hazard assessment  
 17 determines whether or not glyphosate is  
 18 capable of causing non-Hodgkin's lymphoma?  
 19 MR. LASKER: Objection to form.  
 20 THE WITNESS: So, in fact, this 06:46  
 21 what IARC is performing is a hazardous  
 22 assessment. They are making a  
 23 categorical -- they're taking a  
 24 categorical approach with a conclusion  
 25 of carcinogenicity. 06:47

Page 421

1 BY MS. FORGIE:  
 2 Q. And did you read the deposition of  
 3 Dr. John Acquavella in this case?  
 4 A. Yes, I did.  
 5 Q. From reading that deposition, is it 06:47  
 6 your understanding that Dr. Acquavella is an  
 7 epidemiologist?  
 8 A. Yes.  
 9 Q. Is it also your understanding that  
 10 Dr. Acquavella was a -- is a former employee 06:47  
 11 of Monsanto?  
 12 A. Yes.  
 13 Q. And is it also your understanding  
 14 that he is a -- that Dr. Acquavella is a  
 15 current consultant to Monsanto? 06:47  
 16 MR. LASKER: Objection to form.  
 17 THE WITNESS: I read that in the  
 18 deposition, I believe, and I met him  
 19 while he was an employee of Monsanto at  
 20 some of these meetings. 06:47  
 21 BY MS. FORGIE:  
 22 Q. Do you recall reading what  
 23 Dr. Acquavella said about IARC's hazard  
 24 assessment?  
 25 A. Yes. I understood his testimony as 06:47

<p style="text-align: right;">Page 422</p> <p>1 stating that IARC got the hazard assessment 2 right but that there are questions about the 3 risk assessment. 4 MR. LASKER: Objection to form. 5 BY MS. FORGIE: 06:47 6 Q. So Dr. Acquavella's testimony was 7 that IARC got it right in that in 8 categorizing glyphosate as 2A; is that 9 correct? 10 MR. LASKER: Objection to form. 06:48 11 Mischaracterizes the testimony. 12 THE WITNESS: I did understand from 13 reading his testimony that he actually 14 referred to a correct hazard assessment, 15 and if he meant correct, then he would 06:48 16 have included the assessment of 17 carcinogenicity in terms of a 2A. 18 BY MS. FORGIE: 19 Q. And likewise, it would be correct 20 that in agreeing with IARC's hazard 06:48 21 assessment, he would have agreed that 22 glyphosate is capable of causing 23 non-Hodgkin's lymphoma; is that correct? 24 MR. LASKER: Object to the form. 25 Mischaracterizes testimony. 06:48</p>	<p style="text-align: right;">Page 424</p> <p>1 than two days per year? 2 Do you see that? 3 A. Yes. 4 Q. And what is the odds ratio there 5 for proxy and self-respondents? 06:49 6 A. So for proxy and self-respondents, 7 meaning for everyone, it's 1.73 with a 8 confidence interval of 1.02 to 2.94. 9 Q. And is that odds ratio controlled 10 for use of 2,4-D, dicamba, and malathion? 06:50 11 A. Yes, it is. 12 Q. And are those the only three 13 pesticides that you're aware of that are 14 associated as risk factors for non-Hodgkin's 15 lymphoma? 06:50 16 A. I am aware that 2,4-D is a 2B 17 category according to IARC. Malathion is a 18 2A. I'm not aware that dicamba is 19 categorized. 20 Q. Okay. And with the 1.73 odds 06:50 21 ratio, is that statistically significant? 22 A. It is. 23 Q. And is the greater than two days of 24 use per year category there more important 25 than the never/ever use category that was 06:50</p>
<p style="text-align: right;">Page 423</p> <p>1 THE WITNESS: So since IARC based 2 its evaluation on NHL and quotes a 3 positive association with NHL, I assume 4 that that was what he meant. 5 BY MS. FORGIE: 06:48 6 Q. Can you look at Exhibit 16, please. 7 MR. LASKER: Which one is that? 8 MS. FORGIE: It's the Brazil slide 9 show, slide deck, PowerPoint, whatever 10 you want to call it. 06:49 11 THE WITNESS: Yeah. 12 BY MS. FORGIE: 13 Q. And on that, can you turn to the 14 Section 26, page 26, "Proxy Versus 15 Self-Respondent," please. 06:49 16 A. Yes. 17 MR. LASKER: Page 26? 18 MS. FORGIE: Yes. This one. 19 "Proxy Versus Self-Respondents." 20 MR. LASKER: Thanks. 06:49 21 MS. FORGIE: Do you have it? 22 MR. LASKER: I do. 23 BY MS. FORGIE: 24 Q. Okay. Do you see the section where 25 they're talking about frequency of greater 06:49</p>	<p style="text-align: right;">Page 425</p> <p>1 discussed earlier by the defense counsel? 2 MR. LASKER: Objection to form. 3 THE WITNESS: Absolutely. It's 4 much more important to look at higher 5 intensity because oftentimes that is 06:50 6 where we see effects when we're 7 evaluating carcinogens. 8 BY MS. FORGIE: 9 Q. And with regard to the seven -- the 10 category greater seven lifetime days, years, 06:51 11 number of years times number of days per 12 year. 13 Do you see that? 14 A. Yes. 15 Q. And it looks like the odds ratio 06:51 16 has actually gone down in that section. 17 Do you see that? 18 A. Yes. The odds ratio hovers around 19 the 1. 20 Q. Can you explain why the odds ratio 06:51 21 is lower for that category than for the 22 greater than 2 category where the odds ratio 23 is 1.73? 24 A. Yeah. These are two different -- 25 very different measures. One is the 06:51</p>

Page 426	<p>1 intensity, and the other is duration, and                  2 the lifetime days is the product of duration                  3 and intensity meaning that, in essence, I am                  4 watering out any intensity via duration.                  5 I can get the same numbers with a 06:51                  6 very low intensity over long duration as                  7 with a shorter duration and a higher                  8 intensity. So that measure really is more                  9 closely related to duration than to                  10 intensity. 06:52                  11 Q. And does that explanation -- how                  12 does that tie into whether or not this                  13 information tells you -- what information                  14 this gives you about glyphosate-based                  15 formulations causing non-Hodgkin's lymphoma? 06:52                  16 A. So in terms of occupational                  17 epidemiology, we are very interested in high                  18 level exposures which we often have a much                  19 better way in assessing a much more reliable                  20 way in assessing and also believe that high 06:52                  21 intensity exposures are really what we have                  22 to worry about, and we have to protect                  23 workers from.                  24 So I would think that the high                  25 intensity more than two days per year is 06:52</p>	Page 428	<p>1 proxies from the category, is there any                  2 reason you would want to include proxies?                  3 A. Well, the one reason I can think of                  4 is that proxies are responding because the                  5 self-respondent isn't available which means 06:53                  6 the self-respondent would be too sick to                  7 answer or dead.                  8 So what you're doing is you're                  9 pretty much removing the sickest individuals                  10 if you're removing the proxy respondents. 06:54                  11 Q. Okay. And then can you turn -- oh,                  12 a couple more questions about the NAPP                  13 study.                  14 You were shown Exhibit 16. Do you                  15 see at the bottom where it says, on the 06:54                  16 front page, it says Sao Paulo Brazil?                  17 A. Yes.                  18 Q. Okay. So is it your understanding                  19 this is a PowerPoint presentation that                  20 accompanied the Brazil presentation? 06:54                  21 A. That's what I understand.                  22 Q. Were you also made -- or have you                  23 also seen slide shows with regard to a                  24 presentation in Canada?                  25 A. Yes, I was shown that. 06:54</p>
Page 427	<p>1 what really is an interesting finding in                  2 terms of worker health.                  3 Q. And one last question. You see                  4 there's two categories here, proxy and                  5 self-respondents category A and 06:52                  6 self-respondents only category B.                  7 Do you see that?                  8 A. Yes, I see that.                  9 Q. Do you see that under greater than                  10 two days of use per year, while the odds 06:53                  11 ratio goes up from 1.73 for proxy and                  12 self-respondents to 1.77 for                  13 self-respondents only, it is not                  14 statistically significant for                  15 self-respondents only. 06:53                  16 Do you see that?                  17 A. Yes, I see that.                  18 Q. Is there any way to -- what happens                  19 when you take out the proxy group?                  20 A. You are pretty much reducing sample 06:53                  21 size, and when you reduce sample size, you                  22 automatically lose statistical power to show                  23 a statistically significant effect. So                  24 that's what happens here.                  25 Q. With regard to if you remove 06:53</p>	Page 429	<p>1 Q. And you also have seen abstracts                  2 and posters with regard to a Canadian                  3 presentation?                  4 A. Yes.                  5 Q. Have you also seen a slide show, 06:54                  6 abstracts, or posters related to an IARC                  7 presentation?                  8 A. To the IARC presentation, yes.                  9 Q. And did any of the information --                  10 with regard to your expert report, you, I 06:54                  11 believe, testified that you only used the                  12 Brazil abstract when you were drafting your                  13 expert report; is that correct?                  14 A. That's correct.                  15 Q. So with regard to all of the other 06:55                  16 materials related to the NAPP study, all                  17 these other slide shows, other abstracts,                  18 other posters, did any of them affect or                  19 change your opinion as stated in your expert                  20 report? 06:55                  21 A. The only way it changed my opinion                  22 is that it solidified the opinion that there                  23 is, in fact, carcinogenicity to go after.                  24 Q. In assessing the risk of cancer in                  25 glyphosate, is there any potential bias in 06:55</p>

<p style="text-align: right;">Page 430</p> <p>1 controlling for concurrent pesticide use?  2 A. Yes. It's always a problem with  3 concurrent exposures. We haven't really  4 found a mathematical way to get around it.  5 There is probably none to get around it. 06:55  6 If exposures are highly correlated,  7 you have to sit down and ask the question is  8 it more or less likely that these exposures  9 are independent risk factors or indicators  10 or proxies for the actual exposure under 06:56  11 investigation?  12 So when you're putting these in the  13 same statistical model, then something  14 occurs that we call co-linearity, and what  15 that means is that there's some technical 06:56  16 term. These variables split the variants or  17 the explained variants. And in essence, if  18 you put enough highly correlated variables  19 into the same model, none of them will  20 explain anything anymore. All of them will 06:56  21 go towards the one.  22 I've seen that multiple, multiple  23 times in air pollution studies where the air  24 pollutants are highly correlated, and this  25 is what you see. Therefore, you are going 06:56</p>	<p style="text-align: right;">Page 432</p> <p>1 blanket validity statements in terms of  2 studies.  3 So I'm using the AHS study and the  4 loss to follow up as a good example of what  5 to be careful of when you're conducting a 06:57  6 cohort study.  7 Q. And, Doctor, I'd like you to turn  8 to Exhibit 17, please.  9 A. Yes.  10 Q. And, Doctor, do you see a date on 06:58  11 this slide presentation?  12 A. Yeah. That was on my old slides  13 from fall 2012.  14 Q. So this was approximately four  15 years before you were retained as an expert 06:58  16 in this litigation; is that correct?  17 A. That's correct.  18 Q. And, Doctor, in Exhibit 17, these  19 slide presentations that you use in your  20 teaching at UCLA, do you have criticisms of 06:58  21 the AHS study incorporated in there?  22 A. I believe so.  23 Q. Can you point those out, please?  24 A. So what I'm doing here is  25 introducing the AHS cohort to the students 06:58</p>
<p style="text-align: right;">Page 431</p> <p>1 one by one by one in order to assess their  2 affect on household counts.  3 Q. Doctor, you were asked many  4 questions about your criticisms of the draft  5 manuscripts of unpublished AHS data. 06:56  6 Do you recall those questions?  7 A. Yes.  8 Q. You've made several criticisms of  9 the draft manuscripts and the unpublished  10 glyphosate data with regard to the AHS 06:57  11 study; is that correct?  12 A. That's correct.  13 Q. With regard to those criticisms of  14 the AHS study, have you ever publicly made  15 those criticisms prior to being retained in 06:57  16 this litigation?  17 A. Yes.  18 Q. And in what format is that?  19 A. Well, in my teaching. When I teach  20 my students about the cohort design, I warn 06:57  21 them against the limitations of cohorts  22 because I think I pointed out that this  23 validity slide in the beginning of one of my  24 slide shows is there to actually cause  25 discussion with my students about these 06:57</p>	<p style="text-align: right;">Page 433</p> <p>1 talking about retro and prospective data  2 collection and what the problems are, and  3 then I'm showing them the composition of the  4 cohort and data collection progress in  5 different phases and specifically on page 6, 06:59  6 I show them a slide that was given to me  7 during phase 2 data collection in which I  8 point out how many people are actually not  9 completing phase 2 in different parts of  10 phase 2. 06:59  11 And I'm then directing them to the  12 issue of exposure assessment being  13 incomplete when you have a time varying  14 exposure that you cannot capture at a second  15 time of follow-up. 06:59  16 Q. So, Doctor, is it accurate to state  17 that approximately four years before being  18 retained as an expert in this litigation,  19 you were teaching -- you were using the AHS  20 problems, exposure assessment problems you 06:59  21 described with the AHS cohort study as it  22 relates to glyphosate as a teaching tool to  23 your students as to how not to conduct an  24 epidemiological study?  25 A. Not as not to conduct but what to 06:59</p>

Page 434

1 be careful of when you're conducting studies  
 2 that otherwise seem so perfect.  
 3 Q. Doctor, you were asked a lot of  
 4 questions today, and you were shown a lot of  
 5 documents. Do any of the documents or 07:00  
 6 questions that you were asked change your  
 7 opinion as expressed in your expert report  
 8 that to a reasonable degree of scientific  
 9 certainty glyphosate causes non-Hodgkin's  
 10 lymphoma? 07:00  
 11 A. I still stand to my conclusions as  
 12 cited.  
 13 Q. And, Doctor, same question, in  
 14 other words, you were asked a lot of  
 15 questions and shown a lot of documents 07:00  
 16 today. Do any of them change your opinion  
 17 to a reasonable degree of scientific  
 18 certainty glyphosate-based formulations  
 19 including Roundup cause non-Hodgkin's  
 20 lymphoma? 07:00  
 21 A. Nothing changes my opinion.  
 22 MS. FORGIE: That's it.  
 23 MR. LASKER: I have one follow-up  
 24 question. It's not going to take me  
 25 five seconds. 07:00

Page 435

1 MS. FORGIE: I'm not going to allow  
 2 any time. No more questions. I'm  
 3 sorry.  
 4 MR. WISNER: Let him have one  
 5 follow-up. 07:01  
 6 MS. FORGIE: You guys are a lot  
 7 nicer than me.  
 8  
 9 **FURTHER EXAMINATION**  
 10 **BY MR. LASKER:** 07:01  
 11 Q. Dr. Ritz, you provided your slide  
 12 deck for teaching students in fall of 2012.  
 13 Do you have any other slide decks of your  
 14 teaching of your students that mention the  
 15 AHS study? 07:01  
 16 A. Yes. Many. Every year.  
 17 Q. Okay. I will for the record object  
 18 to the fact --  
 19 A. It's the same slide deck. It's  
 20 updated. 07:01  
 21 MR. LASKER: I'll ask those slide  
 22 decks be produced if they refer to the  
 23 AHS study. Obviously, we understand all  
 24 slide decks deal with case control  
 25 studies or cohort studies is over the 07:01

Page 436

1 top, but if she has other slide decks  
 2 that refer to AHS, that seems pretty  
 3 squarely in line --  
 4 MR. WISNER: To the extent they're  
 5 different than the one you have. 07:01  
 6 MS. FORGIE: He just said it's the  
 7 same.  
 8 MR. LASKER: I don't know.  
 9 THE WITNESS: It is the same.  
 10 MR. LASKER: I don't understand 07:01  
 11 that. I don't know if you've looked at  
 12 them or not. You can look at them. If  
 13 they're the exact same slide deck,  
 14 that's fine. But if they're not the  
 15 exact same slide deck, we ask they be 07:02  
 16 produced. And you don't have to commit  
 17 to that. You can look at them.  
 18 THE WITNESS: Fine.  
 19 MS. FORGIE: She said they're the  
 20 same. I believe her. All right. Done? 07:02  
 21 MR. LASKER: I'm sorry. We're off  
 22 the record.  
 23 (Testimony continues on the  
 24 following page in order to  
 25 include jurat.) 07:02

Page 437

1 **THE VIDEOGRAPHER:** This concludes  
 2 today's proceedings in the deposition of  
 3 Dr. Beate Ritz. The total number of  
 4 videotapes used today was five, and  
 5 we're off the record at 7:02 p.m. 07:02  
 6 (Time noted: 7:02 p.m.)  
 7  
 8  
 9  
 10  
 11 \_\_\_\_\_  
 12 Beate Ritz, MD, PhD  
 13  
 14  
 15 Subscribed and sworn to before me  
 16 this day of , 2017.  
 17  
 18  
 19 \_\_\_\_\_  
 20 (Notary Public)  
 21 My Commission expires: \_\_\_\_\_  
 22  
 23  
 24  
 25

1 CERTIFICATE  
2 STATE OF CALIFORNIA:  
3

4 I, LISA MOSKOWITZ, CSR, RPR, CRR, CLR,  
5 NCRA Realtime Systems Administrator,  
6 Certified Shorthand Reporter, do hereby  
7 certify:

8 That the witness whose deposition is  
9 hereinbefore set forth was duly sworn, and  
10 that such deposition is a true record of the  
11 testimony given by such witness.

12 I further certify that I am not related  
13 to any of the parties to this action by  
14 blood or marriage, and that I am in no way  
15 interested in the outcome of this matter.

16 IN WITNESS WHEREOF, I have hereunto set  
17 my hand this 19th day of September, 2017.  
18  
19  
20  
21

22 \_\_\_\_\_  
23 LISA MOSKOWITZ, CSR 10816, RPR, CRR, CLR  
24 NCRA Realtime Systems Administrator  
25

1 NAME OF CASE: In re: Roundup  
2 DATE OF DEPOSITION: September 18, 2017  
3 DEPONENT: BEATE RITZ, MD, PHD  
4 1. To clarify the record.  
5 2. To conform to the facts.  
6 3. To correct transcription error.

7 Page \_\_\_\_\_ Line \_\_\_\_\_ Reason \_\_\_\_\_  
8 From \_\_\_\_\_ to \_\_\_\_\_

9 Page \_\_\_\_\_ Line \_\_\_\_\_ Reason \_\_\_\_\_  
10 From \_\_\_\_\_ to \_\_\_\_\_

11 Page \_\_\_\_\_ Line \_\_\_\_\_ Reason \_\_\_\_\_  
12 From \_\_\_\_\_ to \_\_\_\_\_

13 Page \_\_\_\_\_ Line \_\_\_\_\_ Reason \_\_\_\_\_  
14 From \_\_\_\_\_ to \_\_\_\_\_

15 Page \_\_\_\_\_ Line \_\_\_\_\_ Reason \_\_\_\_\_  
16 From \_\_\_\_\_ to \_\_\_\_\_

17 Page \_\_\_\_\_ Line \_\_\_\_\_ Reason \_\_\_\_\_  
18 From \_\_\_\_\_ to \_\_\_\_\_

19 Page \_\_\_\_\_ Line \_\_\_\_\_ Reason \_\_\_\_\_  
20 From \_\_\_\_\_ to \_\_\_\_\_

21 Page \_\_\_\_\_ Line \_\_\_\_\_ Reason \_\_\_\_\_  
22 From \_\_\_\_\_ to \_\_\_\_\_

23 Page \_\_\_\_\_ Line \_\_\_\_\_ Reason \_\_\_\_\_  
24 From \_\_\_\_\_ to \_\_\_\_\_

25 Page \_\_\_\_\_ Line \_\_\_\_\_ Reason \_\_\_\_\_  
From \_\_\_\_\_ to \_\_\_\_\_



A				
<b>a.m (15)</b> 2:6 8:2,17 72:20,21 72:22,24 96:15,17 96:18,20 144:17,18 144:19,21	<b>accurately (1)</b> 91:18	<b>addressed (2)</b> 27:3 48:1	1:24 2:15 438:5,23	165:4 168:9,10,11 171:4 176:9 185:2 195:13 205:15 248:12 292:16 293:1,1 302:14 352:22 353:8 360:21 399:10 400:19 402:23 407:18 411:10,22
<b>Aaron (1)</b> 5:24	<b>acknowledging (1)</b> 368:16	<b>addressing (2)</b> 26:5 224:4	<b>admissible (1)</b> 412:11	<b>agreed (6)</b> 95:16 125:8 243:2 301:15 325:10 422:21
<b>abbreviated (1)</b> 181:8	<b>Acquavella (8)</b> 24:10,22 25:8 421:3,6 421:10,14,23	<b>adds (3)</b> 168:3 175:18,19	<b>advantages (1)</b> 316:12	<b>agreeing (2)</b> 410:9 422:20
<b>ability (3)</b> 55:25 170:10 419:4	<b>Acquavella's (2)</b> 24:16 422:6	<b>adheres (1)</b> 42:15	<b>advice (1)</b> 31:12	<b>agreement (1)</b> 375:5
<b>able (25)</b> 29:14 42:12 51:7 54:25 78:14 80:23 91:18 102:18 118:25 120:19 122:8 124:12 126:9 136:17 145:5 173:22 174:23 176:16 181:14 184:16 212:12 278:16 412:1 413:1 413:2	<b>act (1)</b> 152:22	<b>adjust (23)</b> 152:11 216:15 218:11 218:12 236:2,13 238:3,7 239:10 240:16,20,25 241:24 242:11 247:16 248:17,22 279:10 286:2,6 295:1 330:12 334:25	<b>advising (3)</b> 13:18 26:15,16	<b>agrees (1)</b> 61:25
<b>above-mentioned (1)</b> 391:2	<b>action (1)</b> 169:16	<b>adjusted (60)</b> 152:9,10,18 153:9,13 153:15 154:16,21 157:6,12,21,21 158:11,12,21,25 159:3,14 179:3 180:4,22 181:18 215:2,18 217:1,19 237:19 239:6 240:1 242:13 248:4 249:10 253:12 279:4,18,24 280:13 280:18,22 281:8 282:6,19 283:18,25 285:1 287:23 288:10 289:20 295:24 308:6,13 319:14,15 320:10 396:22 397:16 398:15 399:24 400:21,24	<b>advisor (1)</b> 14:6	<b>agriculture (1)</b> 149:14
<b>above-stated (1)</b> 390:24	<b>ACTIONS (1)</b> 1:7	<b>adjusting (9)</b> 105:10 106:12 152:13 216:14 220:20 240:17 247:21 279:25 294:20	<b>advisory (20)</b> 18:24 20:17 21:6,17 21:23,25 22:17 23:2 23:8,9,11,17 24:1 25:5,18 32:2,10 325:4 383:8 385:4	<b>ahead (2)</b> 90:18 127:18
<b>active (3)</b> 17:7 22:2 77:25	<b>activity (1)</b> 25:17	<b>adjustment (8)</b> 151:21,24 159:12 216:23 236:25 238:25 253:6 281:21	<b>affected (3)</b> 404:13 429:18 431:2	<b>AHS (71)</b> 20:23 23:12 25:18 26:16 27:2,2,17,23 28:9,14,17 29:17 30:12 31:5 32:3,6 32:11,16,23 33:14 124:2,20 150:18 151:2 319:1 327:8 333:17 336:7 342:18,24 344:25 347:14 355:4,13 356:4 357:4,19,23 358:21 359:19,21 360:24 361:1 362:1 362:25 366:23 374:8 376:5,13 378:21 380:23 382:3,5,13 383:8 385:5,5 386:4 398:18 400:7 431:5 431:10,14 432:3,21 432:25 433:19,21 435:15,23 436:2
<b>activities (2)</b> 25:22,25	<b>acts (1)</b> 159:18	<b>adjusts (3)</b> 279:12 294:2 296:6	<b>affiliate (1)</b> 14:20	<b>Administrator (4)</b> 214:21 237:15,17 239:16 282:18 335:19
<b>activity (1)</b> 25:17	<b>actual (10)</b> 135:22 148:6 160:16 181:9 209:2 365:2,2 365:5 386:21 430:10	<b>Admin (1)</b> 279:12 294:2 296:6	<b>age (17)</b> 152:13 179:5 180:5 187:20 188:24,25 189:10,14 237:5 238:7 240:18 242:13 248:17 279:4 319:15 337:8 337:10	
<b>acts (1)</b> 159:18	<b>acutely (1)</b> 150:6		<b>aged (1)</b> 189:14	
<b>actual (10)</b> 135:22 148:6 160:16 181:9 209:2 365:2,2 365:5 386:21 430:10	<b>add (6)</b> 132:14 222:21 272:4 283:2 390:8 394:2		<b>agencies (1)</b> 419:9	
<b>above-mentioned (1)</b> 391:2	<b>added (6)</b> 171:22 215:4 222:15 300:13 394:14,15		<b>Agency (1)</b> 6:11	
<b>above-stated (1)</b> 390:24	<b>adding (2)</b> 173:9 219:12		<b>agent (8)</b> 42:7,15,16 171:8 203:7 264:16 312:3 419:4	
<b>absolutely (4)</b> 235:1 238:6 418:25 425:3	<b>addition (2)</b> 414:21 415:8		<b>agent's (1)</b> 420:12	
<b>abstract (20)</b> 38:4,20 283:21 288:18,20,22,25 290:2,6,16,18 291:11,23 294:11 295:14,17 364:1,10 364:11 429:12	<b>additional (15)</b> 26:18 69:17 72:7 82:2 175:17 215:23 219:12,13 277:20 282:13 293:20 294:7,21 410:20 416:19		<b>agents (12)</b> 18:14 244:22,24 245:20 246:9,11,18 262:17 273:22 309:15 310:10 332:7	
<b>abstracts (7)</b> 37:8,18,22 38:12 429:1,6,17	<b>additivity (2)</b> 235:6,11		<b>ago (3)</b> 33:7,8 98:2	
<b>accept (2)</b> 32:7 286:1	<b>address (10)</b> 27:6 32:4 39:13 83:25 84:16 144:10 226:18 342:3 347:18 395:14		<b>agree (42)</b> 41:3 46:21 67:2,25 68:7,25 71:6 80:11 88:14 93:8,14 94:20 94:25 105:22 106:10 130:2 147:4 148:16 149:11	
<b>accepted (1)</b> 316:17				
<b>access (2)</b> 220:19 226:12				
<b>accompanied (1)</b> 428:20				
<b>account (4)</b> 151:21 193:2,14 378:24				
<b>accuracy (1)</b> 365:10				
<b>accurate (3)</b> 419:12 420:16 433:16				

<b>AHS's (1)</b> 32:18	338:25 370:20 373:19 412:16 414:10	305:13,23 306:4,5,7 306:10 308:8 311:15 314:7 318:10,14 324:4,10 335:5,24,25 342:17 345:7,10 347:12,17 347:24 349:7 350:5 352:2,11 355:1 357:24 358:23 364:15 365:9 377:16 378:14 379:13 385:22 386:4 389:1 390:16 396:21 398:3 399:19 416:21 417:19,24 418:6,13 418:15	49:21 50:17 56:8 57:18 58:24 59:16 60:1,2 61:20 63:19 64:22 65:17 66:8 68:5,20 69:13 70:16 71:1,19 81:9 91:10 93:20 101:19 102:13 103:8,21 104:17 105:17 106:19 111:10 112:13 120:25 121:15 123:20 124:12,17 126:19 126:23 127:1,9,22 128:16 130:21 137:18 149:10 158:1 162:12 202:3 203:3 209:18 210:19 212:3 215:14 217:15 218:3 219:5 220:14 220:23 222:6 224:11,25 225:10 226:15,17,22 227:12 231:4 236:17 237:23 238:12,16 239:4,20 239:22 240:7,22,23 241:4,11,11,13,14 241:18 242:3 246:15 247:11 257:13 258:13,20 258:21,24 259:10 259:19,23 260:18 261:7,22 262:11 265:2,13 266:1,22 267:11,24 268:10 268:11 269:21 270:11,18 273:1 275:12 276:4,7 295:21 296:11,13 299:24 315:8 321:22 323:23 324:14 327:1,5 329:6 339:12,22 344:16 352:5 353:12 354:4,18 358:4 359:5 360:2 361:10 362:9,11 367:8 368:5,13,19 370:5,8 372:10 373:7 374:24 378:8 379:3,16 380:8,10 381:9 385:12 391:16 394:23 397:22 399:14,15	404:1,11 405:1 410:4,23 411:19 412:2,8 428:7 <b>answerable (1)</b> 242:6 <b>answered (134)</b> 44:18 45:11,23 46:12 47:6 57:17 58:23 59:15 61:19 63:18 64:21 65:16 66:17 67:11 68:19 69:12 70:15,25 71:17 90:17 91:9 93:19 100:5 101:18 102:12 103:7,20 104:15 106:18 111:9 112:12 120:23 121:14,24 123:2,18 124:16 125:19 127:10 128:14 130:20 137:17 149:9 157:25 162:11 202:1,1 203:2 209:17 210:18 211:5,17 212:2 218:2 219:4 220:13 221:8 222:4 224:10 225:8,9 227:9,11 236:16 237:22 238:15 239:3 240:4 241:8 242:2 246:15 247:10 257:12 258:12 259:9 261:6 261:21 262:8,22 265:11,12,25 266:21 267:10 268:7,25 269:12 270:8 272:12,25 273:15 274:9,22 275:9 276:2,5 295:20 296:10 305:17 315:7 321:21 323:22 324:13 334:22 339:21 344:15 353:11 354:3,17 358:2 359:3,3,25,25 362:8 367:7 368:4,7 372:9 373:4,5 377:25 378:7 379:2 379:15 380:7 385:11 391:15 394:22 397:21 399:13 401:15 403:25 404:10
<b>AHS2013 (1)</b> 348:21	<b>amounts (1)</b> 371:23			
<b>air (2)</b> 430:23,23	<b>analyses (35)</b> 22:10,21 23:20 24:16 24:24 28:10 49:9 50:8,8 115:21 185:6 231:22 233:12 244:21 249:13 254:1 263:9 279:2 287:11 289:13 290:25 291:19 292:24 293:20 294:7 297:9 309:3 311:13 314:5 352:17 376:17 387:20 414:23 415:1,9	<b>analyze (5)</b> 40:1 43:19 44:14 224:16 324:16 <b>analyzed (11)</b> 60:6 88:17 91:7 223:24 277:2 302:15 308:15 339:14 343:2 346:10 374:18 <b>analyzing (6)</b> 45:19 48:14 145:2 343:10 367:1 378:24 <b>and/or (2)</b> 145:14 169:7 <b>Andrus (2)</b> 3:3 9:1 <b>Angeles (5)</b> 1:17 2:12 3:13 8:1,14 <b>animal (44)</b> 33:19 54:21,23 55:14 56:2 59:21 60:14 62:15 63:7 71:24 73:5,7,17 74:5,8,11 74:12,15,20 75:21 76:8,16 77:3,4,5 78:6,8,21 79:5,19 79:22 80:1,14,20 81:5,23 150:24 407:14,25 408:14 408:17,23 415:23 418:20 <b>animals (3)</b> 77:8 82:23 404:14 <b>announced (1)</b> 35:7 <b>answer (173)</b> 11:4 16:16 23:23 35:13 44:19 46:13		
<b>al (4)</b> 224:6 243:25 244:13 245:15				
<b>Alaska (1)</b> 3:5				
<b>Alavanja (2)</b> 7:4 21:8				
<b>Aldrin (1)</b> 247:24				
<b>algorithm (1)</b> 75:2				
<b>algorithms (1)</b> 29:8				
<b>all-encompassing (2)</b> 255:9 257:18	<b>analysis (149)</b> 23:4 25:7 46:24 47:11 47:17,20 52:25 54:2 54:8,22,23 69:20 70:6 126:4 138:17 138:22 139:14 155:12 159:12 163:10,14,19 165:12 170:11,12 170:21 199:8 206:11 210:13,23 211:1,19,22 212:22 212:22 214:8,9 215:17 216:21 217:8 219:10 227:23,24 230:1 231:23 232:19 233:6,16,19 234:4,6 234:14 235:23 236:10,12 240:9 243:25 244:14 250:6,12,16 251:5 262:20,25 263:5 264:9,14 265:4,15 265:16 266:23 267:13,14 268:13 271:5 276:17,23,24 277:14 278:23 279:15 280:7 284:13,22 286:13 288:13 289:10,25 291:10 292:13,18 294:17 296:21 297:4 298:1,17 300:1,11 302:10,16 302:16 304:5			
<b>allow (9)</b> 42:22,24 48:3 52:15 189:9 207:25 332:22 333:6 435:1				
<b>allowed (2)</b> 190:7 332:22				
<b>allowing (3)</b> 190:10,13 290:24				
<b>allows (5)</b> 46:9 111:4 334:15 335:13 414:17				
<b>alongside (1)</b> 136:20				
<b>alternate (4)</b> 97:12,17,18 99:6				
<b>alternative (21)</b> 50:25 51:12 94:18 95:2 97:6,23,24,24 98:5,12 99:18 100:10 101:4,15,22 102:16 103:14,17 104:3,12,24				
<b>amendment (1)</b> 314:11				
<b>amendments (2)</b> 18:24 19:17				
<b>America (1)</b> 306:14				
<b>American (3)</b> 6:16 276:17 277:10				
<b>Ames (3)</b> 405:25 406:5,9				
<b>amount (11)</b> 185:10 209:23 210:1 266:7 299:14,17				

<p><b>answering (2)</b> 323:14 368:21</p> <p><b>answers (5)</b> 269:23 351:17 361:12 367:10 380:5</p> <p><b>anticipated (1)</b> 14:25</p> <p><b>anybody (4)</b> 25:5 112:22 336:15 383:9</p> <p><b>anymore (3)</b> 17:7 221:12 430:20</p> <p><b>apparent (1)</b> 335:2</p> <p><b>appear (3)</b> 92:12 161:14 162:8</p> <p><b>appeared (2)</b> 23:13 392:18</p> <p><b>appears (6)</b> 114:17 320:25 387:25 390:3 393:2,15</p> <p><b>appendix (1)</b> 134:8</p> <p><b>application (3)</b> 227:17 333:23 342:18</p> <p><b>applications (2)</b> 36:23 344:22</p> <p><b>apply (4)</b> 215:4 345:2,3 358:6</p> <p><b>applying (5)</b> 185:18 275:16,20 276:12,14</p> <p><b>appoint (1)</b> 37:19</p> <p><b>appointed (1)</b> 21:6</p> <p><b>appointment (1)</b> 21:10</p> <p><b>appoints (1)</b> 37:19</p> <p><b>approach (4)</b> 44:12 160:2 345:19 420:24</p> <p><b>approached (1)</b> 21:7</p> <p><b>appropriate (15)</b> 83:14 105:22 106:23 125:11 128:8,25 159:15 290:8 324:18 362:21 380:4 382:15 383:1 383:12 384:9</p> <p><b>appropriately (1)</b> 110:22</p> <p><b>appropriateness (1)</b> 159:21</p>	<p><b>approval (4)</b> 201:7,11 202:13,22</p> <p><b>approved (4)</b> 199:20 200:16 202:19 208:16</p> <p><b>approximately (3)</b> 8:17 432:14 433:17</p> <p><b>arbitrarily (1)</b> 94:24</p> <p><b>area (3)</b> 12:2 55:2 415:5</p> <p><b>areas (2)</b> 38:13 39:25</p> <p><b>argue (4)</b> 67:19 82:20 83:5 95:11</p> <p><b>arguing (1)</b> 94:4</p> <p><b>argument (1)</b> 143:2</p> <p><b>argumentation (1)</b> 416:17</p> <p><b>argumentative (1)</b> 412:10</p> <p><b>Aristei (2)</b> 2:11 3:10</p> <p><b>arriving (1)</b> 414:3</p> <p><b>arsenicals (1)</b> 149:16</p> <p><b>article (9)</b> 5:15 86:14,18,24 87:3 88:5 97:4 114:18 387:11</p> <p><b>articles (6)</b> 77:5 78:6 80:14 82:14 83:1 86:12</p> <p><b>ascertained (2)</b> 341:24,25</p> <p><b>aside (2)</b> 39:8 113:10</p> <p><b>asked (148)</b> 21:9,15 44:17 45:11 45:22 46:11 47:6 57:16 58:23 59:14 61:18 63:17 64:20 65:15 66:16 67:11 68:18 69:11 70:14 70:24 71:16 90:17 91:9 93:18 100:5 101:18 102:12 103:7,20 104:15 106:17 111:9 112:12 120:22,24 121:13,23 123:2,18 124:16 125:19</p>	<p>126:20 128:14 130:20 137:17 149:9 157:25 162:11 202:1 203:2 209:17 210:18 211:5,17 212:2,15 218:2 219:3 220:12 221:8,9 222:4 224:10 225:8 227:9 236:16 237:22 239:3 240:4 241:8 242:2 246:5,15 247:9 257:12 258:12 259:9 260:16 261:5,20 262:8 265:11,24 266:21 267:9 268:24 269:11 270:7 272:11,24 273:3,14 274:8,11 274:14,21,25 275:8 276:1 295:20,25 296:10 305:17 315:6 321:21 323:22 324:13 334:22 339:21 344:3,15 353:11 354:3,17 358:2 359:3,25 361:7 362:8 367:7 368:4 372:8 373:4 374:23 377:24 378:7 379:2 379:14 380:7 381:7 385:10 390:21 391:15 394:21 397:21 399:13 401:15,22 403:25 404:9,24 411:13,17 414:5 431:3 434:3,6 434:14</p> <p><b>asking (19)</b> 10:18 28:7 50:4 62:19 74:18 104:23 123:6 157:17 174:21 241:13 245:24 315:11,24 346:25 347:9 351:8 375:4 378:3 412:17</p> <p><b>aspect (1)</b> 174:16</p> <p><b>assess (13)</b> 101:23 120:19 122:8 144:7 151:25 167:6 176:16 184:12,21 240:13 404:14 419:6 431:1</p>	<p><b>assessed (5)</b> 38:15,16 199:1 338:8 339:18</p> <p><b>assessing (13)</b> 48:9 122:23 123:14 125:15 149:12 199:9 203:5 210:14 362:13 406:5 426:19,20 429:24</p> <p><b>assessment (46)</b> 24:5 27:2 49:2,3 52:18 62:12,13,15 62:17 65:3 145:15 175:12 182:12 183:8 220:9 266:4 273:18 314:9 315:13 316:13 324:18 338:13 352:18 390:9 394:3 399:2 402:24 416:6 418:24,24 419:2,3,8 420:2,7,11,16,22 421:24 422:1,3,14 422:16,21 433:12 433:20</p> <p><b>assessments (4)</b> 22:16 26:23 29:6 417:10</p> <p><b>Assign (1)</b> 363:19</p> <p><b>assistant (1)</b> 13:14</p> <p><b>associated (15)</b> 33:15 51:23 124:13 128:11 142:3 145:11 150:15 151:2 252:17 269:4 329:16 331:21 342:6 418:2 424:14</p> <p><b>association (66)</b> 8:22 48:17 50:10,11 64:6 65:11 66:12 67:5 68:10 69:7 70:8,18,19 71:3 87:9 91:19 101:7 110:6 111:7 120:8 120:19 121:21 122:8,24 123:15 125:15 131:3,6 142:12,18 143:5 147:5 148:11,18 149:1 165:14,18,19 166:2,19 167:15 168:21 170:17 171:8 174:1,3 176:19 185:7 195:6</p>	<p>212:13 223:8,18,19 224:7 225:4 227:6 230:17 249:15 250:8 310:21 323:2 323:6,18 351:14,14 423:3</p> <p><b>associations (3)</b> 71:23 104:8 331:17</p> <p><b>assume (7)</b> 27:24 146:7 197:4 202:17 210:12 304:19 423:3</p> <p><b>assumed (1)</b> 211:14</p> <p><b>assumes (1)</b> 165:19</p> <p><b>assuming (7)</b> 143:17 144:2 191:22 330:24 337:3 344:10 367:16</p> <p><b>assumption (10)</b> 130:9,18 200:12,21 201:17 346:3,4 373:25 374:3 377:4</p> <p><b>assumptions (15)</b> 130:22,25 202:5 207:10 215:23 216:8,10 217:10 233:23 335:10 376:25,25 377:3 381:17,23</p> <p><b>asthma (1)</b> 239:8</p> <p><b>asthmatics (7)</b> 236:10,21 238:1,4 239:14 240:10 242:9</p> <p><b>ate (3)</b> 411:15,21 413:10</p> <p><b>atrazine (9)</b> 231:23 232:3,11 233:6,17 234:7 235:2,9 338:20</p> <p><b>attachment (3)</b> 348:1,3,4</p> <p><b>attend (2)</b> 26:2 38:22</p> <p><b>attorneys (8)</b> 3:3,4,11,19 4:4,11 10:22 81:13</p> <p><b>attributable (1)</b> 194:24</p> <p><b>attribute (2)</b> 195:4 253:20</p> <p><b>audience (1)</b> 290:25</p>
---	---	---	--	--

<b>August (1)</b> 17:19	401:16 407:2 410:19 416:3 419:20	2:10 3:10,14 9:3,3 199:4,25 393:19	199:3 222:8 225:18 266:3 301:17 310:23 321:7 426:19	<b>bird (1)</b> 193:12
<b>author (3)</b> 199:14 226:10,11	<b>background (3)</b> 168:3 176:6,13	<b>Bayesian (5)</b> 105:19,24 106:4,22 115:21	<b>beyond (5)</b> 15:2 79:13 162:22 197:18 222:12	<b>birds (3)</b> 193:10 194:20 198:12
<b>authors (9)</b> 23:7 157:22 242:11 243:24 289:15 379:4 380:12 381:16 384:3	<b>backwards (2)</b> 142:24 186:7	<b>bearing (1)</b> 8:11	<b>bias (71)</b> 28:16,19,20 29:1,19 29:24 30:4,7,8,14 31:14 47:10,14,21 48:15 49:6 50:7 64:10 65:13 66:14 67:7 68:12 69:9 70:11,21 71:13 84:3 84:4 98:24 130:9,14 130:18 131:7,10,10 131:11,12,13,16,17 131:21,25 132:20 133:9,11,12,16 134:19 135:8,8,10 135:15,17 138:24 139:4,6,25 140:1,5 140:10,12,15,20,24 141:2,4,18 310:12 310:20 311:7 429:25	<b>bit (9)</b> 26:25 90:12 113:2 146:5 177:22 178:1 198:24 204:12 313:12
<b>automatically (2)</b> 240:16 427:22	<b>bacteria (1)</b> 404:13	<b>Beate (17)</b> 1:16 2:9 5:3,11 6:6 8:7 10:7 96:22 203:14,21 306:25 307:7 419:16,23 437:3,12 439:3	<b>biases (3)</b> 47:18 88:23 130:25	<b>Blair (19)</b> 5:24 35:21 146:15,17 147:4 148:10,16 226:10 277:25 347:20 350:2,22 351:7,17,20 353:8 382:23 398:20 399:10
<b>available (7)</b> 184:1 203:7 208:2 224:19 287:5,21 428:5	<b>bad (6)</b> 96:7,9 108:21 150:2 182:11 301:22	<b>beauty (2)</b> 218:5 224:12	<b>big (9)</b> 30:19 31:22 173:19 338:14,21,22 359:9 372:15 416:5	<b>Blair's (3)</b> 348:1 350:15 382:23
<b>Avenue (2)</b> 3:20 4:5	<b>badgering (13)</b> 65:22 259:25 260:16 262:9 268:9 270:10 275:9 361:5,12 362:6 374:21 381:7 404:24	<b>beginning (6)</b> 96:21 203:20 307:6 333:24 419:22 431:23	<b>biggest (2)</b> 205:11 414:9	<b>blanket (1)</b> 432:1
<b>average (9)</b> 189:7,24 192:17,25 194:2 212:7 272:3 311:21 340:4	<b>balance (1)</b> 61:10	<b>Behalf (1)</b> 5:13	<b>bioaccumulate (1)</b> 150:3	<b>blood (2)</b> 188:5 438:14
<b>avoid (3)</b> 104:20 134:21 140:16	<b>balanced (1)</b> 62:7	<b>behaved (1)</b> 367:17	<b>bioassay (4)</b> 74:20 75:22 76:9 79:20	<b>board (1)</b> 36:9
<b>aware (16)</b> 24:20 30:19 33:3 35:6 183:10 184:11 289:15 305:12 347:25 360:17 382:12,22 418:4 424:13,16,18	<b>bang (1)</b> 22:16	<b>behaves (1)</b> 296:20	<b>bioassays (17)</b> 73:5,8,18 74:6,15 76:16 77:3 78:8 79:5,23 80:1 81:5 81:24 83:1 408:14 408:17,24	<b>body (1)</b> 50:18
	<b>banned (1)</b> 358:8	<b>belief (1)</b> 303:5	<b>biologic (2)</b> 73:19 417:16	<b>Boffetta (1)</b> 15:15
<b>B</b>	<b>Banvel (9)</b> 255:2,15,22 257:1,20 261:14,18,25 262:5	<b>believe (52)</b> 16:21 17:5 18:23 69:4 70:7,17,21 76:15 84:7 106:22 124:11 132:5 158:3,17 179:24 182:5,19 215:8 221:22 243:8 263:1 286:22,24 290:4,8 291:19,22 292:2 293:9 301:23 323:15 324:9 335:13,18 337:18 337:21 347:13 348:7 352:17,18 355:23 362:23 374:25 402:7 403:1 404:15 409:2 421:18 426:20 429:11 432:22 436:20	<b>biological (8)</b> 73:25 74:19 75:6,18 75:20 76:23 187:3 401:25	<b>Bologna (1)</b> 34:7
<b>B (12)</b> 5:7 6:1 7:1 114:22 115:17 116:11,19 132:7 279:10 280:21 281:10 427:6	<b>based (25)</b> 40:8 59:18 63:3 69:4 224:17 227:20 232:24,24 236:25 245:5 247:4,5 251:13 263:1 269:25 275:15 279:16 303:6 314:16 324:6 340:25 342:17 351:21 356:9 423:1	<b>believed (1)</b> 243:9	<b>biologically (3)</b> 192:14 193:1 194:15	<b>bomb (1)</b> 187:14
	<b>baseline (13)</b> 22:8 171:12 175:18 325:17 333:19 356:17,25 360:13 362:16 366:19 369:25 370:15 375:14	<b>benefit (1)</b> 11:1	<b>biomarkers (2)</b> 24:17 343:17	<b>book (1)</b> 99:4
	<b>basic (2)</b> 47:11 167:10	<b>best (3)</b> 40:22 114:24 145:3		<b>books (1)</b> 137:6
	<b>basically (5)</b> 281:17 282:11 296:23 299:11 356:16	<b>better (13)</b> 38:2 41:18 87:5 164:20 184:20		<b>bordering (1)</b> 400:23
	<b>basis (4)</b> 185:19 262:5 288:14 336:16			<b>bottle (1)</b> 185:16
	<b>Baum (8)</b>			<b>bottom (13)</b> 114:11 124:22 156:4 186:5,6,8 228:15 326:13 364:9 365:16 385:17,24 428:15

418:14,22	122:17 129:20,21	179:6 180:6 189:2,4	<b>care (4)</b>	126:5 133:17 134:2
<b>brain (1)</b>	175:14 200:24	189:15,22 190:13	12:16,18 13:5 138:3	134:13 135:22
12:25	202:24 301:18	190:18 192:13	<b>career (2)</b>	136:11 137:15
<b>Brazil (6)</b>	<b>calculation (4)</b>	194:20 197:21,22	16:24 225:18	139:7,8 170:13
38:23 289:24 423:8	110:3 111:4 201:1	197:22 279:6 321:7	<b>careful (3)</b>	171:24 177:7
428:16,20 429:12	203:9	347:7 407:9 408:14	19:12 432:5 434:1	186:13 190:9 198:7
<b>break (15)</b>	<b>calibrating (2)</b>	408:17,23 429:24	<b>carefully (2)</b>	204:7,9 215:7,10
27:22 73:2 144:14	105:9 106:11	<b>cancers (11)</b>	191:8 197:6	216:20 224:17
177:21 184:24	<b>California (8)</b>	29:15 90:6,15 103:4,5	<b>Carolina (1)</b>	226:3 227:23,24
203:11 264:4	1:2,17 2:13,14 3:13	150:21 188:6	333:22	228:3 232:25
270:19 326:1	8:11,15 438:2	189:11 196:17	<b>carrying (1)</b>	236:21 237:4 238:5
370:23 384:13,15	<b>call (22)</b>	197:1 321:6	39:19	255:7 257:22
384:18,20 406:19	36:11 37:17 81:18	<b>candidate (1)</b>	<b>case (111)</b>	259:15 311:22
<b>breaking (4)</b>	110:1 127:17,24	33:1	1:6 8:9,12 44:5 51:22	314:2 315:11
72:12 143:9 255:10	135:15 153:4,5	<b>Cantor (46)</b>	52:13,18 54:4 78:10	341:22,23,25 347:4
264:3	157:9 159:23 235:3	6:8 178:13,22 179:10	79:4 97:10 100:18	387:12,14,22,23
<b>Brent (2)</b>	245:25 250:16	180:4,20 181:2,4,20	107:25 117:12	<b>casual (1)</b>
3:15 9:5	292:23 300:6,21	182:3,5 183:13,15	124:3 133:13	267:18
<b>briefly (2)</b>	304:16 332:6	184:9,9 186:9,12	134:25 136:1	<b>catching (1)</b>
235:15 416:23	343:16 423:10	187:24 189:18	137:10 139:22	215:10
<b>bring (2)</b>	430:14	192:2 194:10	140:4,11,13,25	<b>categorical (7)</b>
82:3,4	<b>called (7)</b>	198:17 200:22	141:2,4 146:15	58:10,12,14 61:9
<b>broad (7)</b>	10:8 109:5 133:5	201:19 202:25	149:3 161:19	164:21 420:23,24
27:21 28:3,5 29:20	152:25 170:5 277:9	204:9 205:2,18	168:19 169:3,17,21	<b>categories (13)</b>
148:24 149:2	313:21	212:11 213:16	171:22 173:9 175:6	63:21 66:18 67:13,15
315:22	<b>calls (4)</b>	214:11,16,23 215:2	177:3 182:4 188:13	68:17 165:15
<b>broadly (2)</b>	25:23 26:5 104:1	217:2,16 218:4,20	190:21 193:9	301:14 311:17,21
29:9 78:20	417:1	219:7,9,14 221:16	194:19 197:14	350:7 351:24
<b>bromide (1)</b>	<b>camp (1)</b>	221:19 222:9 243:7	208:21 218:10	353:16 427:4
365:15	106:21	243:11	223:4,7 225:1 226:4	<b>categorization (1)</b>
<b>build (1)</b>	<b>Canada (6)</b>	<b>capable (5)</b>	227:3 230:2 238:3	164:24
170:3	183:13 243:22 306:15	136:21 185:21 420:9	243:21 247:15	<b>categorize (1)</b>
<b>bulbs (1)</b>	396:20 397:15	420:18 422:22	254:8 259:14 269:3	273:23
96:1	428:24	<b>capture (6)</b>	276:24 277:1 278:3	<b>categorized (1)</b>
<b>bulk (1)</b>	<b>Canadian (4)</b>	190:9,11,20 193:9	279:17 284:13	424:19
337:6	277:1 297:5 298:2	198:6 433:14	287:24 297:5,13	<b>categorizing (3)</b>
<b>business (1)</b>	429:2	<b>captured (4)</b>	298:2 304:16	311:17 419:3 422:8
36:14	<b>Canadian-based (1)</b>	194:17,19 368:22,22	305:11,20 306:13	<b>category (32)</b>
<b>busy (1)</b>	279:17	<b>capturing (3)</b>	310:3,10 311:19	27:25 62:8 63:15
22:13	<b>cancer (80)</b>	192:4 193:1 198:11	313:19 314:1,12,16	116:24 131:11
<b>buying (1)</b>	12:18,19 13:5 16:1	<b>CARC (6)</b>	314:18,20 315:2	185:18 232:25
208:15	27:24 28:21,24,25	80:18 82:13 415:15	316:7 317:22,22	257:25 259:12,16
<hr/>	29:4,9,10,13 41:19	415:18,19,21	318:1,6,7,8,9 320:9	259:17 266:6,9,25
<b>C</b>	41:22 73:5,7,17	<b>carcinogen (3)</b>	320:25 321:12,19	271:12 272:15
<b>C (7)</b>	74:5,15,20 75:22	62:9 150:10 188:10	330:1 336:10 338:9	282:16 299:16
3:1 4:1 116:25 117:11	76:8,16 77:3,7,15	<b>carcinogenic (5)</b>	339:18 340:25	300:16,16 303:22
117:20 438:1,1	78:8 79:5,20,23	18:15 230:24 231:13	342:9 346:11 347:3	306:11 350:6
<b>calculate (14)</b>	80:1 81:5,24 83:1	406:6 419:5	360:14 395:22	424:17,24,25
102:18 104:5,6 113:3	90:13 91:6 100:2,3	<b>carcinogenicity (9)</b>	396:1,13,20 397:14	425:10,21,22 427:5
129:7,13,25 163:20	102:6,9,10,25	75:15 90:3 187:16	400:13 420:15	427:6 428:1
163:23 172:9	103:14,15 142:13	335:10 407:13,22	421:3 435:24 439:1	<b>causal (27)</b>
180:12 205:20	142:22 143:15,18	420:25 422:17	<b>case-by-case (1)</b>	5:16 50:7,12 64:9
320:2 353:5	143:20 145:22	429:23	137:10	65:12 66:13 67:6
<b>calculated (2)</b>	146:18 150:22	<b>carcinogens (5)</b>	<b>cases (51)</b>	68:11 69:8 70:10,18
272:9 350:7	168:2,4 170:11,13	149:24 150:12 331:2	29:4,9 123:11 124:1,5	71:3,23 88:1,21
<b>calculating (7)</b>	171:23,24 172:2	406:5 425:7	124:19 125:1,25	90:22 91:19 93:6

111:6 120:8 121:10 121:20 122:24 131:6 191:21 230:17 417:9 <b>causally (1)</b> 124:13 <b>causation (10)</b> 5:13 45:21 46:3,7 49:19 87:23 88:18 101:15,24 104:9 <b>cause (21)</b> 40:1 41:22 49:22 50:21 51:7 97:11,13 98:11,14 100:3 101:3 102:8,9 103:13,15 159:18 190:18 191:18 198:4 431:24 434:19 <b>caused (10)</b> 90:5,15 91:6 100:2 103:3,4 190:21 194:18 198:7 215:7 <b>causes (13)</b> 87:20 100:20 102:25 143:17 145:18,22 152:21 188:10 215:8 323:11 330:7 407:9 434:9 <b>causing (7)</b> 100:13 187:11 191:9 420:9,18 422:22 426:15 <b>cell (4)</b> 156:3 189:4 280:21 281:10 <b>cells (2)</b> 190:23 404:14 <b>cellular (1)</b> 188:12 <b>certain (21)</b> 23:9 33:18 35:20 40:24 55:25 127:21 150:21,25 179:11 186:25 192:11,15 202:5,12 209:23,25 224:16 334:4 377:3 395:24 414:11 <b>certainly (5)</b> 35:4 73:13 81:16 195:13 413:4 <b>certainty (3)</b> 418:1 434:9,18 <b>certificate (2)</b> 11:19 12:6 <b>Certified (1)</b>	438:6 <b>certify (2)</b> 438:7,12 <b>cetera (12)</b> 98:24 149:16 194:7,7 255:11,13 274:13 344:6,23 381:20,21 417:16 <b>chain (1)</b> 197:25 <b>chair (8)</b> 20:19,23 21:3,12,13 21:15 25:17 385:3 <b>challenge (3)</b> 50:1 330:21 331:11 <b>chance (31)</b> 47:3,8,21 48:15 64:10 65:13 66:14 67:7 68:12 69:9 70:11,21 71:13 72:10 84:1,3 84:6,18 85:6 90:5 91:23 98:24 105:4 107:11 108:10 110:5 114:24 117:4 118:8,17 190:20 <b>Chang (4)</b> 284:10,21 285:12 322:20 <b>change (24)</b> 26:21,22 114:12 241:19 280:10 282:6 306:21 338:15 346:16,20 349:20,22 355:21 360:9 370:13,14,18 373:12 377:7 398:5 419:14 429:19 434:6,16 <b>changed (16)</b> 325:13,14 339:3,6,8 357:14 358:15 360:5,14,16,18 370:10,12 373:14 420:4 429:21 <b>changes (4)</b> 282:24 349:24 369:4 434:21 <b>characterization (1)</b> 411:11 <b>characterize (1)</b> 14:19 <b>charge (1)</b> 18:4 <b>charged (1)</b> 22:18 <b>Charles (2)</b>	5:15 86:14 <b>chart (2)</b> 154:17 319:6 <b>check (10)</b> 180:25 183:3 189:4 236:5 274:10 365:10 401:17 414:18 415:2 416:16 <b>checked (1)</b> 365:20 <b>checking (3)</b> 366:24 378:15,15 <b>chemical (11)</b> 245:20 246:9,11,18 246:23 255:21 261:13,24 262:13 308:15 310:25 <b>chemicals (11)</b> 149:14,17,21,23,25 244:20 247:21 254:10 311:3,10 331:18 <b>chicken (1)</b> 150:25 <b>child (1)</b> 77:14 <b>children (1)</b> 12:25 <b>chlorines (1)</b> 150:1 <b>choice (1)</b> 140:7 <b>Christopher (1)</b> 18:22 <b>chronic (3)</b> 198:13,25 301:23 <b>chunk (1)</b> 205:11 <b>circle (2)</b> 70:5 154:11 <b>circles (1)</b> 40:21 <b>circumstance (2)</b> 97:9 192:16 <b>circumstances (1)</b> 136:15 <b>circumvented (1)</b> 140:21 <b>citation (1)</b> 229:1 <b>citations (2)</b> 77:6,10 <b>cite (12)</b> 74:3 217:25 228:23 228:24 229:9,24	251:22 252:8 259:3 263:5 277:15 390:20 <b>cited (2)</b> 218:18 434:12 <b>citing (2)</b> 229:18 416:5 <b>City (1)</b> 204:14 <b>clarify (2)</b> 220:2 439:4 <b>class (9)</b> 47:11 49:17 115:17 134:9 255:22 261:24 262:13 313:17 316:24 <b>classes (1)</b> 261:13 <b>classification (1)</b> 67:3 <b>classify (1)</b> 272:17 <b>clear (29)</b> 15:3 21:16 53:15 58:17 59:24 64:2 65:2 75:5 76:21 80:22 82:6,21 89:16 120:4 159:1 180:3 186:20 245:23 248:19 249:1 266:14 283:16 291:6 299:23 315:1 317:2 353:21 355:5 359:18 <b>clearly (9)</b> 80:12 83:14 127:10 162:23 260:22 269:4 295:24 312:23 381:16 <b>clever (2)</b> 267:14 268:12 <b>clinical (3)</b> 12:11 13:5 317:17 <b>clinically (1)</b> 89:8 <b>close (5)</b> 24:11 56:3 112:19 137:21 309:24 <b>closely (2)</b> 142:17 426:9 <b>closer (1)</b> 391:5 <b>CLR (38)</b> 1:23 2:14 110:1,2,3 110:16 111:3,4,12 111:24 112:7	114:21 116:2,12,18 116:23 117:1,12 118:25 119:6,14 129:25 180:11,19 180:20 181:11,24 212:15 213:3,10,14 213:16 214:7,10 320:2,9 438:4,22 <b>CLRs (3)</b> 118:10 129:7,13 <b>club (1)</b> 34:2 <b>co-adjustments (1)</b> 214:23 <b>co-authors (1)</b> 230:13 <b>classes (2)</b> 250:9,24 <b>co-exposures (1)</b> 326:15 <b>co-investigators (4)</b> 228:7,17 229:22 378:14 <b>co-linearity (1)</b> 430:14 <b>co-worker (1)</b> 136:16 <b>coaching (3)</b> 378:2,3,5 <b>coauthor (1)</b> 147:1 <b>Cocco (18)</b> 122:4,6,20,22 123:7,7 123:8,9,13,21,24 124:10,18 125:13 125:24 126:8 400:3 409:23 <b>cofactors (1)</b> 216:23 <b>coffee (6)</b> 142:12,20 143:14,23 143:25 144:4 <b>cohort (40)</b> 6:18 22:3,12 26:7,18 31:10 140:12,21,24 141:1 144:7 312:25 316:16,17,22 317:18,23 318:12 318:14 321:3 323:9 323:16 326:14,20 333:25 336:8 337:5 339:13 341:3 350:23 351:13 355:14 398:13 400:7 431:20 432:6 432:25 433:4,21
--	---	---	--	---

435:25 <b>cohorts (1)</b> 431:21 <b>collaborative (2)</b> 226:5,7 <b>colleagues (2)</b> 15:20 50:3 <b>collect (2)</b> 225:16,22 <b>collected (3)</b> 22:9 362:2,16 <b>collection (3)</b> 433:2,4,7 <b>collegial (1)</b> 19:9 <b>collegially (1)</b> 14:20 <b>Collegium (7)</b> 33:23 34:1,24 35:6,18 35:22 36:1 <b>Colorado (1)</b> 3:6 <b>column (9)</b> 92:6 179:17,20 184:3 184:4 228:16 244:7 297:17 392:10 <b>combination (1)</b> 230:14 <b>combined (6)</b> 231:18,23 232:4 233:7,17 238:24 <b>come (22)</b> 15:14 27:9 36:24 57:7 60:16 61:8 69:23 88:8 96:2 128:3 154:11 190:12 197:9 205:21 272:4 332:16 357:18 358:21 359:19 362:1 369:13 419:10 <b>comes (6)</b> 31:17 61:22 72:5 170:25 330:25 359:13 <b>comfortable (2)</b> 198:11 407:21 <b>coming (9)</b> 22:21 26:1 50:6 88:21 94:22 181:17 197:11 333:18 338:12 <b>comment (21)</b> 57:25 159:2 349:22 380:13 390:3 391:6 391:9,13,21,25	393:5,12,14,25 394:1,12,18 395:2,9 403:9 406:22 <b>commentary (5)</b> 238:15 259:25 412:13 412:24 416:25 <b>commented (2)</b> 380:12 393:11 <b>commenting (2)</b> 230:9 412:7 <b>comments (1)</b> 291:3 <b>Commission (1)</b> 437:21 <b>commit (1)</b> 436:16 <b>committee (23)</b> 20:17,19,24 21:2,6,12 21:23 22:1,17 23:3 23:11,17 25:6 26:16 31:12 32:2,11 36:18 36:20 38:2 325:4 383:8 385:4 <b>common (9)</b> 63:24 106:6 184:18 224:21 225:20,21 321:6 326:15 414:7 <b>communicate (1)</b> 137:22 <b>community (8)</b> 32:19 95:15,15 289:16 316:18,22 318:4 389:17 <b>comparable (1)</b> 321:24 <b>compare (13)</b> 110:3 111:4 139:23 181:25 235:1 239:9 239:11,13 240:11 242:8 264:23 330:8 395:8 <b>compared (15)</b> 43:12,13 45:1 134:14 215:2 254:22 269:17 293:6 303:14 321:17 328:5 330:15 343:25 354:14 365:1 <b>comparing (5)</b> 170:25 175:13 234:25 235:4 339:24 <b>comparison (3)</b> 171:10 182:10 353:18 <b>comparisons (3)</b> 86:6 171:11 345:10	<b>complete (3)</b> 122:15 234:15 381:20 <b>completed (2)</b> 11:4 26:13 <b>completely (5)</b> 133:19 143:18 262:10 264:16 306:22 <b>completing (1)</b> 433:9 <b>complex (2)</b> 324:16 413:14 <b>complicated (1)</b> 344:7 <b>composition (1)</b> 433:3 <b>compound (5)</b> 75:10 254:4 308:15 407:9 413:13 <b>compounds (4)</b> 18:15 254:3 406:7,8 <b>comprehensive (1)</b> 95:19 <b>comprehensively (1)</b> 199:1 <b>computer (1)</b> 325:19 <b>concept (5)</b> 39:24 167:3,5,8 186:21 <b>conceptual (1)</b> 169:12 <b>concern (20)</b> 131:14 133:13 189:17 194:10,14 197:19 198:19,20,23 214:14,18 217:22 293:4 296:5 310:12 375:18,20 378:23 390:1 393:4 <b>concerned (5)</b> 138:22 194:5 214:15 311:5 367:23 <b>concerning (1)</b> 293:21 <b>concerns (14)</b> 25:6 217:17 242:21 293:25 294:6,10,14 294:15,25 295:5,16 354:25 395:24 400:19 <b>conclude (4)</b> 125:13 216:25 285:10 391:10 <b>concluded (3)</b> 65:9 67:25 417:25 <b>concludes (1)</b>	437:1 <b>concluding (1)</b> 228:9 <b>conclusion (29)</b> 48:16 56:24 57:7 58:1 59:1 61:8,16 62:3 62:20,25 63:1,2,2 63:13 66:21 72:6 88:9,18 128:9 228:9 229:21 230:16 233:6 332:16 392:9 392:10 417:22 418:11 420:24 <b>conclusions (41)</b> 52:24 53:8,9,10,13,16 53:18,22 54:1 55:12 56:1,21 57:11,12,14 58:5,9,9,14,19,20 59:8,12,17,22 60:3 60:16,19,24 61:9,11 61:23 66:6 69:22 70:2 88:2,7,21 286:15 410:25 434:11 <b>concomitantly (1)</b> 239:6 <b>concur (11)</b> 52:24 53:9,25 57:12 58:4,19,20 59:12,21 66:5,9 <b>concurrent (3)</b> 163:21 430:1,3 <b>concurring (2)</b> 58:25 59:8 <b>concurs (1)</b> 53:12 <b>Conditional (1)</b> 115:3 <b>conditioned (1)</b> 117:5 <b>conditioning (2)</b> 105:10 106:12 <b>conditions (1)</b> 92:9 <b>conduct (11)</b> 28:9 35:8 54:22 138:16 170:10 231:23 287:8 297:9 345:9 433:23,25 <b>conducted (17)</b> 37:7,14 38:16 78:5 115:21 159:4 195:11 211:23 251:6 305:13 306:9 317:23 333:5 361:2 376:6,17,24	<b>conducting (20)</b> 25:8 27:23 36:14,24 52:25 54:1,7 86:4 129:22 145:2 163:13 170:20 173:25 195:10 245:8 283:9 284:11 286:13 432:5 434:1 <b>confer (1)</b> 58:12 <b>conference (20)</b> 25:23 36:18,25 37:1,3 37:21 38:2,3,23 277:15 288:22,25 289:24 290:10,17 291:12,14 292:3,18 322:6 <b>conferences (3)</b> 37:9,14 290:23 <b>conferred (1)</b> 69:18 <b>confidence (112)</b> 43:9 64:11 65:14 66:15 67:9 68:14 69:10 70:13,23 71:15 86:15 107:6 107:12,13,16,19,23 108:2,6,8,13,14,17 108:20,24 109:5,8 109:10,14,15,21,22 110:2,9,15 111:21 112:1,15,17 114:23 115:9 117:14 118:9 118:18,23 119:4,6,8 119:14,17 130:7,12 130:16,23 131:4 152:19 155:17 157:1 158:17 159:16 160:19,20 161:6,12 162:16,19 178:25 180:12 212:24 213:2 214:20,20,24 216:18,19,24 217:5 217:7,11 232:18,21 233:15 249:7 251:1 279:20 280:11 281:5,17,22 282:12 283:1 306:15 309:24 312:13 319:20,22 320:1,4,8 320:16,22,23,24 321:4,9,14,23 322:1 322:10 354:21 396:16 424:8 <b>confirm (2)</b>
--	---	--	---	--

213:20 283:22	176:19 184:17	<b>contradictory (1)</b>	<b>conversation (1)</b>	140:2,3,7,9,21
<b>confirmed (2)</b>	195:1 247:13 289:8	416:1	32:13	141:12,14 142:5
74:24 75:14	290:9 292:12,16	<b>contrast (4)</b>	<b>conversations (2)</b>	143:16 144:11
<b>confirms (1)</b>	294:17	345:13,20,22,24	28:8 30:12	145:6,7,18 149:7
41:16	<b>considerable (1)</b>	<b>contribute (1)</b>	<b>convince (3)</b>	150:16 151:3,22
<b>conflated (1)</b>	280:10	324:2	46:2 49:9 167:13	152:15,22,23 153:3
393:10	<b>consideration (1)</b>	<b>contributes (4)</b>	<b>copy (1)</b>	153:11,12 154:8,17
<b>conform (1)</b>	117:16	42:7 89:6 323:12	82:8	155:13,18,20,24
439:4	<b>considered (23)</b>	324:10	<b>corner (1)</b>	156:19 157:8,13
<b>confounded (1)</b>	16:10 17:11 33:6	<b>contributing (2)</b>	114:11	158:13 159:5,19
286:8	43:17 107:20	312:4 331:3	<b>correct (600)</b>	160:11,25 161:17
<b>confounder (19)</b>	111:24 135:20	<b>control (66)</b>	11:16,17,21 13:7,11	162:9 163:6,10,14
142:2,8 143:15 144:6	136:10 137:13	133:14 134:25 140:4	13:15,16,19,20,22	163:25 164:14
146:4,11 151:12	159:8 244:22	140:11,13,25 141:2	13:23 15:4 20:20,21	165:20,21 166:20
152:22 159:19	245:14 247:8	141:4 145:23	22:25 23:1 32:11	168:22 170:7,14,21
167:7,14,23 168:19	277:20 283:9	149:18 163:5,8,13	33:24,25 35:18,22	171:17 172:2,16
169:7,11,13,15	289:25 290:7 291:9	163:17 167:5 182:4	36:1,5,6,19 37:9,10	174:5 176:7,21
330:2 333:14	291:12,24 292:4	203:24 223:4,8	39:16,21 40:2,12	177:8 179:1,2,8,13
<b>confounders (8)</b>	315:18 316:4	225:1 243:21	41:12,22 42:5,13	180:8,15,23 181:12
145:6 163:9 165:13	<b>considering (3)</b>	247:15 276:24	43:1,3,22 44:16	182:22 185:10
165:15 167:2 169:2	47:9,15 294:15	277:1 279:17	45:9,21 46:10 49:23	186:10,17,18,22
330:5,23	<b>considers (1)</b>	284:13 293:8,11	50:21 51:24 52:3,4	187:5 188:6,14
<b>confounding (41)</b>	231:12	297:6 298:2 306:14	52:19 53:2,6,10,19	189:24 191:1,4,21
47:22 48:15 64:10	<b>consistent (3)</b>	310:3,10 313:19	56:18,19,25 57:15	192:7 193:3,5,18
65:13 66:14 67:8	51:2 102:4 375:12	314:1,12,16,18,20	60:7 61:17 62:4,17	194:13 195:5
68:13 69:9 70:12,22	<b>consistently (1)</b>	315:3 316:7 317:22	63:16 64:12,13,19	196:13,14,20
71:14 142:2 143:3,3	375:14	317:22 318:1,6,7,8	65:14 73:6 74:6,16	199:11 200:13,21
144:11,25 145:8	<b>constantly (1)</b>	318:9 320:10,25	75:8 76:24 77:22	200:25 204:10,24
151:22,25 152:12	216:9	321:12,19 330:11	84:1,8,18 85:19,23	206:6,14,22 207:7
163:2,6,13,17	<b>consult (1)</b>	336:11 338:9	86:17 87:10,20	207:11,20 208:5
164:23 165:24	23:17	339:19 342:9 347:3	89:20,20 90:6,15	209:1,5,15 211:3,15
166:18 167:5,6	<b>consultant (1)</b>	395:22 396:2,14,20	91:7,19 92:13,18,24	211:25 212:19,20
169:5,8 264:20	421:15	397:15,15 400:14	93:17 94:18,19,20	212:25 213:12,17
328:2,3 329:18,22	<b>containing (1)</b>	435:24	95:3 97:14 98:15	214:11,12,13
329:23 330:11,13	315:4	<b>controlled (5)</b>	99:12 100:3 101:16	216:11 217:9
330:18 333:12	<b>contains (1)</b>	227:3 230:2 295:15	102:10 103:18	219:21 221:18
<b>confuse (1)</b>	292:23	310:24 424:9	104:13 105:14,23	223:5,20 224:8
169:2	<b>context (18)</b>	<b>controlling (5)</b>	107:7,8,13,22,25	225:6 227:7,25
<b>confused (3)</b>	71:5,24 88:23 93:3,22	165:13,24 166:16,17	108:10 109:6,10,11	228:4,10,18,24
221:12 289:19 326:25	95:6,8 100:18 102:5	430:1	109:16,24 110:6	229:7,10,17 230:6
<b>connecting (1)</b>	110:22 113:1	<b>controls (30)</b>	111:7 112:10 114:2	231:24 232:6,15,22
237:11	114:25 117:5	123:12 124:2,3,21	115:1,6,10,22,24,25	232:23 233:9,20
<b>connection (5)</b>	118:21 200:3	125:2 126:1,6	116:6,15 117:6	234:16,23 235:24
37:7 54:4 212:11	417:13,15 418:21	133:19 135:1,22	118:10,20,25	235:25 236:3,14,19
234:7 409:21	<b>continents (1)</b>	136:12 137:15	119:25 120:10,21	237:2,20 239:1
<b>conscientious (1)</b>	51:15	139:7,9 140:7	121:12,22 122:4,10	240:2,24 241:21
295:25	<b>continue (4)</b>	215:18 216:20	122:25 123:16	242:22 243:8,22
<b>consensus (1)</b>	14:10 17:4,12 185:1	232:25 237:4 238:6	124:14 128:12	244:1,15 245:15,17
216:12	<b>continues (2)</b>	255:8 257:23	129:8,18 130:1,9,11	246:13 247:8,17,20
<b>consequences (1)</b>	93:24 436:23	259:16 293:6 314:2	130:18 131:7,18,22	248:5,23,24 249:7,9
198:13	<b>continuing (1)</b>	315:11 318:2 341:1	131:23 132:8 133:9	249:16 250:9,13
<b>conservative (1)</b>	385:24	347:5 400:16	133:10,14,15,19	251:2,3,8,14 252:5
159:23	<b>continuum (2)</b>	<b>convention (4)</b>	134:11,15 135:3,4	252:6,11,19 253:9
<b>consider (14)</b>	95:21 97:25	41:6 85:10 107:16,19	135:12,22 136:12	253:14 254:22
47:16 57:24 88:21	<b>contradict (1)</b>	<b>conventional (1)</b>	137:15 138:19,20	256:2,7,13 257:10
151:12 160:1	322:11	111:23	138:25 139:16	258:7,18 259:7



260:12 261:4 263:3 263:7,25 266:15 271:4,7,16,24 272:10,23 275:7,25 277:2,16 278:25 279:1,8,13,14,21 280:4,15,19,20,25 281:12,24 282:7,21 283:10,20 284:5,6 284:16 285:2,8,15 286:18 287:7,11,25 288:14 289:1 290:11 292:13,19 293:3,23 295:2 297:9,23 298:5,12 298:13,17 299:3,9 299:10,15 300:4,20 301:9,12 302:20 303:8,17 304:6 305:24 306:7,16 308:9,16,22 309:9 309:11 310:13 311:1,7 312:11 313:17,24 314:5,14 315:19 316:5,18 317:9,10,19,20,24 318:11,15,16 319:2 319:9,15,23 320:6 320:12 321:1,13 322:21,23 323:3 324:8 325:5 326:17 326:23 327:15,22 328:6 330:16 331:18,23 336:4,11 336:20 338:5,10 339:12 340:11,19 341:8,9,16 342:2,9 342:20 343:2,10 344:12 345:14 346:1 348:13 350:24 351:16,17 352:4 353:22,23 354:1,15 355:2,3,11 356:13 357:8,25 359:1,23 360:23 361:21,24 363:4,22 364:17,24,25 365:3 365:7,17,21,22 366:3 367:5 368:1 369:9,14,23 371:2 371:16 372:7 373:2 373:10 374:5,19 375:25 376:8,18 377:22 378:25 379:13 380:2 381:5 381:24 382:16	383:22 385:22 386:6,7,11,24 387:14,23 388:2,16 389:13 390:13,14 390:18 391:23 392:19 393:6,18 394:16 395:8 396:1 396:15 397:1,19 398:16,21 399:11 399:21 400:8,25 401:4,13,21,25 402:4 406:9,10 407:22 416:8,9 422:9,14,15,19,23 429:13,14 431:11 431:12 432:16,17 439:5 <b>correctly (11)</b> 134:7 142:20 160:10 169:20 185:4 188:7 198:18 265:20 327:24 331:12 360:21 <b>correlate (1)</b> 327:18 <b>correlated (13)</b> 174:9 328:17,20 329:25 330:20 331:5,16 332:11 334:2 335:17 430:6 430:18,24 <b>correlation (9)</b> 174:13 175:5 177:11 177:12,17 327:7,20 329:9,12 <b>corresponding (1)</b> 387:6 <b>coumaphos (1)</b> 365:16 <b>council (2)</b> 37:15,19 <b>counsel (13)</b> 8:23 9:15 55:16 79:23 81:21 96:10 348:13 408:18 410:8,9,13 413:10 425:1 <b>counselor (2)</b> 36:4,7 <b>count (3)</b> 137:25 207:10 365:14 <b>counties (1)</b> 51:16 <b>counting (5)</b> 133:6 309:5 362:7 366:12,15 <b>counts (3)</b>	137:24 298:9 431:2 <b>couple (5)</b> 190:25 351:2 375:3 408:8 428:12 <b>course (13)</b> 57:23 80:12 105:1 129:2 195:16 208:3 222:19 371:22 380:15 411:9 412:3 415:8 416:22 <b>court (25)</b> 1:1 8:10,20 10:4,24 11:1,5 59:25 80:2 81:17,18,25 83:10 126:25 170:2 226:19 340:15 410:19,25 411:25 412:12,25 413:1,4 413:20 <b>cover (1)</b> 367:22 <b>covering (1)</b> 222:17 <b>create (2)</b> 135:9 176:17 <b>created (1)</b> 275:14 <b>credible (9)</b> 64:9 65:12 66:13 67:7 68:12 69:8 70:11,19 71:3 <b>credited (1)</b> 34:8 <b>crews (1)</b> 201:10 <b>criteria (12)</b> 59:18 159:8 179:11 269:1,8,25 270:1 320:15 407:12,14 416:1 418:22 <b>criterion (3)</b> 47:9 125:23 316:20 <b>critical (2)</b> 50:2 140:14 <b>critically (1)</b> 197:6 <b>criticism (2)</b> 289:15 395:6 <b>criticisms (5)</b> 431:4,8,13,15 432:20 <b>critique (1)</b> 73:12 <b>critiquing (1)</b> 73:11 <b>crops (2)</b> 338:16,24	<b>cross (1)</b> 416:16 <b>cross-reference (1)</b> 414:24 <b>cross-talk (1)</b> 328:14 <b>CRR (4)</b> 1:23 2:14 438:4,22 <b>CSR (4)</b> 1:23 2:14 438:4,22 <b>cumulative (16)</b> 187:13 324:7 335:25 336:2 339:16 340:3 340:13,16,18,22,25 341:2,4 342:4,8,12 <b>curious (2)</b> 79:13 412:16 <b>current (3)</b> 164:8,9 421:15 <b>currently (2)</b> 20:22 132:7 <b>Curriculum (1)</b> 5:9 <b>cursor (1)</b> 415:23 <b>Curwin (1)</b> 24:7 <b>cut (1)</b> 324:21 <b>cutoff (4)</b> 340:18,24 341:1,3 <b>CV (10)</b> 11:10,19 19:19,21 20:2,15 33:22 36:16 39:7 82:8 <b>cytotoxic (2)</b> 74:13 76:2 <b>cytotoxicity (1)</b> 82:25	88:22 95:18,24 96:6 98:22 107:24 110:21 116:19,22 119:18,24 129:14 129:16,24 135:19 136:9,11 137:12,14 138:18 139:16 142:17 145:25 146:1 158:19 164:20 167:7 169:9 183:13,13 205:1 206:19,19 207:4 210:11,13,14 211:2 212:16,18 219:9,9 219:13 220:18 222:9,14,15 223:3 224:4,19 225:2,11 225:16 226:5,8,12 227:4,13,14,16 230:1 231:18 232:24 238:2 242:20 243:6,11 246:8,8 249:14 250:7,22 253:16 265:21 266:16 267:5 268:1,21 270:2 278:22 279:16 280:8 283:7 283:8,10,15,17,18 283:25 284:2,13 285:11 286:18 287:4 288:5,9 289:20,23 290:5,9 290:13,19 291:8,11 291:13,18,23 292:2 292:9,12,17,22,25 293:5,6,7,10 294:1 294:2,11,13,15,25 295:16 296:20,23 297:6,7,8,12 298:24 298:25 299:5 300:12,13 302:15 304:21 309:6 314:22 322:21 324:1,10 326:14 328:10 329:8,11,15 332:1 336:18 337:18,21 338:5,6 340:9,17 346:10,12 347:11,18,20 348:21 349:20 350:3,9,23 351:9,21 352:11,16 353:3,6 354:15 356:21 357:7 358:22 362:2 362:4,15,16 364:12
<b>D</b>				
<b>D (9)</b> 5:1 111:20 114:22 115:18 116:12,20 117:2,2,16 <b>D.C (1)</b> 4:13 <b>daily (1)</b> 336:16 <b>data (274)</b> 22:9 27:13 41:15 42:17,21 43:20,21 44:14 45:8,19 46:8 47:16 49:9,11 52:14 69:23 70:7 71:24,25 72:7 88:1,6,8,16,17				

364:13 365:2,2,5 367:12,15,18,21 369:19 370:3 372:13 375:22,24 376:15 377:16 380:16,19,25 381:20 383:20 386:6,10,11,22,23 387:14,18,23 388:5 388:6,9,19,20,24 389:5,6,10,16 391:4 396:18,19 397:14 398:18 399:1,7 401:20 402:2 406:4 406:6,11,12,13,14 406:16 408:4 416:19 417:8,12,13 417:15 418:3,20,20 418:21 431:5,10 433:1,4,7 <b>dataset (3)</b> 177:12 227:19,20 <b>datasets (1)</b> 400:8 <b>date (13)</b> 8:15 188:11 199:9 200:15 202:18 208:12,23 210:16 211:13 348:10,12 432:10 439:2 <b>dated (1)</b> 6:11 <b>dates (3)</b> 149:21 209:7,7 <b>dating (2)</b> 148:13,20 <b>DAVID (1)</b> 3:8 <b>day (27)</b> 126:17 137:1,2 197:14 208:2 209:15 272:3,9,14 272:23 273:13 274:6,7,19 275:6,24 275:25 276:13 301:19 303:7,11,13 303:13,13,14 437:16 438:17 <b>days (97)</b> 192:11 263:2,2,3 264:10,11,18,24,25 265:6,7 266:8,9,25 269:15 271:16,23 272:1,18 273:12,20 273:23 275:15,19 296:22 297:4,21,22	298:8 299:12,20 300:1,2,3,7,9,14,17 300:21,22,23 301:6 301:6,7,13 302:1,6 302:11,12,16,19,23 303:1,18,20 304:3,6 304:23,24 305:14 324:7,8 335:25 336:3,4,6,9 337:20 339:16,25 340:1,2 340:10,11,11,13,13 340:16,18,24 341:1 341:4,5,5,6,7 342:16 345:2 364:2 398:4 424:1,23 425:10,11 426:2,25 427:10 <b>DDT (4)</b> 312:8 358:9 360:5 362:13 <b>De (80)</b> 6:12,20 22:24 32:25 33:5 125:14,25 126:11 153:12,16 154:3,12 181:1,3,8 181:24 182:2 184:10 203:24 205:16 212:15 213:14 214:9,18,22 215:17 217:23 218:23 219:1 220:7 220:10,15 221:3,23 222:7 224:5 225:3 226:6 227:5,18,19 227:22 228:6,16 229:21 230:12 231:16 234:9 235:24 264:23 276:25 310:6 312:24 319:1,7,11 319:21 320:2,4 321:16 322:25 323:8,15 326:9 334:23 335:12,23 336:18 339:14 341:3 342:5,5,24 345:7,23 398:13,25 400:7 401:16,20 <b>dead (1)</b> 428:7 <b>deal (3)</b> 28:15 241:16 435:24 <b>dealing (6)</b> 39:7 54:14,15 76:2 247:22 410:1 <b>dealings (1)</b>	19:3 <b>debate (4)</b> 31:6 80:25 89:9 215:24 <b>debated (1)</b> 215:24 <b>debunk (2)</b> 50:5 317:1 <b>December (6)</b> 200:14,25 201:12,22 202:17,22 <b>decide (14)</b> 41:4 50:13 105:1 108:17 110:18 169:12 187:15 245:20 246:23 330:1,21 352:24 413:2 415:18 <b>decided (6)</b> 18:13,17 26:19 150:2 355:19 380:20 <b>deciding (1)</b> 94:23 <b>decision (1)</b> 345:9 <b>decision-making (2)</b> 94:2 95:25 <b>deck (20)</b> 131:24 132:5,19 165:6 277:19,23 278:2,14 313:10,13 313:15 316:14 405:8,17,21 423:9 435:12,19 436:13 436:15 <b>decks (5)</b> 113:25 435:13,22,24 436:1 <b>declaratory (2)</b> 127:7 413:18 <b>Defendant (1)</b> 4:11 <b>defense (1)</b> 425:1 <b>defer (1)</b> 55:14 <b>define (5)</b> 142:8 164:18 212:4 274:6,19 <b>defined (8)</b> 86:1 144:6 275:6 302:12 303:12 304:3,9 388:6 <b>defines (2)</b> 64:5 266:4 <b>defining (2)</b>	143:3 179:10 <b>definitely (4)</b> 123:25 144:12 150:11 197:19 <b>definition (8)</b> 64:18,25 65:24 83:24 179:15 201:21 347:6 389:6 <b>definitions (2)</b> 84:2,6 <b>degree (6)</b> 11:20,23 13:10 140:6 434:8,17 <b>deliberately (1)</b> 67:12 <b>Delzell (4)</b> 284:10,21 285:13 322:20 <b>demarcation (1)</b> 196:12 <b>demonstrates (1)</b> 48:17 <b>Denmark (1)</b> 34:22 <b>denominator (1)</b> 184:18 <b>department (2)</b> 12:15 14:2 <b>depend (5)</b> 51:10 141:24 171:15 177:10 333:16 <b>depended (1)</b> 23:7 <b>dependent (2)</b> 144:4 189:8 <b>depending (7)</b> 86:3 141:18 143:20 187:20 190:16 192:18 340:6 <b>depends (19)</b> 115:13,14 117:21 131:9 136:3,14 137:19,20 166:22 177:16 182:9 195:9 205:5 209:19 325:11 328:9 333:10 337:10 389:15 <b>depicted (2)</b> 156:22 160:10 <b>depicting (2)</b> 156:17 161:4 <b>depiction (9)</b> 153:7 155:23 156:16 158:9 160:3,15 161:10,14 162:2	<b>DEPONENT (1)</b> 439:3 <b>deposed (2)</b> 382:22,24 <b>deposition (42)</b> 1:15 2:9 5:23 8:6,13 10:19,23 80:3,11 81:10 82:2 83:12 96:22 146:14 203:14,21 262:24 277:24 278:12,15 289:22 306:25 307:7 348:9,14 349:2 350:2,16 382:23 402:18 403:2 408:11 412:6 419:16,23 421:2,5 421:18 437:2 438:8 438:10 439:2 <b>depositions (1)</b> 348:18 <b>derive (2)</b> 165:17 324:20 <b>describe (8)</b> 37:6,11 243:24,25 244:13 319:22 368:10 371:9 <b>described (5)</b> 272:6 346:6 368:24 418:15 433:21 <b>describes (2)</b> 344:18 417:1 <b>design (11)</b> 42:3,10 49:1 88:23 245:18 315:18 316:4,10 318:5 332:3 431:20 <b>designing (3)</b> 42:11,19,20 <b>designs (2)</b> 317:8,14 <b>detail (4)</b> 92:8 395:22 396:1 402:19 <b>determination (1)</b> 331:20 <b>determine (15)</b> 43:20 44:15 45:8 46:6 47:1,25 48:3 121:20 128:10 138:17 170:18 173:22 272:23 334:18 335:15 <b>determined (4)</b> 64:16 124:25 211:13 330:5
---	--	---	---	---

<b>determines (1)</b> 420:17	43:11,16 95:12 173:17,20 202:9	<b>directed (1)</b> 167:9	<b>discussions (12)</b> 27:4,11,16,20,22 28:4 28:13 29:16 74:2 121:5 289:8,12	347:19 383:19 393:6 405:6
<b>determining (4)</b> 46:23 121:9 194:23 201:23	225:13 239:17 253:20 257:4,5 296:3 299:11 344:4 345:4 397:8 418:23 419:1 420:1	<b>directing (1)</b> 433:11	<b>disease (21)</b> 5:21 42:8 87:9 89:7 134:3,14 141:11 143:7 145:4,10,17 145:21 165:14 187:4,11,19 188:5 198:5 201:24 215:9 420:9	<b>documents (4)</b> 17:22 434:5,5,15
<b>developed (1)</b> 105:19	<b>differences (2)</b> 359:9 385:18	<b>directly (1)</b> 317:18	<b>disclose (1)</b> 79:16	<b>doing (21)</b> 46:1 49:8 60:22 78:19 78:23 103:12 110:24 135:5 136:25 162:17 167:9 186:8 254:1 264:19 288:3 290:24 382:19 383:15 409:14 428:8 432:24
<b>development (1)</b> 77:14	<b>different (82)</b> 14:3 30:5 33:13 43:6 51:15,15,16,17 55:21 72:2 85:20 86:3,10 90:12 106:8 110:4 111:5 119:23 121:5 137:11 140:23 151:20,21 151:23 153:6,8,13 161:3 163:4 167:2 171:5,9,12 175:21 187:8,19 192:17 218:7,7,8 219:7 220:20 232:24 239:15 244:20 246:9 254:10 292:21 298:11 301:21 303:12 309:15,16 325:1 328:21 331:18 333:7 343:9 362:22 363:4 365:14 368:11,14,16 369:3 378:4,20,23 380:13 380:15 388:5,10 389:7 396:10 415:11 418:16 420:13 425:24,25 433:5,9 436:5	<b>disclosed (2)</b> 79:15 80:9	<b>disclosed (1)</b> 79:16	<b>diseased (1)</b> 133:17
<b>developments (1)</b> 107:1	<b>devoted (2)</b> 105:9 106:11	<b>disclosure (3)</b> 78:7,12 79:20	<b>disclosed (2)</b> 79:15 80:9	<b>diseases (1)</b> 196:19
<b>devoted (2)</b> 105:9 106:11	<b>diagnosable (2)</b> 188:13 192:7	<b>discontinued (1)</b> 360:8	<b>disclosed (2)</b> 79:15 80:9	<b>disorders (1)</b> 34:9
<b>diagnose (1)</b> 187:4	<b>diagnosed (3)</b> 186:14 191:16 193:15	<b>discount (1)</b> 309:5	<b>disclosed (2)</b> 79:15 80:9	<b>dissertations (1)</b> 197:3
<b>diagnosing (2)</b> 34:10 187:18	<b>diagnosing (2)</b> 34:10 187:18	<b>discounting (1)</b> 196:4	<b>disclosed (2)</b> 79:15 80:9	<b>dissuades (1)</b> 312:3
<b>diagnosis (9)</b> 194:13 195:3 196:6 208:23 209:7,7,10 209:14 211:7	<b>diagnosis (9)</b> 194:13 195:3 196:6 208:23 209:7,7,10 209:14 211:7	<b>discovered (1)</b> 142:17	<b>disclosed (2)</b> 79:15 80:9	<b>distance (1)</b> 160:23
<b>dialogue (1)</b> 95:23	<b>dialogue (1)</b> 95:23	<b>discuss (17)</b> 37:6 56:16 80:20 100:16 168:18 178:12 228:7,17 289:10 320:22 390:9,11 394:3,5 401:24 402:2 408:19	<b>disclosed (2)</b> 79:15 80:9	<b>distinguish (6)</b> 265:17 272:16 276:10 332:4 334:15,20
<b>dicamba (83)</b> 231:24 232:4,11 233:7,17 234:7 235:2,10 247:24 251:7,23,23 252:3,9 252:10,18 253:11 253:12,18,20,21 254:14,19,22 255:1 255:4,8,21,23,24 256:7,9,11,13,14,15 256:16,17,18,25 257:1,16,19 258:6,9 259:4,5,6,11 260:8 260:10,10,25 261:10,12,16,24 262:1,13,14,15,16 262:18 279:12,18 280:1,14,22 281:9 281:21 282:18 283:19 284:1 285:19,23 293:7,8 293:11 294:3 295:1 296:7 424:10,18	<b>dialogue (1)</b> 95:23	<b>discusses (2)</b> 72:4 99:4	<b>disclosed (2)</b> 79:15 80:9	<b>distinguished (1)</b> 125:5
<b>died (1)</b> 397:7	<b>died (1)</b> 397:7	<b>discusses (2)</b> 72:4 99:4	<b>disclosed (2)</b> 79:15 80:9	<b>distinguishes (2)</b> 304:17 306:2
<b>diesel (4)</b> 33:17,20 150:15,23	<b>diesel (4)</b> 33:17,20 150:15,23	<b>discussing (13)</b> 39:19 57:11 60:18 234:2 250:12 313:20 316:16 321:1 322:14 339:19 391:22 419:25 420:1	<b>disclosed (2)</b> 79:15 80:9	<b>distinguishing (2)</b> 270:13 271:10
<b>difference (24)</b> 40:17,24 41:1 42:1,25	<b>difference (24)</b> 40:17,24 41:1 42:1,25	<b>discussion (23)</b> 20:7,11 23:5 30:2,16 56:20 77:18 212:17 228:11,22 229:22 231:16 234:9 251:13 263:22 316:20 318:19 324:2,17 345:6 384:8 403:18 431:25	<b>disclosed (2)</b> 79:15 80:9	<b>distribution (10)</b> 94:6,22,23 95:20 99:2 99:5,9 109:2 234:15 364:2
			<b>disclosed (2)</b> 79:15 80:9	<b>distributions (3)</b> 94:12 104:7 115:20
			<b>disclosed (2)</b> 79:15 80:9	<b>District (4)</b> 1:1,2 8:10,10
			<b>disclosed (2)</b> 79:15 80:9	<b>divided (1)</b> 109:23
			<b>disclosed (2)</b> 79:15 80:9	<b>dividing (1)</b> 111:14
			<b>disclosed (2)</b> 79:15 80:9	<b>Doctor (9)</b> 413:23 419:25 431:3 432:7,10,18 433:16 434:3,13
			<b>disclosed (2)</b> 79:15 80:9	<b>doctoral (5)</b> 11:20,23 13:19,21 15:23
			<b>disclosed (2)</b> 79:15 80:9	<b>document (12)</b> 1:6 38:5 39:6 66:20 76:12 132:11 147:11 313:14

243:20 271:2 276:16 277:25 278:11,15 306:25 307:9 308:2 312:6 313:10 326:9 347:20 348:1 349:1 350:2,15,22 351:7 351:17,20 353:8 375:21 376:6,14 377:14 378:13 382:23,23 385:3 395:23 398:20 399:10 402:17,19 406:15 407:5 408:10,22 409:18 410:16 414:2 416:24 419:16,23 421:3,6,10,14,23 422:6 435:11 437:3	<b>drops (1)</b> 282:17 <b>DS (1)</b> 256:4 <b>due (15)</b> 28:20 47:3 77:11 84:18 108:10 142:19 152:20 159:17 173:7 190:9 234:11 264:20 338:15 386:6 387:18 <b>duly (2)</b> 10:9 438:9 <b>duplicate (1)</b> 311:13 <b>Durable (1)</b> 86:16 <b>duration (34)</b> 296:22,23 297:3,22 298:11,16 299:3,6,8 299:18 300:25 301:2,5,8,23 304:5 304:8,9,11,14,18,20 304:22 305:4,8,13 309:18 312:1 426:1 426:2,4,6,7,9 <b>Dynel (2)</b> 256:2,4	31:1 63:25 162:17 368:20 <b>eat (1)</b> 177:24 <b>eaten (2)</b> 412:6,13 <b>eating (1)</b> 409:15 <b>edited (1)</b> 134:9 <b>educated (1)</b> 368:24 <b>effect (60)</b> 40:2 43:17 49:23 50:21 51:8 55:6 88:24,25 89:5 97:22 112:10 125:6,8 161:12 162:7 164:2 169:3,4,6,16,17,21 170:6,9,18,24 171:6 171:13,16 173:24 175:3 176:3,25 177:6,15 196:20 235:12 236:9 240:14 242:9 253:3 263:10,14 264:22 265:1 266:11 267:1 267:21 268:18 269:16 270:4,16 280:10 301:1,3 303:3 330:25,25 335:1 427:23 <b>effects (15)</b> 74:14 76:3 77:12,13 77:15 80:16 82:9 197:10,11 198:25 229:17 230:5 240:11 335:14 425:6 <b>efficient (1)</b> 114:13 <b>efficiently (1)</b> 48:2 <b>effort (2)</b> 226:5,7 <b>efforts (1)</b> 31:9 <b>Eghal (1)</b> 371:8 <b>eight (2)</b> 207:12 270:9 <b>eight-hour (2)</b> 272:4 274:7 <b>eighth (5)</b> 104:16 227:10 260:15 270:7 362:7	<b>either (17)</b> 41:16 51:25 99:18 106:21,24 111:5 126:25 132:6 170:4 254:3 269:18 299:9 300:19 324:7 353:25 354:12 397:18 <b>elapse (1)</b> 187:1 <b>elapsed (2)</b> 191:20 194:11 <b>elderly (1)</b> 138:5 <b>elect (1)</b> 36:13 <b>elected (2)</b> 36:3 158:8 <b>element (1)</b> 122:1 <b>elevated (2)</b> 252:2 311:4 <b>elicit (1)</b> 37:14 <b>Elyse (2)</b> 4:15 10:1 <b>emerge (1)</b> 309:22 <b>emphasis (2)</b> 116:4,14 <b>emphasizing (1)</b> 98:19 <b>emphatic (1)</b> 279:5 <b>employee (2)</b> 421:10,19 <b>encompasses (1)</b> 258:15 <b>encompassing (2)</b> 257:18 277:11 <b>end-all (1)</b> 93:5 <b>endeavor (1)</b> 40:1 <b>endeavors (2)</b> 34:25 35:2 <b>endpoint (1)</b> 129:11 <b>enjoy (1)</b> 267:14 <b>enormously (1)</b> 372:1 <b>enrolled (5)</b> 333:20 337:8 338:17 355:18,25 <b>enrollees (1)</b>	31:21 <b>enrolling (1)</b> 338:23 <b>enrollment (6)</b> 325:17 337:14,15 346:21 355:16 377:10 <b>entered (1)</b> 295:9 <b>entire (2)</b> 237:16 304:5 <b>entitled (4)</b> 17:16 86:15 128:23 363:18 <b>Environmental (2)</b> 6:10 36:5 <b>environmentally (1)</b> 34:4 <b>EPA (4)</b> 200:14 208:12,16 415:15 <b>epi (2)</b> 14:2 132:7 <b>epidemiologic (24)</b> 42:20 43:1 45:7 46:7 50:17,18 52:14 56:17 62:4 64:17 65:4,8 71:10,11 97:2 122:7 144:9 151:18 178:11 188:17 191:14 290:1 317:13 334:9 <b>epidemiological (24)</b> 39:15 42:11 48:14 59:10 60:4 61:17 66:11 67:3 68:9 69:5,21,22 119:24 148:17 153:2 170:20 229:24 230:15 291:25 292:5 325:2 333:5 334:13 433:24 <b>epidemiologist (16)</b> 47:25 49:18 61:1,1 63:5 71:5 78:23 79:9,10 88:20 163:20 210:10 273:18 315:19 408:3 421:7 <b>epidemiologists (18)</b> 42:3 43:19,25 44:12 44:14 47:10 50:1 83:25 84:15,20,21 85:3,19 107:11 163:4,8,12 316:21 <b>epidemiology (58)</b>
	<b>E</b>			

5:18 13:11,15 15:21 16:4 27:24 30:18 36:5 39:14,25 41:19 41:20 46:2 52:2,5,8 52:19 53:18 56:25 57:15,23 58:6,15,21 59:13 60:6,11 61:14 61:22 62:14,21,24 63:12,14 64:4,17 69:2,15 70:3 71:21 73:13 79:12,13 82:16 84:23 86:13 92:24 93:2,4 131:21 187:9 189:22 196:2 296:19 414:7 415:22 417:4 426:17	374:13 377:19 381:1 439:5 <b>errors (2)</b> 365:12 378:17 <b>Esfandiary (3)</b> 3:16 9:7,7 <b>especially (9)</b> 33:11 69:16 119:13 138:5 268:6 280:7 321:5 330:19 360:15 <b>ESQ (11)</b> 3:7,8,14,15,16,22,23 4:7,8,14,15 <b>essence (4)</b> 45:3 257:23 426:3 430:17 <b>essential (1)</b> 39:23 <b>essentially (1)</b> 312:18 <b>establish (3)</b> 139:19 407:8,13 <b>established (2)</b> 308:4 353:17 <b>estimate (33)</b> 44:4,4,23 45:13 46:15 46:23 88:25 117:13 117:16,20 119:15 119:17 125:7 153:15 164:3,4 165:13,17 171:2 181:19 191:9 194:2 215:1 216:17 235:12 236:9 253:3 263:17 264:22 265:1 311:20 322:2 322:9 <b>estimates (33)</b> 43:9 46:17 97:22 114:21 115:17 116:2,11 118:16 129:15,17 130:14 152:9,11 158:25 159:3,9,14,21 162:15,19 234:11 237:25,25 240:12 242:9 263:14 280:10 286:23 312:18 320:17 390:13 394:7 397:9 <b>estimating (5)</b> 45:4,6 48:9 188:18,19 <b>estimation (1)</b> 44:22 <b>et (16)</b>	98:24 149:16 194:7,7 224:6 243:25 244:13 245:15 255:11,13 274:13 344:6,23 381:20,21 417:16 <b>evaluate (15)</b> 22:20 24:4,12 30:23 38:18 60:15 85:4,6 110:21 167:20 176:24 195:14 280:5,9 320:15 <b>evaluated (3)</b> 57:21 123:22 140:14 <b>evaluating (8)</b> 46:18 60:10 88:1 98:21 158:19 405:2 405:3 425:7 <b>evaluation (8)</b> 62:7 68:22,24 79:11 90:22 122:15 420:12 423:2 <b>evaluations (1)</b> 263:13 <b>event (2)</b> 168:9 254:6 <b>events (3)</b> 18:6 190:19 197:25 <b>eventually (1)</b> 128:1 <b>ever/never (23)</b> 182:22 183:4,6,16 184:13,18,21 185:6 185:12 249:2,11 266:5 278:23 279:15 309:17 311:15 350:8 352:1 352:10 353:6 366:18 396:21 401:13 <b>everybody (7)</b> 61:24 62:2 135:6 197:15 208:1 340:15 370:18 <b>evidence (34)</b> 45:9 61:10 72:8 88:16 92:11,17,21 93:10 93:16 94:9 99:11 105:13 106:15 131:6 264:12 265:8 265:22 266:17 267:6 268:3,22 269:9,14 270:3 291:25,25 292:4,5 323:9,16 351:14 402:21 403:13	407:8 <b>exact (13)</b> 120:23 202:2 270:8 288:21 309:6,7 361:7,8 374:23 377:24 378:1 436:13,15 <b>exactly (23)</b> 27:21 44:9 75:24 78:19 82:18 93:12 120:14 139:18 165:21 168:25 199:14 208:10 239:10 242:11 272:5 274:23 276:2 319:24 325:8 344:2 348:17 389:4 394:17 <b>exaggerate (2)</b> 134:2,13 <b>exam (2)</b> 333:19,21 <b>EXAMINATION (4)</b> 5:2 10:12 413:25 435:9 <b>examined (2)</b> 10:9 92:7 <b>example (32)</b> 14:21 30:24 41:20 86:5 111:13,19 116:24 117:2 135:25 136:15 142:10,15 143:21 150:9 154:14 160:14 164:8 168:17 170:8 174:13 175:9,11 181:1 182:11 188:24 191:12,13 334:25 362:12 401:6 415:19 432:4 <b>examples (1)</b> 165:16 <b>excellent (1)</b> 220:16 <b>exchange (1)</b> 15:23 <b>exchangeability (1)</b> 234:15 <b>exclude (12)</b> 45:20 46:9 52:15 57:20 107:11 108:2 110:5 111:6,6 113:5 287:10,13 <b>excluded (1)</b> 83:4	<b>excludes (2)</b> 107:21 131:4 <b>excluding (2)</b> 397:5,6 <b>excuse (1)</b> 96:10 <b>executive (2)</b> 383:7,7 <b>exercise (1)</b> 130:4 <b>exert (2)</b> 115:19 278:8 <b>exhibit (67)</b> 5:9,10,15,16,19,23 6:3,4,5,8,9,12,13,14 6:15,16,18,20,21 7:3,4 11:11,12 39:9 39:12 86:20,21 113:14 132:1,5 147:17 148:1 155:8 156:9 157:4 166:10 178:15 199:24 200:4 203:25 204:1 213:23 214:1 223:13 235:19 243:17 277:3,7 288:23 307:10 313:7 318:22,25 349:8 350:17,21 363:14,17,18 386:16,19 405:10 405:15 423:6 428:14 432:8,18 <b>exist (1)</b> 242:20 <b>existed (2)</b> 147:7 310:20 <b>existing (4)</b> 114:25 117:6 290:19 290:19 <b>exists (2)</b> 91:19 347:14 <b>expanded (1)</b> 369:10 <b>expanding (2)</b> 67:17 374:13 <b>expect (7)</b> 29:1,2,14 188:4 282:13 310:20 311:19 <b>expected (1)</b> 310:25 <b>expenses (1)</b> 137:4 <b>expensive (1)</b> 225:15
---	---	---	---	---

225:15 <b>experience (1)</b> 364:23 <b>experiment (3)</b> 90:24 94:4 99:7 <b>experimentalists (1)</b> 63:8 <b>experiments (6)</b> 74:12,24 75:14,23,25 76:1 <b>expert (100)</b> 5:10 6:5 20:13 37:5 39:5 52:21 56:15 57:10,24 58:18 59:9 66:2,4,25 73:3,8,16 76:13 79:8,10,19 80:6,22,24 81:4 83:15,19 84:13 86:25 87:17 107:7 117:23,24 119:21 131:17 142:2 152:1 152:2 155:24 158:24 165:23 182:21 183:9 186:2 212:23 218:17 248:25 249:17,19 250:5,21 251:8,22 254:11,12 257:5 258:4 259:3 260:7 262:5,21 263:6 277:16,21 278:3,9 283:6,17,24 285:5 288:12,14 291:10 292:11 294:12 295:18 305:11,20 310:5,17 319:13,19 345:8 347:22 348:5 348:14,18 389:21 395:7 401:24 402:6 402:8 408:15 409:2 429:10,13,19 432:15 433:18 434:7 <b>expertise (3)</b> 38:14 55:2 82:7 <b>experts (2)</b> 18:22 55:15 <b>expires (2)</b> 34:14 437:21 <b>explain (16)</b> 51:2,6 84:12 86:25 98:1 117:9 123:8 126:7 132:22 165:22 186:19 367:11 414:2 416:23 425:20	430:20 <b>explained (2)</b> 91:16 430:17 <b>explaining (2)</b> 49:20 50:20 <b>explains (3)</b> 51:20 91:25 92:15 <b>explanation (6)</b> 51:5,12,20 110:5 361:23 426:11 <b>explanations (1)</b> 50:25 <b>explode (1)</b> 236:23 <b>exploding (1)</b> 238:8 <b>exploratory (6)</b> 244:1,14,23 245:15 247:8,13 <b>explore (2)</b> 311:18 409:18 <b>exposed (30)</b> 43:11,13 45:1 141:20 150:11 164:11,12 164:13 175:15,20 176:11 209:14 237:4,4 238:5 250:23 254:2 255:7 255:7 261:9,11 262:16 268:14 326:17 330:10,10 332:12,13 336:7 396:17 <b>exposure (255)</b> 5:21 22:15 24:4 26:7 27:1 29:18 30:6,13 30:19,22 31:13,19 32:4,5 41:21 42:16 48:18 49:2,5 64:7 70:9 87:9 124:7 125:4 126:7,10,12 134:2,13 135:12,16 135:19,21,25 136:9 136:11 137:12,14 142:3,4 143:6 145:11,14 149:2,7 149:21 152:21 159:17 165:14 167:17,19,22 168:3 168:21 169:15 171:22 174:15 176:18 182:12,14 182:22 184:13,21 185:10,13,14,22 186:17 187:1,4,10 187:12,13 188:5,12	189:3 190:9,17,18 190:22 191:15,17 191:23 193:7,17 194:1,13,18,21,25 195:4 196:18 198:4 198:7,14 199:10,15 199:16 201:20,24 203:6 209:10,11,20 210:4 211:13 215:8 215:8 225:23 238:25 240:1,25 241:24 247:16 248:22 251:7,7 252:3,4,8 254:14,19 255:16 256:6 257:16,19 258:6 259:4 260:21 261:9 264:17,18,21,24 265:6 266:3 272:10 272:23 273:13,18 274:7,20 275:6,7,25 286:5,7 296:22,22 299:14 300:2,3,14 300:18 301:24 302:1,5,6,20 303:7 303:11,14,24 304:3 304:4 305:14 308:7 309:23 311:25 314:8,11,21 315:4 315:12,13 316:13 324:6,7,8,18,19,24 324:25 325:7,9 328:4,5,18 329:10 329:10,19,24 330:9 330:14,15 333:16 335:25 336:2,3,4,6 336:8,10 337:20 338:13 339:7,16 340:3 341:5,6,7,16 341:16 342:4,8,16 343:21 345:11,12 345:20,22,24 346:5 346:8 347:6 350:6,6 351:15,23,25 352:18 353:24 356:7 357:20 359:9 359:11 360:14,15 362:2 364:23 367:24 369:19 371:7,15,21 377:7 390:8,10 394:2,4 399:2 430:10 433:12,14,20 <b>exposures (113)</b> 24:13 30:21 31:18,24 33:13,19,21 38:15	133:18 135:1 136:8 136:18 146:18 149:12 151:14 152:14 163:21,24 164:9,10 174:9 176:2,5 177:3,11 179:7,11,12 180:7 180:23 189:1 191:2 191:8 192:4,10 193:2 195:2,18 196:3,5 200:23 201:18,19 210:12 210:15,16 220:18 224:1,21 225:21,25 236:2,13 237:1,20 238:23 244:20 246:12,18 248:4 250:23 252:10,17 253:17 254:2,20 257:9 263:1 271:6 273:4,5 274:15 275:21 280:19 282:7 283:19,25 285:1 294:3 308:13 310:24 312:17 313:24 326:16 329:25 330:12,20 332:5,5 333:8 334:1 338:6,8 339:15 342:25 343:23 346:10 347:1,11 355:8,20,21 359:10 360:11 370:25 398:4,15 400:24 426:18,21 430:3,6,8 <b>express (2)</b> 91:12 381:12 <b>expressed (2)</b> 414:4 434:7 <b>extend (1)</b> 162:7 <b>extensive (4)</b> 227:19,20 263:15 274:11 <b>extensively (1)</b> 225:22 <b>extent (10)</b> 34:23 41:2 170:18 171:13 176:17 234:19 242:21 346:9 408:18 436:4 <b>external (4)</b> 20:17 25:18 383:8 385:4 <b>extra (4)</b> 170:13 171:22,24	177:3 <b>extreme (2)</b> 191:13 373:12 <b>extremely (2)</b> 50:2 69:2 <b>eyeball (1)</b> 213:5 <hr/> <b>F</b> <hr/> <b>F (1)</b> 438:1 <b>face (1)</b> 92:12 <b>fact (45)</b> 78:4 82:15 83:19 87:1 94:14 100:1,17 103:3 110:4 122:22 123:14 129:24 140:18,19 142:19 191:3 218:25 220:6 221:2 254:18 258:8 260:9,15 268:7 283:8 288:10 305:12 306:18 307:15 310:6 320:23 327:25 331:21 333:4,7 343:22 374:11 389:9 390:25 393:16 394:14 411:11 420:20 429:23 435:18 <b>factor (15)</b> 143:4 146:3,6,8 164:14 169:5 175:12,17 194:25 285:22,24 328:13 328:20,23 334:19 <b>factored (1)</b> 301:7 <b>factors (20)</b> 32:19 33:14 48:1 145:4,10 151:6 163:22 164:11,13 187:20 189:5 215:19 279:11 328:1 332:7,11 334:19 335:16 424:14 430:9 <b>facts (3)</b> 49:21 50:20 439:4 <b>faculty (4)</b> 14:3 16:22 33:1,6 <b>fair (12)</b> 31:7 46:5 47:4,20 48:5 51:8 125:17
---	---	---	---	---

260:17 292:15 301:5 323:1 420:6	<b>federal (1)</b> 79:21	<b>finds (1)</b> 351:13	173:6	56:10 57:1,16 58:7
<b>fairly (5)</b> 38:5 111:25 171:25 172:4 344:25	<b>feed (1)</b> 289:13	<b>fine (12)</b> 68:5 72:18 226:23 240:23 264:7 281:3 334:11 348:19 360:4,6 436:14,18	<b>fix (1)</b> 249:21	58:22 59:5,14 60:8 61:5,18 62:5,22 63:17 64:14,20 65:6 65:15,20 66:16 67:10 68:15 69:11 70:14,24 71:16 72:11,16 73:9 74:7 74:22 75:9 76:4 78:11 79:6 80:10 81:6 82:3 83:5,13 84:19 85:15,24 87:21 89:21 90:16 91:8,20 92:2,25 93:18 95:4 97:15 98:16 99:13 100:4 100:23 101:17 102:11 103:6,19 104:14 105:15 106:2,17 107:14 108:11 109:17 110:7 111:8 112:11 113:9,13,19 114:5 114:14 115:2,11 116:7,16 117:7 118:11 119:1,10 120:22 121:13,23 122:11 123:1,17 124:15 125:18 126:15 127:5,13,16 127:24 128:13,23 129:9 130:10,19 131:8 132:14,23 133:2,20 134:17 135:13,23 136:13 137:16 138:12 139:1,17 140:8,22 141:15 142:6,25 143:8,12 144:15 145:19 146:20 147:9,19,22 149:8 151:4,15 153:19,22 154:18 155:2,19 156:11,20,24 157:14,24 158:14 159:6 161:1,18 162:10 163:15 164:15 165:7 166:4 166:6,21 168:7,10 168:23 169:24 170:22 171:18 172:3,12,17,22 173:1,18 174:6,17 174:20 175:8 176:8 176:22 177:9,23 179:18 180:1,24
<b>fall (4)</b> 164:6 271:21 432:13 435:12	<b>feel (1)</b> 204:5	<b>finish (13)</b> 61:5 65:20 119:10 126:15 127:13 128:24 151:15 231:5 237:13 337:1 346:18 370:4,8	<b>Flaherty (3)</b> 4:7 9:12,12	
<b>fallen (1)</b> 216:7	<b>fellow (4)</b> 33:23 35:17,21,25	<b>finished (2)</b> 231:4 243:14	<b>fluctuated (1)</b> 281:15	
<b>falling (1)</b> 322:9	<b>FERGIE (3)</b> 259:8 266:20 267:9	<b>FIRM (1)</b> 3:18	<b>focus (3)</b> 32:23 77:12 175:3	
<b>falls (2)</b> 42:16 159:24	<b>field (7)</b> 24:8,13 26:20,23 27:9 88:4 125:5	<b>first (65)</b> 13:21 15:2 21:5 22:10 22:11,14,15,20 34:8 34:10 54:2 75:4,17 79:2 89:15 108:16 118:1 127:5 175:10 178:12,18 186:8,16 188:2 190:17 194:12 199:20 200:15 201:7,11 202:18 208:2 209:15 210:1,4,16 211:13 214:19 216:1 249:14 267:15 277:22 283:16 295:7 297:17 312:25 328:10 337:4 347:21,25 351:23 355:9,25 357:15 367:25 369:7,20 370:24 371:15 373:9 377:9 391:6 402:10,16 418:16	<b>folks (1)</b> 367:24	
<b>falsify (1)</b> 40:10	<b>fields (1)</b> 136:23	<b>first-degree (1)</b> 279:6	<b>follicular (1)</b> 280:12	
<b>familiar (3)</b> 19:1 33:12 416:20	<b>fieldwork (2)</b> 22:19 134:21	<b>fish (1)</b> 77:13	<b>follow (3)</b> 22:18 314:17 432:4	
<b>family (2)</b> 179:5 180:5	<b>fifth (6)</b> 103:22 123:19 221:9 225:9 267:10 374:22	<b>fit (3)</b> 63:15 64:18 318:6	<b>follow-up (13)</b> 28:21 29:3 141:8,9,10 141:20 193:22 356:18 363:20 367:15 433:15 434:23 435:5	
<b>far (15)</b> 15:5,12 21:7 32:12 54:25 112:20,21 179:14 192:3 204:11 248:11 366:1 367:3 371:7 383:25	<b>fight (1)</b> 216:9	<b>fitting (1)</b> 163:9	<b>followed (4)</b> 32:16,17 35:11 204:20	
<b>farm (1)</b> 202:19	<b>figure (7)</b> 187:9 365:11 373:1 374:18 377:17 379:22,23	<b>five (11)</b> 68:19 188:4,11 190:13 195:24 200:2 268:7 355:17 366:11 434:25 437:4	<b>following (7)</b> 29:12 32:22 194:6 234:13 287:20 391:8 436:24	
<b>farmed (1)</b> 148:25	<b>figuring (1)</b> 299:13	<b>fivefold (1)</b>	<b>following (7)</b> 29:12 32:22 194:6 234:13 287:20 391:8 436:24	
<b>farmer (2)</b> 136:19,20	<b>file (1)</b> 83:9		<b>follows (2)</b> 10:10 194:4	
<b>farmers (24)</b> 22:5 147:6 149:4 150:11,16 176:11 176:13 201:11,20 202:8,20 203:8 208:10,14 250:23 325:17 333:18 334:4 337:6,7 338:1 338:18,23 355:24	<b>filled (1)</b> 12:24		<b>fooled (1)</b> 119:16	
<b>farming (13)</b> 31:4 147:6 148:12,19 150:25 151:1 200:22,23 201:18 202:12 337:11 339:4,6	<b>final (2)</b> 12:22 289:13		<b>footnote (12)</b> 179:4 252:5,7,13 255:21 257:17 259:13 261:1 386:3 387:12,16,21	
<b>fast (2)</b> 25:3 394:25	<b>find (27)</b> 19:14 29:4,9,14 50:25 51:4 68:3 78:20 87:16 90:9 99:3,10 99:25 102:7 112:9,9 138:4 148:25 232:17 249:3 274:3 280:14 299:6 350:21 384:11 402:21 414:9		<b>footnotes (1)</b> 387:8	
<b>favor (3)</b> 113:6 216:7 323:17	<b>finding (5)</b> 34:9 298:4 319:21 377:21 427:1		<b>forest (9)</b> 152:25 153:4 160:5,9 160:21 161:5,16 162:6,13	
<b>Favorite (1)</b> 142:15	<b>findings (17)</b> 32:18 51:6 114:24 152:19 159:16 228:8,17 229:15 230:3 232:1,5 234:10 245:13 247:6 248:2,3 377:17		<b>Forgie (527)</b> 3:7 5:5 8:25,25 9:16 9:23 14:17 16:15 19:12 23:22 25:9 26:8 28:2,18 30:10 31:15 32:21 35:9,15 38:10 40:3,13 41:23 43:4,23 44:17 45:10 45:22 46:11 47:5 48:20 49:24 51:9 53:11,20 55:4,18	
<b>February (2)</b> 26:2 349:19				

181:13 182:8,23  
 183:19 184:15,22  
 185:2,11 187:6  
 188:15 189:25  
 191:5 192:8 193:4  
 193:19 195:8  
 196:21 198:21  
 199:12 200:6,19  
 201:2,14,25 203:1  
 204:15 205:4,19  
 206:7,15 207:8,21  
 208:7 209:16  
 210:17 211:4,16  
 212:1 213:7,22  
 215:20 218:1 219:2  
 219:22 220:11  
 221:6 222:1 223:21  
 224:9 225:7 226:20  
 226:25 227:8  
 228:25 229:12  
 230:7,19 231:3  
 232:7 233:10,21  
 234:24 235:16  
 236:4,15 237:13,21  
 238:14 239:2 240:3  
 241:2,6,17 242:1,23  
 243:14 244:2,16  
 245:9,16 246:14  
 247:9 248:6,15  
 249:25 250:14  
 251:18 253:23  
 254:23 255:17  
 256:3,21,23 257:11  
 258:11,23 259:24  
 260:4,13 261:5,20  
 262:7 264:2,7  
 265:10,24 268:5,24  
 269:11 270:6 271:8  
 272:11,24 273:14  
 274:8,21 275:2,8  
 276:1,7,19 281:1,13  
 282:8,22 283:11  
 284:17 285:16  
 286:21 287:12  
 288:1,15 289:2  
 290:12 291:15  
 292:7,20 293:12  
 294:4 295:3,19  
 296:9 297:10 298:6  
 298:18 300:5  
 301:10 302:21  
 303:9,15 304:7  
 305:15,17 307:12  
 307:17 308:23  
 309:12 310:14  
 311:8 312:12 313:2

313:5,25 314:6  
 315:6,20 317:11  
 320:13 321:2,20  
 322:17,22 323:4,21  
 324:12 325:6,25  
 326:24 327:4,16  
 328:7,16 329:20  
 330:17 331:24  
 333:9 334:21  
 336:12,21 337:1,23  
 338:11 339:20  
 340:20 341:10,17  
 342:10 343:3,11  
 344:13 346:2,18  
 347:2 348:6 349:3  
 349:10,13,15,21  
 350:11,25 352:14  
 353:10 354:2,16  
 355:12 356:14  
 357:9 358:1 359:2  
 359:24 361:4,11,16  
 362:5 363:5 364:7  
 364:18 365:4 366:4  
 367:6 368:3 370:4,7  
 371:3,18 372:8  
 373:3 374:20 376:1  
 376:9,19 377:23  
 378:5 379:1,14  
 380:3 381:6 382:8  
 382:17 383:3,13,23  
 384:10,14,19  
 385:10 386:25  
 388:3 389:2,14  
 390:19 391:14,24  
 392:20 393:7  
 394:19,21 395:11  
 396:6 397:2,20  
 398:7,10,22 399:12  
 399:22 400:9 401:1  
 401:10,14 402:25  
 403:8,16,24 404:9  
 404:22 405:22  
 407:10,23 409:1,5  
 411:2,9 412:21  
 413:4,12 414:1  
 419:24 420:14  
 421:1,21 422:5,18  
 423:5,8,12,18,21,23  
 425:8 434:22 435:1  
 435:6 436:6,19  
**form (360)**  
 26:8 28:18 31:15  
 32:21 38:10 40:3,13  
 41:23 43:4,23 45:10  
 45:22 46:11 47:6  
 48:6,20,25 49:24

51:9 53:11,20 55:5  
 55:18 56:10 57:1,16  
 58:7,22 59:14 60:8  
 62:5 63:17 64:14,20  
 65:15 66:16 67:10  
 68:16 69:11 70:14  
 71:16 73:9 74:7,22  
 75:9 78:11,15 79:6  
 84:19 85:15,24  
 87:21 89:21 90:16  
 91:8,20 92:25 95:4  
 97:15 98:16 99:13  
 100:4 101:17  
 102:11 103:6,19  
 104:14 105:15  
 106:2 107:14  
 108:11 109:17  
 110:7 111:8 112:11  
 115:2,11 116:7,16  
 117:7 118:11 119:1  
 122:11 123:2,17  
 124:15 125:18  
 128:13 129:9  
 130:10,19 131:8  
 133:11,20 134:17  
 135:13,23 136:13  
 137:16 139:1,17  
 140:8,22 141:15  
 142:6,25 145:19  
 146:20 147:9 149:8  
 151:4 153:19  
 154:18 155:19  
 156:20,24 157:14  
 157:24 158:14  
 159:6 161:2,18  
 162:10 163:15  
 164:15 166:4,21  
 168:23 169:24  
 170:22 171:18  
 172:3,18 173:1,18  
 174:6 175:8 176:8  
 176:22 177:9  
 180:24 181:8,13  
 182:8,23 183:19  
 184:15 185:11  
 187:6 188:15  
 189:25 191:5 192:8  
 193:4,19 195:8  
 196:21 198:21  
 199:12 201:2,25  
 203:1 205:4,19  
 206:7,15 207:8,21  
 208:7 209:16  
 210:17 211:4,16  
 212:1 213:7 215:20  
 218:2 219:2,22

220:11 221:7 222:2  
 224:10 225:8 227:9  
 230:7,19 232:7  
 233:10,21 234:24  
 236:4,15 237:22  
 239:3 240:4 241:8  
 242:2,23 244:2,17  
 245:9,16 246:14  
 247:10 248:6  
 250:14 253:23  
 254:23 255:18  
 256:3,21 257:12  
 258:12 259:9  
 260:14 261:6 262:8  
 265:11 266:21  
 268:6 271:8 281:2  
 281:14 282:9,22  
 283:11 284:17  
 285:16 286:21  
 287:12 288:1 289:2  
 290:12 292:7,20  
 293:12 294:4 295:3  
 295:19 296:10  
 297:10 298:6,18  
 300:5 301:11  
 302:21 303:15  
 304:7 305:15  
 308:23 309:12  
 310:14 311:8  
 312:12 313:11,25  
 314:6 315:6,20  
 317:11 320:13  
 321:2,20 322:22  
 323:4,21 324:12  
 325:6 326:24  
 327:16 328:7  
 329:20 330:17  
 331:24 333:9  
 334:21 336:12,21  
 337:23 338:11  
 339:20 340:20  
 341:10,17 342:10  
 343:3,11 344:13  
 346:2 347:2 348:6  
 349:3 350:11  
 352:14 353:10  
 354:2,16 355:12  
 356:14 357:9 358:1  
 359:2,24 361:5  
 363:5 364:18 365:4  
 366:4 367:6 368:4  
 371:5 372:9 373:4  
 374:21 376:1,9,20  
 378:7 379:2 380:7  
 382:8,17 383:3,13  
 383:23 386:25

388:3 389:2,14  
 391:14,24 392:20  
 393:7,19 394:19  
 395:11 396:6 397:2  
 397:20 399:12,22  
 400:9 401:1,14  
 402:25 403:8,16,24  
 407:10,23 413:16  
 416:11 420:10,19  
 421:16 422:4,10,24  
 425:2  
**format (3)**  
 266:23 267:12 282:1  
**format (2)**  
 258:24 431:18  
**formed (1)**  
 416:12  
**former (2)**  
 16:3 421:10  
**formulate (4)**  
 40:5 44:21 48:7 52:7  
**formulates (1)**  
 31:11  
**formulation (1)**  
 200:16  
**formulations (5)**  
 52:1 403:14 417:18  
 426:15 434:18  
**forth (10)**  
 55:16 116:3,13  
 273:10 288:13  
 324:5 351:21 384:3  
 384:7 438:9  
**found (20)**  
 33:17 40:11 82:11  
 92:8 94:16 95:1  
 97:4 100:9 101:13  
 113:24 147:5  
 250:25 286:16  
 306:10 326:20  
 327:12 365:23  
 367:2 374:13 430:4  
**four (18)**  
 48:24 110:23 123:11  
 172:14 195:21  
 254:9 331:12 332:5  
 332:10,18 355:16  
 360:1 366:11 400:4  
 400:8 406:19  
 432:14 433:17  
**fourth (1)**  
 121:24  
**frame (1)**  
 198:10  
**France (2)**  
 395:23 396:2



<b>frankly (2)</b> 241:5 412:9	375:15	407:7,19 408:2	165:25 166:2,17,20 173:25 174:10 176:3,25 177:13 178:23 180:13 182:6 183:25 184:13 185:8,10 186:17 194:12 195:12 199:10,19 201:4,12 202:8,11 202:18 207:6 208:1 208:14 209:24 212:18 213:15 223:9,19 224:7 227:6 228:8,18,20 229:17 230:5,17 231:2,7,14 232:5,14 232:21 233:1,9,20 234:22 236:9,11 237:2,3,24 238:5,22 240:14 245:6,13 246:3 247:7 248:3 248:10,20 249:3,15 250:8,24 251:6 252:4,9,14 253:19 253:22 254:13,20 255:3,11,16,23 256:7,10 257:8 258:6,10,16 259:3,6 260:8,11 261:1,10 261:16,19 262:1,6 263:3 264:12 265:9 265:18 266:4,18 267:6,7,16 268:4,18 268:23 269:4,10,17 270:4 271:6,19 276:14 278:24 284:4 285:21 287:6 292:1,6 298:13 299:9 300:2,4,15,18 300:19 302:5 305:14 306:12 313:19 314:19 315:3 318:13 319:1 319:8 321:15,17 323:2,10,19 324:11 325:16 326:15,17 326:21 327:13,14 327:18,21 328:3,4,5 328:10,18,21,25 329:3,9,13,14,19 330:9,14,15,24 331:13 333:2 334:5 334:16 335:2,14,20 336:7,10,15,19 337:4,10 338:15,18 338:25 339:17	342:6 343:1,9 350:4 350:8 351:15,23 352:1,2,11 353:2,7 354:13,14 357:25 358:15 360:18 362:4,22 363:8 365:23 367:2,23 369:4,9,22 370:16 371:1,10,25 372:19 373:14,18 374:12 374:16 375:19,24 377:6,8,17,18,22 378:19,19,23 379:12 380:12 381:1 382:7,16,20 383:2,12,20,22 384:9 385:9,14 386:4,11 388:25 390:21 391:18,23 392:2 394:10 395:14,15 396:4,23 399:3,20 402:21,22 403:12,14,23 404:8 404:20 418:2 420:17 422:8,22 429:25 431:10 433:22 434:9
<b>French (2)</b> 396:13 400:5	<b>G</b>	<b>genotoxicology (1)</b> 54:18	<b>glyphosate-based (8)</b> 52:3 183:17 200:15 225:4 403:14 417:17 426:14 434:18	
<b>frequencies (1)</b> 303:16	<b>G (6)</b> 252:5,7 257:17 259:13 261:1 262:16	<b>Germany (2)</b> 11:16 14:8	<b>glyphosate-intensiv...</b> 339:4,6	
<b>frequency (14)</b> 269:15 297:3,21,25 298:7 302:25 303:2 303:14 304:3,6,15 304:21 344:22 423:25	<b>game (1)</b> 249:9	<b>getting (9)</b> 35:3 65:18,21 85:8 226:21 259:23 324:17 375:8 381:11	<b>glyphosate-related ...</b> 52:1	
<b>frequent (1)</b> 267:19	<b>gather (1)</b> 26:6	<b>give (21)</b> 78:22 81:6 83:16 112:8 127:9 136:6 152:19 183:11 196:19 236:8 241:3 241:10,14 264:13 272:14 299:20 351:2 361:23 404:23 411:19 415:19	<b>GMOs (1)</b> 369:22	
<b>frequentist (2)</b> 106:4,21	<b>gathered (3)</b> 346:11,14 417:11	<b>given (11)</b> 108:9 158:4 165:16 202:8 233:22 274:14 329:8,11,14 433:6 438:11	<b>go (61)</b> 15:24 17:20 35:4 40:22 43:25 47:17 48:13 49:4 57:4 75:18 76:19 79:13 81:13 90:18 96:6,12 113:8 126:18,24 127:18,21 137:3 156:13 161:13,14 161:20 162:3 177:21 192:5 213:19 216:12 222:12 235:14 249:20 254:12 283:21 295:13 297:15 303:17	
<b>friends (1)</b> 14:16	<b>gathering (3)</b> 26:17 314:21 355:7	<b>gives (6)</b> 207:12 236:9 243:3 414:14 420:7 426:14		
<b>front (4)</b> 83:20 152:3 295:23 428:16	<b>gauge (1)</b> 417:8	<b>giving (1)</b> 162:15		
<b>fuel (1)</b> 150:15	<b>gene (1)</b> 89:6	<b>glean (1)</b> 123:10		
<b>full (9)</b> 83:16,19 118:1 216:22 273:12,13 275:6 290:9 297:7	<b>general (26)</b> 5:12 27:25 92:19 93:15 135:19 136:9 137:11 149:20 163:3 197:13 202:13 223:25 231:7 242:5 311:6,9 318:3 325:16 338:17 352:16 357:11 358:24 387:20 392:1 420:8 420:12	<b>glyphosate (351)</b> 20:9 22:25 24:17 27:14 32:14 35:8 51:23,25 52:6,19 59:13 60:5 62:12 63:13 64:7,8,17 65:9 66:9 67:4 68:8 69:6 70:3,6 71:12 73:6 77:22 80:17 82:10 87:19,19 90:2 90:5,13,14 91:6 97:10,13 98:11,14 100:1,2,7,12,20 101:3 102:6,6,8,9 102:25 103:3,4,13 103:15 119:24 120:9,13,20 121:11 121:21 122:9,24 123:12,15 124:13 125:16 128:11 147:8 148:20 149:7 152:5,20 153:3 155:16 159:5,17		
<b>fully (7)</b> 152:10,18 157:12 158:21 215:1,15 262:21	<b>generally (16)</b> 27:18 30:18 40:4 49:25 93:9,11 99:10 146:25 188:3 197:1 216:11 222:8 310:3 316:17 317:7 341:15			
<b>fumigant (2)</b> 386:23 387:3	<b>generate (3)</b> 41:10 42:17,21			
<b>fumigants (1)</b> 275:18	<b>generating (1)</b> 40:9			
<b>fun (1)</b> 78:24	<b>genetically (1)</b> 338:15			
<b>fundamental (2)</b> 49:17 50:16	<b>genomic (1)</b> 89:3			
<b>funding (2)</b> 34:25 35:3	<b>genotox (1)</b> 402:18			
<b>fungicide (2)</b> 386:23 387:2	<b>genotoxic (2)</b> 74:14 76:3			
<b>fungicides (1)</b> 275:18	<b>genotoxicity (22)</b> 54:15,21 57:5 58:2 59:20 60:12,13 74:3 75:7,13 82:24 402:3 403:18 404:3,13,16 404:17 405:3,4			
<b>funny (1)</b> 168:24				
<b>further (14)</b> 161:13,15 162:8,8 183:12 229:16 230:4 305:13 347:16 410:9 411:22 412:23 435:9 438:12				
<b>future (4)</b> 21:18 115:1 117:6				

307:18 319:5 325:23 335:8,21 342:1 354:22 389:23 392:7 395:21,25 401:5,16 410:5,19 414:7,13 414:19 415:2 416:3 429:23 430:21 <b>goes (14)</b> 45:2 46:18 119:18 126:3 136:22 162:24 168:14 196:15 206:20 299:9 341:4 371:8 402:18 427:11 <b>going (79)</b> 14:24 22:4 26:20 38:4 45:21 62:25 67:19 80:10 82:20 83:5,8 84:13 85:7 87:16 96:25 98:3 112:5 126:16,17,21,22,23 127:20,22,24 128:2 134:22 146:18 147:16 149:6 162:22 163:3 175:16 183:10 184:7 186:10 190:25 200:1,10,11 208:4 213:4 220:24 222:23 226:14,16 239:19 257:6 259:18,21 262:22 269:20,21 270:10 282:2 286:11 312:16 329:5 342:1 344:25 346:10 350:20 361:17 378:11 384:14,19 395:21 406:20 408:20 409:1,10 410:17 411:22 412:24 414:21 419:13 430:25 434:24 435:1 <b>gold (2)</b> 139:20,23 <b>Goldman (2)</b> 2:11 3:10 <b>good (16)</b> 8:4 10:14,15 11:2 86:19 106:16 143:8 157:15 178:2 198:9 199:4 264:2 302:2 334:24 361:16 432:4	<b>Google (1)</b> 414:13 <b>Gotcha (1)</b> 18:19 <b>gotten (5)</b> 224:24,25 346:16 361:12 391:5 <b>Grandjean (1)</b> 34:21 <b>graph (1)</b> 373:20 <b>graphs (1)</b> 167:10 <b>great (3)</b> 11:9 78:24 144:15 <b>greater (24)</b> 183:15 184:12 264:11 265:7 271:15,23 273:11 296:5 299:8 300:3,17 301:14 302:17,19 327:13 327:14 328:3 342:7 345:23 423:25 424:23 425:10,22 427:9 <b>Greenland's (1)</b> 99:3 <b>Grindal (2)</b> 4:3 9:13 <b>group (42)</b> 16:4 18:3,7,24 23:19 24:7 25:18 27:2,5 27:23 32:11 34:4 60:11,13,14,22 61:2 61:22 62:24 63:12 64:23 69:24 240:15 258:14,19,22 267:17 270:16 274:4 284:23 302:18 336:8 341:5 341:6,7 345:12 370:17 375:11 418:17,18,19 427:19 <b>group's (1)</b> 152:5 <b>groups (10)</b> 18:10,16 60:10 188:18 240:12 309:19 345:13,24 353:24 396:11 <b>guess (11)</b> 33:24 134:4 175:24 177:15 181:16 183:5 207:12 228:10 264:1 352:5	411:12 <b>guidelines (2)</b> 37:2,23 <b>guys (5)</b> 9:16 155:3 174:21 177:23 435:6 <hr/> <b>H</b> <hr/> <b>H (3)</b> 5:7 6:1 7:1 <b>habit (1)</b> 96:7 <b>habits (1)</b> 96:9 <b>hairly (1)</b> 156:3 <b>half-hour (3)</b> 271:19,20,21 <b>halfway (2)</b> 36:21 188:2 <b>Hamburg (2)</b> 12:14,23 <b>hand (6)</b> 25:2 126:11 304:15 338:1 350:20 438:17 <b>handed (1)</b> 132:4 <b>handful (1)</b> 74:2 <b>handled (4)</b> 182:11,13 183:24 185:14 <b>happen (6)</b> 25:20 126:22 134:22 189:2 246:20 346:20 <b>happened (3)</b> 107:4 199:15 368:18 <b>happening (4)</b> 187:11 188:21,23 377:9 <b>happens (4)</b> 216:22 232:1 427:18 427:24 <b>happy (4)</b> 51:19 160:7,8 218:12 <b>hard (1)</b> 339:23 <b>Hardell (16)</b> 6:4 156:1,2,7,17 157:11,20 228:23 229:2,10,24 230:9 344:6,10 400:3 409:23 <b>harder (3)</b>	166:1,19,23 <b>Hashibe (2)</b> 16:5 17:6 <b>hazard (7)</b> 418:24 420:11,16 421:23 422:1,14,20 <b>hazardous (4)</b> 419:2 420:2,7,21 <b>head (9)</b> 15:3,6 130:5 180:18 180:19 181:15 184:17 186:6 197:16 <b>heading (1)</b> 261:1 <b>heads (1)</b> 197:17 <b>health (21)</b> 6:23 12:4,5 20:18 23:19 24:3 27:12 31:8 34:5 141:13,17 195:19 229:17 230:5 318:15 325:1 343:7 347:17 363:21 385:21 427:2 <b>heard (2)</b> 10:16 383:9 <b>heavily (3)</b> 115:10,18 415:22 <b>Hedlund (2)</b> 2:10 3:10 <b>held (2)</b> 2:10 8:13 <b>Hello (1)</b> 73:2 <b>help (5)</b> 16:8 37:1,20 332:2 417:7 <b>helped (2)</b> 17:10 24:4 <b>helping (1)</b> 16:6 <b>helps (3)</b> 218:9,9,11 <b>Heltshe (9)</b> 7:3 363:12,13,18 375:21 376:6,14 377:14 378:13 <b>hematopoietic (4)</b> 150:21 196:17 197:1 279:5 <b>herbicide (6)</b> 52:7 257:20 386:10 386:22 388:20,24 <b>herbicides (10)</b>	52:3 150:8 183:17,24 225:5 238:24 275:17 338:19 388:14,20 <b>hereinbefore (1)</b> 438:9 <b>hereunto (1)</b> 438:16 <b>heterogeneity (1)</b> 86:7 <b>hierarchical (18)</b> 213:9,11 214:8 215:19,22 216:2,6 217:6,12 232:3 233:5,16,19,24 234:5,13 335:4,8 <b>hierarchy (1)</b> 217:24 <b>high (15)</b> 119:16 126:11 269:3 301:25 303:20 304:13,17 338:2 341:7 345:11 366:21 375:2 426:17,20,24 <b>high-risk (5)</b> 179:6,7,10 180:6,7 <b>higher (18)</b> 105:11 106:13 125:24 189:13 257:6,8 267:20 300:15 309:19 316:23 328:4 329:18 330:14 336:2,9 339:9 425:4 426:7 <b>highest (6)</b> 300:16 317:1,5,17 330:10 336:8 <b>highlighting (1)</b> 148:9 <b>highly (19)</b> 89:1 152:9 153:9,13 153:15 154:16 157:21 158:25 159:2,13 253:12 329:25 330:20 331:5 332:11 334:2 430:6,18,24 <b>Hill (10)</b> 263:9,12 416:21,24 417:19,23 418:6,13 418:14,22 <b>hinges (1)</b> 140:6 <b>hint (1)</b> 78:22
---	---	---	---	--

<b>histories (1)</b> 274:12	33:19 150:25	424:17 429:6,8	<b>impacted (1)</b> 369:22	78:1 180:10 184:9 222:13 254:20
<b>history (2)</b> 179:6 180:6	<b>hypotheses (13)</b> 94:18 95:3 98:5,13 101:22,23 102:17 102:20 104:3,4,24 105:2,3	<b>IARC's (22)</b> 20:8 52:18 53:10,16 53:17 54:1,11 56:23 56:24 57:14 58:4,8 58:9,19,20 59:8,12 59:22 60:3 159:12 421:23 422:20	<b>impetus (2)</b> 229:15 230:4	257:24 261:14 284:3,7,14 357:25 362:4 395:9 397:24 398:1 422:16
<b>Hodgkin's (1)</b> 151:6	<b>hypothesis (77)</b> 39:20,23 40:5,9,11,15 40:15,16,24 41:3,6 41:7,8,10,11,14,17 41:21,25 42:4,6,8 42:13,17,18,23 43:2 43:10,21 44:1,2,16 45:9,20,25 46:9 47:2 48:4 51:22 92:18,22 93:11,17 97:6,10,12,18,18 98:3,10 99:12,19 100:10,12,19 101:2 101:5,12,14,16 102:15,17,24 103:13,14,17,18 104:13,22,25 105:14 106:16 107:22 245:7 246:13 281:23 323:10	<b>idea (7)</b> 106:16 150:2 246:24 322:5 337:24 392:1 420:7	<b>important (6)</b> 145:15 205:22 255:13 321:25 424:24 425:4	<b>includes (21)</b> 12:3 77:7 181:2,21 243:1,6 255:3,22 260:25 261:2,25 263:17 281:6 282:20 308:5 322:1 350:5 357:7 383:20 386:4 401:19
<b>Hohenadel (3)</b> 250:10,11,21		<b>ideas (3)</b> 18:5 22:15,16	<b>Importantly (2)</b> 118:2,16	<b>including (31)</b> 29:12,22 31:11 36:12 63:22 70:5 81:25 83:16 85:21 139:16 187:20 208:15 220:22 257:7 258:15 259:6 274:12 281:23,25 290:15 309:3 359:19 374:10 376:5,14 377:4 378:18 390:25 396:10 419:5 434:19
<b>hold (3)</b> 87:12 234:12 307:17		<b>identical (5)</b> 232:4,9 233:18 234:20,21	<b>imprecision (1)</b> 234:11	
<b>hold-out (1)</b> 368:1		<b>identification (21)</b> 11:13 39:10 86:22 113:15 132:2 148:2 155:9 156:10 166:11 178:16 200:5 204:2 223:14 235:20 243:18 277:8 313:8 318:23 349:9 363:15 386:17	<b>improves (1)</b> 219:13	
<b>holding (3)</b> 114:25 117:4 377:1		<b>identified (3)</b> 11:18 334:14 366:1	<b>imputed (1)</b> 364:4	
<b>holdout (3)</b> 364:4,24 365:7		<b>identify (14)</b> 8:23 9:19 17:23 39:20 84:5 91:18 120:8 131:16 145:3 166:1 166:19 167:1 168:20 212:12	<b>imputation (49)</b> 355:2,6 356:5 357:5 357:11,23 358:6,25 359:7,8,22 360:4 361:2 362:3,14,20 363:2,19,25 364:21 364:22 365:10,21 365:24 366:2,25 367:4 372:24 373:16 374:10,15 375:19,23 376:7,16 377:5 378:16 380:22,24 381:4,15 381:17 382:5,14,25 383:10,21 384:2 385:7	
<b>Hollingsworth (3)</b> 4:10 9:25 10:2		<b>identifying (1)</b> 145:9	<b>impute (4)</b> 356:6,17 357:1 373:19	<b>incomplete (1)</b> 433:13
<b>honor (1)</b> 34:11		<b>ignored (1)</b> 306:22	<b>imputed (1)</b> 380:17	<b>incorporated (3)</b> 8:19 358:22 432:21
<b>hope (1)</b> 184:20		<b>ignoring (1)</b> 173:3	<b>inappropriate (3)</b> 382:6 383:22 385:8	<b>incorrect (4)</b> 196:22 271:9 337:22 377:3
<b>Hospital (1)</b> 12:14		<b>II (4)</b> 149:15,19,19 150:12	<b>incentive (1)</b> 135:2	<b>increase (6)</b> 33:18 89:7 190:14 254:21 332:19 377:8
<b>hospital-based (2)</b> 400:14,16		<b>imagine (10)</b> 114:3 154:22 180:10 181:2 189:12 227:17 272:15 328:19 336:15 378:10	<b>incidence (1)</b> 299:7	<b>increased (18)</b> 142:22 148:11 173:6 230:22 252:15 254:15 271:13 326:21,22 327:21 329:9,12,18,21 331:21 367:24 371:25 372:22
<b>hour (3)</b> 72:15,16 98:2		<b>immediately (1)</b> 77:10	<b>incidents (1)</b> 230:22	
<b>hours (8)</b> 48:24 272:3 273:20 273:24 398:11 411:4,8 412:19	<b>hypothesize (1)</b> 41:5	<b>immune (1)</b> 189:5	<b>include (19)</b> 112:18 130:13 179:12 180:8 181:20 238:25 243:10 258:9 262:6 283:3 301:5 309:23,25 312:14 322:21 354:21 398:1 428:2 436:25	<b>increases (4)</b> 176:6 219:15 311:23 311:25
<b>household (1)</b> 431:2	<b>hypothetical (1)</b> 333:1	<b>impact (5)</b> 170:10 171:25 390:12 394:6 416:6	<b>included (20)</b> 29:10 53:1 54:8 58:1	<b>increasing (2)</b> 329:13 332:8
<b>hover (2)</b> 308:25 354:20	<b>I</b>			<b>incredibly (1)</b> 413:13
<b>hovering (3)</b> 353:14 354:10 401:6	<b>IARC (91)</b> 14:22 15:4,8,15,18,24 16:4,7,13,20,25 17:6,9,18,24 18:20 18:23 19:4,17,21 52:24 53:1,13,22 54:5,8,12,14,19 56:22 57:6,11 58:1 59:1,17,19 60:6,9 61:15 62:20 63:12 63:21 64:3,5,16 65:9,23 66:5,9,18 66:18,21 67:2,12,14 67:20,24 68:7,17,21 69:17,24 71:6 72:3 72:4,7 80:18 82:12 150:9 152:4 284:10 284:22 285:14 286:13,23 287:3 322:19 407:12 415:14 416:7,10,13 418:5,12 420:21 422:1,7 423:1			
<b>hovers (1)</b> 425:18				
<b>huge (4)</b> 89:11 210:1 338:25 377:8				
<b>human (8)</b> 56:3 95:25 120:13 150:10 404:14 408:1,4 418:20				
<b>humans (1)</b> 407:9				
<b>hundred (5)</b> 90:8,23 177:5,8 340:1				
<b>hundreds (1)</b> 411:12				
<b>husband (3)</b> 136:23 137:2 138:3				
<b>husbandry (2)</b>				

<b>incremental (1)</b> 222:22	115:20	174:12 176:6	<b>intermediate (1)</b> 143:6	424:8
<b>independent (13)</b> 52:25 54:2,7,23 66:23 68:23 143:4 144:1 285:21,23 330:7 403:11 430:9	<b>inform (1)</b> 242:6	<b>instruction (1)</b> 127:1	<b>intermediates (1)</b> 145:13	<b>intervals (26)</b> 43:9 86:16 107:7,12 108:13,14 110:10 112:17 114:23 118:10,19,23 130:7 130:12,23 161:6,13 162:16 214:25 216:24 217:11 283:1 309:24 312:14 321:24 354:21
<b>independently (1)</b> 60:16	<b>information (42)</b> 26:6,7,18 38:19 108:15,15 110:17 113:3 135:12,17,21 139:4,6 195:17 247:6 272:22 295:12,14,16 297:20 315:5 355:7 356:10,11,17 357:21 362:19 371:22 372:6,12 373:23 379:22,24 380:1 390:9 394:3 415:7,12 416:14 426:13,13 429:9	<b>insult (1)</b> 188:13	<b>internal (1)</b> 91:17	<b>internally (1)</b> 286:17
<b>indicate (2)</b> 230:21 272:21	<b>informative (21)</b> 45:14 185:6,20 186:13 214:17 217:20,25 218:20 218:22 219:1 220:10 221:5,13,20 221:23 222:10,11 222:24,25 223:1 312:2	<b>integrate (1)</b> 16:6	<b>internationally (1)</b> 36:4	<b>interview (2)</b> 139:21,22
<b>indicated (1)</b> 179:4	<b>informed (5)</b> 25:25 69:22 113:5 135:16 291:1	<b>intends (5)</b> 81:6 82:15 83:16 240:8 242:8	<b>international (1)</b> 36:4	<b>interview-based (1)</b> 133:13
<b>indicates (1)</b> 162:23	<b>ingredient (1)</b> 78:1	<b>intense (6)</b> 267:19 268:16,17 302:5 338:7 339:15	<b>internet (1)</b> 113:24	<b>interviewed (3)</b> 339:5 355:15 397:8
<b>indication (5)</b> 112:8 266:10 298:16 302:17 390:16	<b>ingredients (1)</b> 77:25	<b>intensity (34)</b> 269:14 271:6 299:18 301:3,4,24 303:2,6 303:20 304:10,12 304:13,16 305:7 309:18,20 312:1 324:7 339:16 342:13,17,25 343:6 343:24 398:3 425:5 426:1,3,4,6,8,10,21 426:25	<b>internships (1)</b> 15:24	<b>interviewing (1)</b> 22:4
<b>indicative (1)</b> 235:5	<b>informal (1)</b> 131:25	<b>intensity-weighted (...)</b> 336:3 342:15	<b>interpret (8)</b> 93:23 98:18 103:10 108:13 265:21 266:16 273:7 274:16	<b>introduce (3)</b> 170:19 328:1 372:24
<b>indicator (2)</b> 266:3 328:24	<b>informative (21)</b> 45:14 185:6,20 186:13 214:17 217:20,25 218:20 218:22 219:1 220:10 221:5,13,20 221:23 222:10,11 222:24,25 223:1 312:2	<b>intensive (1)</b> 338:2	<b>interpreted (3)</b> 87:18 131:5 269:8	<b>introduced (3)</b> 138:24 149:18 372:23
<b>indicators (3)</b> 286:5 329:3 430:9	<b>informed (5)</b> 25:25 69:22 113:5 135:16 291:1	<b>intensively (1)</b> 415:25	<b>interpreting (2)</b> 66:24 130:23	<b>introducing (1)</b> 432:25
<b>individual (11)</b> 137:21,25 139:3 191:15 251:23 253:25 257:19 286:15 299:14 332:6 366:25	<b>ingredient (1)</b> 78:1	<b>intention (2)</b> 35:7 81:3	<b>interprets (3)</b> 274:23 275:11 276:3	<b>introduction (2)</b> 6:18 337:3
<b>individuals (16)</b> 164:6 313:22 326:16 338:16 339:18 351:22,25 355:9 356:7,11 365:3,6 369:6 372:20 397:7 428:9	<b>ingredients (1)</b> 77:25	<b>intentionally (1)</b> 409:15	<b>interrupted (1)</b> 328:15	<b>investigate (4)</b> 210:5 225:25 243:4 245:22
<b>inducing (1)</b> 185:21	<b>initial (5)</b> 23:4 83:3 278:3 347:22 348:5	<b>intent (3)</b> 239:13 265:14,16	<b>interruption (1)</b> 206:25	<b>investigated (3)</b> 244:19 246:4 379:5
<b>inducted (1)</b> 34:15	<b>initiation (2)</b> 197:21,22	<b>intention (2)</b> 35:7 81:3	<b>interval (66)</b> 46:16,17 107:13,16 107:20,23 108:2,7 108:20,24 109:10 109:14 110:16 112:1,15 117:14 119:4,6,8,14,17 130:17 131:4 155:18 157:1 158:17 160:19,20 162:20 179:1 212:24 213:2 214:20,20 216:18 216:19 217:6,7 232:18,21 233:15 249:7 251:2 279:20 280:11 281:6,17,22 282:12 306:16 319:20,23 320:1,4 320:16,22,24,25 321:5,9,14 322:1,7 322:10 396:16	<b>investigation (5)</b> 134:4,15 229:16 230:4 430:11
<b>industry-sponsored...</b> 345:17	<b>input (2)</b> 23:8 290:24	<b>interact (1)</b> 22:5		<b>investigators (27)</b> 22:14 38:7 39:2 51:16 142:16 158:12 224:6 245:14 248:21 272:9,13,21 273:2 275:4 345:9 355:4 356:5 357:4 362:25 374:8 375:21 376:5,13 377:15 382:13 396:3 400:22
<b>infer (1)</b> 129:2	<b>inrollment (1)</b> 358:16	<b>interaction (3)</b> 235:3 250:17,19		<b>invited (5)</b> 14:20 15:7,15 34:12 34:19
<b>Inference (1)</b> 5:17	<b>insecticide (2)</b> 275:17 387:2	<b>interacts (1)</b> 31:10		<b>inviting (1)</b> 15:13
<b>inflate (1)</b> 330:13	<b>insecticides (1)</b> 312:8	<b>interdisciplinary (1)</b> 55:7		<b>involve (1)</b> 38:6
<b>influence (1)</b> 171:14	<b>inserts (1)</b> 395:2	<b>interest (9)</b> 32:24 44:5 48:18,19 142:4,5 167:17 171:9,15		<b>involves (1)</b> 252:9
<b>influenced (2)</b> 118:8,17	<b>insofar (3)</b> 27:8 95:22 170:23	<b>interested (8)</b> 21:10 29:23 33:2 34:5 146:25 246:2 426:17 438:15		
<b>influences (1)</b>	<b>instance (7)</b> 64:8 87:19 94:16 138:11 168:4	<b>interesting (3)</b> 416:13,15 427:1		

<b>Iowa (4)</b> 205:10 243:10 297:7 333:21	<b>jump (1)</b> 112:22	117:20 121:4	<b>Lakewood (1)</b> 3:6	114:7,16,19 115:5
<b>irregular (3)</b> 270:14 271:11 272:16	<b>June (2)</b> 206:21 209:8	125:22 127:5,17	<b>landing (1)</b> 303:21	115:15 116:10,21
<b>irrelevant (1)</b> 196:4	<b>junior (3)</b> 15:20 16:9 18:9	132:9 136:6 144:4	<b>language (3)</b> 63:22,24 392:17	117:22 118:13
<b>ISEE (5)</b> 36:8 37:8 38:22 277:15 289:24	<b>jurat (1)</b> 436:25	145:23 146:8,11,22	<b>large (13)</b> 90:9 91:1 124:19	119:2,20 121:6,18
<b>ISEE's (1)</b> 36:17	<b>K</b>	148:8,23,25 149:24	<b>larger (13)</b> 90:9 91:1 176:13	122:2,19 123:5
<b>issue (32)</b> 27:6 30:8 81:25 84:1	<b>Kansas (7)</b> 204:14,21,23 206:4 220:2,4 297:9	180:18 184:22	<b>largest (5)</b> 123:25 124:20 258:19	124:9 125:10
84:16 132:20	<b>Kathryn (3)</b> 3:7 8:25 81:8	195:6,15 199:14,19	<b>Lasker (588)</b> 4:14 5:4 9:24,24	126:13,16 127:11
133:16 134:24	<b>keep (4)</b> 113:11 127:6 339:7	204:11 208:6,8,17	10:13,17 11:14	127:14,19 128:1,5
135:10 141:13	<b>keeping (1)</b> 94:2	210:1,5,22 221:12	14:23 16:18 19:13	128:20 129:5,10
142:1 148:11	<b>keeps (1)</b> 128:2	232:8 238:7 239:17	19:15 24:14 25:12	130:15 131:1,15
160:13 168:1	<b>kept (2)</b> 189:4 409:10	241:4 244:23 245:5	26:11 28:6,23 30:11	132:3,16,18,25
173:23 186:24	<b>Killex (2)</b> 256:2,4	245:10 247:3	32:1 33:4 34:16	133:4,7,24 134:23
191:1 196:16	<b>kin (1)</b> 135:11	248:11 249:23	35:12,16 38:21	135:18 136:5 137:8
212:10 215:6,6	<b>kind (25)</b> 21:10 36:9 41:3 44:1	266:8 272:8 278:19	39:11 40:7,18 42:2	138:9,13 139:12,24
225:20 242:18,25	49:5 64:24 68:25	296:13 299:22	43:18 44:8 45:5,16	140:17 141:6,22
293:16,17 333:12	99:6 131:10 135:17	304:9 318:2 333:24	46:4,20 47:19 48:6	142:9 143:10,13
346:12 355:5 369:4	137:4 140:23 141:1	334:11 335:11	48:11 49:13 50:14	144:13,22 146:13
389:18 433:12	167:21 187:15	338:14 339:2,3,5	51:21 53:14,23	147:3,12,16,21,23
<b>issues (17)</b> 28:15 39:14 47:21,21	211:18 225:22	340:15,16 344:19	55:11 56:5,14 57:9	148:3 150:13 151:8
47:22,23 48:15	233:12 254:1 255:2	345:1 349:4,22	58:3,16 59:2,6,23	151:16,17 154:1,24
55:17 80:5 84:14	265:1 289:12 291:3	362:12 366:20	61:3,12 62:1,10	155:4,10,21 156:7
174:2 192:1 193:13	316:12 415:11	367:13 371:7,10	63:9 64:1,15 65:1,7	156:13,15,21 157:3
407:6 408:8 409:11	<b>kinds (3)</b> 83:17 245:24 413:19	375:8 381:18	66:1,22 67:21 69:3	157:16 158:6,22
410:1	<b>kitchen (1)</b> 159:24	382:10 383:25	69:19 70:20 71:8	159:10 161:9,24
<b>Italy (1)</b> 34:7	<b>knee-jerk (1)</b> 88:3	388:13 395:23	72:9,14,18 73:1,15	163:1,18 165:3,10
<b>J</b>	<b>knew (3)</b> 14:1 21:20 282:2	398:11 400:18	74:10 75:3,16 76:6	166:7,12 167:24
<b>Jeff (2)</b> 9:16,22	<b>know (112)</b> 10:21 11:9 14:18 20:6	402:17 407:25	77:1,17 80:21 81:11	168:8,13 169:19,25
<b>JEFFREY (1)</b> 3:23	25:2 27:20,21 34:19	408:11 414:11,19	81:16 82:21 83:9,18	171:19 172:7,13,21
<b>job (2)</b> 1:25 199:3	34:24 35:2 36:2	417:12 436:8,11	83:22 85:1,18 86:11	172:23 173:4,21
<b>John (1)</b> 421:3	39:6 48:22 49:16	<b>knowing (1)</b> 304:2	86:23 88:13 90:1	174:11,18,23 175:2
<b>judge (9)</b> 68:4 80:23 83:19	55:10 56:2 57:20	<b>knowledge (1)</b> 38:13	91:3,14,24 92:3,4	175:23 176:15
126:18 127:18,25	60:5,22 66:18 68:18	<b>known (8)</b> 13:24 14:7 145:22	93:7 94:13 96:13,24	177:1,14,25 178:9
128:3 182:13	71:6 72:13 80:20	152:10 188:9	98:6 99:8,20 100:14	178:20 179:19,23
241:16	81:19 87:5 94:1,8	195:12 348:8	101:1 102:1,22	180:2 181:6,23
<b>judged (1)</b> 359:13	105:25 107:2 114:5	416:21	103:11 104:10	182:17 183:1 184:2
<b>judgment (1)</b> 316:7		<b>knows (3)</b> 137:6 208:14 303:17	105:6,21 106:9	184:25 185:3 186:1
<b>July (3)</b> 17:20 206:21 209:8		<b>Krause (1)</b> 14:4	107:5,18 109:3,20	187:22 189:16
		<b>Kurt (1)</b> 13:22	111:1 112:2 113:7	190:3 191:11
		<b>L</b>	113:11,16,21,22	192:20 193:11
		<b>lab (4)</b> 75:14,23,25 76:1		194:8 196:8 198:15
		<b>label (2)</b> 64:24 255:9		199:6,7,18,23 200:1
		<b>labeled (1)</b> 8:5		200:8,20 201:6,16
		<b>laboratory (1)</b> 74:24		202:14 203:10,22
		<b>lag (2)</b> 193:8 196:11		204:3,17,22 205:8
				206:1,10,17 207:2,3
				207:13,23 208:18
				210:7,24 211:9,21
				212:8 213:8,24
				214:2 217:3 218:15
				219:18 220:1,23
				221:1,14 223:2,15
				224:2,22 226:14,23
				227:1,21 229:3,13
				230:11 231:1,9
				232:10 233:14
				234:1 235:13,18,21

236:6,24 237:14 238:10,16,18 239:19,24 240:21 241:5,12,20 242:15 242:17 243:5,16,19 244:5 245:1,11 246:6 247:2,14 248:9,18 249:22 250:2,4,18 251:20 254:7 255:12 256:1 256:5 257:3 258:2 258:17 259:1,18,20 260:2,5,23 261:17 262:3,19 264:5,8 265:19 266:12 267:2,22 268:19 269:6,20,24 270:17 271:1,14 272:19 273:8 274:1,17,24 275:3,22 276:15,21 276:22 277:13 281:3,7,19 282:15 283:5,13 284:20 286:10 287:1,15 288:8,19 289:18 291:5,20 292:10 293:2,22 294:9 295:11 296:4,16 297:14 298:10,22 300:10 302:3 303:4 303:10 304:1 305:9 305:18 307:8,13,14 307:18 308:1 309:8 310:1,15 312:5,20 313:4,6,9 314:4,10 315:14,23 317:15 318:24 320:19 321:10 322:4,18,24 323:7 324:3,23 325:20 326:8 327:2 327:9,19 329:4 330:3 331:9 332:20 334:6 335:3 336:17 336:24 337:12 338:4 340:8,23 341:12,19 342:14 343:5 344:8 345:5 346:7,22 347:8 348:11 349:5,12,14 349:19,23 350:1,14 350:19 351:6 352:20 353:19 354:8,23 356:3,19 357:17 358:19 359:16 360:19 361:9,15,17,20	362:24 363:9,16 364:8,20 365:8 366:9 367:19 368:8 370:6,22 371:12 372:3,16 374:6 375:17 376:4,12,22 378:1,9,12 379:10 379:20 380:18 382:1,11,21 383:5 383:17 384:5,12,18 385:2,15 386:14,18 387:4 388:11 389:8 389:19 390:22 391:20 392:5,23 393:13 394:11 395:5,17 396:12 397:12 398:12 399:5,17 400:1,17 401:7,12,18 402:12 402:15 403:6,10,20 404:6,18 405:9,12 405:16,18,23 406:2 406:18 407:4,17 408:5 409:4,7 411:25 412:18,23 413:6 420:10,19 421:16 422:4,10,24 423:7,17,20,22 425:2 434:23 435:10,21 436:8,10 436:21 <b>latency (64)</b> 186:22,23,24 187:7,8 188:4,17 189:6,23 190:8,20 192:24 194:2,15 198:19 200:24 201:23 202:24 203:9 204:6 204:8 205:15,17,23 206:2,3,5 207:6,15 207:17,18,25 208:3 208:20,21,24 209:2 209:4 211:1,23 214:15 215:3,5,6 217:17,22 218:18 218:24 219:6,8,15 219:20 220:7,22 221:3,21,24 222:12 222:16,17,19 242:18 243:2,7 <b>latest (1)</b> 337:15 <b>LAW (1)</b> 3:3 <b>lay (1)</b> 381:13	<b>lead (2)</b> 187:4 391:10 <b>learn (1)</b> 132:17 <b>leave (1)</b> 82:1 <b>leaves (1)</b> 34:14 <b>lecture (2)</b> 48:22 115:16 <b>lectures (1)</b> 114:1 <b>led (1)</b> 18:7 <b>ledger (1)</b> 137:5 <b>Lee (10)</b> 6:14 235:14,15,22 236:1,8 239:25 240:24 241:22 242:22 <b>Leemon (2)</b> 4:19 9:9 <b>left (12)</b> 14:4 17:6,20 92:5 162:9 184:4,4 316:3 366:7 398:8 406:20 411:3 <b>legal (1)</b> 8:19 <b>lengthening (1)</b> 220:21 <b>lesser (1)</b> 316:9 <b>let's (44)</b> 11:10 39:4,5 64:2 65:2 72:10 73:24 76:19 81:13 109:13 130:6 131:24 143:10 154:25 156:7 165:5 178:10 182:19,19 188:9 192:11 199:23 203:23 235:14 243:12 249:23 254:11 264:3,5 270:19 276:16 306:20,21 307:18 312:21,24 318:17 331:12 336:23 350:15 384:18 386:14 401:19 406:18 <b>letter (3)</b> 6:9 117:2 200:14 <b>leukemia (2)</b>	12:25 156:3 <b>level (9)</b> 109:22 117:1 139:9 149:1 169:12 301:23,25 339:9 426:18 <b>levels (3)</b> 151:21,23 275:15 <b>Liability (2)</b> 1:4 8:8 <b>license (1)</b> 333:23 <b>licenses (1)</b> 12:8 <b>life (1)</b> 276:14 <b>lifelong (2)</b> 30:22 31:18 <b>lifetime (32)</b> 31:4 297:4,22 299:12 300:1,2,4,7,14,17 300:21,22 301:6 302:1,7,11,12,16,19 302:23 303:13 304:6,23 305:5,6,14 314:3 315:12 343:21 347:5 425:10 426:2 <b>light (1)</b> 96:1 <b>light-bulb (1)</b> 96:2 <b>liked (1)</b> 199:2 <b>likelihood (4)</b> 89:19,23,24 91:5 <b>likewise (2)</b> 387:11 422:19 <b>limit (14)</b> 34:17 108:17 109:6,8 109:15,23 110:2 111:14,15,21 115:9 180:12 238:2 320:8 <b>limitation (1)</b> 393:15 <b>limitations (2)</b> 390:6 431:21 <b>limited (12)</b> 34:13 63:15,23 64:3,5 67:17,23 105:12 106:14 123:10 124:7 226:1 <b>lindane (2)</b> 358:9 362:13 <b>line (20)</b> 7:10 56:16 160:22	199:24 203:25 351:12 436:3 439:6 439:7,9,10,12,13,15 439:16,18,19,21,22 439:24 <b>lines (2)</b> 162:3,7 <b>Lisa (5)</b> 1:23 2:13 8:21 438:4 438:22 <b>list (6)</b> 19:25 153:9 230:25 231:2,12 246:10 <b>listed (19)</b> 19:22 74:25 75:1,4 76:1,2,10,11 120:7 122:3,21 123:23 128:10 133:9 156:2 156:18 202:11 279:11 327:12 <b>listing (2)</b> 119:23 317:5 <b>literature (57)</b> 50:18 55:10 57:5 59:11,20 60:5,15,19 61:17 62:4 63:4 64:18 67:4 68:9 69:5,15,17,21 70:6 71:10,11 73:21,23 75:19 76:17,19,20 77:4,6,19 78:5,7,14 78:20 79:14 80:15 80:20 148:18 197:2 197:10 216:3 289:14 290:1 314:23 315:2 317:8 334:10,14 382:3 387:7 389:13 391:12 414:10,18 414:22 415:2 417:3 <b>litigation (9)</b> 1:4 8:8 20:13 32:17 53:6 206:24 431:16 432:16 433:18 <b>little (15)</b> 26:25 90:11 146:5 167:10 177:21 178:1 195:15 198:24 204:12 264:20 289:19 313:12 323:12,17 373:20 <b>lives (1)</b> 96:1 <b>LLP (2)</b> 9:25 10:2
--	--	---	---	---

<b>Lockridge (2)</b> 4:3 9:13	22:25 54:12,14 80:13 142:16 154:22	312:18 334:1 414:15,19 415:25	182:7 183:18 184:14 185:9	424:17
<b>logarithmic (6)</b> 160:11,13 161:8,11 161:16 162:6	250:22,22 251:6 300:14,15 327:11 340:17 342:23	434:3,4,14,15 435:6	186:14 187:2 188:14 191:17 192:7,23 193:3,16 223:10,20 224:8 225:5 227:7 228:4 252:16 266:19 267:8 268:4 269:10 270:5 278:24 279:24 280:12,21 281:11 282:4 284:5 287:6 292:1 300:20 302:18 306:13 318:14 319:8 321:15,18 323:3,11 323:20 324:11 329:17 330:8 342:7 351:16 352:3 353:7 396:24 399:21 417:18 420:18 422:23 424:15 426:15 434:10,20	<b>males (1)</b> 226:2 <b>manmade (1)</b> 149:17 <b>manner (3)</b> 108:21 114:13 216:12 <b>manuscript (8)</b> 23:10 383:24 384:1 385:21 386:8 388:7 394:14,15 <b>manuscripts (2)</b> 431:5,9 <b>March (4)</b> 349:12,20 389:22 391:7 <b>marginally (2)</b> 232:20 253:13 <b>mark (24)</b> 68:4 126:17 127:21 128:2 147:17,19,21 155:5 156:7 178:14 199:23 203:24 220:23 226:15 238:16 239:20 242:15 259:18 269:20 270:17 313:1 349:6 361:15 386:14
<b>logistic (9)</b> 154:10 214:7 216:13 217:8 232:2,19 234:3 235:6 335:6	<b>looking (48)</b> 19:19 45:18 47:23 51:1 73:3 77:20 100:19 107:2 108:1 110:9 112:15 139:14 156:3 163:17 167:25 172:10,15 173:25 176:4 179:15 185:15 189:8 192:3 192:18 198:12 206:11 210:10 214:6 225:1 227:3 227:22 231:6 253:17 255:6 267:15 268:15 306:19 311:22 326:9 346:23 350:23 361:1 370:25 372:19 387:9 388:7 400:12 407:6	<b>lots (6)</b> 308:24 309:2 376:25 379:5 381:17 400:15 <b>love (1)</b> 86:18 <b>loves (1)</b> 406:15 <b>low (19)</b> 86:15 105:11 106:13 111:15 118:8,10,17 124:7 126:10 301:23 303:20 304:12,17 312:17 339:7 341:5 345:11 400:13 426:6 <b>lower (14)</b> 92:10 109:9 111:15 160:18 257:22,23 281:5 299:6 303:21 309:22,22 328:5 330:15 425:21 <b>lowest (4)</b> 184:18 317:1,6 330:9 <b>lucky (1)</b> 164:16 <b>lunch (6)</b> 177:21 178:1 184:23 199:5 203:11,16 <b>lung (8)</b> 145:22 168:2,4 170:11,13 171:22 171:24 172:2 <b>lymphocytic (1)</b> 282:4 <b>lymphoma (110)</b> 6:21 27:14 28:11 32:20 33:15 51:24 63:15 65:10 66:10 67:5 68:10 69:6 70:4,10 71:13 77:22 97:11,14,20 98:12 98:15 100:21 101:4 101:8 119:25 120:9 120:20 121:12,22 122:9,25 123:16 124:14 125:17 128:12 129:12 147:7 148:12,19 149:5 150:16 151:2 151:6,10 174:1,4 176:21 177:4,8 178:24 180:13	<b>lymphomas (1)</b> 194:24 <b>lymphopoietic (2)</b> 179:6 180:6	<b>marked (30)</b> 5:8 6:2 7:2,9 11:12 39:9 86:21 113:14 132:1 148:1 155:8 156:9 166:10 178:16 200:5 204:2 223:14 235:20 243:18 277:8 313:8 318:23 349:9 350:16 363:15 386:17 405:9 409:7 409:12 410:24 <b>market (3)</b> 147:8 148:21 358:11 <b>marking (2)</b> 11:10 127:20 <b>marks (9)</b> 96:15,21 200:14 203:12,19 306:23 307:5 419:15,21 <b>marriage (1)</b> 438:14 <b>mass (1)</b> 332:2 <b>master's (1)</b> 13:10 <b>match (1)</b>
<b>logistical (4)</b> 212:21 215:17 232:12 232:14				
<b>long (13)</b> 16:19,21 17:17 48:21 72:14 87:4 127:7 161:20 190:16 198:6 318:1 355:15 426:6				
<b>longer (20)</b> 31:21 177:22 190:8 190:19 193:25 197:23 204:12,14 204:25 205:3,23 206:5,20 215:5 222:16,18 243:2 263:15 281:11 410:12				
<b>longest (2)</b> 195:17 204:20				
<b>look (76)</b> 49:11 50:17 78:15 79:14 82:16 83:20 88:6,22 94:5,11 95:18,19 109:5,7 113:4 125:12 128:8 129:6 156:1 157:4,5 160:16 174:2,8,9 181:7,24 185:9 195:20,20,24 197:5 205:9 210:21 213:20 222:18 231:11 240:9 251:17,18 293:10 296:24 299:5,12 302:9 308:11 309:14,14 310:16 312:6 313:23 318:17 319:11 321:5 328:9 341:21 350:15 351:22,24 352:15 353:1 363:2 365:11 384:17,20 387:5,8,16,19 392:6 412:1 413:20 423:6 425:4 436:12,17	<b>looks (9)</b> 132:10 184:23 223:23 312:7 327:23 336:5 342:18 357:19 425:15 <b>Los (5)</b> 1:17 2:12 3:13 8:1,14 <b>lose (1)</b> 427:22 <b>losing (1)</b> 250:2 <b>loss (7)</b> 28:20 29:3 141:8,9,10 141:19 432:4 <b>lot (39)</b> 16:9 30:1,24 45:24 46:1,17 49:8 89:12 106:5 108:25 124:2 136:7 143:22,24 167:10 214:22 215:13 216:8 217:1 225:16 226:8 233:12 237:16 238:21 292:23 301:20 303:23 308:18 311:11			
<b>looked (23)</b>				
			<b>M</b>	
			<b>made-up (2)</b> 304:22 406:16 <b>magnitude (2)</b> 390:11 394:5 <b>main (2)</b> 151:25 354:25 <b>major (6)</b> 255:21 261:13,15,24 262:13 346:5 <b>majority (1)</b> 309:10 <b>making (16)</b> 116:23 134:12 159:20 162:7 168:20 171:10 175:4 187:24 214:16 217:10,18 294:23 377:5 379:6 395:6 420:22 <b>malathion (22)</b> 249:16 250:9,25 279:12,19 280:1,14 280:23 281:9,22 282:19 283:19 284:1 285:20 293:7 293:9,11 294:3 295:2 296:7 424:10	

38:12	233:11 234:17	272:1 343:17	85:9 134:1 142:1	364:22,22 365:11
<b>material (1)</b>	242:25 244:24	<b>mechanism (3)</b>	249:12 261:3	373:16,17,24
277:20	246:24 297:11	75:13 191:21 408:1	319:19 390:15	374:15 375:23
<b>materials (2)</b>	298:20 305:25	<b>mechanisms (2)</b>	400:11 408:16	376:11,24 377:10
49:17 429:16	348:15 370:6	62:17 76:11	435:14	379:9,11 381:15
<b>math (2)</b>	405:22	<b>mechanistic (8)</b>	<b>mentioned (23)</b>	382:14,25 383:10
109:15 213:4	<b>meaning (17)</b>	60:13 71:25 77:4,6	25:13 49:14,15,16	384:2,9 385:8
<b>mathematical (1)</b>	53:21 86:3,10 91:12	78:6 80:15 407:15	73:11,17 74:4 75:1	<b>methodological (1)</b>
430:4	97:23 108:22	418:20	76:15 84:11 100:17	39:14
<b>mathematically (1)</b>	137:25 143:25	<b>Mecoprop (15)</b>	150:14 160:5	<b>methodologies (1)</b>
169:9	167:14 190:6	247:25 252:10,19	178:18 206:19	23:18
<b>matter (15)</b>	245:21 274:23	253:2,7,19 254:21	211:11 245:3 319:4	<b>methodology (28)</b>
8:7 49:10 92:19 93:15	312:15 320:17	255:25 256:11	408:9 409:20	39:24 88:15 107:10
96:5 135:19 136:9	340:3 424:7 426:3	257:10 258:10,18	414:25 415:17	284:9 285:12,13
137:11 145:8	<b>meaningful (2)</b>	259:7 260:12 261:4	416:7	287:2,20 290:21
177:24 178:19	89:7 282:6	<b>median (24)</b>	<b>mentioning (2)</b>	361:3 363:2,25
347:23 348:5	<b>meanings (2)</b>	204:6,8 205:1,15,17	194:9 393:3	365:21,24 366:2,25
352:19 438:15	121:2 328:22	206:2 207:6,17,17	<b>mentions (4)</b>	367:4 372:24
<b>Matthew (1)</b>	<b>means (17)</b>	207:25 208:20	20:15 33:22 79:19	374:10 375:20
32:9	29:12 64:3 66:4 78:12	209:2,11 211:1,7,23	87:6	376:7,16 378:16
<b>maximum (8)</b>	90:7,23 99:15	217:17,22 218:18	<b>mentor (3)</b>	380:23,25 381:4
207:15,16 208:21,24	102:14,21 112:4	218:23 220:7 221:3	13:25 15:20 16:9	382:5 383:21
209:4 337:16,19,20	167:12 188:8	221:21,24	<b>mentored (2)</b>	<b>methods (15)</b>
<b>McDuffie (48)</b>	269:15 273:12	<b>medical (15)</b>	13:22 14:3	24:5 26:22 27:5,9
6:15 228:24 229:6,9	303:7 428:5 430:15	11:16,19,20,24 12:3,6	<b>mentoring (2)</b>	32:4 47:11 51:17
229:25 230:10	<b>meant (4)</b>	12:16,18,23 63:5	13:18 16:20	84:22 105:19
243:12,21,24	121:16 417:6 422:15	88:4 95:15 197:9	<b>mentorship (1)</b>	106:11 163:5
244:13 245:14	423:4	247:23 317:14	16:14	220:21 344:19
247:15 248:21	<b>measure (43)</b>	<b>medically (1)</b>	<b>mercurial (1)</b>	414:7 419:11
249:3,14 250:7,22	43:6,15 91:22,23	56:1	312:8	<b>methyl (1)</b>
251:5,15,16 252:14	107:10 167:19,21	<b>meet (1)</b>	<b>message (2)</b>	365:15
254:13,18 259:5	169:16,18,21 170:6	269:8	395:3,4	<b>Mia (1)</b>
260:9 262:20,25	170:9,24 183:8	<b>meeting (8)</b>	<b>met (6)</b>	16:5
263:20,23 265:5	187:2 191:7 196:20	21:9 25:4,15 26:1	20:25 21:2 35:20 72:8	<b>Michael (4)</b>
266:17 268:2,22	201:18 253:11	30:17 34:6 60:17	383:15 421:18	3:14,22 9:3,21
269:7 270:3 271:3,4	298:12 301:22	69:24	<b>meta (1)</b>	<b>mid (2)</b>
274:4,18 275:4	302:2,24 304:11	<b>meetings (4)</b>	322:6	341:6 345:11
277:2 298:5,15,23	320:3 325:7,9 328:4	24:2 29:7 61:25	<b>meta-analyses (5)</b>	<b>middle (13)</b>
299:2 300:12	339:17 342:12,13	421:20	284:12 414:23 415:1	26:22 174:25 188:1
345:25 401:21	342:22,25 343:6,7	<b>meets (1)</b>	415:9,11	346:21 358:16
<b>McHENRY (3)</b>	344:5,7,9,11 365:12	179:11	<b>meta-analysis (19)</b>	365:25 366:6 367:3
4:19 9:9,9	371:14 375:5 426:8	<b>member (15)</b>	115:10,19 159:4,13	374:16 377:9,19
<b>McNair (2)</b>	<b>measured (2)</b>	16:3,22 17:24 18:3,10	283:10 284:3,16,22	378:20 381:2
4:18 8:18	191:14 342:5	20:16,16 25:17	284:24 285:11	<b>Mike (1)</b>
<b>MD (8)</b>	<b>measurement (3)</b>	32:10 34:12,14	286:14 287:3,9,19	9:16
1:16 2:9 5:3,11 6:7	118:23 119:3,5	36:10,17 55:7,23	322:11,13,15,19,20	<b>mild (1)</b>
10:7 437:12 439:3	<b>measurements (1)</b>	<b>members (5)</b>	<b>meta-analytic (1)</b>	194:2
<b>MDL (2)</b>	24:8	23:9 34:13 36:11,24	322:2	<b>Miller (4)</b>
1:5 8:11	<b>measures (15)</b>	336:7	<b>method (46)</b>	3:18,22 9:21,21
<b>mean (27)</b>	43:7 98:13 184:20	<b>membership (3)</b>	40:8 41:9 52:12	<b>million (1)</b>
25:1 66:24 67:1 75:24	185:9 309:18 324:6	34:20 37:16,17	165:12 217:9 245:4	85:14
89:18 90:4,13 91:4	324:19,24,25 342:8	<b>memorial (1)</b>	342:19 355:2,6	<b>mind (11)</b>
108:7 114:22	343:24 344:1,20	18:13	356:5 357:5,11,24	48:16 72:1 113:5
150:18 158:20	345:1 425:25	<b>mention (18)</b>	358:6,17,25 359:7,8	201:17 217:20
166:23 195:25	<b>measuring (5)</b>	73:4,7 74:9,15,18	359:12,14,22 360:4	220:9 285:18 294:8
221:13 232:9	182:6 191:2 208:22	75:21 77:3 82:25	360:7 362:14,20,21	332:6,22 391:10



<p><b>mine (2)</b> 12:4 159:9</p> <p><b>miners (2)</b> 170:14 171:23</p> <p><b>minimal (6)</b> 131:14 171:25 172:4 264:17,21 270:14</p> <p><b>minimally (2)</b> 299:19 319:14</p> <p><b>minimize (1)</b> 31:12</p> <p><b>minimum (10)</b> 187:10 188:4,11 189:7,23 190:17 192:24 193:21 197:4 275:24</p> <p><b>Minneapolis (1)</b> 4:6</p> <p><b>Minnesota (7)</b> 4:6 204:12,20 205:10 219:20 243:11 297:8</p> <p><b>minus (3)</b> 89:3,4,11</p> <p><b>minute (2)</b> 132:23 351:3</p> <p><b>minutes (4)</b> 72:17 200:2 398:9 406:19</p> <p><b>mischaracterizatio...</b> 222:3</p> <p><b>mischaracterizes (24)</b> 66:17 100:5 219:3 220:12 221:7 254:24 255:18 273:15 288:16 289:3 291:16 302:22 344:14 350:12 358:2 371:4 371:19 383:24 393:20 398:23 401:2 403:1 422:11 422:25</p> <p><b>mischaracterizing (2)</b> 68:16 293:13</p> <p><b>misclassification (21)</b> 5:20 29:18,19 30:7,13 30:20 31:13,18 32:5 32:6 133:12 138:24 139:11 185:23 303:24 304:4 346:5 346:9 347:13 390:12 394:6</p> <p><b>misclassified (4)</b> 182:15 305:7 324:22 399:4</p>	<p><b>misleading (4)</b> 234:11,23 235:10,11</p> <p><b>mismeasurement (2)</b> 286:6,7</p> <p><b>misread (1)</b> 105:16</p> <p><b>misreading (2)</b> 67:12 68:17</p> <p><b>misreport (1)</b> 139:8</p> <p><b>misreports (1)</b> 138:8</p> <p><b>missed (4)</b> 19:23 74:1 263:6 414:25</p> <p><b>missing (16)</b> 134:5 175:25 215:7 377:4 386:6 387:14 387:18,23 388:6,9 388:19,20,24 389:5 389:10,16</p> <p><b>Mississippi (1)</b> 32:9</p> <p><b>misspoke (1)</b> 333:3</p> <p><b>misspoken (1)</b> 380:9</p> <p><b>misstated (1)</b> 30:6</p> <p><b>Misstates (1)</b> 393:8</p> <p><b>mistake (1)</b> 319:18</p> <p><b>misunderstand (1)</b> 63:25</p> <p><b>misunderstanding (2)</b> 166:14 168:16</p> <p><b>misunderstood (1)</b> 95:7</p> <p><b>misuse (1)</b> 95:9</p> <p><b>mixed (15)</b> 251:7 252:3,8,9 253:17,18 254:2,14 254:20 255:16 256:6 258:6 259:4 260:8 262:17</p> <p><b>mixes (1)</b> 305:7</p> <p><b>mixing (5)</b> 275:16,20 276:12 301:20 342:18</p> <p><b>mixture (13)</b> 253:21 255:23,24 256:9,11 260:21,25 261:2,8,10,12,16,25</p>	<p><b>mixtures (7)</b> 255:11 256:8 257:7 258:9 259:6,12 260:11</p> <p><b>model (30)</b> 157:10 158:18,21 159:24 163:9 236:22,25 238:9 239:9 249:4,5 250:17,19 253:1,1 279:25 282:14 283:3 285:18 286:1 286:7 293:18,19 294:1 295:9 331:4,6 398:1 430:13,19</p> <p><b>modeling (1)</b> 381:19</p> <p><b>models (11)</b> 50:7 74:16 152:10,18 165:1 239:12,14,14 242:12 286:9 397:23</p> <p><b>modern (2)</b> 43:24 84:21</p> <p><b>modification (11)</b> 169:4,18 170:19,24 171:16 174:16 175:4 176:3,18 177:6,16</p> <p><b>modified (2)</b> 338:16,24</p> <p><b>modifier (7)</b> 169:6,16,21 170:6,9 171:6,13</p> <p><b>modifiers (2)</b> 169:3 173:24</p> <p><b>molecular (1)</b> 55:8</p> <p><b>moment (2)</b> 44:13 287:20</p> <p><b>Monday (2)</b> 1:18 8:1</p> <p><b>monitoring (2)</b> 390:10 394:4</p> <p><b>monograph (14)</b> 15:4,6 18:7 52:20 57:6 59:19 62:8,14 80:19 82:12 152:5 416:8,10,13</p> <p><b>monologue (1)</b> 126:21</p> <p><b>Monsanto (8)</b> 4:11 9:25 10:2,17 24:10 421:11,15,19</p> <p><b>month (3)</b> 31:2 36:11 197:15</p>	<p><b>months (2)</b> 30:25 192:12</p> <p><b>morning (3)</b> 8:4 10:14,15</p> <p><b>mortality (1)</b> 29:11</p> <p><b>Moskowitz (5)</b> 1:23 2:13 8:21 438:4 438:22</p> <p><b>motion (3)</b> 81:25 82:1 83:9</p> <p><b>motions (4)</b> 81:2 82:4,5,19</p> <p><b>move (12)</b> 80:7 81:20 130:6 198:3,5 203:23 241:15 242:16 243:12 262:23 342:2 408:24</p> <p><b>Moving (1)</b> 177:20</p> <p><b>multi-regressional (...)</b> 399:19</p> <p><b>multi-variate (5)</b> 155:12,15 157:10 165:1 308:8</p> <p><b>multi-variated (1)</b> 399:24</p> <p><b>multi-varied (1)</b> 154:21</p> <p><b>multiple (15)</b> 151:24 206:12 227:24 262:17 310:10 333:25 335:19 363:19 381:16 396:10 408:16 411:12 414:9 430:22,22</p> <p><b>multiply (1)</b> 303:19</p> <p><b>multitude (1)</b> 40:25</p> <p><b>mutagenic (5)</b> 402:23 403:15,23 404:8,21</p> <p><b>mutagenicity (6)</b> 403:13,19 404:5,12 405:2,5</p> <p><b>myeloma (1)</b> 396:11</p> <hr/> <p style="text-align: center;"><b>N</b></p> <hr/> <p><b>N (3)</b> 3:1 4:1 5:1</p> <p><b>N.W (1)</b> 4:12</p>	<p><b>nail (1)</b> 138:11</p> <p><b>name (6)</b> 8:18 10:16 245:21 246:22 413:9 439:1</p> <p><b>NAPP (38)</b> 39:1 69:25 70:7 158:7 158:11 183:12 184:11 278:21 283:8,15,17 284:2 285:10,15 286:12 287:3 288:13 289:23 290:5 291:8 291:11 292:12,18 293:5 294:1,25 296:23 297:4 305:12 322:21 340:17,25 396:18 397:13 400:6 401:19 428:12 429:16</p> <p><b>narrow (7)</b> 86:15 111:21 116:2 116:12 118:9,18,23</p> <p><b>narrower (4)</b> 116:22 217:7 320:9 320:24</p> <p><b>narrowing (1)</b> 217:10</p> <p><b>nature (1)</b> 101:6</p> <p><b>Nauen (2)</b> 4:3 9:13</p> <p><b>NCI (1)</b> 146:24</p> <p><b>NCRA (4)</b> 1:24 2:14 438:5,23</p> <p><b>near (1)</b> 34:6</p> <p><b>nearly (1)</b> 234:21</p> <p><b>Nebraska (24)</b> 181:21 204:13,19,25 205:24 206:6,9,18 207:5,18 210:13 211:2,7,24 219:16 220:22 223:3 224:4 225:2 227:4,25 243:1 297:5 300:13</p> <p><b>necessarily (10)</b> 23:6 29:1 95:17 115:12 141:16 158:20 164:1,20 211:6 328:8</p> <p><b>necessary (3)</b> 83:10 190:18 410:15</p>
---	---	---	--	--

**need (32)**  
 48:12,13 68:4 80:24  
 81:19 89:9,12 96:12  
 139:20 154:19  
 167:8 169:12  
 176:18,23 180:25  
 181:17 186:25  
 196:17 231:11  
 240:23 263:19  
 309:5 325:23  
 360:22 362:14  
 381:13 390:8 394:1  
 395:12 404:23  
 412:18 415:7

**needed (3)**  
 21:14 106:24 209:24

**needs (2)**  
 351:1 394:13

**negative (4)**  
 85:13,23 90:20 406:8

**neither (2)**  
 127:16 249:5

**nested (2)**  
 317:21 318:9

**Neugut's (3)**  
 278:11,15 349:1

**never (16)**  
 35:20 85:5 87:22  
 136:22 150:19  
 188:19 243:9  
 253:24 275:5  
 293:15 350:5  
 353:21 375:6  
 403:17 408:2  
 412:11

**never/ever (4)**  
 306:11 398:14,19  
 424:25

**new (2)**  
 34:14 399:1

**NHL (46)**  
 64:8 87:20 100:13  
 120:13 150:22  
 165:25 166:2,17,20  
 176:6,10,14 188:10  
 189:22 191:19  
 194:13 204:7  
 218:19 230:18,22  
 259:15 269:5  
 278:25 285:22,24  
 292:6 299:7 313:22  
 313:22 322:10  
 328:1,13,20 331:3  
 331:22 332:8,19  
 350:8 387:13,20,22  
 396:8,13 418:1

423:2,3

**NHLs (1)**  
 194:17

**nice (2)**  
 111:25 321:8

**nicely (2)**  
 309:20 322:9

**nicer (1)**  
 435:7

**night (1)**  
 136:24

**nine (1)**  
 30:25

**ninth (1)**  
 227:10

**NIOSH (1)**  
 24:7

**no-brainer (1)**  
 222:14

**nominate (1)**  
 37:17

**non (2)**  
 173:8 353:21

**non-asthmatics (5)**  
 236:11 238:1 239:15  
 240:10 242:10

**non-carcinogenic (1)**  
 406:7

**non-differential (3)**  
 139:10,15 185:22

**non-differentially (1)**  
 182:16

**non-epidemiologist...**  
 67:18

**non-Hodgkin's (106)**  
 27:14 28:11 32:20  
 33:15 51:24 63:14  
 65:10 66:10 67:4  
 68:9 69:6 70:4,10  
 71:12 77:21 97:11  
 97:13,20 98:12,14  
 100:21 101:3,7  
 119:25 120:9,20  
 121:11,22 122:9,25  
 123:16 124:14  
 125:16 128:11  
 129:12 147:6  
 148:12,19 149:5  
 150:16 151:2,9,10  
 174:1,4 176:21  
 177:4,7 178:23  
 180:13 182:7  
 183:17 184:14  
 185:8 186:14 187:2  
 188:14 191:16  
 192:7,23 193:3,15

194:23 223:9,20  
 224:8 225:5 227:7  
 228:4 252:16  
 266:18 267:7 268:4  
 269:10 270:5  
 278:24 279:24  
 284:4 287:6 292:1  
 300:20 302:18  
 306:13 318:13  
 319:8 321:15,18  
 323:3,11,19 324:11  
 329:17 330:7 342:6  
 351:16 352:2 353:7  
 396:24 399:21  
 417:18 420:18  
 422:23 424:14  
 426:15 434:9,19

**non-informative (1)**  
 312:19

**non-nested (1)**  
 318:5

**non-responders (2)**  
 27:6 363:20

**non-toxic (1)**  
 210:3

**non-use (1)**  
 354:14

**normal (3)**  
 162:4 216:13 224:18

**normally (2)**  
 20:24 415:3

**North (5)**  
 6:16 276:17 277:9  
 306:14 333:21

**Northern (2)**  
 1:2 8:10

**Notary (1)**  
 437:19

**note (6)**  
 248:25 250:5,20  
 306:22 393:14  
 394:13

**noted (2)**  
 389:10 437:6

**notes (2)**  
 105:7 115:16

**noting (1)**  
 234:12

**null (72)**  
 39:20,23 40:5,14 41:5  
 41:7,8,10,14,16,20  
 41:25 42:4,8,12,17  
 42:18,22 43:2,10,20  
 44:1,1,15 45:9,20  
 45:25 46:9 47:2  
 48:3 51:22 89:19

92:11,17,21 93:10  
 93:17 94:17 95:2  
 97:5,10 98:3,10  
 99:11,18 100:10,11  
 100:19 101:2,12,14  
 101:22 102:15,24  
 103:13,17 104:3,12  
 105:14 106:16  
 107:21 112:18,19  
 112:20,21 162:22  
 162:24 281:23,25  
 282:20 283:3,3

**number (97)**  
 5:8 6:2 7:2 8:6,11,12  
 11:12 34:13 39:9  
 62:9 74:1 83:24  
 86:21 96:16,22  
 113:14 114:14  
 117:2 124:3,16,25  
 125:1,2 126:5,6  
 128:15 132:1 133:1  
 148:1 155:8 156:9  
 166:10 172:5  
 178:15 181:9,11  
 190:14 192:11  
 200:4,6 203:13,20  
 204:1 214:21  
 223:13 229:4,6  
 230:22 235:19  
 237:12 243:17  
 244:19 246:18  
 255:7 257:6,8,21,22  
 257:24 277:7 300:8  
 300:23,25 301:2,13  
 301:19,19 303:18  
 303:21 304:24,24  
 306:24 307:6 313:7  
 318:22 322:13,15  
 336:6,14 340:6  
 341:15 349:8  
 363:14 366:20  
 369:11 386:16  
 387:12,21,22  
 405:24 409:8  
 414:14 419:16,22  
 425:11,11 437:3

**numbers (12)**  
 114:10 148:5 171:5  
 181:15 251:21  
 352:23,25 353:1  
 386:5 400:20  
 417:12 426:5

**numerical (1)**  
 34:17

**numerically (1)**  
 299:8

**numerous (4)**  
 162:2 325:1 409:13  
 410:1

---

**O**

---

**o'clock (1)**  
 199:25

**object (361)**  
 26:8 28:18 31:15  
 32:21 38:10 40:3,13  
 41:23 43:4,23 45:10  
 45:22 46:11 47:6  
 48:6 49:24 51:9  
 53:11,20 55:4,18  
 56:10 57:1,16 58:7  
 58:22 59:14 60:8  
 62:5 63:17 64:14,20  
 65:15 66:16 67:10  
 68:15 69:11 70:14  
 71:16 73:9 74:7,22  
 75:9 78:11 79:6  
 84:19 85:15,24  
 87:21 89:21 90:16  
 91:8,20 92:25 95:4  
 97:15 98:16 99:13  
 100:4 101:17  
 102:11 103:6,19  
 104:14 105:15  
 106:2 107:14  
 108:11 109:17  
 110:7 111:8 112:11  
 115:2,11 116:7,16  
 117:7 118:11 119:1  
 122:11 123:1,17  
 124:15 125:18  
 128:13 129:9  
 130:10,19 131:8  
 133:20 134:17  
 135:13,23 136:13  
 137:16 139:1,17  
 140:8,22 141:15  
 142:6,25 145:19  
 146:20 147:9 149:8  
 151:4 153:19  
 154:18 155:19  
 156:20,24 157:14  
 157:24 158:14  
 159:6 161:1,18  
 162:10 163:15  
 164:15 166:4,21  
 168:23 169:24  
 170:22 171:18  
 172:3,17 173:1,18  
 174:6 175:8 176:8  
 176:22 177:9  
 180:24 181:13

182:8,23 183:19 184:15 185:11 187:6 188:15 189:25 191:5 192:8 193:4,19 195:8 196:21 198:21 199:12 201:2,25 203:1 205:4,19 206:7,15 207:8,21 208:7 209:16 210:17 211:4,16 212:1 213:7 215:20 218:1 219:2,22 220:11 221:6 222:1 222:2 224:9 225:7 226:20,24 227:8 230:7,19 232:7 233:10,21 234:24 236:4,15 237:21 238:14 239:2 240:3 241:7,8 242:1,23 244:2,16 245:9,16 246:14 247:10 248:6 250:14 253:23 254:23 255:17 256:3,21 257:11 258:11 259:8 260:2,14,14 261:6 262:7 265:10 266:20 268:5,6 271:8 281:1,13 282:8,22 283:11 284:17 285:16 286:21 287:12 288:1 289:2 290:12 292:7,20 293:12,13 294:4 295:3,19 296:9 297:10 298:6 298:18 300:5 301:10 302:21 303:15 304:7 305:15 308:23 309:12 310:14 311:8 312:12 313:25 314:6 315:6 315:20 317:11 320:13 321:2,20 322:22 323:4,21 324:12 325:6 326:24 327:16 328:7 329:20 330:17 331:24 333:9 334:21 336:12,21 337:23 338:11 339:20 340:20 341:10,17	342:10 343:3,11 344:13 346:2 347:2 348:6 349:3,21 350:11 352:14 353:10 354:2,16 355:12 356:14 357:9 358:1 359:2 359:24 361:4,13 363:5 364:18 365:4 366:4 367:6 368:3 371:5 372:9 373:3 374:20 376:1,9,19 378:6,6 379:1 380:6 382:8,17 383:3,13 386:25 388:3 389:2 389:14 391:14,24 392:20 393:7,19 394:19 395:11 396:6 397:2,20 399:12,22 400:9 401:1,14 402:25 403:8,16,24 407:10 407:23 413:15,20 420:10 422:24 435:17 <b>objected (1)</b> 383:16 <b>objecting (2)</b> 174:24 259:24 <b>Objection (97)</b> 14:17 23:22 25:9 35:9 35:15 44:17 47:5 48:20 55:4 61:18 62:22 68:15 70:24 81:8 83:7 93:18 106:17 120:22 121:13,23 123:1 174:20 218:1 221:6 222:1 224:9 225:7 227:8 228:25 229:12 237:21 239:2 240:3 241:2,7 241:17 242:1 244:16 247:9 255:17 257:11 258:11 259:8 260:13 261:5,20 262:7 265:10,24 266:20 267:9 268:5 268:24 269:11 270:6 272:11,24 273:14 274:8,21 275:8 276:1 281:1 281:13 282:8 288:15 291:15 296:9 301:10 303:9	361:4 362:5,8 368:3 371:3,18 372:8 373:3 374:20 377:23 379:1,14 380:3,6 381:6 383:23 384:10 385:10 390:19 398:22 404:9,22 420:19 421:16 422:4,10 425:2 <b>objectionable (1)</b> 413:15 <b>objections (2)</b> 258:25 413:8 <b>observational (6)</b> 130:8,12,17,24 140:1 417:7 <b>observed (12)</b> 64:6 65:11 66:12 67:6 68:11 69:7 70:8 90:5,15 91:6 364:4 381:20 <b>observer (2)</b> 18:3,6 <b>observers (1)</b> 18:8 <b>obtain (1)</b> 77:20 <b>obtaining (1)</b> 87:7 <b>obvious (1)</b> 288:5 <b>obviously (11)</b> 38:4 60:2 137:10 170:2 200:10 214:22 348:21 352:24 369:8 389:16 435:23 <b>occasional (3)</b> 268:15 301:16 304:18 <b>occasionally (1)</b> 269:18 <b>occupation (2)</b> 180:7 185:19 <b>occupational (11)</b> 12:4,5 34:4,8,9 225:23 273:3,5 276:11 343:23 426:16 <b>occupations (2)</b> 179:7 202:6 <b>occur (5)</b> 133:23 134:19 189:11 190:19 192:10 <b>occurred (2)</b> 187:17 373:13	<b>occurs (1)</b> 430:14 <b>odd (4)</b> 43:2 258:8 278:22 356:22 <b>odds (155)</b> 43:7 44:7,24 84:17 89:5 109:13 118:6 151:20 153:1,10,16 154:3,6,7,9,16,21 155:15,17,22 156:17 157:6,7,12 157:21 158:3,10,16 160:16,18 163:20 163:23 171:14 172:1 175:21 178:22 179:3,21 180:4,21,21,22 182:20 183:16,23 213:10,15 217:19 218:21 232:13,13 232:16 233:7,8,13 233:18 234:2,21 237:18 238:21,24 239:25 241:22,23 248:20 249:2,4,5 251:1 252:2,7,22 253:8,13 256:12 258:4,5 259:2,4 260:6,7,10 269:5 279:3,10,19 280:2 280:13,15,18,23 281:4,10,20 282:5 282:17,19,23 284:24 285:14 287:23 288:10 296:6,8 298:8 300:18 306:11 308:4,5,12,14,18,21 308:25 309:1,1,4,10 309:14,22,23 310:7 310:9 311:4,11,13 312:10 319:6,12,13 320:10 321:17 330:8,13 353:25 354:6 396:3,9,14,23 396:25 397:17 398:19 399:6,20 400:21,22 424:4,9 424:20 425:15,18 425:20,22 427:10 <b>offer (4)</b> 81:4 116:5,15 408:22 <b>offering (3)</b> 79:25 81:23 385:7 <b>offices (1)</b>	2:10 <b>official (4)</b> 15:13 18:2 195:19 202:22 <b>officially (2)</b> 15:16 17:14 <b>oftentimes (1)</b> 425:5 <b>oh (16)</b> 27:19 76:25 132:13 170:3 181:17 184:6 206:13 229:8 250:3 297:2 349:15 356:24 364:11 386:1 405:25 428:11 <b>okay (128)</b> 11:5,9 12:6,10 14:15 14:24 20:1,4 21:5 37:5 52:11 53:4,24 59:24 62:2,11,21 64:2 65:2 69:20 70:1 71:20 73:24 79:17 84:12 85:2 90:11 96:13 99:22 102:23 112:23 113:13 115:16 116:22 117:23 118:22 120:16 122:3 127:19 132:13 141:23 143:10 148:7 149:4 154:25 160:3 165:8 172:8 173:13 176:16 177:2,20 183:7 184:6 196:15 202:15 206:18 210:8,25 212:9 219:19 221:15 228:6 231:10 238:11 245:12 247:15 250:3 251:12 253:7 256:23 264:5 267:23 268:12 270:17 272:8 273:9 274:24 278:5 280:12 281:8 285:7 290:4 292:15 296:17,21 297:15 302:14 305:22 306:20 314:25 318:3,12 323:13 324:4 326:19 329:5 330:4 337:17 340:14 342:15
---	---	---	--	---

346:8 348:2 350:15 353:20 369:2,12 370:23 371:13 375:9 389:9,20 390:23 395:18 396:18 398:10 400:18 405:6 406:18 411:9 412:20 413:22 418:10 423:24 424:20 428:11,18 435:17	<b>opinions (13)</b> 79:4,25 80:8 81:4,23 83:16 267:3 286:12 408:13 409:18 410:16 414:3 416:11	137:12 158:20 218:13 219:15 220:22 255:4 256:14,25 257:17 278:23 311:20 322:2 416:5	270:22,23,25 307:1 307:2,3,5,21,22,23 307:25 326:3,4,5,7 384:22,23,24 385:1 406:24,25 407:1,3 419:17,18,19,21 437:5,6	<b>pages (13)</b> 76:21,22 77:2 85:9 114:8 123:9 124:6 132:14 133:3 148:10 166:13,15 351:2
400:18 405:6 406:18 411:9 412:20 413:22 418:10 423:24 424:20 428:11,18 435:17	<b>opportunity (2)</b> 24:22 243:3	<b>overlap (1)</b> 54:11	<b>pack (10)</b> 300:7,24 302:15 365:25 366:6 367:3 374:17 377:20 378:20 381:2	<b>Pahwa (2)</b> 276:18 283:8
<b>old (2)</b> 148:23 432:12	<b>opposed (2)</b> 162:5 173:15	<b>overlapping (1)</b> 281:18	<b>page (141)</b> 5:2 7:10 39:13,18,19 52:22,23 56:16,20 58:18 59:9 66:19,25 74:9 77:1,1,5 84:7 87:2 92:2,3 114:15 114:20 117:24 118:3,4 119:21,22 120:2 124:6 125:12 128:7 132:19,24,25 133:1,4 148:4,5,8 152:1,3,24 154:17 155:12,23 156:23 157:5 160:4 165:9 168:1,16,17 174:19 174:22 177:16 178:24 179:16 182:21,24 183:9 186:3,4,5,9,10 187:25 189:21 192:22 228:13,16 231:17 234:8 236:7 244:6 249:17,19 263:12,19 275:14 277:10 278:20 283:14 285:6 296:24,25 297:16 305:22 308:9 310:5 310:16 315:16 316:3,14 317:4 319:5,12 326:11 345:8,16 350:22 351:7 353:2 365:12 365:13 373:2 385:16,17,24,25 387:16,19 389:21 389:22 390:1,3 392:8 393:3 402:6 402:11,14 405:22 405:23 423:14,17 428:16 433:5 436:24 439:6,7,9,10 439:12,13,15,16,18 439:19,21,22,24	<b>paid (2)</b> 17:8 138:1
<b>older (1)</b> 31:20	<b>opposite (3)</b> 196:23 256:22 303:23	<b>overlaps (1)</b> 388:17	<b>pair-wise (1)</b> 86:5	<b>pair-wise (1)</b> 86:5
<b>Olson (1)</b> 406:15	<b>option (1)</b> 410:7	<b>oversight (1)</b> 19:21	<b>pancreatic (5)</b> 142:13,22 143:15,18 143:19	<b>pancreatic (5)</b> 142:13,22 143:15,18 143:19
<b>once (7)</b> 10:21 21:3 34:6 36:11 49:6 125:7 185:17	<b>Orange (1)</b> 3:21	<b>overwhelming (1)</b> 375:11	<b>panel (4)</b> 21:17 23:8,9 24:2	<b>panel (4)</b> 21:17 23:8,9 24:2
<b>oncologist (1)</b> 13:7	<b>order (15)</b> 88:1 92:10 193:8 196:3 198:6 239:9 242:6,10 272:16 352:13 393:24 417:7 419:10 431:1 436:24	<b>oxidative (6)</b> 75:7,12 402:4 404:4 407:7,19	<b>paper (66)</b> 97:1 153:16 154:14 154:20 158:5 223:17 224:4 225:17,19 226:6,12 227:2,3 228:2,7,23 228:24 229:2,2,7,9 229:10,23 230:13 250:10 251:15,16 263:20,23 268:2 270:3 271:3,4 274:5 274:19 275:5 290:15 298:5,23 299:2 306:20 308:5 308:6,21 359:12,18 360:25 366:23 374:4 376:14,18,21 379:17 383:14 385:20 386:12 387:2 388:2,18 389:10,11 390:2 392:7,8 414:6 415:4	<b>paper (66)</b> 97:1 153:16 154:14 154:20 158:5 223:17 224:4 225:17,19 226:6,12 227:2,3 228:2,7,23 228:24 229:2,2,7,9 229:10,23 230:13 250:10 251:15,16 263:20,23 268:2 270:3 271:3,4 274:5 274:19 275:5 290:15 298:5,23 299:2 306:20 308:5 308:6,21 359:12,18 360:25 366:23 374:4 376:14,18,21 379:17 383:14 385:20 386:12 387:2 388:2,18 389:10,11 390:2 392:7,8 414:6 415:4
<b>oncology (1)</b> 77:7	<b>organic (2)</b> 150:1,4	<b>P (17)</b> 3:1,1 4:1,1 85:12,21 85:22,22 90:3 93:25 95:16 97:4 99:22,24 100:8 116:25 117:10	<b>papers (9)</b> 54:20 55:20 56:12 147:2 216:4 359:20 371:9 414:14 415:4	<b>papers (9)</b> 54:20 55:20 56:12 147:2 216:4 359:20 371:9 414:14 415:4
<b>one-paragraph (1)</b> 290:6	<b>organizers (4)</b> 37:1,3,21 38:3	<b>P-value (73)</b> 84:7,10,24 85:4,6,11 86:2 87:2,6,17,23 87:24 88:15,19 89:1 89:10,10,17,22 90:12,21,22 91:4,13 91:16,21,22 93:9 94:6,15,22 95:12,13 95:13,20,20 98:9,20 99:2,4,5,10 100:6 100:11 101:12,21 102:5,8,18 103:1,16 103:24 104:1,2,6,11 105:4 107:17,24,25 108:16,19,21 109:1 109:2,2 110:16 111:17,22 117:10 119:13,13 249:9	<b>paragraph (16)</b> 92:6 118:1,15 152:4 188:1,2 228:14,15 390:8,24 392:12,19 393:24 394:2,17 395:1	<b>paragraph (16)</b> 92:6 118:1,15 152:4 188:1,2 228:14,15 390:8,24 392:12,19 393:24 394:2,17 395:1
<b>ones (9)</b> 33:12 36:23 83:2 84:22 150:8 193:10 215:11 230:24 309:6	<b>organizing (1)</b> 36:18	<b>P-values (25)</b> 84:15 85:12,21 86:1,9 86:14,15 88:6 89:4 92:9,16,20 93:4,15 94:25 96:1 98:25 102:3 104:5,8,21 105:11 106:13 118:9,18	<b>paragraphs (3)</b> 74:5 75:21 76:8	<b>paragraphs (3)</b> 74:5 75:21 76:8
<b>ongoing (5)</b> 22:20 25:22,25 30:16 31:5	<b>original (6)</b> 283:6 295:18 305:11 370:24 415:2 416:4	<b>p.m (38)</b> 178:4,5,6,8 203:15,17 203:17,19 270:21	<b>parallel (1)</b> 150:5	<b>parallel (1)</b> 150:5
<b>onset (3)</b> 188:5 192:12 347:7	<b>originally (1)</b> 20:16		<b>parameter (12)</b> 44:5 45:13,15,18 46:19 84:24,25	<b>parameter (12)</b> 44:5 45:13,15,18 46:19 84:24,25
<b>open (1)</b> 246:21	<b>Orsi (5)</b> 160:15 395:23 400:10 400:11 409:23			
<b>opine (1)</b> 186:3	<b>outcome (18)</b> 28:22 48:19 49:3 141:11,25 142:4 143:4 167:16 168:22 175:18 191:4,10 194:1 195:4 201:24 310:22 359:15 438:15			
<b>opining (1)</b> 289:21	<b>outcomes (3)</b> 38:15 220:19 396:9			
<b>opinion (39)</b> 45:21 49:19 51:7 53:4 78:9,16 79:22 81:7 185:5 221:2 264:9 265:4,7 267:4 268:1 268:22 288:14 291:10 302:4,9 323:8,18 385:6 403:11,22 404:7,19 407:5,21 408:22 410:21 415:16 416:12 429:19,21 429:22 434:7,16,21	<b>outrageous (1)</b> 411:24			
	<b>outside (2)</b> 32:16 325:4			
	<b>overall (24)</b> 53:13,22 59:1 61:24 62:11 65:3 66:21 72:6 88:7,22 98:23			

87:24 93:5 97:22 129:14,17	<b>pediatrics (1)</b> 12:24	329:3 434:2	273:17 274:12	362:1 364:16
<b>parameters (13)</b> 44:4,24 45:4,7 46:15 46:16,24 48:9 87:25 110:14 112:25 124:25 126:5	<b>Pedram (2)</b> 3:16 9:7	<b>perfectly (2)</b> 360:3,6	308:7,13 325:8,10 325:14 326:19 327:7,10 328:24 331:1 333:7,19,22 334:1 335:15 355:7 357:6 358:7,7,11,14 359:15 360:7,12 362:17,18 363:7,19 368:17 375:7 377:2 379:7 430:1	369:15,16,20 370:24 371:14,16 371:16 382:15 383:11 433:7,9,10
<b>paraphrasing (1)</b> 87:12	<b>peer (11)</b> 37:7,11,15,17,20,22 38:6,9,17 389:17 390:17	<b>perform (1)</b> 417:19	<b>performed (5)</b> 284:4 290:22 335:24 363:3 418:5	<b>phases (1)</b> 433:5
<b>Parkinson's (3)</b> 29:22,25 32:24	<b>peer-reviewed (18)</b> 288:7 357:22 358:23 359:20 360:25 361:25 380:21 385:19,20 387:6,10 388:1 389:12 391:12 392:25 393:17 395:10,13	<b>performing (4)</b> 417:8,9,23 420:21	<b>period (70)</b> 17:13,24 21:21,22 22:1,23 23:20 25:14 26:5,12 30:25 186:25 189:7,23 192:24 193:25 194:16 195:2,18 196:11,18 200:24 201:24 202:24 203:9 205:16,17 207:6,15,17,18,25 208:3,21,24 209:4 209:11 211:1,23 214:16 217:18,22 218:18,24 219:7,8 219:21 220:3,8 221:21,24 222:12 222:19 243:7 275:24 341:15 343:18 346:21 355:16 358:16 367:22 369:8,14,20 369:21 371:17 372:21 374:12 377:7,10	<b>PhD (12)</b> 1:16 2:10 5:3,11,25 6:7 10:7 11:25 13:10 14:12 437:12 439:3
<b>parse (1)</b> 332:23	<b>people (55)</b> 25:1 27:10 38:12 41:2 164:17 185:23 189:13 190:11 194:20 205:6 216:1 233:2,4 240:13 246:23 261:9 264:15,17,23,25 265:17 267:16,17 268:14 269:17 270:13 273:3,19 276:13 288:3 309:7 311:16 317:13 339:2 355:15 364:15 366:19 367:14,17,18,21,22 368:20,25 369:24 370:9,10,11 371:11 372:12,14,25 380:22 397:10 433:8	<b>periods (3)</b> 30:22 222:17 343:19	<b>pesticides (106)</b> 24:18 27:18 28:10 30:15 137:4 138:2 153:14 158:11 165:25 166:18 173:24 174:4 176:10,20 177:13 179:13 180:8,10 185:16,18 206:12 227:25 230:23 236:3,14 237:20 238:23 240:2,25 241:25 245:24 247:17 248:4,22 252:18 276:12 280:19 282:7 285:1 289:21 294:21 310:21 314:3 325:11 326:16,22 327:12,15,17,22,25 328:12 329:2,13,16 330:4 331:13,14 333:14 334:16 335:1 338:2 343:1 343:10,13,14,23 357:12,13,19 358:18 361:1 363:4 364:3 365:15,19 366:1 367:1 372:19 373:11,11 374:17 375:25 376:18 377:18 378:18,21 379:5,19,23 380:1 380:14,17 381:3 388:9,13,15,18 389:1 395:16 396:22 397:16,24 398:2 400:24 424:13	<b>phone (3)</b> 9:11,15 36:10
<b>part (21)</b> 24:1 29:6 38:8 46:24 52:17 60:13 111:20 112:24 122:16 126:2 127:6 128:19 129:4 142:7 143:1 175:11 218:4 219:8 289:25 291:9 409:12	<b>pending (1)</b> 201:15	<b>person (9)</b> 15:13 188:20,20,22 191:23 254:2 332:12 337:4 355:18	<b>petition (1)</b> 80:2	<b>phosphates (1)</b> 150:4
<b>participants (1)</b> 29:13	<b>percent (55)</b> 89:6,19 90:4,8,14,25 91:5 107:12,15 108:2,6,8,18 109:21 110:15,16 131:4 206:4,5,8 207:4 211:24 214:19 249:7 355:8 356:2 356:12,22 364:17 364:24 366:18 368:2,7,10,12,13,14 368:18,25 369:1,13 369:19 370:15 372:4 374:1,2,7,11 374:14 375:3,6,7,9 375:10,11	<b>personally (2)</b> 275:16,19	<b>phase (25)</b> 22:3 26:5,17 27:7 355:6,22,25 356:8 357:7,20 358:22	<b>phrase (1)</b> 392:24
<b>particular (4)</b> 87:8 133:13 410:2 420:8	<b>people (55)</b> 25:1 27:10 38:12 41:2 164:17 185:23 189:13 190:11 194:20 205:6 216:1 233:2,4 240:13 246:23 261:9 264:15,17,23,25 265:17 267:16,17 268:14 269:17 270:13 273:3,19 276:13 288:3 309:7 311:16 317:13 339:2 355:15 364:15 366:19 367:14,17,18,21,22 368:20,25 369:24 370:9,10,11 371:11 372:12,14,25 380:22 397:10 433:8	<b>periods (3)</b> 30:22 222:17 343:19	<b>pest (1)</b> 149:17	<b>physician (3)</b> 12:9,11 34:8
<b>particularly (2)</b> 30:14 298:1	<b>percent (55)</b> 89:6,19 90:4,8,14,25 91:5 107:12,15 108:2,6,8,18 109:21 110:15,16 131:4 206:4,5,8 207:4 211:24 214:19 249:7 355:8 356:2 356:12,22 364:17 364:24 366:18 368:2,7,10,12,13,14 368:18,25 369:1,13 369:19 370:15 372:4 374:1,2,7,11 374:14 375:3,6,7,9 375:10,11	<b>person (9)</b> 15:13 188:20,20,22 191:23 254:2 332:12 337:4 355:18	<b>pesticide (52)</b> 6:22 27:24 30:18 136:8 152:14 176:2 176:5 177:2 180:23 223:25 224:16,20 231:18 239:1,5 242:12 272:2	<b>physiologist (1)</b> 150:4
<b>parties (1)</b> 438:13	<b>percent (55)</b> 89:6,19 90:4,8,14,25 91:5 107:12,15 108:2,6,8,18 109:21 110:15,16 131:4 206:4,5,8 207:4 211:24 214:19 249:7 355:8 356:2 356:12,22 364:17 364:24 366:18 368:2,7,10,12,13,14 368:18,25 369:1,13 369:19 370:15 372:4 374:1,2,7,11 374:14 375:3,6,7,9 375:10,11	<b>personally (2)</b> 275:16,19	<b>petition (1)</b> 80:2	<b>picture (2)</b> 98:23 99:1
<b>parts (5)</b> 47:1 72:2 129:1 208:19 433:9	<b>percent (55)</b> 89:6,19 90:4,8,14,25 91:5 107:12,15 108:2,6,8,18 109:21 110:15,16 131:4 206:4,5,8 207:4 211:24 214:19 249:7 355:8 356:2 356:12,22 364:17 364:24 366:18 368:2,7,10,12,13,14 368:18,25 369:1,13 369:19 370:15 372:4 374:1,2,7,11 374:14 375:3,6,7,9 375:10,11	<b>personally (2)</b> 275:16,19	<b>pest (1)</b> 149:17	<b>piece (3)</b> 110:17,19 373:22
<b>passing (1)</b> 409:21	<b>percent (55)</b> 89:6,19 90:4,8,14,25 91:5 107:12,15 108:2,6,8,18 109:21 110:15,16 131:4 206:4,5,8 207:4 211:24 214:19 249:7 355:8 356:2 356:12,22 364:17 364:24 366:18 368:2,7,10,12,13,14 368:18,25 369:1,13 369:19 370:15 372:4 374:1,2,7,11 374:14 375:3,6,7,9 375:10,11	<b>personally (2)</b> 275:16,19	<b>pest (1)</b> 149:17	<b>pieces (2)</b> 60:10 418:16
<b>pathology (2)</b> 56:2,4	<b>percent (55)</b> 89:6,19 90:4,8,14,25 91:5 107:12,15 108:2,6,8,18 109:21 110:15,16 131:4 206:4,5,8 207:4 211:24 214:19 249:7 355:8 356:2 356:12,22 364:17 364:24 366:18 368:2,7,10,12,13,14 368:18,25 369:1,13 369:19 370:15 372:4 374:1,2,7,11 374:14 375:3,6,7,9 375:10,11	<b>personally (2)</b> 275:16,19	<b>pest (1)</b> 149:17	<b>place (7)</b> 34:6 93:12 187:3 191:21 195:2 210:12,15
<b>pathway (2)</b> 143:7 145:14	<b>percent (55)</b> 89:6,19 90:4,8,14,25 91:5 107:12,15 108:2,6,8,18 109:21 110:15,16 131:4 206:4,5,8 207:4 211:24 214:19 249:7 355:8 356:2 356:12,22 364:17 364:24 366:18 368:2,7,10,12,13,14 368:18,25 369:1,13 369:19 370:15 372:4 374:1,2,7,11 374:14 375:3,6,7,9 375:10,11	<b>personally (2)</b> 275:16,19	<b>pest (1)</b> 149:17	<b>placement (1)</b> 119:8
<b>patients (3)</b> 12:17,18 13:5	<b>percent (55)</b> 89:6,19 90:4,8,14,25 91:5 107:12,15 108:2,6,8,18 109:21 110:15,16 131:4 206:4,5,8 207:4 211:24 214:19 249:7 355:8 356:2 356:12,22 364:17 364:24 366:18 368:2,7,10,12,13,14 368:18,25 369:1,13 369:19 370:15 372:4 374:1,2,7,11 374:14 375:3,6,7,9 375:10,11	<b>personally (2)</b> 275:16,19	<b>pest (1)</b> 149:17	<b>plaintiff's (8)</b> 20:13 55:16 81:3 408:18 410:8,8,13 413:10
<b>pattern (1)</b> 51:2	<b>percent (55)</b> 89:6,19 90:4,8,14,25 91:5 107:12,15 108:2,6,8,18 109:21 110:15,16 131:4 206:4,5,8 207:4 211:24 214:19 249:7 355:8 356:2 356:12,22 364:17 364:24 366:18 368:2,7,10,12,13,14 368:18,25 369:1,13 369:19 370:15 372:4 374:1,2,7,11 374:14 375:3,6,7,9 375:10,11	<b>personally (2)</b> 275:16,19	<b>pest (1)</b> 149:17	<b>plaintiffs (15)</b> 3:4,11,19 4:4 5:14 9:1 9:4,6,8,10,13,23 18:22 81:21 408:21
<b>patterns (1)</b> 309:21	<b>percent (55)</b> 89:6,19 90:4,8,14,25 91:5 107:12,15 108:2,6,8,18 109:21 110:15,16 131:4 206:4,5,8 207:4 211:24 214:19 249:7 355:8 356:2 356:12,22 364:17 364:24 366:18 368:2,7,10,12,13,14 368:18,25 369:1,13 369:19 370:15 372:4 374:1,2,7,11 374:14 375:3,6,7,9 375:10,11	<b>personally (2)</b> 275:16,19	<b>pest (1)</b> 149:17	<b>plausibility (9)</b> 73:19,25 74:20 75:6 75:18,20 76:23 401:25 417:16
<b>Paulo (1)</b> 428:16	<b>percent (55)</b> 89:6,19 90:4,8,14,25 91:5 107:12,15 108:2,6,8,18 109:21 110:15,16 131:4 206:4,5,8 207:4 211:24 214:19 249:7 355:8 356:2 356:12,22 364:17 364:24 366:18 368:2,7,10,12,13,14 368:18,25 369:1,13 369:19 370:15 372:4 374:1,2,7,11 374:14 375:3,6,7,9 375:10,11	<b>personally (2)</b> 275:16,19	<b>pest (1)</b> 149:17	<b>plausible (2)</b> 192:14 193:1
<b>pay (3)</b> 17:10,11,12	<b>percent (55)</b> 89:6,19 90:4,8,14,25 91:5 107:12,15 108:2,6,8,18 109:21 110:15,16 131:4 206:4,5,8 207:4 211:24 214:19 249:7 355:8 356:2 356:12,22 364:17 364:24 366:18 368:2,7,10,12,13,14 368:18,25 369:1,13 369:19 370:15 372:4 374:1,2,7,11 374:14 375:3,6,7,9 375:10,11	<b>personally (2)</b> 275:16,19	<b>pest (1)</b> 149:17	<b>play (3)</b> 170:25 211:20 249:8
<b>paying (1)</b> 35:4	<b>percent (55)</b> 89:6,19 90:4,8,14,25 91:5 107:12,15 108:2,6,8,18 109:21 110:15,16 131:4 206:4,5,8 207:4 211:24 214:19 249:7 355:8 356:2 356:12,22 364:17 364:24 366:18 368:2,7,10,12,13,14 368:18,25 369:1,13 369:19 370:15 372:4 374:1,2,7,11 374:14 375:3,6,7,9 375:10,11	<b>personally (2)</b> 275:16,19	<b>pest (1)</b> 149:17	<b>played (1)</b> 114:3
<b>payment (1)</b> 17:16	<b>percent (55)</b> 89:6,19 90:4,8,14,25 91:5 107:12,15 108:2,6,8,18 109:21 110:15,16 131:4 206:4,5,8 207:4 211:24 214:19 249:7 355:8 356:2 356:12,22 364:17 364:24 366:18 368:2,7,10,12,13,14 368:18,25 369:1,13 369:19 370:15 372:4 374:1,2,7,11 374:14 375:3,6,7,9 375:10,11	<b>personally (2)</b> 275:16,19	<b>pest (1)</b> 149:17	<b>playing (1)</b> 125:5
<b>PC (1)</b> 2:11	<b>perfect (2)</b>	<b>personally (2)</b> 275:16,19	<b>pest (1)</b> 149:17	<b>please (16)</b> 8:23 9:18 10:4 16:17

<p>61:6 147:15 231:4 264:4 351:3 361:16 398:8,11 423:6,15 432:8,23</p> <p><b>plot (8)</b> 152:25 153:4 160:5 160:22 161:5,16 162:6,14</p> <p><b>plots (1)</b> 160:9</p> <p><b>plus (9)</b> 54:12 56:1 179:22 181:19 219:15 340:2 356:12 373:25 395:1</p> <p><b>point (56)</b> 37:24 43:8 46:16,17 46:23 57:13 65:21 72:12 73:16 75:17 88:15 89:12 98:4 114:20 117:13 119:15,16 127:21 134:10,11 143:9 154:23 162:15,19 168:15 175:4,24 187:17,23 192:21 201:1,23 202:23 209:13 245:2 251:4 255:14 263:24,25 264:3 287:4 322:2,8 337:21 340:19 378:11 382:2,24 390:2 403:18 404:2 406:21 410:18 412:14 432:23 433:8</p> <p><b>pointed (2)</b> 391:2 431:22</p> <p><b>pointing (2)</b> 148:18 391:7</p> <p><b>points (6)</b> 116:23 144:25 324:21 340:9 402:3 409:8</p> <p><b>pollutants (1)</b> 430:24</p> <p><b>pollution (1)</b> 430:23</p> <p><b>pool (2)</b> 218:6 242:20</p> <p><b>Poole (16)</b> 5:15 86:14,24 87:6 91:25 92:15 93:8,14 94:15 96:25 97:3 98:8 103:1 104:19 105:7 110:11</p> <p><b>Poole's (2)</b></p>	<p>99:23 114:18</p> <p><b>pooled (25)</b> 6:16 184:9 218:5 219:10 224:5,13,20 225:2,11 227:15,15 227:23 230:1 235:22 276:17,24 276:25 277:10 279:16 284:13 306:14 396:19 414:23 415:1,9</p> <p><b>pooling (4)</b> 183:12 184:10 220:17 397:14</p> <p><b>pools (2)</b> 222:9 401:20</p> <p><b>poorly (1)</b> 11:8</p> <p><b>popping (1)</b> 331:17</p> <p><b>population (20)</b> 31:4 90:24 143:21 144:3 171:2,5,11 175:16 176:4,11 189:8,10 192:18 197:12,13 206:23 209:3 271:7 334:17 396:2</p> <p><b>population-based (1)</b> 318:1</p> <p><b>populations (6)</b> 143:22,24 171:1 202:13 334:3 400:5</p> <p><b>Portier (5)</b> 18:22 19:4,7 35:25 402:19</p> <p><b>Portier's (1)</b> 402:17</p> <p><b>portion (3)</b> 403:3 412:5,12</p> <p><b>portions (1)</b> 410:21</p> <p><b>position (7)</b> 13:18 15:10 33:6 56:8 291:7,8 408:20</p> <p><b>positive (21)</b> 48:17 50:5,10,11 64:6 65:10 66:11 67:5 68:10 69:7 70:8,18 131:3 142:12,18 223:18 323:2,6 331:16 406:8 423:3</p> <p><b>possibility (10)</b> 29:17 138:23 144:11 168:18 176:1 193:14,23 311:6</p>	<p>329:14 330:19</p> <p><b>possible (12)</b> 60:19,23 62:9 98:13 150:10 152:12 192:14 198:8 208:25 210:16,21 330:16</p> <p><b>possibly (2)</b> 145:13 150:22</p> <p><b>posters (3)</b> 429:2,6,18</p> <p><b>potential (29)</b> 28:16 31:13 32:5,18 110:6 111:6 122:23 151:22 152:21 159:18 163:5,22 164:9 186:17 187:16 194:12 199:10,16 201:23 203:6 229:16 230:5 303:23 336:19 341:16 371:6 393:15 420:13 429:25</p> <p><b>potentially (5)</b> 137:13 230:24 231:12 334:17 371:1</p> <p><b>power (31)</b> 110:3 111:5 112:9 120:7 121:20 122:1 122:14,16,18 124:24,24 125:4,9 125:21 126:3 128:9 128:19 129:1,3,20 129:21 183:15 184:12 189:13 198:20,23 212:12 218:10 225:24 400:13 427:22</p> <p><b>powerful (20)</b> 120:18 121:1,3,3,9 122:7,23 123:14 124:11 125:14 126:2 171:16 174:2 181:3 182:3,5 190:7 218:13 222:20,22</p> <p><b>PowerPoint (7)</b> 5:18,22 6:17 113:8,23 423:9 428:19</p> <p><b>practice (2)</b> 12:13 81:2</p> <p><b>practiced (1)</b> 12:11</p> <p><b>practices (1)</b> 136:18</p> <p><b>pre-review (1)</b></p>	<p>23:16</p> <p><b>preamble (2)</b> 18:25 19:17</p> <p><b>predates (1)</b> 193:17</p> <p><b>predict (7)</b> 364:13,22 366:18 367:11 368:17,20 372:14</p> <p><b>predicted (1)</b> 375:15</p> <p><b>prefer (3)</b> 189:21,23 192:24</p> <p><b>pregnancy (2)</b> 30:24 77:14</p> <p><b>pregnant (1)</b> 31:3</p> <p><b>preliminary (4)</b> 288:5 290:11,15 291:9</p> <p><b>premise (1)</b> 135:5</p> <p><b>preparation (1)</b> 245:22</p> <p><b>prepared (12)</b> 80:4 247:5 278:2,7 288:12 290:5 305:10,19 347:22 348:4 410:11,14</p> <p><b>preparing (1)</b> 23:20</p> <p><b>present (31)</b> 4:17 17:4 22:7 24:2 77:11,14 84:15 128:6 152:25 155:23 157:12,20 158:16 162:4 171:6 177:16 182:20 246:8 268:22 279:3 289:5,6,17 319:6 378:25 379:25 380:20 383:9 384:4 403:13 406:4</p> <p><b>presentation (14)</b> 38:25 278:21,21 288:21,24 290:7 315:25 428:19,20 428:24 429:3,7,8 432:11</p> <p><b>presentations (5)</b> 24:6,9 37:8 39:1 432:19</p> <p><b>presented (33)</b> 23:5 158:4 160:21 212:18 267:5 268:2 270:2 286:19 287:4</p>	<p>288:23 289:23 290:6,10 291:13,23 292:3,17,22 294:1,2 294:11 295:17 308:8 317:7 318:20 337:18 342:16 375:22,24 377:16 378:14 380:19,25</p> <p><b>presenting (15)</b> 22:14,15 53:5,7 158:2 161:16 246:7,11 266:17 290:14,23 292:25 293:5 347:20 376:15</p> <p><b>presents (2)</b> 326:14 338:6</p> <p><b>preserve (1)</b> 413:17</p> <p><b>president (2)</b> 36:12,12</p> <p><b>presume (5)</b> 167:8 176:12 194:18 224:15 418:7</p> <p><b>presumed (1)</b> 197:8</p> <p><b>presumes (1)</b> 185:13</p> <p><b>presuming (4)</b> 201:3 208:11 209:20 209:21</p> <p><b>pretty (11)</b> 37:3 51:18 94:3 119:19 173:19 355:18 361:18 409:25 427:20 428:9 436:2</p> <p><b>prevalence (14)</b> 49:5 124:8 125:3 126:7,10,12 364:2 366:16,21 367:3 373:18,21 374:9 375:2</p> <p><b>prevent (1)</b> 389:11</p> <p><b>previous (1)</b> 415:10</p> <p><b>previously (4)</b> 18:14,16 165:16 307:15</p> <p><b>prior (28)</b> 26:20 129:22 133:18 147:7 183:24 184:1 192:12 202:13 209:13 221:7 222:3 234:14 278:2 289:20 313:24</p>
--	--	--	--	--

344:14 346:25 347:7 348:18,21,22 348:25 356:9 358:3 369:25 415:5,5 431:15 <b>probability (3)</b> 87:7,18 115:20 <b>probable (12)</b> 94:17 95:2 97:5,19,21 98:10 99:16 100:1,9 101:14 102:20 104:2 <b>probably (25)</b> 40:21 51:19 87:5 146:11,19 171:4 172:9,10 178:2 182:14 184:25 194:5 204:5 205:21 210:21 213:24 214:24 234:10,23 235:10 268:16 388:4 392:1 412:18 430:5 <b>problem (17)</b> 30:19,20 31:20,23 44:22 127:6 140:20 170:20,24 334:4 346:19 347:13 373:13,13 395:15 397:4 430:2 <b>problematic (1)</b> 67:19 <b>problems (7)</b> 288:6 391:3 392:4 400:15 433:2,20,20 <b>procedure (2)</b> 224:18 343:15 <b>procedures (1)</b> 26:16 <b>proceedings (2)</b> 207:1 437:2 <b>process (9)</b> 10:23 33:9 37:12 38:6 41:9 45:6 46:6 187:3 192:6 <b>produce (1)</b> 22:11 <b>produced (4)</b> 132:12 313:13 435:22 436:16 <b>producing (1)</b> 380:16 <b>product (8)</b> 52:7 300:8,23 302:13 304:23,25 420:9 426:2	<b>production (1)</b> 333:2 <b>Products (2)</b> 1:4 8:8 <b>professional (6)</b> 14:11,13 16:24 19:6 21:8 270:1 <b>professionals (1)</b> 34:5 <b>professor (1)</b> 13:15 <b>professors (1)</b> 18:9 <b>proffer (1)</b> 81:3 <b>proffered (1)</b> 79:22 <b>proffering (1)</b> 79:3 <b>program (11)</b> 15:4,7,12,21 16:7,14 16:20 17:2 55:8,24 105:9 <b>progress (2)</b> 22:7 433:4 <b>project (3)</b> 6:17 276:17 277:10 <b>projects (1)</b> 107:23 <b>promotion (3)</b> 197:21,23,24 <b>proper (4)</b> 88:14 140:7 201:22 202:23 <b>properly (2)</b> 80:8 115:21 <b>proprietary (1)</b> 412:7 <b>prospective (6)</b> 317:18 390:5 391:9 392:14 393:1 433:1 <b>protect (1)</b> 426:22 <b>protective (6)</b> 274:13 279:8 286:4 295:8 342:20 344:21 <b>prove (1)</b> 117:18 <b>proves (1)</b> 112:23 <b>provide (38)</b> 12:18 41:15 45:8 52:14 83:24 84:6 92:10,12,16,20 93:10,16 105:13	106:15 119:22 120:5 127:2 135:12 153:9 154:15 226:4 226:8 229:15,22 230:3 264:11 265:8 267:6 268:3 270:3 271:5 278:22 297:20 298:15,19 323:9 407:8 410:14 <b>provided (14)</b> 12:16 13:4 116:19 118:24 135:20,21 136:9,11 137:12,14 227:18 277:18,19 435:11 <b>provides (7)</b> 99:11 262:20,25 265:5 266:10 269:13 323:16 <b>providing (3)</b> 88:16 265:22 269:9 <b>province (2)</b> 248:17 279:5 <b>provocative (1)</b> 289:7 <b>proxies (11)</b> 135:20 136:10 137:12 139:2,7 145:14 397:5 428:1,2,4 430:10 <b>proxy (33)</b> 135:11 136:16,19 137:20,21,24 138:8 138:18,23 139:16 139:20,22 167:19 167:21 169:7,14 279:7 286:3 295:7 297:17 305:23,24 306:3 329:24 330:2 423:14,19 424:5,6 427:4,11,19 428:10 <b>psychiatric (1)</b> 12:15 <b>public (2)</b> 195:19 437:19 <b>publication (15)</b> 22:24 23:21,25 33:2 227:14 357:18 358:21 361:25 376:8 377:21 378:22 380:21 386:20 391:5 394:8 <b>publications (5)</b> 23:12 33:3 119:23 138:16 140:19 <b>publicly (1)</b>	431:14 <b>publish (1)</b> 225:18 <b>published (39)</b> 77:20 223:4,7 224:4 225:1 227:2 228:2 275:5 288:7 289:14 319:1 325:3 357:6 357:21,22 358:24 359:21 360:24,25 366:23 376:14 377:15 382:3,20 386:9 387:7,7,11 388:1 389:12 391:11,19 392:25 393:17 394:15 395:10 414:22 415:5 416:18 <b>publishing (2)</b> 146:22 394:9 <b>PubMed (3)</b> 414:8,10,12 <b>pull (1)</b> 154:25 <b>pulled (2)</b> 227:4 393:22 <b>pulling (1)</b> 159:9 <b>pure (1)</b> 52:6 <b>purpose (2)</b> 46:22 202:16 <b>purposes (9)</b> 106:8,23 202:21 210:14 263:3 287:17 309:16,17 330:6 <b>pursue (1)</b> 13:9 <b>put (25)</b> 55:15 62:7 71:5,23 93:3,11,12 110:20 110:20 114:9 116:3 116:13 125:23 183:11 239:15 282:13 288:13 331:4,6 414:8 417:13,14 418:15 418:21 430:18 <b>putting (11)</b> 18:4 113:9 127:7 168:12 235:16 276:19 290:14 313:2 365:7 418:19 430:12 <b>puzzle (1)</b>	110:20 <b>pyrethrin (1)</b> 312:9 <hr/> <b>Q</b> <hr/> <b>quality (1)</b> 316:23 <b>quantified (1)</b> 275:25 <b>quantitative (1)</b> 131:13 <b>question (159)</b> 11:3,8,8 16:16 24:22 25:3 28:2,8 30:10 49:18 50:16 52:11 52:12 59:4,11 61:13 62:25 63:11 65:6 66:7,23 67:1,22,24 68:3,6 71:9 76:5 77:11 80:4,25 81:12 81:15 85:17 90:11 100:24 103:23 116:9 120:23 122:20 123:6 124:12 126:19,20 127:22,23 138:12 153:23,25 154:2 157:17 163:3 168:7 168:14 172:12,22 174:17,24 175:1 184:7 200:12,19 201:15 202:2,17 204:16 214:6 217:5 217:14,15 218:16 218:17,25 220:5,24 221:10,22 223:16 224:3,23 226:16 227:11 238:12,13 238:19 239:22 241:21 242:5 243:4 249:24,25 258:3,21 258:24 259:21,22 262:22 265:3 267:24 268:20,21 269:22 270:8 272:20 274:3,25,25 283:23 291:18 296:12 310:2 322:17 323:14 327:5 329:5 330:6 333:4 334:8 339:10 339:11 341:13 347:10 351:12 361:7,8,19,21,24 362:22 366:22 369:3 373:5 374:23
--	--	---	--	---

376:3 377:14,24 378:2,4,9 381:8 391:1 392:22 398:7 401:11 405:13,13 406:11 409:10,12 410:23 411:14,17 411:20 413:8 414:17 427:3 430:7 434:13,24 <b>questioning (5)</b> 397:25 408:7 409:16 410:10,18 <b>questionnaire (10)</b> 26:6 245:19 246:5,21 314:15 315:10 346:25 356:9 363:21 372:5 <b>questionnaires (3)</b> 31:11 356:13,23 <b>questions (41)</b> 10:18 24:25 25:24 26:10 50:4 56:6,8 81:9 85:8 86:19 92:8 126:24 127:2,3 246:21 269:23 274:11 307:11 344:3 351:8 380:11 406:21 409:25 410:4,6,11,15 412:2 412:22 413:3,14,16 413:22 422:2 428:12 431:4,6 434:4,6,15 435:2 <b>quickly (2)</b> 87:16 96:12 <b>quite (9)</b> 28:4 58:15 70:19 71:3 71:21 80:21 150:5 323:13 412:9 <b>quizzes (1)</b> 137:2 <b>quote (2)</b> 92:1 99:24 <b>quotes (2)</b> 316:10 423:2	173:3,7 175:6 177:17 <b>Railroad (1)</b> 3:20 <b>raise (4)</b> 193:23 197:19 390:1 410:7 <b>raised (8)</b> 25:5,6 217:17 242:19 375:20 391:1 393:4 393:5 <b>raising (5)</b> 176:1 189:17 192:2 196:16 375:18 <b>Ramazzini (8)</b> 33:23 34:1,7,24 35:7 35:18,22 36:1 <b>random (1)</b> 377:4 <b>randomized (1)</b> 317:16 <b>randomly (1)</b> 364:16 <b>randomness (1)</b> 91:23 <b>range (3)</b> 210:21 211:12 212:5 <b>ranges (1)</b> 212:24 <b>ranging (1)</b> 92:9 <b>ranking (7)</b> 316:25 317:5,8,16 318:4,6,20 <b>rarely (1)</b> 104:23 <b>rate (9)</b> 27:1 43:7,13,14 44:23 153:1 175:21 176:13 354:20 <b>ratio (128)</b> 43:3,3,7,15 44:6,7,23 44:24 84:17 89:5,24 109:6,8,9,13,15,18 109:23 110:2 111:15,21 115:9 153:17 154:7,9,16 154:21 155:15,17 155:22 156:17 157:6,7,12,22 158:3 158:10 160:18 163:20 171:14 172:1 175:22 178:23 179:3,22 180:4,12,21,21,22 182:20 183:16	213:10 217:19,24 218:21 232:13,14 232:16 233:7,8,18 251:1 252:3,8 253:8 253:13 256:12 258:5,5,8 259:2,5 260:6,8,10 269:5 279:4,10,19 280:13 280:15,18,23 281:4 281:10,20 282:5,17 282:19,23 285:14 287:23 298:8 300:19 306:11 308:4,14,25 309:1,5 312:10 319:7,12,14 320:8 330:9,14 350:8 352:12 353:6 353:8 396:3,14,23 396:25 398:14,19 399:7,20 424:4,9,21 425:15,18,20,22 427:11 <b>ratios (61)</b> 43:7,8,8 118:6,7 151:20 153:1,1,10 153:10 154:3,7 158:16 160:16 163:23 183:23 213:15 233:13 234:3,21 237:19 238:21,25 239:25 241:23,23 248:20 249:2,4,6 252:22 278:22 280:2 284:24 288:11 296:6,8 308:6,12,18 308:21 309:2,10,15 309:23 310:7,9 311:4,11,13 320:10 321:17 324:6 336:1 353:25 354:7,20 396:9 397:17 400:21,23 <b>re-review (2)</b> 18:14,18 <b>reach (9)</b> 45:21 48:16 51:7 88:1 128:9 286:14 331:19 410:25 417:22 <b>reached (6)</b> 55:13 56:22 61:15 62:20 356:1 418:12 <b>reaching (6)</b> 38:6,17 49:19 60:23 70:1 407:21	<b>reaction (1)</b> 88:3 <b>read (32)</b> 52:20 55:10,20 57:3,5 57:20 59:18 73:25 80:24 87:7 146:14 188:7 230:8 278:11 278:15 290:20 313:12 349:1 351:1 394:24,25 402:17 413:1 415:8,10,13 415:14,14,17 416:13 421:2,17 <b>reader (3)</b> 152:19 159:15 162:18 <b>reading (10)</b> 69:14 101:10 166:25 223:22 247:1 258:7 380:23 421:5,22 422:13 <b>real (5)</b> 52:8,9 95:11 331:11 335:20 <b>realistically (2)</b> 105:12 106:14 <b>reality (2)</b> 208:4,9 <b>realize (1)</b> 183:22 <b>realized (2)</b> 28:7 355:20 <b>realizing (1)</b> 183:21 <b>really (42)</b> 21:17 23:15 35:19 42:14 88:2 94:5 111:12 136:3 138:7 143:17 146:7,10 149:17 168:24 171:9 189:7 193:6 194:16 197:17 198:12 199:13 209:21 220:16 221:11 240:11 267:14 270:9 301:22 302:1 303:2 306:4 316:9,20 328:9,12 349:4 362:6 371:7 426:8 426:21 427:1 430:3 <b>Realtime (4)</b> 1:24 2:15 438:5,23 <b>reason (30)</b> 21:19 34:3,18 71:22 150:20 151:25 162:16 164:19	170:8 214:24 218:19 260:19 289:17 290:17 352:9 428:2,3 439:6 439:7,9,10,12,13,15 439:16,18,19,21,22 439:24 <b>reasonable (16)</b> 64:11 65:14 66:15 67:9 68:14 69:10 70:13,23 71:14 72:12 264:18 266:7 352:5 418:1 434:8 434:17 <b>reasoning (2)</b> 89:13 93:6 <b>reasons (7)</b> 82:10 151:24 157:15 218:14 335:9 390:24 399:8 <b>reassessing (1)</b> 31:23 <b>reassigned (1)</b> 14:5 <b>reboot (1)</b> 325:24 <b>rebooted (1)</b> 325:19 <b>rebuttal (11)</b> 6:5 165:23 277:21 278:7,8 347:18 348:23 354:24 385:16 389:25 395:7 <b>recall (39)</b> 18:1 21:8 24:15 25:4 25:15 31:1,22 32:8 33:16,20 35:24 131:17,21 132:20 133:9,11,16,22 134:19 135:1,6,8,8 135:10,15 166:3 180:19 310:12,20 310:23 311:7 348:20,25 350:10 350:13 363:8 420:3 421:22 431:6 <b>recalling (1)</b> 185:23 <b>receive (2)</b> 17:12 34:24 <b>received (6)</b> 11:15,18 14:12 23:3 313:11 347:19 <b>recess (12)</b> 72:21 96:17 144:18
<b>R</b>				
<b>R (4)</b> 3:1,15 4:1 438:1 <b>race (1)</b> 152:13 <b>radiation (2)</b> 197:2,10 <b>radon (12)</b> 168:3,20 169:22 170:4,5,9,12 171:22				



178:5 203:16 270:22 307:2,22 326:4 384:23 406:25 419:18 <b>recognize (1)</b> 112:4 <b>recommend (2)</b> 18:24 288:4 <b>recommendations (2)</b> 22:19 32:3 <b>recommended (1)</b> 15:14 <b>recontact (1)</b> 355:24 <b>record (68)</b> 7:9 8:24 9:15,20 15:3 59:25 72:20,24 76:21 79:17 81:10 81:11,14,17,22 96:15,20 139:21 144:17,21,23 178:4 178:8 180:3 186:20 203:15,19 207:2 214:5 240:23 243:20 248:19 249:1,21 258:21 270:21,25 307:1,5 307:19,21,25 317:3 318:18 326:7 353:20 360:23 361:15 384:22 385:1 405:8 406:22 406:24 407:3 408:6 408:10 410:24 411:2,6 412:4 413:7 419:17,21 435:17 436:22 437:5 438:10 439:4 <b>recorded (1)</b> 360:13 <b>records (1)</b> 314:17 <b>reduce (1)</b> 427:21 <b>reduces (2)</b> 345:12,19 <b>reducing (1)</b> 427:20 <b>reduction (1)</b> 280:17 <b>reevaluated (1)</b> 151:7 <b>refer (18)</b> 57:22 76:10 89:23 94:15 113:12 116:18 188:24	246:17 262:14 263:19 273:6 278:20 295:22 310:4 316:6 384:1 435:22 436:2 <b>reference (8)</b> 76:7 78:4 80:16 277:25 353:22,23 379:6 390:7 <b>references (1)</b> 415:3 <b>referencing (2)</b> 83:2 393:22 <b>referred (2)</b> 290:18 422:14 <b>referring (18)</b> 57:25 66:20 74:17,25 75:6,11 95:9 104:22 105:18 235:9 260:20 263:8,18 290:3 389:5 391:22 393:25 394:1 <b>refers (9)</b> 94:7,21 103:25 116:18 128:18 159:7 261:15 388:5 415:4 <b>reflect (2)</b> 105:12 106:14 <b>reflected (4)</b> 43:2 305:5 373:1 374:18 <b>reflects (2)</b> 111:22 257:9 <b>refusal (1)</b> 410:4 <b>refutes (2)</b> 41:16 42:18 <b>regard (14)</b> 53:18 56:24 74:13 81:5 417:17 418:12 425:9 427:25 428:23 429:2,10,15 431:10,13 <b>regarding (8)</b> 27:13,17 28:14 59:12 73:6 292:5 408:13 408:23 <b>registries (3)</b> 29:4,10,11 <b>regression (32)</b> 154:10 163:10 188:12 212:21 213:9,11 214:8,9 215:17,19 215:22 216:2,6,13 217:6,8,12 232:2,3	232:12,15,19 233:5 233:16,19,24 234:3 234:6,14 235:7 335:5,6 <b>regular (13)</b> 15:23 185:19 268:16 268:17 270:15,15 271:11,12,15 276:10,11 303:25 402:8 <b>regulatory (1)</b> 419:9 <b>rejected (3)</b> 43:21 44:16 48:4 <b>rejecting (2)</b> 99:17,17 <b>related (10)</b> 149:7 150:23 151:13 176:10 193:16 285:20 426:9 429:6 429:16 438:12 <b>relates (5)</b> 1:6 304:19,21 355:1 433:22 <b>relating (1)</b> 220:18 <b>relation (2)</b> 390:10 394:4 <b>relationship (7)</b> 14:11,13 19:7,10 24:11 77:21 121:10 <b>relative (26)</b> 31:17 44:6,23 84:17 110:15 120:6,7 128:9 135:24 171:2 171:3 172:5 279:6 352:3 354:5,12,19 365:12 366:6,13,14 366:17 377:19 378:17 381:1 390:13 <b>relatively (4)</b> 24:11 111:20 194:21 226:1 <b>relevant (6)</b> 77:11 152:18 194:15 198:4 210:3 414:16 <b>reliability (3)</b> 25:7 88:8 293:16 <b>reliable (13)</b> 135:21 136:3,10 137:14 138:6 291:25 292:4 293:10 315:18 316:4,10 377:22 426:19	<b>relied (2)</b> 294:12 295:17 <b>relies (1)</b> 135:10 <b>rely (9)</b> 84:24 117:10 119:12 150:20 175:5 398:24,25 399:9 416:10 <b>relying (1)</b> 252:4 <b>remaining (1)</b> 345:20 <b>remember (14)</b> 15:12 23:10 24:6,9 25:11 32:12 113:18 166:25 179:14 213:22 347:5 378:11 383:4 397:3 <b>reminder (1)</b> 162:17 <b>remove (3)</b> 196:3 296:1 427:25 <b>removed (2)</b> 284:15 285:25 <b>removing (2)</b> 428:9,10 <b>rendered (1)</b> 79:10 <b>rendering (1)</b> 78:9 <b>rent (1)</b> 17:11 <b>repair (1)</b> 342:19 <b>repeat (5)</b> 90:7,23 270:12 376:3 399:16 <b>repeating (1)</b> 415:12 <b>replace (1)</b> 288:6 <b>report (177)</b> 5:10 6:6 25:21 37:5 39:5,15 49:16 52:21 53:17,25 56:15 57:11,14,22 58:18 59:9 66:3,5 67:1 73:3,4,8,16 76:13 79:19 80:6,18,23,24 82:13,18,22 83:15 83:19,23 84:8,13 85:9 86:25 87:1,14 87:17 107:7 117:24 117:25 119:22 120:2 128:7 131:17	133:18 136:1,17 142:2 145:1 151:20 152:1,3,24 153:16 155:24 158:10,24 165:23 166:16 178:12 180:21 182:21 183:10 186:2,4,5,8 187:25 212:23,23 218:18 223:8,17 224:6 225:3,14,17 227:5 244:8 247:7 248:2 249:1,13,17,19 250:5,20,21 251:4,8 251:22 252:1 254:11,12 257:5 258:4 259:3 260:7,7 260:22,24 261:3 262:5,21 263:7 273:3,19 277:16,21 278:3,8,9 279:19 280:1,23 283:6,17 283:24 285:5 288:12,16 292:11 294:12 295:18 299:3 305:11,20 310:5,17 314:3 319:5,13,13,16,16 319:20 320:21 323:1 338:17 344:12 345:8 347:19,22 348:5,15 348:18,23 354:24 364:1 370:16 379:24 385:16 389:21,25 395:7 401:24 402:7 404:17 406:6 409:3 414:4,6 415:14,15 415:18,20,21 417:21 429:10,13 429:20 434:7 <b>reported (60)</b> 1:22 84:17 142:11,18 154:6 157:22 158:25 172:1 178:22 193:3 225:12 233:8 234:21 238:21 241:23 244:11 248:20 250:25 252:15,22 254:13 257:21 260:9 265:21 287:23,24 298:5 300:16 308:16,21 309:10
--	---	---	---	--

309:15 310:21 311:12 312:10 321:18 322:7 323:25 336:1,9 340:5,18 350:4 352:12 354:15 363:24 366:19 369:25 370:18 371:11,24 378:17 396:3,14,22 397:18 397:23 398:14 399:7 400:22 <b>reporter (15)</b> 8:20 9:14,18 10:4,25 11:5 96:10 113:20 147:24 170:2 226:15 325:18,22 328:15 438:6 <b>reporter's (1)</b> 11:1 <b>reporting (11)</b> 8:19,22 226:13 236:1 241:22 254:19 283:18 306:17 320:11 322:14 396:7 <b>reports (7)</b> 109:12 131:3,3 249:3 259:5 408:15 415:10 <b>represent (7)</b> 10:17 79:24 132:11 200:11,13 340:14 348:12 <b>representation (2)</b> 153:5 200:12 <b>representative (2)</b> 369:1 374:1 <b>reproduce (1)</b> 343:24 <b>reproducible (1)</b> 117:19 <b>reproductive (1)</b> 419:6 <b>requests (1)</b> 395:2 <b>required (4)</b> 79:21 127:9 241:3,10 <b>requires (2)</b> 130:8,17 <b>research (9)</b> 16:2 17:7 27:17 33:14 35:8 48:8 105:9 115:1 117:6 <b>researcher (1)</b> 143:20	<b>reserve (1)</b> 410:16 <b>reserving (1)</b> 408:21 <b>respect (59)</b> 30:14 32:18 45:18 55:12,13 57:14 58:5 58:21 60:3,4 61:16 62:3,21 63:14 64:3 65:8 71:10,11 79:4 79:25 82:22 84:5 101:6 111:3 125:14 130:6 136:8 141:10 141:20 143:14 149:4 154:13 159:2 163:2 183:7,15 187:24 189:18 194:10,15,16 198:17,19 206:18 210:9 215:3 221:16 228:8,18 247:7 248:1,2 286:15 293:4 294:16,25 297:21 321:12 363:3 <b>respond (9)</b> 27:10 355:10 356:8 372:13,15 409:2,9 412:24 413:12 <b>responded (12)</b> 355:9 356:13,22 364:16 367:24 369:6,16 370:1 372:5,20 374:8 409:4 <b>respondent (1)</b> 279:7 <b>respondents (7)</b> 135:11 286:3 295:7 305:23,24 383:11 428:10 <b>responding (2)</b> 136:21 428:4 <b>responds (2)</b> 372:1 394:17 <b>response (29)</b> 27:1 28:10 132:12 264:12,14 265:8,15 265:23 266:18,24 267:7,13 268:3,23 269:2,9 270:4 275:15 302:25 309:21 311:14,18 313:14 335:24 345:7,10 372:7 387:20 409:5	<b>responsibilities (1)</b> 13:17 <b>responsible (1)</b> 254:5 <b>responsive (1)</b> 413:3 <b>responsiveness (1)</b> 412:8 <b>rest (1)</b> 394:16 <b>restart (1)</b> 96:12 <b>restate (1)</b> 90:20 <b>restrictions (1)</b> 150:7 <b>result (13)</b> 50:5 87:8 89:16 90:9 91:1 103:2 139:4,5 170:13 188:13 192:6 235:2 409:16 <b>resulted (2)</b> 191:3 288:21 <b>resulting (3)</b> 77:13 177:3,7 <b>results (32)</b> 22:11,14,21 23:4 51:18 89:17 116:3,5 116:13,15 123:11 130:2 138:19 153:6 153:8 158:10 161:4 179:17 230:21 234:12 235:6 236:1 239:6 244:9,11 246:11 269:13 289:5,6 296:14 378:25 382:15 <b>retained (3)</b> 431:15 432:15 433:18 <b>retro (1)</b> 433:1 <b>retrospective (12)</b> 313:21 314:5,8,9,12 314:17,21 315:5,13 315:17 316:3,8 <b>return (2)</b> 97:2 212:17 <b>review (29)</b> 5:16 20:8 23:11,25 24:15,19 37:7,11,25 38:6,9 53:1 54:3,5,6 54:9,18,20 68:8 69:5 73:22 245:5 384:11 389:17 390:18,21 402:20 414:6 417:2	<b>reviewed (20)</b> 18:15,16 33:10 52:17 54:19 57:8 69:25 73:14 78:8 132:9 278:6 314:24 315:2 315:3 333:6 334:9 383:19 395:3 408:15 416:7 <b>reviewer (2)</b> 293:1 296:1 <b>reviewers (6)</b> 37:15,18,20,25 38:17 216:8 <b>reviewing (4)</b> 36:23 37:22 63:3 229:23 <b>revisions (1)</b> 386:21 <b>reword (1)</b> 171:20 <b>ridiculous (2)</b> 81:13 94:3 <b>right (84)</b> 17:25 19:14 33:8 40:19 42:19 45:17 63:10 76:25 81:18 81:19 85:8,14 96:3 99:15 109:25 111:2 112:3 115:24 118:20 129:16 133:2 142:23 146:19 149:16 155:1 157:23 161:13,15,25 162:9 166:25 168:12 172:21 173:5,11 175:7 181:16 184:3 186:6 187:14,23 191:24 195:7,20 201:9 205:3 206:2 213:5 214:3 231:2 233:3 234:9 249:12 251:10 306:6 308:18 314:13 315:17 316:15 318:7 319:6 333:19 337:11 338:19 340:1 345:16 347:1 360:10 364:14 368:9 369:17 372:2 374:3 384:6 386:2 387:3 406:3 408:22 410:17 411:19 412:21 422:2,7 436:20 <b>right-hand (3)</b>	114:11 179:17,20 <b>rigorous (1)</b> 47:17 <b>rise (1)</b> 196:19 <b>risk (73)</b> 6:21 32:19 33:13,18 42:1 43:3,7,11,12 44:6,6,23,25 45:1 84:17 110:15 118:7 142:22 143:4 145:3 145:9 146:3,6,8 151:5 153:10 163:22 164:11,13 164:14 171:2,3,12 171:12 173:7 175:12,14,17,19,21 254:14 271:13 285:22,24 302:17 324:5 328:1,13,20 328:22 331:3,21 332:7,8,10,19 334:18,19 335:16 336:1 350:8 352:3 352:12 353:6,8 390:13 398:14 418:24 419:8 422:3 424:14 429:24 430:9 <b>risks (4)</b> 252:16 354:6,12,20 <b>Ritz (49)</b> 1:16 2:9 5:3,11 6:6 8:7 10:7,14 11:15 39:4,13 73:2 81:4 81:22 83:23 96:23 96:25 113:17,23 132:4 144:24 178:10 203:14,21 203:23 204:4 227:2 238:11 243:20 271:2 276:16 306:25 307:7,9 308:2 312:6 313:10 326:9 385:3 407:5 408:10,22 414:2 419:17,23 435:11 437:3,12 439:3 <b>Ritz's (2)</b> 409:18 410:16 <b>road (2)</b> 201:9 202:7 <b>roadways (1)</b> 201:9 <b>rodent (1)</b> 56:7
--	---	--	--	---

<b>rodents (3)</b> 80:17 82:9,14	64:11 65:13 66:14 67:8 68:13 69:10 70:12,22 71:14	180:9 183:23 190:2 190:6 193:6,7 234:17 252:12 255:20 261:13 284:8 383:20 387:12 428:15,16	<b>second (41)</b> 22:3 26:5,17 80:2,11 83:12 87:13 92:6 118:14 145:12 152:8 158:8 226:10 228:14,16,19 244:6 253:1 278:8 297:19 306:19 307:17 355:6,10 356:8 357:16 358:22 361:1 364:16 367:25 368:19 369:7,15,16 371:14 371:16 372:7 373:16 402:11 409:7 433:14	352:7,22 353:3 364:6 365:20 374:9 391:3 392:9,15 406:20 408:16 423:24 424:2 425:6 425:13,17 427:3,7,8 427:9,16,17 428:15 430:25 432:10		
<b>role (7)</b> 15:19 16:7 21:25 23:2 36:7 383:6 385:3	<b>rules (3)</b> 79:21 169:14 215:4	<b>scale (9)</b> 160:11,14 161:8,11 161:17 162:5,6 390:10 394:4	583:12 587:13 592:6 598:8 599:8 606:10 608:14,16,19 614:6 615:1 618:8 619:19 620:19 621:17 622:6,10 623:8 624:16 625:14 626:19 627:17 628:11 629:15 630:19 631:17 632:11 633:15 634:19 635:17 636:11 637:15 638:19 639:17 640:11 641:15 642:19 643:17 644:11 645:15 646:19 647:17 648:11 649:15 650:19 651:17 652:11 653:15 654:19 655:17 656:11 657:15 658:19 659:17 660:11 661:15 662:19 663:17 664:11 665:15 666:19 667:17 668:11 669:15 670:19 671:17 672:11 673:15 674:19 675:17 676:11 677:15 678:19 679:17 680:11 681:15 682:19 683:17 684:11 685:15 686:19 687:17 688:11 689:15 690:19 691:17 692:11 693:15 694:19 695:17 696:11 697:15 698:19 699:17 700:11 701:15 702:19 703:17 704:11 705:15 706:19 707:17 708:11 709:15 710:19 711:17 712:11 713:15 714:19 715:17 716:11 717:15 718:19 719:17 720:11 721:15 722:19 723:17 724:11 725:15 726:19 727:17 728:11 729:15 730:19 731:17 732:11 733:15 734:19 735:17 736:11 737:15 738:19 739:17 740:11 741:15 742:19 743:17 744:11 745:15 746:19 747:17 748:11 749:15 750:19 751:17 752:11 753:15 754:19 755:17 756:11 757:15 758:19 759:17 760:11 761:15 762:19 763:17 764:11 765:15 766:19 767:17 768:11 769:15 770:19 771:17 772:11 773:15 774:19 775:17 776:11 777:15 778:19 779:17 780:11 781:15 782:19 783:17 784:11 785:15 786:19 787:17 788:11 789:15 790:19 791:17 792:11 793:15 794:19 795:17 796:11 797:15 798:19 799:17 800:11 801:15 802:19 803:17 804:11 805:15 806:19 807:17 808:11 809:15 810:19 811:17 812:11 813:15 814:19 815:17 816:11 817:15 818:19 819:17 820:11 821:15 822:19 823:17 824:11 825:15 826:19 827:17 828:11 829:15 830:19 831:17 832:11 833:15 834:19 835:17 836:11 837:15 838:19 839:17 840:11 841:15 842:19 843:17 844:11 845:15 846:19 847:17 848:11 849:15 850:19 851:17 852:11 853:15 854:19 855:17 856:11 857:15 858:19 859:17 860:11 861:15 862:19 863:17 864:11 865:15 866:19 867:17 868:11 869:15 870:19 871:17 872:11 873:15 874:19 875:17 876:11 877:15 878:19 879:17 880:11 881:15 882:19 883:17 884:11 885:15 886:19 887:17 888:11 889:15 890:19 891:17 892:11 893:15 894:19 895:17 896:11 897:15 898:19 899:17 900:11 901:15 902:19 903:17 904:11 905:15 906:19 907:17 908:11 909:15 910:19 911:17 912:11 913:15 914:19 915:17 916:11 917:15 918:19 919:17 920:11 921:15 922:19 923:17 924:11 925:15 926:19 927:17 928:11 929:15 930:19 931:17 932:11 933:15 934:19 935:17 936:11 937:15 938:19 939:17 940:11 941:15 942:19 943:17 944:11 945:15 946:19 947:17 948:11 949:15 950:19 951:17 952:11 953:15 954:19 955:17 956:11 957:15 958:19 959:17 960:11 961:15 962:19 963:17 964:11 965:15 966:19 967:17 968:11 969:15 970:19 971:17 972:11 973:15 974:19 975:17 976:11 977:15 978:19 979:17 980:11 981:15 982:19 983:17 984:11 985:15 986:19 987:17 988:11 989:15 990:19 991:17 992:11 993:15 994:19 995:17 996:11 997:15 998:19 999:17 1000:11 1001:15	<b>room (6)</b> 25:1 29:7 60:21 61:24 62:2 72:4	<b>run (2)</b> 150:5 289:10	<b>seed (1)</b> 312:8
<b>Roos (80)</b> 6:12,20 22:24 32:25 33:5 125:14,25 126:11 153:12,16 154:4,13 181:1,3,8 181:24 182:2 184:10 203:24 205:16 212:16 213:14 214:9,18,22 215:17 217:23 218:23 219:1 220:7 220:10,15 221:3,23 222:7 224:5 225:3 226:6 227:5,18,19 227:22 228:6,16 229:21 230:12 231:16 234:9 235:24 264:23 276:25 310:7 312:24 319:2,7,11 319:21 320:3,4 321:16 322:25 323:8,15 326:10 334:24 335:12,23 336:18 339:14 341:3 342:5,5,24 345:7,23 398:13,25 400:7 401:17,20	<b>runoff (1)</b> 77:13	<b>scenario (1)</b> 172:16	357:16 358:22 361:1 364:16 367:25 368:19 369:7,15,16 371:14 371:16 372:7 373:16 402:11 409:7 433:14	<b>seeing (8)</b> 23:10 35:24 50:6 74:21 90:10 137:5 289:20 305:4		
<b>ROSA (1)</b> 4:8	<b>Rustler (3)</b> 255:23 256:7,10	<b>Scholar (1)</b> 414:13	361:1 364:16 367:25 368:19 369:7,15,16 371:14 371:16 372:7 373:16 402:11 409:7 433:14	<b>seek (2)</b> 82:1 83:11		
<b>Ross (2)</b> 32:9,14	<b>runoff (1)</b> 77:13	<b>school (1)</b> 12:23	361:1 364:16 367:25 368:19 369:7,15,16 371:14 371:16 372:7 373:16 402:11 409:7 433:14	<b>seeking (1)</b> 40:1		
<b>roughly (4)</b> 204:8 205:1,16 206:4	<b>runs (1)</b> 202:9	<b>science (6)</b> 40:6,22 41:4 60:11 83:17 417:4	361:1 364:16 367:25 368:19 369:7,15,16 371:14 371:16 372:7 373:16 402:11 409:7 433:14	<b>seen (16)</b> 17:22 91:2 138:15 202:10,16 278:1 283:7,25 288:11 305:21 347:23 348:3 428:23 429:1 429:5 430:22		
<b>Roundup (12)</b> 1:4 8:7 68:8 70:9 78:1 78:2 129:11 152:20 159:17 210:15 434:19 439:1	<b>Rustler (3)</b> 255:23 256:7,10	<b>sciences (1)</b> 82:17	361:1 364:16 367:25 368:19 369:7,15,16 371:14 371:16 372:7 373:16 402:11 409:7 433:14	<b>select (1)</b> 78:15		
<b>row (2)</b> 117:11 351:24	<b>S</b>	<b>scientific (24)</b> 34:25 35:2 39:24 40:1 40:8,20 41:9 52:12 88:15 95:14,23 167:4,7 289:16 290:25 316:18,22 317:7 318:4 407:6 417:3 418:1 434:8 434:17	361:1 364:16 367:25 368:19 369:7,15,16 371:14 371:16 372:7 373:16 402:11 409:7 433:14	<b>selected (3)</b> 21:11 275:17 364:17		
<b>RPR (4)</b> 1:23 2:14 438:4,22	<b>Sao (1)</b> 428:16	<b>scientifically (1)</b> 38:20	361:1 364:16 367:25 368:19 369:7,15,16 371:14 371:16 372:7 373:16 402:11 409:7 433:14	<b>selecting (1)</b> 268:14		
<b>RR (1)</b> 394:7	<b>saw (10)</b> 167:10 277:24 278:5 290:2 294:13 348:16,17,20,22,25	<b>scientist (20)</b> 15:8,11,18 16:8,11 17:9,18 57:2,3 58:11 60:21 63:3 68:23 71:4 72:1 78:17,18 79:9,12 82:16	361:1 364:16 367:25 368:19 369:7,15,16 371:14 371:16 372:7 373:16 402:11 409:7 433:14	<b>selection (18)</b> 28:15,16,19 29:1,2,24 30:4,8 140:1,5,10 140:12,15,20,24 141:2,4,18		
<b>rubric (1)</b> 262:16	<b>saying (27)</b> 93:23 102:2 106:3,20 125:6 148:22 159:22 169:8 170:7 184:24 196:24 198:2 230:21 255:1 255:1 275:14 322:12 327:6,10 332:1,1 343:19 377:6,13 394:12,13 412:15	<b>scientists (12)</b> 15:22 16:9 18:9 27:13 28:9,14 29:17 30:13 32:3,6 284:11 289:5	361:1 364:16 367:25 368:19 369:7,15,16 371:14 371:16 372:7 373:16 402:11 409:7 433:14	<b>self (2)</b> 306:3 397:4		
<b>ruled (9)</b>	<b>says (27)</b> 53:3 74:16 77:9 84:9 92:19 93:13 100:6,7 105:5 106:25 120:11 133:21	<b>Scott (2)</b> 4:18 8:18	361:1 364:16 367:25 368:19 369:7,15,16 371:14 371:16 372:7 373:16 402:11 409:7 433:14	<b>self-evident (2)</b> 36:21,22		

49:8 50:8 138:17 139:13 211:19 292:24 293:20 294:17 305:23 306:5,7,10	<b>sex (4)</b> 152:13 179:5 180:5 279:4 <b>shake (2)</b> 197:15,17 <b>share (1)</b> 385:6 <b>Sheila (2)</b> 223:6 224:15 <b>Shimada (3)</b> 4:15 10:1,1 <b>SHIMADO (6)</b> 155:7 166:9 200:7 214:1 350:18 405:11 <b>short (10)</b> 38:5 48:25 178:1 181:8 243:8,10 264:3 326:1 343:18 343:19 <b>shorter (12)</b> 181:5 204:14,23 205:3 206:3 219:20 219:23 220:3 341:22,23 371:17 426:7 <b>Shorthand (1)</b> 438:6 <b>shortly (1)</b> 358:10 <b>show (25)</b> 51:18 56:12 120:12 121:17 129:1 147:13 153:20 161:5 175:10 183:4 223:11 263:11 285:3,19 302:24 310:21 331:8 399:1 403:2,4 405:6 423:9 427:22 429:5 433:6 <b>showed (2)</b> 380:25 404:16 <b>showing (7)</b> 304:20 329:1,8 373:20 378:19 402:22 433:3 <b>shown (7)</b> 41:11 150:17 230:16 428:14,25 434:4,15 <b>shows (8)</b> 110:11 120:11,14 122:12 123:23 428:23 429:17 431:24 <b>shrinkage (1)</b> 234:13	<b>sick (1)</b> 428:6 <b>sickest (3)</b> 397:6,11 428:9 <b>side (2)</b> 106:7 197:10 <b>sides (1)</b> 160:23 <b>signal (1)</b> 49:12 <b>significance (6)</b> 84:10 108:5 112:6 280:6 320:16 352:25 <b>significant (25)</b> 31:9 89:2 107:21 108:6 111:24 116:25 117:3 156:19 232:20 234:5,6 249:6 252:15,23 253:5,10 253:14 280:4,24 281:12 396:5 410:20 424:21 427:14,23 <b>significantly (4)</b> 336:9 338:7 339:15 342:7 <b>similar (10)</b> 105:4 107:24 108:14 108:18 232:20 298:4,9 300:7 344:18 364:3 <b>similarly (1)</b> 205:22 <b>simple (16)</b> 67:2 68:3,6 96:5 126:20 238:19 258:3 259:22 266:6 343:25 344:5,25 361:18 370:12 409:10 410:23 <b>simplicity (1)</b> 381:18 <b>simplified (1)</b> 308:17 <b>simplistic (1)</b> 133:5 <b>Simply (1)</b> 411:18 <b>Simultaneous (1)</b> 328:14 <b>single (12)</b> 31:24 190:21 193:9 224:14 308:20 312:9 337:20 358:5	358:7 359:8 379:7 381:19 <b>singular (3)</b> 109:1 415:13,13 <b>sink (1)</b> 159:24 <b>sit (2)</b> 38:25 430:7 <b>sits (1)</b> 72:4 <b>sitting (2)</b> 247:3 403:21 <b>situation (4)</b> 145:17 331:10,15 339:1 <b>situations (1)</b> 86:8 <b>six (9)</b> 68:19 124:16 186:16 194:11 222:4 236:20 237:3 238:4 268:8 <b>sixth (2)</b> 123:19 361:6 <b>size (28)</b> 31:5 41:2 49:5 88:24 88:25 89:5 97:23 115:13 120:12,15 121:17,25 122:13 122:16 123:24 124:1,19,21 125:6,8 128:18,18 131:10 170:16 176:24 218:9 427:21,21 <b>skip (2)</b> 312:21,24 <b>slide (42)</b> 113:25 114:17 131:24 132:5,19 133:8 165:6 277:19,22 278:1,14 313:10,13 313:15 315:17,25 316:3,14 405:8,17 405:21,21,23,24 423:8,9 428:23 429:5,17 431:23,24 432:11,19 433:6 435:11,13,19,21,24 436:1,13,15 <b>slides (7)</b> 113:24 114:10 167:11 288:18 289:9 405:14 432:12 <b>slightest (1)</b> 238:13 <b>slightly (6)</b>	156:18 180:14 206:5 213:12 320:7 396:10 <b>SLL (2)</b> 282:2,3 <b>slowly (1)</b> 10:25 <b>small (8)</b> 25:21 33:18 34:6 282:4 312:16 369:11 400:3,4 <b>smaller (4)</b> 114:21 172:6 173:16 409:22 <b>smallest (1)</b> 180:20 <b>smoke (1)</b> 144:5 <b>smokers (3)</b> 142:21 173:8,8 <b>smoking (18)</b> 142:21 143:15,17,23 143:25 145:24 146:1 168:2,11,12 170:4,11 172:2 173:7 175:6 177:18 179:5 180:5 <b>so-and-so (1)</b> 175:14 <b>society (3)</b> 34:11 36:4,14 <b>sociology (3)</b> 11:20,24 12:3 <b>solely (2)</b> 119:12 198:20 <b>solid (1)</b> 38:20 <b>solidified (1)</b> 429:22 <b>soliloquies (1)</b> 409:11 <b>solvent (1)</b> 33:19 <b>somebody (10)</b> 21:14 125:12 148:24 185:15,18 188:25 189:3 271:18 371:24 399:1 <b>somewhat (7)</b> 114:13 142:13 206:20 209:12 298:4 320:5 409:20 <b>son (1)</b> 136:19 <b>soon (2)</b> 194:21 198:1
---	---	---	---	--

<b>sorry (22)</b> 148:8 172:16 186:4 188:1 213:3 237:9 278:7 288:9 306:21 319:18 322:5 325:18 333:3 349:16 354:9 376:23 379:25 381:12 383:7 389:25 435:3 436:21	311:23,25 <b>specified (3)</b> 245:7 246:12,19 <b>specify (3)</b> 40:23 245:20 246:22 <b>specifying (1)</b> 41:1 <b>speech (1)</b> 127:4 <b>spend (2)</b> 14:21 78:19 <b>spent (1)</b> 16:25 <b>spill (1)</b> 274:12 <b>split (4)</b> 72:1 238:2 331:7 430:16 <b>splitting (4)</b> 267:16 268:13 280:8 309:19 <b>spoken (1)</b> 385:5 <b>spraying (2)</b> 185:16 336:15 <b>spring (1)</b> 271:19 <b>squarely (1)</b> 436:3 <b>stable (2)</b> 116:4,14 <b>stand (3)</b> 114:24 282:3 434:11 <b>standard (6)</b> 107:9,10 139:21,23 414:6 419:10 <b>standardizing (3)</b> 105:10 106:12 164:4 <b>standing (1)</b> 407:7 <b>start (17)</b> 8:5 11:10 41:6 48:25 49:1,3 73:24 127:20 199:9 201:22 208:22 297:16 316:24 317:4 392:19 408:2,4 <b>started (10)</b> 17:2,19 149:13 150:1 208:11 209:22 337:11 338:24 358:13 383:15 <b>starting (9)</b> 41:14 201:1 202:23 203:6 207:10 244:8 309:21 355:22	365:15 <b>starts (8)</b> 77:1 118:1 152:4 199:16 390:4 392:13,24 393:23 <b>state (67)</b> 32:10 41:13,25 52:23 53:25 54:7 58:18 59:7,9 66:2,4 75:25 79:18 81:22 87:14 87:16 102:15,16 104:4 108:4 115:17 116:1,9,11 117:23 118:6 152:8,17 158:24 165:24 186:12,15 187:25 188:3 189:20,21 229:14 230:14 237:6 238:8 240:18 241:15 242:7,14 245:12 246:7 254:12 257:5 258:4 274:5,19 275:5,23 279:5 280:16 316:16 345:8 354:25 377:21 378:22 379:11 381:16 382:24 386:3 389:20 433:16 438:2 <b>stated (20)</b> 77:19 80:13 83:15 101:10 182:1 208:10 221:19 240:5 259:13 260:22 282:25 283:12 285:4 292:12 310:8,19 335:7 382:4 390:23 429:19 <b>statement (19)</b> 78:3 231:8 308:17 315:22,24 373:9 382:12 387:21,25 391:17 393:2,10,22 395:1 405:4,7 408:6 409:6 411:5 <b>statements (8)</b> 82:22 93:3 127:8 159:20 226:21 348:1 413:18 432:1 <b>states (15)</b> 1:1 6:10 8:9 29:11 92:14 94:15,19 219:12 234:10 252:7 261:23	277:12 295:23 386:5 394:1 <b>stating (11)</b> 98:8 103:1 159:11 166:15 196:23 244:18 252:2 254:10 374:4 379:18 422:1 <b>statistic (2)</b> 89:17 90:3 <b>statistical (28)</b> 44:2 45:14 46:24 84:10 105:8,13 106:11,15,21 108:5 112:5 122:14,15,17 124:24 125:21 128:19 129:1,3,20 129:20 218:10 225:24 280:6 282:1 320:15 427:22 430:13 <b>statistically (23)</b> 89:2 107:20 116:4,14 116:25 117:3 121:3 121:9 156:19 234:4 249:6 252:15,23 253:5,10,14 280:4 280:24 281:12 396:4 424:21 427:14,23 <b>statisticians (3)</b> 92:7 96:3 106:5 <b>statistics (3)</b> 45:3 107:1 111:23 <b>status (9)</b> 179:5 180:5 237:5 238:8 239:8 240:18 242:14 342:18,19 <b>stay (1)</b> 410:11 <b>stayed (2)</b> 370:19 389:1 <b>stays (1)</b> 282:11 <b>step (12)</b> 46:5 47:2 145:12 189:19 197:24 215:12 217:4,13 222:22 372:15,17 372:18 <b>stepped (1)</b> 21:13 <b>steps (2)</b> 48:13 100:16 <b>stimulate (3)</b> 316:11,19 318:19	<b>stimulated (1)</b> 416:3 <b>stipend (1)</b> 17:10 <b>Straif (10)</b> 13:22,24 14:5,7,11,15 15:3 20:8,12 35:17 <b>strata (11)</b> 164:3,5,10,12,13,17 164:18,22 165:15 165:18,20 <b>stratification (3)</b> 164:7 165:2 237:17 <b>stratified (9)</b> 163:14,19 165:12 236:10,12 240:9 250:11,15 306:4 <b>stratifying (1)</b> 239:8 <b>Street (1)</b> 4:12 <b>strength (2)</b> 70:2 176:19 <b>strengthens (1)</b> 72:8 <b>strengths (1)</b> 218:8 <b>stress (6)</b> 75:8,12 402:4 404:4 407:7,19 <b>strike (12)</b> 52:15 70:4 80:7 82:1 83:10 182:19,19 245:4 314:25 315:1 329:10 408:24 <b>strive (1)</b> 158:15 <b>strong (10)</b> 58:15 69:2,16 71:21 117:13 145:9 146:3 146:4,8,10 <b>stronger (1)</b> 115:19 <b>strongly (1)</b> 182:15 <b>structure (1)</b> 94:21 <b>student (3)</b> 13:21 14:1,2 <b>students (35)</b> 13:19 15:24 16:1,1,3 16:6 47:12 86:13 88:11 92:24 93:2 96:8 97:2 108:24 109:4 110:13 113:2 117:9 131:20,22
---	---	--	---	---

<p>132:8 134:1,25 165:11 169:1 315:16 316:2,11,15 431:20,25 432:25 433:23 435:12,14</p> <p><b>studied (3)</b> 41:22 209:3 415:24</p> <p><b>studies (171)</b> 6:19 24:2 27:3 29:21 30:24 33:10 38:16 39:15 42:4 43:1 48:10 51:14 52:5,14 53:1 54:2,3,5,8,9,14 54:19,21,24 55:14 56:17,18 59:21 65:4 65:9 66:11 74:3,9 74:11 75:7 77:20 78:21 82:9 85:11,20 86:2 89:3 110:4 111:5 115:8 120:7 120:18 122:7 128:10 129:8,18,25 130:8,13,17,24 133:14 138:5 140:1 140:4,11,12,13 144:9,10 148:23 151:19 153:2,6,8,10 154:14 159:1,5,14 160:4 166:1,17 176:3 178:11 182:4 182:18 184:8,19 197:12 199:2 200:22 205:7 215:5 215:10 218:6,7 222:13,24,25 224:13 225:15 229:24 230:2,15 235:23 263:16 272:2 276:24 279:17 284:15 286:16,17 287:5,14 288:6 290:19 306:14 313:20 314:2,12,16,18,20 315:3 316:7,16,17 316:23 317:18 320:10 321:1,13,19 325:2 333:13 336:11 338:9 339:19,25 340:6 342:9 343:22 344:12 345:17 357:21,22 380:24 396:20 397:15 401:3 402:3,19,21 402:22 403:13</p>	<p>404:15 407:6,19,25 408:1 409:19,22,22 410:3 415:13,14 416:2,4 417:7,9 430:23 432:2 434:1 435:25,25</p> <p><b>study (403)</b> 6:3,4,8,12,13,14,15 6:20,24 7:3,4 20:18 22:22 23:19 24:3 27:12,13 28:17 29:19,20,21,22,25 31:8 42:11,12,20,21 44:15 45:7 46:8 48:4,14,17 49:1 50:6,13,18,24 51:13 56:7 73:13 85:6 88:23,24 90:13 99:25 102:6,6 108:9 109:12 112:9,23 115:13 116:5,15 120:13,18 121:8,20 122:1,3,4,6,21,22 122:23 123:7,8,9,9 123:13,21,24,25 124:4,11,12,18,20 125:13,14,22,25 126:1,8 129:22 131:2,5,7 135:1,10 136:4 138:19,25 140:21,24,25 141:1 141:2,4,13,17 142:10 144:7 145:2 145:25 150:18,20 151:18 154:4,15,17 155:1,16 156:1 157:7,13,22 158:9 158:12 160:15,17 160:17 171:15 178:13,13,18,22,25 180:4,20 181:19,22 182:2,3,6 183:14 184:11 186:7,10,12 189:13,18,22 190:7 191:14 192:2,23 193:21,24 194:3,5 195:5,10,11,14 196:10,11,12 198:17,24 200:23 201:19 202:25 203:24 204:7,9 205:16,18 208:5,9 210:11 211:24 212:11,12 213:16 214:10,11,16,17,18 217:16,19,24 218:5</p>	<p>218:20,21,23 219:1 219:14,14,16,20 220:2,7,10,16 221:3 221:4,17,20,23 222:7,8,9,21,23 223:4,8,24 224:14 224:20 225:1,13,14 226:1 227:15,19,22 230:14 234:8,22 235:14,22 236:1,8 237:16,19 240:1,8 240:24 241:22 242:7,8,22,25 243:11,13,21,22 244:1,14 245:6,8,18 245:19,23 247:16 248:21 250:11 260:9 272:9 273:10 277:1 284:14 287:21,22 298:3,17 299:15 307:10 308:3 310:4,7,10 311:4,10 312:7,25 315:19 316:23 317:8,22,23 318:1,6 318:7,8,9,12,15 319:1,4,7,21 320:3 320:4 321:3,16 322:10,25 323:9,16 323:24 325:1 332:3 332:14,21,25 333:2 333:5,11,15,17 334:10,11,13,24 335:13,18,21,21 336:18 339:14 341:2,14,20 342:5,5 343:7 345:23,25,25 346:13,20,23 347:4 347:9,14,17 350:23 351:13 353:2 355:14 357:6 358:13,24 359:1,23 360:17,24 361:3 362:4 363:1,10,12 363:12,22,24 370:24 371:9,19 375:23 376:13 381:15 382:6 383:1 385:21 386:21 387:7,9 388:12 390:5 391:9,11 392:14,25 393:1,16 393:18 395:10,13 395:19,22 396:14 398:13 399:18 400:3,3,4,5,6,6,14</p>	<p>401:5,5 407:15,15 408:3 409:24 410:2 428:13 429:16 431:11,14 432:3,6 432:21 433:21,24 435:15,23</p> <p><b>study's (1)</b> 91:17</p> <p><b>study-specific (1)</b> 333:12</p> <p><b>studying (3)</b> 52:10 145:4 146:17</p> <p><b>stuff (1)</b> 168:11</p> <p><b>sub (3)</b> 29:21 206:23 396:11</p> <p><b>subanalyses (2)</b> 294:16,18</p> <p><b>subgroup (7)</b> 61:15 164:1 207:19 230:23 255:5 280:7 398:3</p> <p><b>subgroups (1)</b> 312:17</p> <p><b>subject (1)</b> 187:21</p> <p><b>subjects (8)</b> 134:3,14 163:21,24 237:8 309:4 356:12 396:17</p> <p><b>submit (1)</b> 83:18</p> <p><b>submitted (2)</b> 80:6 348:15</p> <p><b>subpoena (1)</b> 313:14</p> <p><b>subpopulation (1)</b> 388:8</p> <p><b>Subscribed (1)</b> 437:15</p> <p><b>subsequent (5)</b> 69:23 184:8 284:12 284:14 386:20</p> <p><b>subsequently (2)</b> 227:4 386:9</p> <p><b>substance (1)</b> 67:24</p> <p><b>substances (2)</b> 180:9 335:11</p> <p><b>substantiates (1)</b> 88:17</p> <p><b>substituted (1)</b> 386:23</p> <p><b>substudies (1)</b> 401:23</p> <p><b>subsumed (1)</b></p>	<p>262:17</p> <p><b>subtract (2)</b> 212:6 407:24</p> <p><b>subtype (1)</b> 387:17</p> <p><b>subtypes (5)</b> 150:22 278:25 279:23 312:15 387:17</p> <p><b>suffer (1)</b> 97:20</p> <p><b>sufficient (4)</b> 191:20 192:5 407:20 409:17</p> <p><b>sufficiently (3)</b> 192:3 195:3 353:16</p> <p><b>suggest (2)</b> 293:19 295:6</p> <p><b>suggested (5)</b> 229:15 230:3 284:2 408:11 418:22</p> <p><b>suggesting (1)</b> 233:3</p> <p><b>suggests (1)</b> 266:25</p> <p><b>Sugimoto (1)</b> 56:7</p> <p><b>Suite (1)</b> 2:12</p> <p><b>sum (2)</b> 386:5 387:22</p> <p><b>summarized (1)</b> 38:1</p> <p><b>summarizes (1)</b> 416:14</p> <p><b>summary (2)</b> 164:2 165:17</p> <p><b>summer (2)</b> 150:19 271:21</p> <p><b>Sundays (1)</b> 78:19</p> <p><b>super (3)</b> 235:5,11 259:12</p> <p><b>Support (1)</b> 5:12</p> <p><b>supports (2)</b> 230:15 323:10</p> <p><b>supposed (3)</b> 79:16 264:13 384:16</p> <p><b>supposedly (4)</b> 358:8 360:5,10 369:13</p> <p><b>sure (41)</b> 10:22 30:1 35:1 47:13 55:19 72:14 89:15 113:17 132:21 134:11 143:19</p>
--	--	---	--	--

146:21 191:6 192:25 197:18 202:15 207:24 211:11 215:14 217:13 223:12 224:24 242:24 248:12 255:14 257:14 262:21 265:2 266:14 277:4 278:18 294:23 299:25 329:7 340:12 352:22 359:18 391:3 395:18 414:24 415:6	<b>systematic (1)</b> 216:2 <b>Systems (4)</b> 1:24 2:15 438:5,23	264:3 270:19 278:5 313:15,21 317:6 324:5 325:25 364:7 384:12,15,18 406:18 427:19 434:24	418:8 423:25 433:1	171:23 177:7 186:16 188:11 189:24 190:15 192:25 194:11 196:11,18 198:9 207:7,19,22 209:11 211:2,8,25 212:5,7 217:18,23 218:19 218:24 220:8 221:4 221:21,25 327:12 340:10,10,11,13,13 340:16 411:17
<b>surprise (1)</b> 239:7 <b>surprised (4)</b> 236:19 300:25 336:14 337:25 <b>surprising (2)</b> 233:22 298:2 <b>survey (8)</b> 355:10 357:16 361:2 367:25,25 369:7,7 372:7 <b>surveys (1)</b> 357:7 <b>survived (1)</b> 335:20 <b>susceptible (1)</b> 189:1 <b>suspect (1)</b> 29:3 <b>suspend (1)</b> 408:7 <b>suspending (1)</b> 410:18 <b>swallow (1)</b> 150:19 <b>swear (1)</b> 10:5 <b>Swedish (1)</b> 399:18 <b>switch (2)</b> 199:5 338:22 <b>sworn (3)</b> 10:9 437:15 438:9 <b>symmetric (1)</b> 161:21 <b>symmetrical (1)</b> 161:7 <b>system (2)</b> 37:24 189:5 <b>system-related (1)</b> 188:6	<b>T</b> <b>T (5)</b> 5:7 6:1 7:1 438:1,1 <b>table (92)</b> 110:11 119:22 120:4 120:11,16 121:7,16 122:4,12,21 123:4 123:23,23 125:12 128:6,6,8,17 129:3 136:24,25 155:13 156:4 157:5,18 178:25 179:4 183:22 184:4,4 205:9 212:18 231:13,19 232:17 236:7 237:7,12,18 238:20,20 247:18 247:20 248:7,11 251:14,17,22 252:5 252:20,21 257:16 258:7 263:1 264:10 265:5,22 266:16 267:5 268:2,21 269:7 270:2 271:3 273:11 279:3 290:3 291:1,4 294:6 295:5 295:23 297:21 305:25 306:2 308:5 308:7 312:6,10,15 317:4 318:20 319:12 324:4 326:11,13 327:12 337:19 373:1 379:24 397:4 406:12 <b>tables (13)</b> 235:1 237:18 238:20 247:19 248:1,11,16 290:23 298:20 308:12 324:15 387:6,10 <b>take (37)</b> 19:16,25 33:9 39:18 52:13 55:3 93:2 100:15 144:13 169:10 177:20 187:3 188:10 189:19 191:12,21 197:23 203:10 223:21 234:19 248:13 251:12	<b>taken (21)</b> 10:19 72:21 93:22 95:5,8 96:17 112:25 144:18 178:5 203:16 208:1 270:22 307:2,22 326:4 348:14 378:24 384:23 406:25 410:22 419:18 <b>takes (1)</b> 48:23 <b>talk (26)</b> 20:5 39:4 44:13 46:25 72:10 82:23 84:4 107:6 118:22 125:9 126:8 132:20 136:23 154:12 178:13 183:11 196:9 208:20 228:22 276:16 287:19 297:18 306:20 389:21 390:7 395:20 <b>talked (14)</b> 80:17 82:8,11,12,13 82:15 140:19 212:9 293:15 338:9 371:1 385:13 395:19 417:20 <b>talking (56)</b> 26:25 28:21,22 30:5,6 38:7 44:9,10 46:22 53:16,17 54:9 56:21 56:22 59:10 65:4 93:25 98:25 121:2 125:21 131:11 141:25 143:21 144:24 148:10 155:11 158:19 168:1,5 174:13 186:9,21 197:20 204:13 207:16 212:10 248:8 271:2 283:15 294:18 308:2 310:6 320:12 322:8 333:11 351:4 363:11 366:17 370:13 372:22 385:17,18 417:11	<b>talks (3)</b> 83:3 87:1 186:23 <b>tape (1)</b> 8:5 <b>tapes (2)</b> 419:14 420:4 <b>Target (9)</b> 255:2,16,22 257:1,20 261:14,18,25 262:6 <b>task (2)</b> 23:14,14 <b>tasked (1)</b> 37:22 <b>taught (3)</b> 85:3,5 88:10 <b>teach (20)</b> 47:10,12 55:9 92:23 93:1 96:8 98:22 108:23 109:4 110:12 113:1 131:12,20 134:1,24 165:11 169:1 315:15 416:22 431:19 <b>teaching (14)</b> 26:3 55:23 86:13 87:4 88:11 97:1 134:20 313:16 431:19 432:20 433:19,22 435:12,14 <b>team (1)</b> 24:23 <b>tease (2)</b> 333:6 335:13 <b>technical (2)</b> 96:11 430:15 <b>techniques (1)</b> 163:9 <b>tell (20)</b> 44:25 56:12 91:16 111:16 112:5 119:7 120:5,16,17 121:7 121:19 126:9 184:17 247:12 253:16 278:16 296:2 349:10 380:4 393:24 <b>telling (1)</b> 285:23 <b>tells (6)</b> 108:25 111:25 136:2 199:14 370:20 426:13 <b>ten (39)</b> 48:23 72:16 170:13	<b>ten-year (1)</b> 188:4 <b>tendancies (1)</b> 310:23 <b>tenfold (1)</b> 97:19 <b>tenth (1)</b> 71:17 <b>term (7)</b> 29:20 31:17 44:2 235:4 316:8 317:21 430:16 <b>terminology (4)</b> 11:23 132:22 160:8 221:16 <b>terms (42)</b> 17:7 28:25 29:13 38:14 41:1 45:14 76:12 78:22 83:24 84:3,5,7 98:23,24 99:1 124:1,3,19,21 131:12 140:14 188:17 201:21 220:17,18 303:24 311:14 328:10 371:23 379:9 380:11 381:13 388:17 414:8,9,12 416:1 417:9 422:17 426:16 427:2 432:1 <b>tertiles (1)</b> 336:2 <b>test (24)</b> 42:4,12,22,24 43:25 44:10,11 86:4,5 89:16,17,24 90:2 102:23 103:12 105:2 108:5 282:1 363:1 376:6 377:11 406:1,5,9 <b>tested (1)</b> 374:15 <b>testified (6)</b> 10:10 211:17 274:22

350:3 402:20 429:11 <b>testifying (1)</b> 83:8 <b>testimony (34)</b> 83:11 215:16 219:3 220:12 221:8 222:4 250:13 255:15,19 273:16 291:16,22 293:14 302:22 314:19 337:17 344:14 350:12 358:3 371:4 388:22 398:23 401:2 403:2 408:23,25 412:10 421:25 422:6,11,13 422:25 436:23 438:11 <b>testing (10)</b> 40:9 42:6,15 44:3 86:8 96:2 102:24 104:25 250:17,19 <b>tests (2)</b> 86:6,7 <b>text (2)</b> 234:8,18 <b>Thank (7)</b> 10:3 13:13 113:13 144:15 180:1 277:5 313:5 <b>Thanks (2)</b> 143:12 423:20 <b>theirs (1)</b> 68:25 <b>thing (8)</b> 56:23 109:4 114:9 117:9 133:25 174:8 338:21 413:6 <b>things (21)</b> 36:15 68:2 89:14 101:6 106:5 138:14 138:21 190:25 196:9 208:15,16 224:13 250:3 296:19 301:21 310:8 311:5 316:24 386:2 393:9 413:19 <b>think (112)</b> 17:19 21:3 34:18 35:19,23 36:21 49:6 49:14 50:24 52:22 58:14 69:1 71:2,13 71:20,21 73:21 83:14 87:4,15 89:14 91:15 92:1 94:9 95:8 96:5 100:17	101:10 102:3 106:7 127:18 134:10 144:25 145:1 147:19 150:21 151:19 153:22 155:11 163:4 166:13 167:25 168:4,15,19 170:3,5 170:7 172:8,21 178:12 179:16 182:1 186:3 187:24 189:20 190:25 192:13 195:11 197:13 201:20 204:13 216:15 220:15 245:3 249:17 250:20 259:22 263:8 266:13 267:25 276:5 285:3 291:24 301:24 308:3 310:4 316:11 317:13 323:17 324:19 325:10,15 327:11 334:23 335:7 337:9 342:2 348:17 349:23 350:16 352:6 353:15 355:8 360:21 366:12 367:9 371:1 381:10 385:23 388:23 395:19,20,25 399:16 400:11 409:14 412:14 418:9 426:24 428:3 431:22 <b>third (2)</b> 121:14 359:5 <b>thoroughly (1)</b> 414:18 <b>thought (11)</b> 21:14 30:4 166:14 182:2 183:25 199:22 202:10 224:15 256:24 289:23 389:18 <b>thousand (2)</b> 177:5,8 <b>three (36)</b> 33:7 37:25 59:18 72:2 110:23 154:3 158:11 182:18 194:6 195:21,23 222:25 235:23 252:18 263:16 271:22 276:3 280:2	294:20 331:2,6,14 332:4,13 343:14 345:13 350:6 351:24 366:10 373:6 396:22 397:16,24 404:25 411:16 424:12 <b>threshold (14)</b> 44:11 93:24 94:2,10 94:24 95:25 99:6 101:21 104:1,2 108:22 109:1 111:18 119:13 <b>thresholds (5)</b> 94:8,8,12 95:9 104:20 <b>throw (3)</b> 159:23 169:10 236:21 <b>throwing (3)</b> 397:10 416:2,3 <b>thrown (1)</b> 185:17 <b>tie (1)</b> 426:12 <b>tighter (2)</b> 114:23 115:8 <b>time (132)</b> 8:16 16:4,10,23,25 21:1,16 22:1,2,8,13 22:24 24:12 25:19 25:20,21 26:4 30:21 34:10 40:22 71:18 87:4 90:8,25 92:1 96:20 103:22 104:16 121:14,24 123:19 127:3 147:7 149:13 178:2 187:1 187:1,10,14,17 188:17 189:10 191:20 192:3,5 193:8,25 195:2 198:3,9 199:4,22 203:7 204:7,9 209:13 210:1 221:9 223:21 225:9 226:16 227:10 239:21,23 240:6 241:9 245:2 248:13 260:15 267:10 270:7,11 275:24 278:2 295:13 301:8 305:10,16,19 313:23 318:10 325:3 332:12 339:24 341:14 343:18,19 346:24 347:1,21,25 348:4	348:22 349:1 351:1 355:17 357:15 359:5 360:9 361:6 362:7 364:7 369:5 369:14 371:17 374:22 375:9 377:7 395:21,25 398:8 409:16,17,24 410:5 410:10,14,19,20,21 411:3,15,21,22 412:5,15,16 413:11 433:13,15 435:2 437:6 <b>time-changing (1)</b> 187:12 <b>times (30)</b> 68:19 74:1 90:8,23 210:22 222:5 268:8 269:19 270:9 271:22 276:3 299:18 300:9,23 301:19 304:24 345:1 360:1 361:9 373:6 381:8 404:25 408:16 409:13 411:12,13,16,17 425:11 430:23 <b>timing (2)</b> 333:16 359:10 <b>title (2)</b> 18:2 84:9 <b>today (12)</b> 8:21 10:18 56:9 247:4 250:13 325:10 385:7 403:21 417:11 434:4,16 437:4 <b>today's (2)</b> 8:15 437:2 <b>told (7)</b> 10:22 68:1 79:15 210:2 275:10 276:2 295:6 <b>tool (3)</b> 164:19 196:6 433:22 <b>top (14)</b> 92:6 122:3,21 124:22 133:9 179:16,19 310:19 315:17 316:2,15 365:16 366:11 436:1 <b>topic (2)</b> 27:21 404:3 <b>topics (1)</b> 77:12 <b>total (9)</b>	299:13,17 300:14 312:8 324:20 387:13,13,22 437:3 <b>totality (2)</b> 57:8 82:17 <b>totally (1)</b> 362:21 <b>totals (1)</b> 386:6 <b>toxic (3)</b> 150:6 419:4 420:13 <b>toxicity (2)</b> 419:6,7 <b>toxicologist (2)</b> 55:20 60:25 <b>toxicologists (3)</b> 55:9,22 63:7 <b>toxicology (9)</b> 54:16,24 55:8,10,14 57:4 58:2 62:16 82:7 <b>track (1)</b> 250:2 <b>trained (3)</b> 56:2 84:21,23 <b>training (3)</b> 11:16 63:6 313:16 <b>traits (1)</b> 192:22 <b>transcript (6)</b> 5:23 147:18 409:8,13 412:1,25 <b>transcription (1)</b> 439:5 <b>Travers (2)</b> 3:23 9:22 <b>treasurer (1)</b> 36:13 <b>treat (1)</b> 330:22 <b>treated (1)</b> 167:22 <b>treating (1)</b> 379:8 <b>TREMBOUR (1)</b> 4:8 <b>trends (1)</b> 86:6 <b>trial (4)</b> 90:7 150:4 202:9,21 <b>trials (2)</b> 317:14,17 <b>tried (10)</b> 98:1 165:22 202:12 343:22 344:20,23 355:24 363:1
---	---	--	---	--



367:10 380:10 <b>trouble (2)</b> 26:24 344:2 <b>true (11)</b> 35:23 40:11 41:11 87:8 143:19 167:15 315:15 328:19 379:21 380:5 438:10 <b>truly (5)</b> 215:7 330:23 332:7 406:6,7 <b>try (13)</b> 10:25 42:21 83:25 117:9 131:12 140:15 144:10 151:23 185:9 296:19 317:1 329:6 342:24 <b>trying (52)</b> 11:22 19:14 22:5 24:12 27:8 37:1 38:11 41:15 44:3,22 46:14 47:24 50:4,16 66:3 68:3 84:16 88:25 95:10,22 96:7 98:18 102:3 104:19 112:3 113:1 119:11 138:11 161:5 164:25 166:24 167:1,20 168:15 169:1 174:15 175:10 187:9 192:9 193:14 195:14 201:18 217:21 220:20 257:15 264:15 267:23 274:3 276:9 320:20 371:13,21 <b>TSG (2)</b> 8:18,22 <b>Tuesday (3)</b> 191:15,18,23 <b>tumors (1)</b> 12:25 <b>turn (5)</b> 124:23 165:5 423:13 428:11 432:7 <b>twice (5)</b> 59:15 238:15 359:4 368:7 377:24 <b>two (92)</b> 9:14 24:25 25:23 33:7 74:5 75:13,21 76:8 110:23 123:11 144:1,3 154:3	163:22 188:21 190:10,12 192:16 194:6 195:21,23 196:1 197:7 205:12 208:19 222:24 234:25 235:23 237:6,6,7 238:20 240:12 249:2 254:3 254:9 261:15 263:2 263:2,16 264:10,11 264:18,24,25 265:6 265:7 266:7,24 269:15,19 271:16 271:23 272:14,18 273:7,12 274:16 276:2 279:2 286:4 296:1 298:8 299:21 301:13,15,17,17,18 304:25 319:16 324:6 328:21 331:1 339:25 340:9 343:14 366:10 373:9 393:9 397:9 397:17 398:4 407:11,14 412:19 424:1,23 425:24 426:25 427:4,10 <b>two-day (2)</b> 26:1 273:12 <b>two-thirds (1)</b> 244:7 <b>two-year (2)</b> 193:21 197:4 <b>twofold (1)</b> 97:21 <b>type (17)</b> 38:16 40:24 50:24 61:10 85:25 86:3 104:22 131:16 136:18 139:25 141:3 185:13 227:16 302:16 329:23 345:19 363:7 <b>types (15)</b> 77:15 78:21 79:14 87:25 102:20 107:24 110:23 149:2 150:24 151:1 224:16 265:17 275:21 388:5 419:7 <b>typically (6)</b> 94:16 95:1 97:4 100:8 101:13 188:3 <b>typo (1)</b> 134:12	<b>U</b>	<b>U.S (7)</b> 149:20 230:2 279:16 306:15 340:25 396:20 397:15 <b>UCLA (16)</b> 13:9,15 14:4 16:2,12 16:19,22 17:13,20 33:1,6 47:12 55:8 88:10 131:12 432:20 <b>uh-huh (10)</b> 65:5 76:14 84:2 115:7 160:12 169:23 173:14 200:18 244:12 392:11 <b>uncertainties (1)</b> 11:7 <b>underestimating (1)</b> 366:8 <b>underlying (3)</b> 50:15 167:4,15 <b>understand (86)</b> 11:22 15:5 16:12 57:10 59:3 61:4,13 62:12 63:10,16,20 66:3 79:8 81:1 100:15 101:9 102:3 104:19 111:2 112:4 124:10 132:21 134:7 138:10 141:12 158:23 160:9 169:20 185:4 190:24 191:7 207:24 209:9 210:8 211:10,11 215:14 217:14,14,21 229:20 255:14 257:15 265:20 266:13 274:2 275:23 286:11 287:17 291:7 294:22,24 299:25 320:20 321:11 327:4,24 329:6,7 331:11 334:7 352:21,22 356:16 358:20 359:17 360:20,22 367:20 369:2 372:17 376:2 377:12 380:22 381:11 382:18 388:23 397:13 398:6 399:6,8 416:16 422:12 428:21 435:23	436:10 <b>understanding (23)</b> 79:3 101:11 112:7 175:25 198:18 214:14 256:17 262:4 266:15 293:4 293:24 303:6 320:21 321:14 324:9 331:19 339:13 356:20 418:11 421:6,9,13 428:18 <b>understands (1)</b> 59:25 <b>understood (8)</b> 98:7 99:21 119:9 129:23 151:16 198:16 290:20 421:25 <b>unexposed (10)</b> 43:12,14 45:2 141:21 175:15,20 264:16 268:13 270:13 345:12 <b>unfair (2)</b> 226:25 262:10 <b>unfortunate (3)</b> 63:22 67:15,16 <b>unfortunately (3)</b> 39:3 88:4 313:11 <b>uninformative (1)</b> 119:19 <b>unique (1)</b> 358:14 <b>uniquely (1)</b> 382:6 <b>United (3)</b> 1:1 6:9 8:9 <b>University (2)</b> 12:14,23 <b>unknown (1)</b> 145:18 <b>unpublished (5)</b> 385:19,20 390:2 431:5,9 <b>unspecified (3)</b> 244:22,24 246:25 <b>update (3)</b> 355:19 371:21,22 <b>updated (5)</b> 132:16 362:18 372:11 381:24 435:20 <b>upper (4)</b> 109:9 111:14 160:20 184:5 <b>upshot (1)</b>	105:8 <b>urinary (1)</b> 24:16 <b>urine (2)</b> 31:2,3 <b>use (145)</b> 6:22 19:10 26:17 67:22,23 83:25 85:5 85:12,20 86:9,12 87:22 89:13 93:4 94:24 95:23 97:1 99:9,23 106:24 108:20 110:1,3,13 110:19 113:2,25 118:25 122:17 130:3 138:23 139:2 161:8,11 163:4 164:19,25 196:7 199:20 200:16 201:5,11 203:8 210:22 216:1 231:18 263:15 265:18,18 266:4 267:16,17 268:16 268:18 269:3 270:1 270:15 271:18 279:6,7,18,25 280:13 281:9 285:14,21 286:3,23 287:22 288:4 298:16 299:8 304:17,18 305:24 312:1 314:3 325:13 325:14 326:21,22 327:8,13,14,14,21 327:21 328:24 329:3,12,14 334:5 336:20,23 338:15 338:17,24 344:24 353:21 354:13 356:21 357:13,14 358:15,24 360:8 362:18,19 363:19 364:3 366:19 367:11 368:17 369:4,10,22,25 370:16,21 371:11 371:25,25 372:13 372:14,22 373:14 374:12,14 375:2,7 380:24 398:14 401:13 414:6 415:25 416:15,16 418:2 419:9 424:10 424:24,25 427:10 430:1 432:19
---	--	----------	---	--	--

<b>useful (3)</b> 89:9 106:8,23	113:4 249:9 356:6,7	<b>videotape (8)</b> 96:16,21 203:13,20 306:24 307:6 419:15,22	394:21 401:10,10	50:23 58:13 67:18 68:22 73:12 91:11 94:4 95:19 105:25 110:9 112:14 129:6 133:6,22 134:18 135:7 162:4,5 163:11,16 168:25 173:9 175:19 185:15 201:4,9 204:17 209:25 214:25 216:3,21 230:8 238:2,3,6 240:19 244:7 246:19,25 261:23 280:8,8 289:10 290:21 292:22 316:9 323:25 324:1 325:15 335:8 344:3 344:24 346:6 367:17 403:22 404:19 416:15 418:15 426:19,20 427:18 429:21 430:4 438:14
<b>user (1)</b> 303:25	<b>variable (6)</b> 167:13,16,17,18 236:22 264:21	<b>videotaped (2)</b> 8:6 10:24	<b>walk (2)</b> 178:10 204:4	<b>ways (10)</b> 41:1 55:21 110:24 161:4 187:8 292:24 368:11,15 397:17 420:13
<b>users (14)</b> 267:18,19 268:15 270:14,14,15 271:11,12,15 272:17 276:10,11 301:16 338:2	<b>variables (16)</b> 152:12 216:14 218:11 239:11,16 240:17 242:12,13 247:23 282:13 283:2 286:5 296:1 330:22 430:16,18	<b>videotapes (1)</b> 437:4	<b>want (77)</b> 40:23 45:12 48:22 50:13 51:11 59:24 81:14 82:4,5,19,23 84:4 94:5 95:17 100:16 106:6 125:7 127:17 129:2 132:21 136:1 137:9 139:19 145:3 147:13,14,21 160:16 164:2 175:3 181:10 182:10 191:2,7 195:1,16,20 195:20,24 196:25 208:22 211:19 215:14 223:22 240:11,13 245:21 249:8,20 251:19 260:3 266:14 286:2 288:2 291:6 292:8 297:16 299:25 309:4 359:17 361:23 362:15 366:14 368:22 369:3 384:11,12 395:18 399:9 403:4 408:5 411:23 412:15 413:7,16 423:10 428:2	<b>we'll (35)</b> 26:25 39:6 44:9,13 46:21,25 68:5 75:18 79:18 81:24 84:4 110:1 126:24 127:21 128:3 154:11,11 155:5 156:13 158:7 178:21 181:24 183:11 184:25 203:24 226:18 238:16 241:15,16 242:15 297:18 342:2 395:25 405:7 408:24
<b>uses (5)</b> 138:3 202:19,20 208:13 343:7	<b>variance (1)</b> 331:7	<b>view (1)</b> 234:20	<b>washington (2)</b> 4:5,13	<b>we're (53)</b> 14:19 38:11 44:3 46:1 50:6 52:10 65:3 72:19 75:5 80:10 84:13 95:22 96:14 100:19 121:2 125:20 126:16,21 127:19 129:19 143:21 148:10 158:18 159:1 164:25 167:9 168:4 178:3 200:1 203:14
<b>usually (12)</b> 50:12 97:17 98:2 104:25 135:15 140:14 160:10 225:14 273:5 284:18 309:23 414:13	<b>variants (2)</b> 430:16,17	<b>viewpoints (2)</b> 417:1,14	<b>wasn't (7)</b> 58:11 218:16 233:3 238:11 262:15 268:20 363:8	
<hr/> <b>V</b> <hr/>	<b>variety (1)</b> 101:5	<b>Virginia (1)</b> 3:21	<b>Washington (2)</b> 4:5,13	
<b>valid (9)</b> 117:17,18 158:18 160:2 182:14 285:18 286:17,24 359:13	<b>various (11)</b> 85:20 98:13 150:24 153:1 246:9 247:22 278:25 279:23 324:5 376:18 378:18	<b>virtually (4)</b> 233:18 308:14,20 413:8	<b>Washington (2)</b> 4:5,13	
<b>validate (1)</b> 343:13	<b>vary (3)</b> 149:13 165:19 192:22	<b>visiting (7)</b> 14:21 15:8,17 16:7 17:9,17 18:9	<b>wasn't (7)</b> 58:11 218:16 233:3 238:11 262:15 268:20 363:8	
<b>validated (3)</b> 342:23 343:8,16	<b>varying (3)</b> 30:21 280:1 433:13	<b>visual (9)</b> 153:5,7 155:23 156:16 158:9 160:3 160:14 161:12 162:2	<b>Washington (2)</b> 4:5,13	
<b>validation (6)</b> 343:15 375:22 376:6 376:10 378:15 381:14	<b>vast (1)</b> 309:10	<b>visualization (1)</b> 162:14	<b>Washington (2)</b> 4:5,13	
<b>validity (35)</b> 25:7 46:18 48:10 49:2 49:4 88:8 91:17,22 115:4 117:5,21 121:4 125:22 139:19 140:6 158:4 293:17,18,25 294:5 294:10,14,15,24 295:4 296:6 316:25 317:5,9 318:5 359:11 366:24 417:15 431:23 432:1	<b>venture (2)</b> 271:25 288:3	<b>visually (1)</b> 161:4	<b>Washington (2)</b> 4:5,13	
<b>validly (1)</b> 216:15	<b>versa (2)</b> 61:2 144:5	<b>Vitae (1)</b> 5:9	<b>Washington (2)</b> 4:5,13	
<b>value (14)</b> 89:19 92:11,12 108:9 112:18,19,20,22 162:23,24 281:25 282:20 283:4 375:4	<b>version (2)</b> 290:15 349:10	<b>vital (6)</b> 179:5 180:5 237:5 238:8 240:18 242:14	<b>Washington (2)</b> 4:5,13	
<b>values (4)</b>	<b>versus (12)</b> 106:4 121:3 139:3 233:1 264:11,17 265:6 267:18 293:7 335:14 423:14,19	<b>volume (5)</b> 18:4,5,11,13,17	<b>Washington (2)</b> 4:5,13	
	<b>vice (2)</b> 61:2 144:5	<b>vulnerable (1)</b> 140:5	<b>Washington (2)</b> 4:5,13	
	<b>vicinity (4)</b> 92:16,20 93:9,15	<hr/> <b>W</b> <hr/>	<b>Washington (2)</b> 4:5,13	
	<b>video (4)</b> 1:15 2:9 8:20 9:19	<b>Wagstaff (2)</b> 3:3 9:2	<b>Washington (2)</b> 4:5,13	
	<b>Videographer (31)</b> 4:18 8:4 9:11 10:3 72:19,23 96:14,19 144:16,20 178:3,7 203:12,18 270:20 270:24 306:23 307:4,20,24 326:2,6 384:21,25 398:9 406:23 407:2 411:7 419:13,20 437:1	<b>wait (36)</b> 11:3 16:15 28:2 30:10 47:5 59:5,5 61:5 65:6,20 76:4 100:23 100:23 119:10 126:15 132:23 151:15 161:1 165:7 201:14 204:15 231:3 237:13 249:23 258:23,23 322:17 328:16,16 337:1 346:18 361:11 370:4	<b>Washington (2)</b> 4:5,13	

207:10,16 237:11 239:19 267:4 305:4 306:19,25 307:20 312:16 324:16 326:2 337:2 342:1 350:23 363:11 384:14,21 406:23 419:17 425:6 436:21 437:5 <b>we've (10)</b> 30:1 50:9 242:19 313:20 320:11,11 321:1 338:9 339:19 410:24 <b>weaknesses (1)</b> 218:8 <b>website (2)</b> 283:10 382:3 <b>Wednesday (1)</b> 191:17 <b>weeded (1)</b> 414:15 <b>week (1)</b> 48:24 <b>weeks (2)</b> 48:23 273:21 <b>weigh (3)</b> 115:9,18 164:3 <b>weighing (1)</b> 344:2 <b>weight (2)</b> 305:2 415:19 <b>weighted (3)</b> 311:21 324:8 415:21 <b>weights (1)</b> 164:5 <b>well-known (1)</b> 142:14 <b>went (14)</b> 24:7 33:8 59:19 204:11 281:11,16 281:22 285:6 288:24 290:16 344:1 358:12 386:12 414:3 <b>weren't (2)</b> 160:6 202:8 <b>West (1)</b> 3:5 <b>WHEREOF (1)</b> 438:16 <b>white (1)</b> 226:2 <b>wide (11)</b> 112:21 117:12,14 156:25 319:21,22	320:23 321:4,16 322:9 396:16 <b>widely (1)</b> 92:8 <b>widen (2)</b> 216:23 283:1 <b>widens (2)</b> 214:21 282:12 <b>wider (3)</b> 117:1 214:25 216:19 <b>width (6)</b> 112:1 114:22 119:3,5 280:11 320:3 <b>widths (2)</b> 112:16 162:20 <b>wife (3)</b> 136:2,22 137:1 <b>Williams (2)</b> 229:2,19 <b>willing (2)</b> 78:14 81:21 <b>Wilshire (3)</b> 2:11 3:12 8:14 <b>wipe (1)</b> 301:3 <b>wish (1)</b> 58:11 <b>Wisner (15)</b> 3:15 9:5,5 81:8,12 83:7 172:20 249:20 402:11,14 405:15 412:4,20 435:4 436:4 <b>withstood (1)</b> 390:17 <b>witness (445)</b> 5:2 6:5 10:5,8 14:18 23:24 25:10 26:9 28:3,19 31:16 32:22 35:10 38:11 40:4,14 41:24 43:5,24 44:20 45:12,24 46:14 47:8 48:7,21 49:25 51:10 53:12,21 55:6,19 56:11 57:2,19 58:8 58:25 59:17 60:9 61:7,21 62:6,23 63:20 64:23 65:19 65:22,23 66:19 67:14 68:21 69:14 70:17 71:2,20 73:10 74:8,23 75:10 78:12 79:7,24 80:3,5 83:11 84:20 85:16 85:25 87:22 89:22 90:19 91:11,21 93:1	93:21 95:5 97:16 98:17 99:14 100:6 101:20 102:14 103:9,24 104:18 105:18 106:3,20 107:15 108:12 109:18 110:8 111:11 112:14 115:3,12 116:8,17 117:8 118:12 119:11 121:1,16,25 122:12 123:3,21 124:18 125:20 126:23 127:1,12,15 128:17,25 130:11 130:22 131:9 132:17 133:21 134:18 135:14,24 136:14 137:19 139:2,18 140:9,23 141:16 142:7 143:1 145:20 146:21 147:10 149:11 151:5 153:20,24 154:19 155:20 156:25 157:15 158:2,15 159:7 161:3,19 162:13 163:16 164:16 165:9 166:5,22 168:24 170:23 172:4,19 173:2,19 174:7 175:9 176:9 176:23 177:10 178:17 179:21 180:25 181:14 182:9,24 183:20 184:16 185:12 187:7 188:16 190:1 191:6 192:9 193:5 193:20 195:9 196:22 198:22 199:13 201:3 202:4 203:4 204:19 205:5 205:20 206:8,16 207:9,22 208:8 209:19 210:20 211:6,18 212:4 215:21 218:4 219:6 219:23 220:15 221:11 222:7 223:23 224:12 225:11 227:13 229:1 230:8,20 231:6 232:8 233:11 233:22 234:25	236:5,18 237:24 239:5 240:8 241:18 242:4,24 244:3,18 245:10,17 246:17 247:12 248:7,16 250:15 253:24 254:25 255:20 256:4,22,25 257:14 258:14 259:11 260:1,17,19 261:8 261:23 262:9,12 265:14 266:2 268:9 268:12 269:1,13 270:10,12 271:9 272:13 273:2,17 274:10 275:9,13 276:5,9 277:9 281:4 281:15 282:10,23 283:12 284:18 285:17 286:22 287:13 288:2,17 289:4 290:13 291:17 292:8,21 293:15 294:5 295:4 295:22 296:12 297:11 298:7,19 300:6 301:12 302:23 303:16 304:8 305:16 308:24 309:13 311:9 312:13 314:1 314:7 315:9,21 317:12 320:14 321:3,23 322:23 323:5,24 324:15 325:7 326:25 327:6 327:17 328:8,17 329:21 330:18 331:25 333:10 334:23 336:13,22 337:2,24 339:23 340:21 341:11,18 342:11 343:4,12 344:17 346:3,19 347:3 348:7 349:4 349:17 350:13 351:4 352:15 353:13 354:5,19 355:13 356:15 357:10 358:5 359:6 360:3 361:6,13 362:6,10 363:6 364:19 365:5 366:5 367:9 368:6 370:9 371:6,20 372:11 373:8 374:21,25	376:2,10,21 378:2,3 378:6 379:4,17 380:4,9 381:7,10 382:9,18 383:4,14 383:25 384:16 385:13 387:1 388:4 389:3,15 390:20 391:17,25 392:21 393:9,21 394:20,24 395:12 396:7 397:3 398:24 399:15,23 400:10 401:4,16 402:13 403:4,9,17 404:2,12,24 405:17 405:25 407:11,24 409:9,14 410:4,22 412:2,8 413:3 420:11,20 421:17 422:12 423:1,11 425:3 436:9,18 438:8,11,16 <b>wives (1)</b> 138:6 <b>woman (1)</b> 31:3 <b>women (1)</b> 31:1 <b>woods (1)</b> 146:5 <b>WOOL (1)</b> 3:8 <b>word (9)</b> 19:10,13,14 63:23,24 67:23,23 187:7 299:24 <b>worded (1)</b> 11:8 <b>wording (2)</b> 67:15 69:1 <b>words (6)</b> 67:16 68:24 131:2 171:20 234:9 434:14 <b>work (27)</b> 15:19,20 17:8,17 19:16,21 20:12 21:20,22 38:8 50:2 52:18 54:4 105:8 109:15 136:7,17 137:23 147:1 270:1 379:12 390:11 394:5 414:12,19 418:17,17 <b>workday (5)</b> 272:4 273:6,13 274:20 275:6
--	---	---	---	---

<b>workdays (3)</b> 273:7 274:16 299:21	<hr/> <b>X</b> <hr/>	194:6,11 195:21,21 195:22,23,23,24 196:1,11,18 198:9 207:7,12,16,19,22 209:12 211:3,8,25 212:6,7 217:18,23 218:19,24 220:8 221:4,22,25 273:21 273:24 298:12 299:19,24 300:7,8 300:23 301:1,2,19 303:1,19,21 304:23 304:24 305:5,6 336:16,19 337:7,8 337:16 340:7 341:11,15 342:12 355:17 371:2 425:10,11 432:15 433:17	299:10 <b>0.8 (4)</b> 109:14,22,23 354:13 <b>0.84 (1)</b> 279:20 <b>0.87 (1)</b> 282:20 <b>0.9 (8)</b> 213:10 350:9 352:4 352:13 353:9 354:13 398:21 399:10 <b>0.92 (1)</b> 251:1 <b>0.94 (1)</b> 299:10 <b>0.95 (3)</b> 306:15 396:25 397:18 <b>01 (3)</b> 85:12,22 92:10 <b>01:00 (5)</b> 200:15,20,25 201:5 201:10 <b>01:01 (5)</b> 201:15,20,25 202:5 202:10 <b>01:02 (4)</b> 202:15,20,25 203:5 <b>01:03 (2)</b> 203:10,15 <b>01:46 (2)</b> 203:20,25 <b>01:47 (2)</b> 204:5,10 <b>01:48 (7)</b> 204:15,20,25 205:5 205:10,15,20 <b>01:49 (4)</b> 206:5,10,15,20 <b>01:50 (5)</b> 206:25 207:5,10,15 207:20 <b>01:51 (5)</b> 207:25 208:5,10,15 208:20 <b>01:52 (5)</b> 208:25 209:5,10,15 209:20 <b>01:53 (6)</b> 209:25 210:5,10,15 210:20,25 <b>01:54 (6)</b> 211:5,10,15,20,25 212:5 <b>01:55 (3)</b> 212:10,15,20	<b>01:56 (6)</b> 212:25 213:5,10,15 213:20,25 <b>01:57 (4)</b> 214:5,10,15,20 <b>01:58 (4)</b> 214:25 215:5,10,15 <b>01:59 (5)</b> 215:20,25 216:5,10 216:15 <b>02 (1)</b> 117:1 <b>02:00 (5)</b> 216:20,25 217:5,10 217:15 <b>02:01 (4)</b> 217:20,25 218:5,10 <b>02:02 (6)</b> 218:15,20,25 219:5 219:10,15 <b>02:03 (5)</b> 219:20 220:5,10,15 220:20 <b>02:04 (5)</b> 221:5,10,15,20,25 <b>02:05 (5)</b> 222:5,10,15,20,25 <b>02:06 (3)</b> 223:5,10,15 <b>02:07 (3)</b> 223:20,25 224:5 <b>02:08 (5)</b> 224:10,15,20,25 225:5 <b>02:09 (4)</b> 225:10,15,20,25 <b>02:10 (7)</b> 226:5,10,15,20,25 227:5,10 <b>02:11 (4)</b> 227:15,20,25 228:5 <b>02:12 (3)</b> 228:10,15,20 <b>02:13 (5)</b> 228:25 229:5,10,15 229:20 <b>02:14 (5)</b> 229:25 230:5,10,15 230:20 <b>02:15 (4)</b> 230:25 231:5,10,15 <b>02:16 (4)</b> 231:20,25 232:5,10 <b>02:17 (5)</b> 232:15,20,25 233:5 233:10
<b>worked (7)</b> 136:20 146:24 365:21 365:24 367:4 374:10 376:16	<b>Xs (1)</b> 297:11	<hr/> <b>Y</b> <hr/>		
<b>worker (2)</b> 202:7 427:2	<b>yeah (54)</b> 15:1 26:14,14 50:7 73:23 129:19 130:3 134:6 147:13,15,15 147:22 148:6,7 149:1 152:7 153:24 155:4 166:7 168:6 173:20 179:21,25 180:16 183:2 205:10,14 213:6 214:4 228:21,21 233:11 243:16 253:3 276:21 297:1 297:2 306:8,8 313:4 319:24 320:7 326:12 347:7 363:13 387:17 392:11 405:16,19 405:25 411:7 423:11 425:24 432:12			
<b>workers (4)</b> 146:23 197:12 333:2 426:23			<b>yes-or-no (2)</b> 409:10 410:23	
<b>working (11)</b> 18:20,23 55:22 63:6 63:12 64:23 69:24 152:5 204:17 284:23 373:24			<b>yes/no (3)</b> 309:16 373:18,21	
<b>workplace (2)</b> 274:15 275:20			<b>yielded (1)</b> 78:5	
<b>works (3)</b> 165:5 217:12 366:2			<b>younger (1)</b> 368:23	
<b>world (7)</b> 52:9,9 149:15,18,19 150:12 380:20			<b>Yvonne (2)</b> 4:7 9:12	
<b>worried (1)</b> 145:8			<hr/> <b>Z</b> <hr/>	
<b>worry (1)</b> 426:22			<b>Zahm (10)</b> 6:13 223:5,7,16 224:6 224:25 227:5,13,17 228:2	
<b>worst (1)</b> 266:5	<b>year (61)</b> 12:22 14:22 17:1,2,21 22:6,6 31:24 34:6 36:25 37:13 132:6 138:2 188:21 192:15 194:4 196:5 197:7,7,16,18 210:4 264:18 266:8,25 269:16,19 271:16 271:22,23 272:14 273:7 275:15,19 297:22 298:8 299:21 300:9,24,24 301:6,8,13,20 302:15 303:1,18 304:25 305:5 340:2 340:13 345:2,3 364:2 398:4 424:1 424:24 425:12 426:25 427:10 435:16		<b>zero (4)</b> 272:18 301:15 303:17 366:7	
<b>worth (1)</b> 88:20			<b>Zhang (3)</b> 16:2,22 17:6	
<b>wouldn't (14)</b> 21:20 35:2 36:2 181:14 184:16 191:18 211:14 245:10 246:3,4 278:16 280:5 286:24 343:15			<hr/> <b>0</b> <hr/>	
<b>wrapped (1)</b> 49:7			<b>0.5 (1)</b> 160:19	
<b>write (2)</b> 246:23 414:5			<b>0.54 (1)</b> 251:2	
<b>writer (1)</b> 325:23			<b>0.55 (1)</b> 157:7	
<b>writing (1)</b> 25:22			<b>0.69 (2)</b> 280:15 306:16	
<b>wrong (10)</b> 93:12 121:25 141:12 191:1 251:14 340:15 348:13 349:24 373:9 400:10	<b>years (86)</b> 18:21 32:23 33:7,8 55:23 63:8 142:11 146:19 186:16 188:11,23 189:6,24 190:11,12,13,15,15 192:12,16,25 194:6		<b>0.7 (4)</b> 179:1 180:14 319:21 320:5	
<b>wrongly (1)</b> 185:24			<b>0.77 (1)</b> 155:18	
<b>wrote (3)</b> 197:3 411:16 416:25			<b>0.78 (1)</b>	

<b>02:18 (4)</b> 233:15,20 234:5,10	255:5	275:20,25 276:5,10 276:15,20	<b>03:41 (3)</b> 297:15,20,25	<b>04:12 (6)</b> 314:5,10,15,20,25 315:5
<b>02:19 (5)</b> 234:15,20,25 235:5 235:10	<b>02:42 (6)</b> 255:10,15,20,25 256:5,10	<b>03:19 (4)</b> 276:25 277:5,10,15	<b>03:42 (6)</b> 298:5,10,15,20,25 299:5	<b>04:13 (5)</b> 315:10,15,20,25 316:5
<b>02:20 (3)</b> 235:15,20,25	<b>02:43 (6)</b> 256:15,20,25 257:5 257:10,15	<b>03:20 (5)</b> 277:20,25 278:5,10 278:15	<b>03:43 (3)</b> 299:10,15,20	<b>04:14 (4)</b> 316:10,15,20,25
<b>02:21 (4)</b> 236:5,10,15,20	<b>02:44 (5)</b> 257:20,25 258:5,10 258:15	<b>03:21 (3)</b> 278:20,25 279:5	<b>03:44 (5)</b> 299:25 300:5,10,15 300:20	<b>04:15 (5)</b> 317:5,10,15,20,25
<b>02:22 (6)</b> 236:25 237:5,10,15 237:20,25	<b>02:45 (6)</b> 258:20,25 259:5,10 259:15,20	<b>03:22 (4)</b> 279:10,15,20,25	<b>03:45 (5)</b> 300:25 301:5,10,15 301:20	<b>04:16 (4)</b> 318:5,10,15,20
<b>02:23 (6)</b> 238:5,10,15,20,25 239:5	<b>02:46 (7)</b> 259:25 260:5,10,15 260:20,25 261:5	<b>03:23 (4)</b> 280:5,10,15,20	<b>03:46 (4)</b> 301:25 302:5,10,15	<b>04:17 (3)</b> 318:25 319:5,10
<b>02:24 (6)</b> 239:10,15,20,25 240:5,10	<b>02:47 (7)</b> 261:10,15,20,25 262:5,10,15	<b>03:24 (6)</b> 280:25 281:5,10,15 281:20,25	<b>03:47 (5)</b> 302:20,25 303:5,10 303:15	<b>04:18 (3)</b> 319:15,20,25
<b>02:25 (8)</b> 240:15,20,25 241:5 241:10,15,20,25	<b>02:48 (3)</b> 262:20,25 263:5	<b>03:25 (4)</b> 282:5,10,15,20	<b>03:48 (5)</b> 303:20,25 304:5,10 304:15	<b>04:19 (6)</b> 320:5,10,15,20,25 321:5
<b>02:26 (5)</b> 242:5,10,15,20,25	<b>02:49 (4)</b> 263:10,15,20,25	<b>03:26 (4)</b> 282:25 283:5,10,15	<b>03:49 (6)</b> 304:20,25 305:5,10 305:15,20	<b>04:20 (5)</b> 321:10,15,20,25 322:5
<b>02:27 (4)</b> 243:5,10,15,20	<b>02:50 (4)</b> 264:5,10,15,20	<b>03:27 (3)</b> 283:20,25 284:5	<b>03:50 (2)</b> 305:25 306:5	<b>04:21 (5)</b> 322:10,15,20,25 323:5
<b>02:28 (5)</b> 243:25 244:5,10,15 244:20	<b>02:51 (7)</b> 264:25 265:5,10,15 265:20,25 266:5	<b>03:28 (4)</b> 284:10,15,20,25	<b>03:51 (2)</b> 306:10,15	<b>04:22 (5)</b> 323:10,15,20,25 324:5
<b>02:29 (4)</b> 245:5,10,15,20	<b>02:52 (5)</b> 266:10,15,20,25 267:5	<b>03:29 (4)</b> 285:5,10,15,20	<b>03:52 (2)</b> 306:20,25	<b>04:23 (5)</b> 324:10,15,20,25 325:5
<b>02:30 (6)</b> 245:25 246:5,10,15 246:20,25	<b>02:53 (5)</b> 267:10,15,20,25 268:5	<b>03:30 (5)</b> 285:25 286:5,10,15 286:20	<b>03:53 (2)</b> 307:5,10,15,20,25	<b>04:24 (2)</b> 325:10,15
<b>02:31 (4)</b> 247:5,10,15,20	<b>02:54 (5)</b> 268:10,15,20,25 269:5	<b>03:31 (5)</b> 287:5,10,15,20,25	<b>04 (17)</b> 93:25 94:16,25 95:13 97:4 98:9,20 99:24 100:8 101:12 102:5 102:19 103:1,16,25 104:21 105:4	<b>04:47 (3)</b> 326:5,10,15
<b>02:32 (3)</b> 247:25 248:5,10	<b>02:55 (6)</b> 269:10,15,20,25 270:5,10	<b>03:32 (6)</b> 288:5,10,15,20,25 289:5	<b>04:03 (1)</b> 307:5	<b>04:48 (5)</b> 326:20,25 327:5,10 327:15
<b>02:33 (3)</b> 248:15,20,25	<b>02:56 (2)</b> 270:15,20	<b>03:33 (5)</b> 289:10,15,20,25 290:5	<b>04:04 (5)</b> 307:10,15,20,25 308:5	<b>04:49 (4)</b> 327:20,25 328:5,10
<b>02:34 (3)</b> 249:5,10,15	<b>03:13 (2)</b> 270:25 271:5	<b>03:34 (4)</b> 290:10,15,20,25	<b>04:05 (4)</b> 308:10,15,20,25	<b>04:50 (5)</b> 328:15,20,25 329:5 329:10
<b>02:35 (3)</b> 249:20,25 250:5	<b>03:14 (5)</b> 271:10,15,20,25 272:5	<b>03:35 (6)</b> 291:5,10,15,20,25 292:5	<b>04:06 (4)</b> 309:5,10,15,20	<b>04:51 (5)</b> 329:15,20,25 330:5 330:10
<b>02:36 (4)</b> 250:10,15,20,25	<b>03:15 (6)</b> 272:10,15,20,25 273:5,10	<b>03:36 (5)</b> 292:10,15,20,25 293:5	<b>04:07 (5)</b> 309:25 310:5,10,15 310:20	<b>04:52 (5)</b> 330:15,20,25 331:5 331:10
<b>02:37 (3)</b> 251:5,10,15	<b>03:16 (4)</b> 273:15,20 274:5,10	<b>03:37 (5)</b> 293:10,15,20,25 294:5	<b>04:08 (4)</b> 310:25 311:5,10,15	<b>04:53 (4)</b> 331:15,20,25 332:5
<b>02:38 (3)</b> 251:20,25 252:5	<b>03:17 (6)</b> 274:15,20,25 275:5 275:10,15	<b>03:38 (6)</b> 294:10,15,20,25 295:5,10	<b>04:09 (4)</b> 311:20,25 312:5,10	<b>04:54 (6)</b> 332:10,15,20,25 333:5,10
<b>02:39 (6)</b> 252:10,15,20,25 253:5,10	<b>03:18 (6)</b> 276:5,10,15,20,25 276:15,20	<b>03:39 (7)</b> 295:15,20,25 296:5 296:10,15,20	<b>04:10 (4)</b> 312:15,20,25 313:5	<b>04:55 (6)</b> 333:15,20,25 334:5
<b>02:40 (4)</b> 253:15,20,25 254:5		<b>03:40 (3)</b> 296:25 297:5,10	<b>04:11 (4)</b> 313:10,15,20,25	
<b>02:41 (5)</b> 254:10,15,20,25				

334:10,15	351:20,25	<b>05:36 (5)</b>	394:5	<b>06:41 (4)</b>
<b>04:56 (5)</b>	<b>05:15 (6)</b>	373:25 374:5,10,15	<b>06:04 (7)</b>	416:25 417:5,10,15
334:20,25 335:5,10	352:5,10,15,20,25	374:20	394:10,15,20,25	<b>06:42 (6)</b>
335:15	353:5	<b>05:37 (5)</b>	395:5,10,15	417:20,25 418:5,10
<b>04:57 (3)</b>	<b>05:16 (6)</b>	374:25 375:5,10,15	<b>06:05 (5)</b>	418:15,20
335:20,25 336:5	353:10,15,20,25	375:20	395:20,25 396:5,10	<b>06:43 (4)</b>
<b>04:58 (5)</b>	354:5,10	<b>05:38 (5)</b>	396:15	418:25 419:5,10,15
336:10,15,20,25	<b>05:17 (4)</b>	375:25 376:5,10,15	<b>06:06 (4)</b>	<b>06:45 (1)</b>
337:5	354:15,20,25 355:5	376:20	396:20,25 397:5,10	419:20
<b>04:59 (5)</b>	<b>05:18 (4)</b>	<b>05:39 (5)</b>	<b>06:07 (6)</b>	<b>06:46 (5)</b>
337:10,15,20,25	355:10,15,20,25	376:25 377:5,10,15	397:15,20,25 398:5	419:25 420:5,10,15
338:5	<b>05:19 (6)</b>	377:20	398:10,15	420:20
<b>05 (25)</b>	356:5,10,15,20,25	<b>05:40 (5)</b>	<b>06:08 (5)</b>	<b>06:47 (7)</b>
85:11,21 89:17 90:3	357:5	377:25 378:5,10,15	398:20,25 399:5,10	420:25 421:5,10,15
90:12,22 91:4 92:10	<b>05:20 (4)</b>	378:20	399:15	421:20,25 422:5
92:16,20 93:9,16,24	357:10,15,20,25	<b>05:41 (7)</b>	<b>06:09 (6)</b>	<b>06:48 (5)</b>
94:1,3 95:10,12,16	<b>05:21 (5)</b>	378:25 379:5,10,15	399:20,25 400:5,10	422:10,15,20,25
96:2 98:20 99:10	358:5,10,15,20,25	379:20,25 380:5	400:15,20	423:5
107:17 108:1,19	<b>05:22 (6)</b>	<b>05:42 (6)</b>	<b>06:10 (6)</b>	<b>06:49 (5)</b>
117:11	359:5,10,15,20,25	380:10,15,20,25	400:25 401:5,10,15	423:10,15,20,25
<b>05:00 (4)</b>	360:5	381:5,10	401:20,25	424:5
338:10,15,20,25	<b>05:23 (4)</b>	<b>05:43 (4)</b>	<b>06:11 (7)</b>	<b>06:50 (5)</b>
<b>05:01 (4)</b>	360:10,15,20,25	381:15,20 382:5,10	402:5,10,15,20,25	424:10,15,20,25
339:5,10,15,20	<b>05:24 (6)</b>	<b>05:44 (4)</b>	403:5,10	425:5
<b>05:02 (5)</b>	361:5,10,15,20,25	382:15,20,25 383:5	<b>06:12 (7)</b>	<b>06:51 (5)</b>
339:25 340:5,10,15	362:5	<b>05:45 (5)</b>	403:15,20,25 404:5	425:10,15,20,25
340:20	<b>05:25 (6)</b>	383:10,15,20,25	404:10,15,20	426:5
<b>05:03 (5)</b>	362:10,15,20,25	384:5	<b>06:13 (5)</b>	<b>06:52 (5)</b>
340:25 341:5,10,15	363:5,10	<b>05:46 (3)</b>	404:25 405:5,10,15	426:10,15,20,25
341:20	<b>05:26 (4)</b>	384:10,15,20	405:20	427:5
<b>05:04 (5)</b>	363:15,20,25 364:5	<b>05:54 (3)</b>	<b>06:14 (6)</b>	<b>06:53 (5)</b>
341:25 342:5,10,15	<b>05:27 (6)</b>	384:25 385:5,10	405:25 406:5,10,15	427:10,15,20,25
342:20	364:10,15,20,25	<b>05:55 (5)</b>	406:20,25	428:5
<b>05:05 (5)</b>	365:5,10	385:15,20,25 386:5	<b>06:32 (5)</b>	<b>06:54 (6)</b>
342:25 343:5,10,15	<b>05:28 (4)</b>	386:10	407:5,10,15,20,25	428:10,15,20,25
343:20	365:15,20,25 366:5	<b>05:56 (4)</b>	<b>06:33 (5)</b>	429:5,10
<b>05:06 (6)</b>	<b>05:29 (6)</b>	386:15,20,25 387:5	408:5,10,15,20,25	<b>06:55 (4)</b>
343:25 344:5,10,15	366:10,15,20,25	<b>05:57 (3)</b>	<b>06:34 (5)</b>	429:15,20,25 430:5
344:20,25	367:5,10	387:10,15,20	409:5,10,15,20,25	<b>06:56 (5)</b>
<b>05:07 (3)</b>	<b>05:30 (6)</b>	<b>05:58 (5)</b>	<b>06:35 (6)</b>	430:10,15,20,25
345:5,10,15	367:15,20,25 368:5	387:25 388:5,10,15	410:5,10,15,20,25	431:5
<b>05:08 (4)</b>	368:10,15	388:20	411:5	<b>06:57 (5)</b>
345:20,25 346:5,10	<b>05:31 (4)</b>	<b>05:59 (6)</b>	<b>06:36 (7)</b>	431:10,15,20,25
<b>05:09 (6)</b>	368:20,25 369:5,10	388:25 389:5,10,15	411:10,15,20,25	432:5
346:15,20,25 347:5	<b>05:32 (6)</b>	389:20,25	412:5,10,15	<b>06:58 (4)</b>
347:10,15	369:15,20,25 370:5	<b>06 (2)</b>	<b>06:37 (7)</b>	432:10,15,20,25
<b>05:10 (4)</b>	370:10,15	95:13 98:21	412:20,25 413:5,10	<b>06:59 (5)</b>
347:20,25 348:5,10	<b>05:33 (6)</b>	<b>06:00 (5)</b>	413:15,20,25	433:5,10,15,20,25
<b>05:11 (4)</b>	370:20,25 371:5,10	390:5,10,15,20,25	<b>06:38 (4)</b>	<b>07:00 (5)</b>
348:15,20,25 349:5	371:15,20	<b>06:01 (5)</b>	414:5,10,15,20	434:5,10,15,20,25
<b>05:12 (2)</b>	<b>05:34 (5)</b>	391:5,10,15,20,25	<b>06:39 (5)</b>	<b>07:01 (7)</b>
349:20 350:5	371:25 372:5,10,15	<b>06:02 (6)</b>	414:25 415:5,10,15	435:5,10,15,20,25
<b>05:13 (3)</b>	372:20	392:5,10,15,20,25	415:20	436:5,10
350:10,15,20	<b>05:35 (5)</b>	393:5	<b>06:40 (5)</b>	<b>07:02 (4)</b>
<b>05:14 (6)</b>	372:25 373:5,10,15	<b>06:03 (5)</b>	415:25 416:5,10,15	436:15,20,25 437:5
350:25 351:5,10,15	373:20	393:10,15,20,25	416:20	<b>09:04 (2)</b>

8:5,10	32:20,25 33:5,10	58:10	<b>1.2 (4)</b>	<b>10 (14)</b>
<b>09:05 (3)</b>	<b>09:31 (3)</b>	<b>09:58 (6)</b>	249:4 319:9,16 323:5	5:4 85:13,14,22 89:2
8:15,20,25	33:15,20,25	58:15,20,25 59:5,10	<b>1.20 (1)</b>	89:4,4,11,11 214:1
<b>09:06 (1)</b>	<b>09:32 (5)</b>	59:15	249:10	214:1 278:20 341:1
10:5	34:5,10,15,20,25	<b>09:59 (5)</b>	<b>1.23 (2)</b>	387:19
<b>09:07 (5)</b>	<b>09:33 (6)</b>	59:20,25 60:5,10,15	280:24 281:16	<b>10:00 (7)</b>
10:15,20,25 11:5,10	35:5,10,15,20,25 36:5		<b>1.26 (3)</b>	60:20,25 61:5,10,15
<b>09:08 (5)</b>	<b>09:34 (5)</b>	<b>1</b>	249:4,10 253:4	61:20,25
11:15,20,25 12:5,10	36:10,15,20,25 37:5	<b>1 (47)</b>	<b>1.28 (1)</b>	<b>10:01 (5)</b>
<b>09:09 (6)</b>	<b>09:35 (4)</b>	8:6 96:16 108:3	299:9	62:5,10,15,20,25
12:15,20,25 13:5,10	37:10,15,20,25	110:11 161:20,21	<b>1.32 (2)</b>	<b>10:02 (6)</b>
13:15	<b>09:36 (5)</b>	162:3,3 199:25	253:4 306:16	63:5,10,15,20,25 64:5
<b>09:10 (5)</b>	38:5,10,15,20,25	231:13 264:22	<b>1.35 (1)</b>	<b>10:03 (6)</b>
13:20,25 14:5,10,15	<b>09:37 (2)</b>	280:2,3 281:6	401:6	64:10,15,20,25 65:5
<b>09:11 (6)</b>	39:5,10	308:19,25 309:1,2	<b>1.4 (1)</b>	65:10
14:20,25 15:5,10,15	<b>09:38 (4)</b>	309:24,25 310:7,8	354:22	<b>10:04 (6)</b>
15:20	39:15,20,25 40:5	310:11 311:12,12	<b>1.43 (1)</b>	65:15,20 66:5,10,15
<b>09:12 (4)</b>	<b>09:39 (5)</b>	312:11,14,22,23	398:2	66:20
15:25 16:5,10,15	40:10,15,20,25 41:5	317:4,4 318:20	<b>1.45 (1)</b>	<b>10:05 (5)</b>
<b>09:13 (5)</b>	<b>09:40 (4)</b>	326:11 327:12	322:3	66:25 67:5,10,15,20
16:20,25 17:5,10,15	41:10,15,20,25	336:1 341:4 353:14	<b>1.5 (4)</b>	<b>10:06 (5)</b>
<b>09:14 (4)</b>	<b>09:41 (5)</b>	353:25,25 354:11	109:13 179:22 399:21	67:25 68:5,10,15,20
17:20,25 18:5,10	42:5,10,15,20,25	354:20,22 370:24	399:23	<b>10:07 (5)</b>
<b>09:15 (5)</b>	<b>09:42 (4)</b>	379:23 401:6	<b>1.51 (4)</b>	68:25 69:5,10,15,20
18:15,20,25 19:5,10	43:5,10,15,20	425:19 439:4	155:17 279:20 282:18	<b>10:08 (5)</b>
<b>09:16 (6)</b>	<b>09:43 (6)</b>	<b>1.0 (18)</b>	282:24	69:25 70:5,10,15,20
19:15,20,25 20:5,10	43:25 44:5,10,15,20	43:3 47:2 107:22	<b>1.53 (1)</b>	<b>10:09 (6)</b>
20:15	44:25	131:5 160:18	399:24	70:25 71:5,10,15,20
<b>09:17 (6)</b>	<b>09:44 (5)</b>	281:24 282:21	<b>1.55 (1)</b>	71:25
20:20,25 21:5,10,15	45:5,10,15,20,25	308:16,22 309:11	251:2	<b>10:10 (6)</b>
21:20	<b>09:45 (5)</b>	352:4 353:22	<b>1.6 (5)</b>	72:5,10,15,20,20,21
<b>09:18 (4)</b>	46:5,10,15,20,25	354:13 396:4,15	153:17 233:7 234:5	<b>10:27 (2)</b>
21:25 22:5,10,15	<b>09:46 (4)</b>	398:20 400:23	281:5,16	72:22,24
<b>09:19 (4)</b>	47:5,10,15,20	401:8	<b>1.66 (2)</b>	<b>10:29 (5)</b>
22:20,25 23:5,10	<b>09:47 (4)</b>	<b>1.02 (1)</b>	282:17,24	73:5,10,15,20,25
<b>09:20 (5)</b>	47:25 48:5,10,15	424:8	<b>1.68 (4)</b>	<b>10:30 (4)</b>
23:15,20,25 24:5,10	<b>09:48 (5)</b>	<b>1.03 (1)</b>	253:13 256:12,18	74:5,10,15,20
<b>09:21 (5)</b>	48:20,25 49:5,10,15	89:6	257:2	<b>10:31 (4)</b>
24:15,20,25 25:5,10	<b>09:49 (4)</b>	<b>1.06 (1)</b>	<b>1.73 (5)</b>	74:25 75:5,10,15
<b>09:22 (4)</b>	49:20,25 50:5,10	300:19	298:8 424:7,20	<b>10:32 (6)</b>
25:15,20,25 26:5	<b>09:50 (5)</b>	<b>1.08 (1)</b>	425:23 427:11	75:20,25 76:5,10,15
<b>09:23 (5)</b>	50:15,20,25 51:5,10	300:19	<b>1.77 (2)</b>	76:20
26:10,15,20,25 27:5	<b>09:51 (5)</b>	<b>1.1 (11)</b>	298:9 427:12	<b>10:33 (5)</b>
<b>09:24 (4)</b>	51:15,20,25 52:5,10	178:25 182:12 212:24	<b>1.85 (1)</b>	76:25 77:5,10,15,20
27:10,15,20,25	<b>09:52 (3)</b>	216:18 217:19	157:7	<b>10:34 (4)</b>
<b>09:25 (5)</b>	52:15,20,25	218:21 319:17	<b>1.88 (3)</b>	77:25 78:5,10,15
28:5,10,15,20,25	<b>09:53 (6)</b>	321:8 323:5 398:15	256:19 257:1 281:23	<b>10:35 (5)</b>
<b>09:26 (3)</b>	53:5,10,15,20,25 54:5	401:8	<b>1.9 (4)</b>	78:20 79:5,10,15,20
29:5,10,15	<b>09:54 (5)</b>	<b>1.10 (1)</b>	179:1 180:14 319:22	<b>10:36 (5)</b>
<b>09:27 (5)</b>	54:10,15,20,25 55:5	399:11	320:5	79:25 80:5,10,15,20
29:20,25 30:5,10,15	<b>09:55 (5)</b>	<b>1.13 (6)</b>	<b>1.92 (4)</b>	<b>10:37 (7)</b>
<b>09:28 (5)</b>	55:10,15,20,25 56:5	279:19 285:15 287:24	258:5,8 259:2 260:6	80:25 81:5,10,15,20
30:20,25 31:5,10,15	<b>09:56 (5)</b>	396:24 397:18	<b>1:03 (2)</b>	81:25 82:5
<b>09:29 (4)</b>	56:10,15,20,25 57:5	401:8	203:15,17	<b>10:38 (7)</b>
31:20 32:5,10,15	<b>09:57 (6)</b>	<b>1.17 (1)</b>	<b>1:46 (2)</b>	82:10,15,20,25 83:5
<b>09:30 (4)</b>	57:10,15,20,25 58:5	299:10	203:17,19	83:10,15

**10:39 (4)**  
 83:20,25 84:5,10  
**10:40 (5)**  
 84:15,20,25 85:5,10  
**10:41 (4)**  
 85:15,20,25 86:5  
**10:42 (3)**  
 86:10,15,20  
**10:43 (3)**  
 86:25 87:5,10  
**10:44 (4)**  
 87:15,20,25 88:5  
**10:45 (3)**  
 88:10,15,20  
**10:46 (4)**  
 88:25 89:5,10,15  
**10:47 (4)**  
 89:20 90:5,10,15  
**10:48 (6)**  
 90:20,25 91:5,10,15  
 91:20  
**10:49 (5)**  
 91:25 92:5,10,15,20  
**10:50 (6)**  
 92:25 93:5,10,15,20  
 93:25  
**10:51 (4)**  
 94:5,10,15,20  
**10:52 (6)**  
 94:25 95:5,10,15  
 96:15,17  
**10:53 (5)**  
 95:20,25 96:5,10,15  
**10:57 (7)**  
 96:18,20,20,25 97:5  
 97:10,15  
**10:58 (5)**  
 97:20,25 98:5,10,15  
**10:59 (4)**  
 98:20,25 99:5,10  
**100 (3)**  
 4:5 18:11,15  
**100,000 (3)**  
 170:14 171:23,24  
**100s (3)**  
 18:4,5,17  
**1047 (1)**  
 157:5  
**108 (1)**  
 3:20  
**10816 (3)**  
 1:23 2:14 438:22  
**11 (8)**  
 5:9 7:14,18 84:7 85:9  
 200:7 351:12 398:9  
**11:00 (6)**

99:15,20,25 100:5,10  
 100:15  
**11:01 (4)**  
 100:20 101:5,10,15  
**11:02 (5)**  
 101:20 102:5,10,15  
 102:20  
**11:03 (6)**  
 102:25 103:5,10,15  
 103:20,25  
**11:04 (4)**  
 104:5,10,15,20  
**11:05 (6)**  
 104:25 105:5,10,15  
 105:20,25  
**11:06 (6)**  
 106:5,10,15,20,25  
 107:5  
**11:07 (4)**  
 107:10,15,20,25  
**11:08 (5)**  
 108:5,10,15,20,25  
**11:09 (6)**  
 109:5,10,15,20,25  
 110:5  
**11:10 (4)**  
 110:10,15,20 111:5  
**11:11 (5)**  
 111:10,15,20,25  
 112:5  
**11:12 (5)**  
 112:10,15,20,25  
 113:5  
**11:13 (5)**  
 113:10,15,20,25  
 114:5  
**11:14 (5)**  
 114:10,15,20,25  
 115:5  
**11:15 (6)**  
 115:10,15,20,25  
 116:5,10  
**11:16 (3)**  
 116:15,20,25  
**11:17 (4)**  
 117:5,10,15,20  
**11:18 (5)**  
 117:25 118:5,10,15  
 118:20  
**11:19 (5)**  
 118:25 119:5,10,15  
 119:20  
**11:20 (5)**  
 119:25 120:5,10,15  
 120:20  
**11:21 (7)**

120:25 121:5,10,15  
 121:20,25 122:5  
**11:22 (6)**  
 122:10,15,20,25  
 123:5,10  
**11:23 (5)**  
 123:15,20,25 124:5  
 124:10  
**11:24 (5)**  
 124:15,20,25 125:5  
 125:10  
**11:25 (5)**  
 125:15,20,25 126:5  
 126:10  
**11:26 (9)**  
 126:15,20,25 127:5  
 127:10,15,20,25  
 128:5  
**11:27 (6)**  
 128:10,15,20,25  
 129:5,10  
**11:28 (5)**  
 129:15,20,25 130:5  
 130:10  
**11:29 (5)**  
 130:15,20,25 131:5  
 131:10  
**11:30 (3)**  
 131:15,20,25  
**11:31 (6)**  
 132:5,10,15,20,25  
 133:5  
**11:32 (5)**  
 133:10,15,20,25  
 134:5  
**11:33 (5)**  
 134:10,15,20,25  
 135:5  
**11:34 (5)**  
 135:10,15,20,25  
 136:5  
**11:35 (5)**  
 136:10,15,20,25  
 137:5  
**11:36 (6)**  
 137:10,15,20,25  
 138:5,10  
**11:37 (4)**  
 138:15,20,25 139:5  
**11:38 (4)**  
 139:10,15,20,25  
**11:39 (5)**  
 140:5,10,15,20,25  
**11:40 (5)**  
 141:5,10,15,20,25  
**11:41 (7)**

142:5,10,15,20,25  
 143:5,10  
**11:42 (5)**  
 143:15,20,25 144:5  
 144:10  
**11:43 (3)**  
 144:15,17,18  
**11:55 (4)**  
 144:19,20,21,25  
**11:56 (5)**  
 145:5,10,15,20,25  
**11:57 (5)**  
 146:5,10,15,20,25  
**11:58 (4)**  
 147:5,10,15,20  
**11:59 (4)**  
 148:5,10,15,20  
**113 (3)**  
 5:16 227:24 228:1  
**1157 (1)**  
 275:14  
**1161 (1)**  
 244:6  
**12 (7)**  
 7:20 85:9 117:24  
 118:4 207:16 237:4  
 238:5  
**12/22/75 (1)**  
 6:11  
**12:00 (4)**  
 148:25 149:5,10,15  
**12:01 (5)**  
 149:20,25 150:5,10  
 150:15  
**12:02 (6)**  
 150:20,25 151:5,10  
 151:15,20  
**12:03 (4)**  
 151:25 152:5,10,15  
**12:04 (4)**  
 152:20,25 153:5,10  
**12:05 (5)**  
 153:15,20,25 154:5  
 154:10  
**12:06 (4)**  
 154:15,20,25 155:5  
**12:07 (4)**  
 155:10,15,20,25  
**12:09 (6)**  
 156:5,10,15,20,25  
 157:5  
**12:10 (5)**  
 157:10,15,20,25  
 158:5  
**12:11 (4)**  
 158:10,15,20,25

**12:12 (5)**  
 159:5,10,15,20,25  
**12:13 (4)**  
 160:5,10,15,20  
**12:14 (6)**  
 160:25 161:5,10,15  
 161:20,25  
**12:15 (4)**  
 162:5,10,15,20  
**12:16 (5)**  
 163:5,10,15,20,25  
**12:17 (5)**  
 164:5,10,15,20,25  
**12:18 (2)**  
 165:5,10  
**12:19 (4)**  
 165:15,20,25 166:5  
**12:20 (4)**  
 166:10,15,20,25  
**12:21 (4)**  
 167:5,10,15,20  
**12:22 (6)**  
 167:25 168:5,10,15  
 168:20,25  
**12:23 (5)**  
 169:5,10,15,20,25  
**12:24 (3)**  
 170:5,10,15  
**12:25 (4)**  
 170:20,25 171:5,10  
**12:26 (5)**  
 171:15,20,25 172:5  
 172:10  
**12:27 (4)**  
 172:15,20,25 173:5  
**12:28 (5)**  
 173:10,15,20,25  
 174:5  
**12:29 (7)**  
 174:10,15,20,25  
 175:5,10,15  
**12:30 (5)**  
 175:20,25 176:5,10  
 176:15  
**12:31 (5)**  
 176:20,25 177:5,10  
 177:15  
**12:32 (5)**  
 177:20,25 178:4,5,5  
**12:33 (4)**  
 178:6,8,10,15  
**12:34 (3)**  
 178:20,25 179:5  
**12:35 (4)**  
 179:10,15,20,25  
**12:36 (4)**



180:5,10,15,20 <b>12:37 (4)</b> 180:25 181:5,10,15 <b>12:38 (4)</b> 181:20,25 182:5,10 <b>12:39 (5)</b> 182:15,20,25 183:5 183:10 <b>12:40 (4)</b> 183:15,20,25 184:5 <b>12:41 (5)</b> 184:10,15,20,25 185:5 <b>12:42 (3)</b> 185:10,15,20 <b>12:43 (3)</b> 186:5,10,15 <b>12:44 (4)</b> 186:20,25 187:5,10 <b>12:45 (4)</b> 187:15,20,25 188:5 <b>12:46 (4)</b> 188:10,15,20,25 <b>12:47 (4)</b> 189:5,10,15,20 <b>12:48 (3)</b> 189:25 190:5,10 <b>12:49 (5)</b> 190:15,20,25 191:5 191:10 <b>12:50 (5)</b> 191:15,20,25 192:5 192:10 <b>12:51 (4)</b> 192:15,20,25 193:5 <b>12:52 (4)</b> 193:10,15,20,25 <b>12:53 (4)</b> 194:5,10,15,20 <b>12:54 (5)</b> 194:25 195:5,10,15 195:20 <b>12:55 (6)</b> 195:25 196:5,10,15 196:20,25 <b>12:56 (4)</b> 197:5,10,15,20 <b>12:57 (5)</b> 197:25 198:5,10,15 198:20 <b>12:58 (4)</b> 198:25 199:5,10,15 <b>12:59 (4)</b> 199:20,25 200:5,10 <b>12100 (3)</b> 2:11 3:12 8:13	<b>123 (1)</b> 114:8 <b>124 (2)</b> 114:8,16 <b>125 (4)</b> 7:11 114:9,16,20 <b>128477 (1)</b> 1:25 <b>13 (1)</b> 7:19 <b>131 (1)</b> 258:1 <b>132 (1)</b> 5:19 <b>1350 (1)</b> 4:12 <b>14 (9)</b> 152:24 154:17 155:23 156:23 157:18 160:4 182:21,24 183:9 <b>148 (1)</b> 5:23 <b>15 (13)</b> 7:12,21 76:22 119:22 120:2 125:12 128:6 128:7 206:4 283:14 389:22 391:7 392:8 <b>155 (1)</b> 6:3 <b>156 (1)</b> 6:4 <b>16 (23)</b> 52:22,23 56:16,20 58:18 59:9 66:19,25 76:22,22 152:1,3 206:4 283:14,14 285:6 405:21,22,23 405:23,24 423:6 428:14 <b>16-md-02741-VC (2)</b> 1:7 8:12 <b>166 (1)</b> 6:5 <b>1661 (2)</b> 155:12 308:9 <b>17 (7)</b> 186:3 187:25 207:4 211:24 366:12 432:8,18 <b>17.4 (2)</b> 206:5,16 <b>1700's (1)</b> 34:7 <b>172 (2)</b> 350:22 351:7	<b>178 (1)</b> 6:8 <b>18 (11)</b> 1:18 2:5 8:1,16 124:6 186:4,5,9 249:17,19 439:2 <b>187 (1)</b> 227:23 <b>189 (1)</b> 34:18 <b>19 (6)</b> 186:10 189:21 192:22 389:22 390:3 393:3 <b>19-1 (3)</b> 5:9 11:11,12 <b>19-10 (3)</b> 6:8 178:15,22 <b>19-11 (2)</b> 6:9 200:4 <b>19-12 (2)</b> 6:12 204:1 <b>19-13 (2)</b> 6:13 223:13 <b>19-14 (2)</b> 6:14 235:19 <b>19-15 (2)</b> 6:15 243:17 <b>19-16 (4)</b> 6:16 277:6,7 288:24 <b>19-17 (3)</b> 6:18 313:6,7 <b>19-18 (4)</b> 6:20 318:21,22,25 <b>19-19 (2)</b> 6:21 349:8 <b>19-2 (3)</b> 5:10 39:9,12 <b>19-20 (4)</b> 7:3 363:14,17,18 <b>19-21 (5)</b> 7:4 386:15,16,19,19 <b>19-3 (4)</b> 5:15 86:20,21 113:9 <b>19-4 (4)</b> 5:16 113:14,21 165:5 <b>19-5 (4)</b> 5:19 132:1,5 405:16 <b>19-6 (2)</b> 5:23 148:1 <b>19-7 (3)</b> 6:3 155:8 307:10 <b>19-8 (3)</b> 6:4 156:9 157:4 <b>19-9 (2)</b> 6:5 166:10 <b>1950s (2)</b>	149:20,22 <b>1960s (2)</b> 148:13 416:25 <b>1965 (2)</b> 183:25 184:1 <b>1972 (1)</b> 360:6 <b>1974 (2)</b> 199:10 208:23 <b>1975 (13)</b> 200:14,25 201:12,22 202:17,22 207:11 208:23 209:22 211:8,15 212:6 337:14 <b>1980 (1)</b> 186:15 <b>1982 (1)</b> 13:1 <b>1983 (2)</b> 186:15 206:21 <b>1985 (2)</b> 211:8 212:6 <b>1986 (1)</b> 206:21 <b>1989 (2)</b> 13:12,13 <b>1990 (1)</b> 227:14 <b>1990s (2)</b> 346:11 369:21 <b>1991 (2)</b> 10:21 13:9 <b>1992 (3)</b> 178:14 213:16 217:16 <b>1993 (11)</b> 22:9 338:13,17 339:3 339:5 341:22 358:12 360:8,9 369:12 371:24 <b>1995 (7)</b> 13:14 338:14,22 339:3 370:1,2 371:25 <b>1997 (9)</b> 13:25 17:3 22:10 337:16 338:14 346:12,14 347:10 369:13 <b>1999 (2)</b> 156:2 355:23 <b>19th (1)</b> 438:17 <hr/> <b>2 (38)</b>	10:21 27:7 96:22 171:2 203:13 205:9 237:18 238:20 248:11,14 251:14 251:17,22 252:5,21 298:9 315:16 316:3 319:12 357:7,20 362:1 365:11 373:1 374:18 375:7 377:17 379:22 382:15 383:11 387:16,21 401:9 425:22 433:7,9,10 439:4 <b>2,4-D (36)</b> 150:8,9 223:24 252:10,18,22 253:18 254:21 255:24 256:11 257:9 258:10,18 259:6 260:11 261:3 279:12,18,25 280:14,22 281:9,21 282:18 283:19 284:1 285:19 293:6 293:8,11 294:3 295:1 296:7 338:20 424:10,16 <b>2,678 (2)</b> 337:20 341:7 <b>2.0 (1)</b> 160:20 <b>2.1 (5)</b> 216:17 232:13,16,19 234:3 <b>2.12 (1)</b> 269:5 <b>2.23 (1)</b> 253:8 <b>2.33 (1)</b> 253:8 <b>2.6 (1)</b> 282:20 <b>2.7 (1)</b> 213:19 <b>2.8 (1)</b> 213:10 <b>2.94 (2)</b> 155:18 424:8 <b>2:56 (2)</b> 270:21,22 <b>20 (10)</b> 7:11 172:14 173:2 189:6 190:15 341:4 364:17,24 366:13 368:2
---	--	--	--	--

<b>20-plus (1)</b> 371:2	351:8,13 353:2 355:1 357:24	7:17	368:12	<b>43 (1)</b> 153:13
<b>200 (4)</b> 6:9 119:18 132:7 228:3	358:25 359:23 361:3 362:3 383:1 383:19 385:22	<b>243 (1)</b> 6:15	<b>300 (1)</b> 236:7	<b>435 (1)</b> 5:4
<b>20005 (1)</b> 4:13	386:4,9,21 387:9 388:2,15 389:10,22	<b>2448 (2)</b> 179:16,19	<b>31 (4)</b> 172:15,19,24 232:25	<b>45 (1)</b> 337:7
<b>2001 (3)</b> 21:21 107:3 369:18	390:2,7,16 391:7 392:18 393:16 395:7 398:18	<b>2450 (1)</b> 178:24	<b>313 (1)</b> 6:18	<hr/> <b>5</b> <hr/>
<b>2002 (3)</b> 156:8 216:5 376:15	<b>2013AH (1)</b> 347:23	<b>25 (4)</b> 55:23 63:8 74:9 370:15	<b>318 (1)</b> 6:20	<b>5 (17)</b> 7:16 89:19 119:18 171:3 172:15,15,25 173:12,13,16,20 231:19 277:10 312:6 316:14 405:15 419:22
<b>2003 (30)</b> 26:13 153:12,16 154:4,13 156:2 181:8 184:10 205:16 213:15 214:9,18 215:18 217:23 218:23 219:1 220:7,10 221:3 224:5 225:3 227:5 228:7 235:24 276:25 310:7 334:24 335:12 355:23 401:17	<b>2013AHS (1)</b> 352:11	<b>259 (1)</b> 7:18	<b>34 (1)</b> 353:2	
<b>2003-case (1)</b> 203:24	<b>2014 (10)</b> 386:11,12,20 387:8 387:11 388:1 392:6 393:18 394:16 395:10	<b>26 (5)</b> 257:24 297:16 423:14 423:14,17	<b>349 (1)</b> 6:21	
<b>2004 (2)</b> 26:13 235:15	<b>2015 (5)</b> 38:23 69:18 276:18 277:15 416:18	<b>269 (1)</b> 7:19	<b>35 (2)</b> 25:1 188:23	<b>5.05 (1)</b> 172:11
<b>2005 (19)</b> 6:20 20:18 21:11,21 22:24 25:14,15 312:24 319:1,7 321:16 322:25 323:9,16 326:10 335:23 341:3 345:6 398:13	<b>2017 (9)</b> 1:18 2:5 8:1,16 131:24 405:8 437:16 438:17 439:2	<b>270 (1)</b> 7:20	<b>36 (2)</b> 233:1 355:8	<b>5:46 (2)</b> 384:22,23
<b>2005AHS (1)</b> 338:5	<b>204 (1)</b> 6:12	<b>271 (2)</b> 1:5 8:11	<b>361 (1)</b> 7:21	<b>5:54 (2)</b> 384:24 385:1
<b>2006 (3)</b> 17:20 21:4 25:16	<b>201 (6)</b> 172:20,24 173:12,13 319:5 341:5	<b>277 (1)</b> 6:16	<b>363 (1)</b> 7:3	<b>50 (3)</b> 25:1 326:11 337:8
<b>2007 (3)</b> 17:21 25:16 33:24	<b>21.5 (1)</b> 206:8	<b>293 (2)</b> 87:2 92:3	<b>38 (4)</b> 368:13,18 369:1 374:2	<b>50s (1)</b> 257:24
<b>2008 (2)</b> 161:23 341:20	<b>22 (3)</b> 337:16 341:11 342:12	<b>2A (7)</b> 62:9 64:24 65:3 71:7 422:8,17 424:18	<b>386 (1)</b> 7:4	<b>51 (3)</b> 229:4,5 319:12
<b>2009 (1)</b> 36:3	<b>220 (2)</b> 7:12,13	<b>2B (2)</b> 150:9 424:16	<b>39 (1)</b> 5:10	<b>550 (5)</b> 77:5 78:6 80:14 82:14 83:1
<b>201 (3)</b> 224:17 226:2 228:5	<b>223 (1)</b> 6:13	<hr/> <b>3</b> <hr/>	<hr/> <b>4</b> <hr/>	<b>55401 (1)</b> 4:6
<b>2010 (3)</b> 113:8 114:1 165:6	<b>225 (1)</b> 7:14	<b>3 (19)</b> 13:2 89:6 156:18 157:1 181:12 203:20 212:18 213:12 231:15 232:17 236:7 237:12,18 238:20 306:24 320:6 324:4 379:24 439:5	<b>4 (12)</b> 7:17 109:16,23 113:19,20 166:6 172:24 173:2 216:18 307:6 375:9 419:16	<b>56 (1)</b> 341:5
<b>2012 (4)</b> 376:21 383:14 432:13 435:12	<b>22960 (1)</b> 3:21	<b>3.0 (1)</b> 180:15	<b>4.0 (1)</b> 212:25	<b>57 (1)</b> 341:6
<b>2013 (35)</b> 122:4 347:20 349:6 349:12 350:3,9,23	<b>23 (5)</b> 7:13 263:12,19 345:8 345:16	<b>3.2 (3)</b> 109:14,22,23	<b>4.25 (2)</b> 173:15,19	<hr/> <b>6</b> <hr/>
	<b>235 (1)</b> 6:14	<b>3.6 (1)</b> 213:4	<b>4.02 (2)</b> 307:3,5	<b>6 (14)</b> 39:18 147:24 166:13 166:15 178:25 231:17 234:8 247:20,22 338:14 350:18,21 387:16 433:5
	<b>237 (1)</b> 7:15	<b>3:13 (2)</b> 270:23,25	<b>4.03 (4)</b> 307:21,22,23,25	<b>6.2 (1)</b> 157:8
	<b>239 (1)</b> 7:16	<b>3:51 (2)</b> 307:1,2	<b>4.23 (2)</b> 326:3,4	<b>6.14 (2)</b> 406:24,25
	<b>24 (2)</b> 7:15 402:14	<b>30 (1)</b> 63:8	<b>4.47 (2)</b> 326:5,7	<b>6:32 (2)</b> 407:1,3
	<b>242 (1)</b>	<b>30-some (1)</b>	<b>40 (3)</b> 337:7 365:13,14	<b>6:43 (2)</b> 419:17,18
			<b>40-some (1)</b> 335:1	<b>6:45 (2)</b> 419:19,21
			<b>40-some-odd (1)</b> 146:19	<b>60 (6)</b>
			<b>414 (4)</b> 5:5 365:12,13 373:2	

132:25 133:5 188:25 232:25 356:12,21 <b>600 (1)</b> 77:6 <b>61 (5)</b> 132:19,24 133:1,5 233:1 <b>62 (12)</b> 356:2 368:7,10,14,25 369:13,19 372:4 374:1,7,11,14	<b>83 (2)</b> 13:3 209:8 <b>86 (2)</b> 5:15 209:8			
<hr/> <b>7</b> <hr/>	<hr/> <b>9</b> <hr/>			
<b>7 (26)</b> 21:4 39:19 85:13,23 89:3 128:15 155:7 155:13 157:5 166:13,15 168:1,16 168:17 177:16 228:13,16 232:16 247:20,22 296:24 296:25 308:7 385:16,17,24 <b>7:02 (2)</b> 437:5,6 <b>7171 (1)</b> 3:5 <b>72 (1)</b> 358:9 <b>73 (1)</b> 257:25 <b>74 (2)</b> 199:16 207:14 <b>75 (4)</b> 207:14 366:18 375:3 375:11	<b>9 (7)</b> 76:21 77:2,5 166:9 228:13 231:17 321:8 <b>9:05 (3)</b> 2:6 8:2,17 <b>90 (2)</b> 148:8,10 <b>90025 (1)</b> 3:13 <b>90s (1)</b> 341:24 <b>94 (1)</b> 375:10 <b>95 (17)</b> 90:4,8,14,25 91:5 107:12,15 108:2,6,8 108:18 109:21 110:15,16 131:4 214:19 249:7 <b>950 (1)</b> 2:12 <b>97 (1)</b> 369:18 <b>98 (2)</b> 165:11 375:6			
<hr/> <b>8</b> <hr/>				
<b>8 (23)</b> 76:21 77:1,1,2 229:6 229:8 248:11,15 263:1 264:10 265:5 266:16 267:5 268:2 268:21 269:7 270:2 271:3 310:5,16 385:25 389:21 390:1 <b>80 (1)</b> 148:4 <b>80226 (1)</b> 3:6 <b>80s (1)</b> 146:23 <b>81 (1)</b> 281:23				