

Exhibit 3

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)
_____)

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15 VIDEO DEPOSITION OF
16 DENNIS WEISENBURGER, M.D.
17 MONROVIA, CALIFORNIA
18 MONDAY, JANUARY 22, 2018
19
20
21

22 REPORTED BY:
23 LISA MOSKOWITZ, CSR 10816, RPR, CRR, CLR,
24 NCRA REALTIME SYSTEMS ADMINISTRATOR
25 JOB NO. 136023

Page 2

1
2
3
4
5 JANUARY 22, 2018
6 8:41 A.M.
7
8
9 VIDEO DEPOSITION OF DENNIS
10 WEISENBURGER, M.D., held at Courtyard by
11 Marriott, 700 West Huntington Drive,
12 Monrovia, California, before Lisa Moskowitz,
13 California CSR 10816, RPR, CRR, CLR, NCRA
14 Realtime Systems Administrator.
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Page 3

1 **A P P E A R A N C E S:**
2 ANDRUS WAGSTAFF ATTORNEYS AT LAW
3 Attorneys for Plaintiffs
4 7171 West Alaska Drive
5 Lakewood, Colorado 80226
6 BY: KATHRYN FORGIE, ESQ.
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16 1350 I Street, N.W.
17 Washington, D.C. 20005
18 BY: KIRBY GRIFFIS, ESQ.
19 BY: ELYSE SHIMADA, ESQ.
20
21 **ALSO PRESENT:**
22 ANDREW TURNER, VIDEOGRAPHER
23
24
25

Page 4

1 ----- I N D E X -----
2 WITNESS: EXAMINATION PAGE
3 DENNIS WEISENBURGER, M.D.
4 Mr. Griffis 9, 147
5 Ms. Forgie 141
6
7
8 ----- E X H I B I T S -----
9 NUMBER MARKED
10 Exhibit 31-1 Notice to take oral and 10
11 videotaped deposition of
12 Dr. Dennis D.
13 Weisenburger
14 Exhibit 31-2 Amended Notice to take 10
15 oral and videotaped
16 deposition of Dr. Dennis
17 D. Weisenburger
18 Exhibit 31-3 Supplemental report of 10
19 Dr. Dennis D.
20 Weisenburger, M.D.,
21 pursuant to PTO number
22 34 and in support of
23 general causation on
24 behalf of plaintiffs
25

Page 5

1
2 Exhibit 31-4 Supplemental materials 10
3 related to the 2017 AHS
4 publication
5 Exhibit 31-5 Andreotti study 10
6 Exhibit 31-6 Malathion monograph 18
7 Exhibit 31-7 Expert report of Dr. 73
8 Dennis D. Weisenburger,
9 M.D., in support of
10 general causation on
11 behalf of plaintiffs
12 Exhibit 31-8 Bonner study 93
13 Exhibit 31-9 Koutros study 93
14 Exhibit 31-10 Koutros study 93
15 Exhibit 31-11 Heltshe study 103
16 Exhibit 31-12 Montgomery study 122
17 Exhibit 31-13 Rinsky study 122
18
19
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Page 6

1	QUESTIONS NOT ANSWERED
2	PAGE LINE
3	20 9
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Page 7

1 LOS ANGELES, MONDAY, JANUARY 22, 2018.
 2 8:41 A.M.
 3
 4 THE VIDEOGRAPHER: Good morning.
 5 This is the start of media labeled
 6 number 1 of the video-recorded
 7 deposition of Dennis Weisenburger in the
 8 matter of Roundup Products liability
 9 litigation in the court of the U.S.
 10 District Court, Northern District of
 11 California, case number 16-MD-02741-VC.
 12 This deposition is being held at the
 13 Courtyard Marriott, address 700 West
 14 Huntington Drive, Monrovia, California
 15 91016 on January 22 at approximately
 16 8:41 a.m.
 17 My name is Andrew Turner. I am the
 18 legal video specialist from TSG
 19 Reporting, Incorporated, headquartered
 20 at 747 Third Avenue, New York, New York.
 21 The court reporter today is Lisa
 22 Moskowitz in association with TSG
 23 Reporting.
 24 Counsel, will you please introduce
 25 yourselves.

Page 8

1 MS. FORGIE: Kathryn Forgie for the
 2 plaintiffs.
 3 MR. ESFANDIARY: Pedram Esfandiary
 4 for the plaintiffs.
 5 MR. GRIFFIS: Kirby Griffis,
 6 Hollingsworth, LLP, for Monsanto.
 7 MS. SHIMADA: Elyse Shimada,
 8 Hollingsworth, LLP, for Monsanto.
 9 THE VIDEOGRAPHER: Thank you.
 10 Will the court reporter please
 11 swear in the witness.
 12
 13 Dennis Weisenburger, MD,
 14 called as a witness, having been
 15 duly sworn, was examined and
 16 testified as follows:
 17
 18 MS. FORGIE: I want to make a
 19 statement for the record.
 20 This deposition is being taken
 21 pursuant to pre-trial order number 34.
 22 It is limited to the recent Agricultural
 23 Health Study publication. It is also
 24 limited to two-and-a-half hours of
 25 questioning.

Page 9

1 EXAMINATION
 2 BY MR. GRIFFIS:
 3 Q. Good morning, Dr. Weisenburger.
 4 A. Good morning.
 5 Q. We met one time at a prior version
 6 of this deposition; is that right?
 7 A. Yes.
 8 Q. You formed your opinions about
 9 causation in this litigation, i.e., that
 10 glyphosate causes non-Hodgkin's lymphoma
 11 without any data from the Agricultural
 12 Health Study after the DeRoos 2005
 13 publication; correct?
 14 MS. FORGIE: Objection.
 15 THE WITNESS: That's correct.
 16 BY MR. GRIFFIS:
 17 Q. At your deposition I showed you an
 18 unpublished draft of some data through 2013
 19 from the AHS pool of data, and we discussed
 20 it. That was not included in your original
 21 report or in your original assessment of
 22 causation; right?
 23 A. That's correct.
 24 Q. And that data, additional data, has
 25 now been published in the 2018 publication

Page 10

1 in the "Journal of the National Cancer
 2 Institute," and we're going to be talking
 3 about that today; right?
 4 A. Yes.
 5 Q. Now, you said in your
 6 supplemental -- well, let me say what I've
 7 marked prior to starting the deposition.
 8 Exhibit 1 is the original notice of
 9 deposition in this case. Exhibit 2 is a
 10 second notice of deposition with the time
 11 corrected because you asked to be deposed at
 12 9 o'clock, rather than 1 o'clock, the
 13 original information we had. 3 is your
 14 supplemental expert report that's marked in
 15 front of you. 4 is an additional materials
 16 considered list that we received quite
 17 recently, and 5 is the National Cancer
 18 Institute 2018 study.
 19 (Exhibit Numbers 31-1, 31-2,
 20 31-3, 31-4, and 31-5 were
 21 marked for identification.)
 22 BY MS. FORGIE:
 23 Q. Correct, sir?
 24 MS. FORGIE: I don't think we have
 25 all the copies here, additional copies.

Page 11

1 MR. GRIFFIS: Do you need an
 2 additional copy of the notice of
 3 deposition?
 4 MS. FORGIE: I just want to make
 5 sure I know what it is.
 6 THE WITNESS: Everything is here.
 7 MS. FORGIE: Yeah, but it's not
 8 here. Let me just look real quick.
 9 Okay.
 10 BY MR. GRIFFIS:
 11 Q. In your supplemental expert report,
 12 sir, which is Exhibit 3, can you get that
 13 out, please. On the second page which is
 14 also the last page, last paragraph, the
 15 first sentence is "In conclusion, my opinion
 16 on the role of glyphosate as a cause of NHL
 17 has not changed based on the
 18 recently-published update of the AHS";
 19 correct?
 20 A. Yes.
 21 Q. So you don't rely certainly on the
 22 NCI, National Cancer Institute 2018 study as
 23 proof that Roundup does cause NHL; right?
 24 A. I do not.
 25 Q. And what weight do you give it as

Page 12

1 evidence that Roundup glyphosate-containing
 2 substances don't cause NHL?
 3 A. Well, I give it some weight because
 4 it is now a published study in a reputable
 5 journal, but there are significant issues
 6 and flaws in the study which would lead me
 7 to not give it very much weight or to change
 8 my opinion.
 9 Q. Does it weaken your conviction that
 10 Roundup or glyphosate-containing substances
 11 cause non-Hodgkin's lymphoma?
 12 A. No.
 13 MS. FORGIE: Object to the form.
 14 THE WITNESS: No.
 15 BY MR. GRIFFIS:
 16 Q. If you give it some weight, sir,
 17 would you please explain how it is that it
 18 does not weaken your conclusion?
 19 A. Well, the findings are basically
 20 the same as the original De Roos study.
 21 They added more cases. They added more
 22 follow-up time. They did a bit more
 23 sophisticated analysis, but the results are
 24 basically the same in all findings. So I
 25 don't give it really more -- any more weight

Page 13

1 than I gave the original De Roos study.
 2 Q. And that weight, the weight that
 3 the original De Roos study had, was built
 4 into your original evaluation and your
 5 original expert report, of course; correct?
 6 A. Yes.
 7 Q. Would you please comment on why you
 8 give it no more weight than you gave to the
 9 De Roos 2005 paper if it is, as you just
 10 said, larger and has more follow-up time and
 11 more sophisticated methods of analysis?
 12 MS. FORGIE: Object to the form.
 13 THE WITNESS: Well, as I mentioned,
 14 there are significant issues and flaws
 15 with the study that I think call into
 16 question the validity of the study in
 17 terms of a negative finding, and, you
 18 know, if one looks at all of the
 19 epidemiologic evidence, there are
 20 multiple case control studies which are
 21 positive. And there's one cohort study,
 22 the Agricultural Health study, which is
 23 negative. So you've got multiple
 24 positive studies, you've got one
 25 negative study which is questionable,

Page 14

1 and so it really doesn't change my
 2 opinion to any degree.
 3 BY MR. GRIFFIS:
 4 Q. I don't want to misrepresent the
 5 methodology you applied, sir. You certainly
 6 don't just count up the positives and the
 7 negatives and compare them. You weigh the
 8 value?
 9 A. Correct.
 10 Q. And reliability of each study
 11 before you reach a conclusion. Fair?
 12 A. Yes, that's correct.
 13 Q. And one important factor in
 14 weighing the reliability and validity of
 15 studies is the size of the study, the number
 16 of exposed cases, the length of follow-up,
 17 the sophistication of the epidemiologic
 18 analysis, et cetera; correct?
 19 MS. FORGIE: Object to the form.
 20 THE WITNESS: Right. You look at
 21 each of the studies individually. You
 22 draw some conclusions about whether they
 23 are acceptable studies or not, and then
 24 you weigh that evidence. And that's
 25 what I did.

Page 15

1 BY MR. GRIFFIS:
 2 Q. Is it fair to say that the -- you
 3 identified a number of what you consider to
 4 be flaws in the National Cancer Institute
 5 2018 study in your supplemental expert
 6 report; right?
 7 A. Yes.
 8 Q. Is it fair to say that it is
 9 because of those flaws that you believe to
 10 exist in the study that you have given it no
 11 more weight than you originally gave to
 12 De Roos 2005?
 13 A. Yes.
 14 Q. You don't claim that recall bias is
 15 a flaw in the NCI 2018 study; right?
 16 MS. FORGIE: Object to the form.
 17 THE WITNESS: I don't claim that,
 18 no.
 19 BY MR. GRIFFIS:
 20 Q. Recall bias is a concern for case
 21 control studies but generally not a concern
 22 for cohort studies; is that fair?
 23 MS. FORGIE: Object to the form.
 24 THE WITNESS: That's true.
 25 ///

Page 16

1 BY MR. GRIFFIS:
 2 Q. And recall bias refers not to just
 3 mistakes people might make when asked to
 4 recall but differential recall based on
 5 whether you already have the condition that
 6 the study is looking at or don't have it;
 7 correct?
 8 A. Yes.
 9 Q. And that's why it tends to apply to
 10 case control and not as to cohort studies;
 11 right?
 12 MS. FORGIE: Object to the form.
 13 THE WITNESS: Yes.
 14 BY MR. GRIFFIS:
 15 Q. If someone said recall bias happens
 16 any time you ask anyone to recall, they
 17 wouldn't understand what they were talking
 18 about epidemiologically speaking; right?
 19 MS. FORGIE: Object to the form.
 20 THE WITNESS: Well, in
 21 epidemiologic terms, you're right.
 22 BY MR. GRIFFIS:
 23 Q. Okay. Now, do you know, sir, that
 24 IARC found the AHS to be a highly
 25 informative study including their imputation

Page 17

1 procedures?
 2 MS. FORGIE: Object to the form.
 3 THE WITNESS: I don't recall that.
 4 BY MR. GRIFFIS:
 5 Q. Have you been shown the malathion
 6 monograph, sir?
 7 A. No.
 8 Q. And you know what I mean when I
 9 refer to the malathion monograph?
 10 A. I assume it's an IARC monograph on
 11 malathion.
 12 Q. Do you know that when the
 13 glyphosate monograph was done, the same
 14 working groups were simultaneously working
 15 on other substances?
 16 A. Yes.
 17 Q. And actually dividing their time
 18 between glyphosate and other substances --
 19 A. Yes.
 20 Q. -- including malathion. You know
 21 that, sir?
 22 A. I don't know what other pesticides
 23 they were considering but yes, they were
 24 considering other pesticides as part of
 25 their work.

1 Q. I'll show you the malathion
2 monograph.

3 MS. FORGIE: I'm going to object to
4 this. It's completely beyond the scope.
5 It's not in his supplemental report and
6 it's not about the AHS. Unless you can
7 tie it pretty quickly to the AHS
8 publication, the actual publication
9 which was not published at the time --
10 the publication we're talking about
11 which was not published at the time the
12 malathion IARC monograph was, then I'm
13 going to instruct him not to answer.

14 MR. GRIFFIS: I admonish counsel
15 not to make speaking objections.

16 MS. FORGIE: That's not an
17 objection. It's a statement as to what
18 is going on here.

19 MR. GRIFFIS: I admonish counsel
20 not to make speaking statements.

21 MS. FORGIE: I'll make whatever
22 statements I can that are important.
23 (Exhibit Number 31-6 was marked
24 for identification.)
25 ///

1 reviewed this document.

2 Q. Yes, sir. You did review the
3 monograph for glyphosate; right?

4 A. I did.

5 Q. Take a look on page 7 under
6 "Exposure assessment."

7 Do you see that?

8 A. Yes.

9 Q. Do you see it says, "This section
10 summarizes the exposure assessment and
11 assignment for epidemiological studies of
12 cancer and exposure to the pesticides
13 considered in the present volume."

14 MS. FORGIE: Don't answer that.
15 BY MR. GRIFFIS:

16 Q. And it lists multiple substances
17 including glyphosate?

18 MS. FORGIE: Don't answer that,
19 please.

20 This has nothing to do with what
21 we're here for. I'm going to instruct
22 him not to answer.

23 MR. GRIFFIS: This is about the AHS
24 data.

25 MS. FORGIE: No, this is not about

1 BY MR. GRIFFIS:

2 Q. Turn, sir, to what I've marked as
3 Exhibit 6. It's the same day as the other
4 monograms.

5 MS. FORGIE: 2015, three years
6 before the publication.

7 MR. GRIFFIS: Counsel.

8 MS. FORGIE: I'm asking why are we
9 talking about this when this --

10 MR. GRIFFIS: We're not going to
11 have a debate on the record. He's not
12 going to listen to your --

13 MS. FORGIE: I can make whatever
14 statements I want. Unless you can tie
15 this into his supplemental report or the
16 AHS publication we're talking about, I'm
17 going to instruct him not to answer.
18 It's not appropriate.

19 MR. GRIFFIS: We'll be back.

20 MS. FORGIE: Fine. We've done that
21 before.

22 BY MR. GRIFFIS:

23 Q. Counsel.

24 Turn to page 7?

25 A. I'd like to state I haven't

1 the AHS publication. This was published
2 three years before the publication, and
3 he's already stated he hasn't reviewed
4 it.

5 BY MR. GRIFFIS:

6 Q. Sir, you have a criticism of
7 imputation; correct? Imputation as done in
8 the NCI 2018?

9 A. I have a criticism of imputation as
10 it was done with regard to glyphosate.

11 Q. And do you know that the IARC
12 commented on that very imputation procedure?

13 A. No, I don't know that they --

14 Q. Turn to page 21, sir.

15 MS. FORGIE: No, don't answer that.

16 Don't answer any questions about the
17 malathion.

18 BY MR. GRIFFIS:

19 Q. Sir, you've said you haven't
20 reviewed the malathion monograph. You also
21 haven't reviewed the section that addresses
22 IARC's assessment of epidemiology from the
23 agriculture Health Study including
24 glyphosate; is that right?

25 A. I'm sorry. Repeat -- would you

Page 22

1 repeat the question?
 2 Q. Yes, sir. You said you haven't
 3 reviewed the malathion monograph.
 4 A. That's correct.
 5 Q. You also haven't reviewed the
 6 section in the malathion monograph in which
 7 IARC addressed its view of the Agricultural
 8 Health Survey data including De Roos 2005
 9 and multiple subsequent publications that
 10 they took into account in the glyphosate
 11 monograph and other monographs and gave its
 12 assessment of the quality of that data;
 13 right?
 14 MS. FORGIE: Don't answer that.
 15 He's not going to answer questions about
 16 the malathion monograph.
 17 BY MR. GRIFFIS:
 18 Q. Do you agree with the working group
 19 that the AHS is a highly informative study?
 20 MS. FORGIE: Could I have that read
 21 back, please.
 22 BY MR. GRIFFIS:
 23 Q. Do you agree with IARC that the AHS
 24 is a highly informative study?
 25 MS. FORGIE: Object to the form.

Page 23

1 THE WITNESS: In general, I would
 2 say yes.
 3 BY MR. GRIFFIS:
 4 Q. Do you consider it to be -- let's
 5 talk specifically about the NCI 2018 data.
 6 You know, sir, that there have been many,
 7 many publications from the AHS pool of data;
 8 right?
 9 A. Yes.
 10 Q. And they address many possible
 11 outcomes, not just non-Hodgkin's lymphoma
 12 and glyphosate; right?
 13 A. Yes.
 14 Q. Many, many substances and other
 15 exposures and other possible health risks
 16 have been compared to many, many outcomes,
 17 and there are multiple publications about
 18 that; right?
 19 A. Yes.
 20 MS. FORGIE: Object to the form.
 21 BY MR. GRIFFIS:
 22 Q. Are you aware that there have been
 23 multiple publications using the same
 24 imputation method that was used in the NCI
 25 2018 paper?

Page 24

1 A. Yes, there have been others.
 2 Q. And there have been multiple
 3 peer-reviewed papers applying that
 4 methodology; right?
 5 A. Yes.
 6 Q. And you didn't know before today
 7 that IARC had also looked at that same
 8 imputation procedure; right?
 9 MS. FORGIE: Object to the form.
 10 THE WITNESS: I did not.
 11 BY MR. GRIFFIS:
 12 Q. When you say that you agree with
 13 IARC that -- well, when you say that the NCI
 14 2018 paper is highly reliable, what do you
 15 mean by that, sir?
 16 MS. FORGIE: Object to the form.
 17 THE WITNESS: I didn't make that
 18 statement.
 19 BY MR. GRIFFIS:
 20 Q. I'm sorry. Highly informative.
 21 MS. FORGIE: Object to the form.
 22 BY MR. GRIFFIS:
 23 Q. Let me ask it again cleanly --
 24 A. Well, you know, it lays out in
 25 detail the follow-up that was done, the

Page 25

1 methodology, and, you know, it is
 2 informative in the sense that it provides
 3 new information. But as I said before, I
 4 think that there are significant issues and
 5 flaws that really take away from the -- call
 6 the findings into question and take away
 7 from the validity of the study. And I'm
 8 speaking specifically about the glyphosate
 9 study.
 10 Q. Had you reviewed the NCI 2018
 11 paper, would you have recommended it for
 12 publication in the "Journal of the National
 13 Cancer Institute"?
 14 A. I probably would have not.
 15 Q. You disagree with the peer
 16 reviewers of the "Journal of the National
 17 Cancer Institute" as to the appropriateness
 18 of the publication?
 19 MS. FORGIE: Object to the form.
 20 THE WITNESS: I think the peer
 21 reviewers probably didn't address the
 22 issues and flaws in the study in an
 23 informative way and so didn't call into
 24 question the study. I mean, I don't
 25 know. The peer review is secret; so we

1 don't know who the peer reviewers were,
2 and we don't know what they said or
3 didn't say.

4 BY MR. GRIFFIS:

5 Q. Do you peer review for the "Journal
6 of the National Cancer Institute"?

7 A. I don't remember if I have or not.
8 Not commonly. Not usually, no.

9 Q. You can't remember if you have; is
10 that right?

11 A. I can't remember off the top of my
12 head if I have or not.

13 Q. Okay. Are there any -- what
14 journals -- are there any epidemiology
15 journals that you peer review for, sir?

16 A. I have done reviews for "Cancer
17 Epidemiology, Biomarkers and Prevention." I
18 may have done reviews for other epidemiology
19 journals, but in general, I don't accept
20 reviews from epidemiology journals.

21 Q. Why is that?

22 A. Well, because it's a lot of work,
23 and I'm a busy man.

24 Q. Why is it a lot of work to do
25 epidemiology reviews?

1 A. Well, any review is a lot of work.
2 You have to read the paper critically. You
3 have to read the literature around it. You
4 have to understand the methodology. It can
5 take you literally hours and hours to do a
6 proper review of a complicated or difficult
7 article and write a very, I would say,
8 helpful and critical review of comments to
9 the editor and to the authors. So it's a
10 lot of work to do that, and, of course, it's
11 done in my free time, my weekends, nights,
12 and holidays. That's when I end up having
13 to do it because I have a full-time job. So
14 I don't do it very often. I very carefully
15 pick the articles that I review, things that
16 I'm interested in or things that I've
17 done -- I have myself done research on
18 usually.

19 Q. Take a look at Exhibit 5, the NCI
20 2018 paper, sir.

21 I'm going to start out in the
22 abstract, the part marked "Conclusions. The
23 author has concluded that in this large
24 perspective cohort study, no association was
25 apparent between glyphosate and any solid

1 tumors or lymphoid malignancies overall,
2 including NHL and its subtypes."

3 Have I read that correctly?

4 A. Yes.

5 Q. And that accurately describes the
6 findings of the study; right?

7 MS. FORGIE: Object to the form.

8 THE WITNESS: Yes.

9 BY MR. GRIFFIS:

10 Q. In the discussion section, first
11 paragraph of the discussion section on
12 page 5 of 8, sir, the authors wrote, "In
13 this updated evaluation of glyphosate use
14 and cancer risk in a large perspective study
15 of pesticide applicators, we observed no
16 associations between glyphosate use and
17 overall cancer risk or with total
18 lymphohematopoietic cancers including NHL
19 and multiple myeloma."

20 Have I read that right?

21 A. Yes.

22 Q. That's an accurate description of
23 the finding in the study; right?

24 MS. FORGIE: Object to the form.

25 THE WITNESS: Yes.

1 BY MR. GRIFFIS:

2 Q. On page 7 of 8, sir, in the
3 right-hand column in the first full
4 paragraph, the authors of the NCI 2018 study
5 comment on the scope of this study compared
6 to the De Roos 2005 publication, and they
7 write, "In this perspective cohort study, we
8 expanded a previous analysis of glyphosate
9 use and cancer risk with more than eleven
10 years of additional follow-up and more than
11 four times the number of glyphosate-exposed
12 cancer cases, n equals 5,779 compared with n
13 equals 1,324."

14 Did I read that right?

15 A. Yes.

16 Q. That's an accurate comparison of
17 this study to the De Roos 2005 study;
18 correct?

19 MS. FORGIE: Object to the form.

20 THE WITNESS: Yes.

21 BY MR. GRIFFIS:

22 Q. On the other -- in the left-hand
23 column, sir, the first full paragraph, the
24 authors repeat that they observed no
25 associations between glyphosate use and NHL

1 overall or any of its subtypes. And then
 2 they say, "This lack of association was
 3 consistent for both exposure metrics,
 4 unlagged and lagged analyses, after further
 5 adjustment for pesticides linked to NHL in
 6 previous AHS analyses and when we excluded
 7 multiple myeloma from the NHL grouping."

8 Have I read that correctly?

9 MS. FORGIE: Object to the form.

10 THE WITNESS: Yes.

11 BY MR. GRIFFIS:

12 Q. And that's accurate. They did all
 13 those adjustments and they still found no
 14 association; correct?

15 MS. FORGIE: Object to the form.

16 THE WITNESS: Yes.

17 BY MR. GRIFFIS:

18 Q. In Table 2, sir, Table 2 of the
 19 data table, these are their findings for all
 20 cancers, multiple and specific, solid and
 21 lymphohematopoietic cancers; correct?

22 A. Yes.

23 Q. For all cancers they found no
 24 association. All of the relative risks were
 25 right around one; correct?

1 association between the substance being
 2 examined and the multiple cancers being
 3 examined; correct?

4 MS. FORGIE: Object to the form.

5 THE WITNESS: Yes.

6 BY MR. GRIFFIS:

7 Q. So we just talked about the all
 8 cancers finding. There are also multiple
 9 breakdown, oral cavity, colon, rectum,
 10 pancreas, lung, melanoma, prostate,
 11 testicular, bladder and kidney --

12 MS. FORGIE: Are you still on
 13 Table 2?

14 MR. GRIFFIS: Yes.

15 MS. FORGIE: Thank you.

16 BY MR. GRIFFIS:

17 Q. And those are all negative as well;
 18 correct?

19 A. I don't know. I didn't look
 20 carefully at them.

21 Q. Yes, sir.

22 A. Yes, I guess, they are all
 23 negative. That's true.

24 Q. So they're all very close to one,
 25 some of the values are above one, some of

1 MS. FORGIE: Object to the form.

2 THE WITNESS: Yes.

3 BY MR. GRIFFIS:

4 Q. And when -- generally speaking,
 5 sir, when an epidemiology study investigates
 6 whether a particular exposure causes a
 7 particular outcome, it looks at a whole
 8 bunch of different outcomes and it finds
 9 relative risks a little bit above one, a
 10 little bit below one, consistently none of
 11 them are statistically significant, the
 12 confidence interval is always straddling the
 13 one, that's what you would expect to see
 14 when a substance does not cause cancer;
 15 right?

16 MS. FORGIE: Object to the form.

17 THE WITNESS: In general, yes.

18 BY MR. GRIFFIS:

19 Q. So, in general, and we'll talk
 20 about your specific criticisms of this in a
 21 moment, of course, sir, but, in general,
 22 this is the pattern of relative risks, point
 23 estimates, and confidence intervals you
 24 would expect to see in a large epidemiology
 25 study where there is, in fact, no

1 the values are below one. All of them are
 2 non-significant and the P-trend, which is a
 3 way of looking at a group of relative risks
 4 and confidence intervals together for
 5 different exposure levels, those are all
 6 non-significant as well; correct?

7 A. Yes.

8 Q. And that was for the solid tumors
 9 to be clear.

10 Let's talk about the
 11 lymphohematopoietic cancers which would be
 12 the lymphomas -- correct? -- and leukemias?

13 A. Yes.

14 Q. The overall figure for
 15 lymphohematopoietic cancers is negative.
 16 Relative risks are all one or below.
 17 Confidence intervals all straddle the null,
 18 the one; correct?

19 MS. FORGIE: Object to the form.

20 THE WITNESS: Yes.

21 BY MR. GRIFFIS:

22 Q. And the subtypes, the Hodgkin
 23 lymphoma breakdown is also negative. The
 24 overall non-Hodgkin's lymphoma breakdown is
 25 negative; correct?

Page 34

1 MS. FORGIE: Are you on Table 3 now
 2 or Table 2?
 3 MR. GRIFFIS: Still on Table 2.
 4 THE WITNESS: Second part of
 5 Table 2.
 6 MS. FORGIE: Okay.
 7 THE WITNESS: So both Hodgkin and
 8 non-Hodgkin show the same pattern.
 9 BY MR. GRIFFIS:
 10 Q. Right. I.e., no association;
 11 correct?
 12 A. Correct.
 13 Q. And then there's a breakdown for
 14 various subtypes of non-Hodgkin lymphoma;
 15 correct?
 16 A. Yes.
 17 Q. So for non-Hodgkin lymphoma B-cell,
 18 there's no association. For chronic
 19 lymphocytic lymphoma and small lymphocytic
 20 leukemia, there is no association; correct?
 21 A. Correct.
 22 Q. For diffuse large B-cell lymphoma,
 23 no association; correct?
 24 MS. FORGIE: Object to the form.
 25 THE WITNESS: Correct.

Page 35

1 BY MR. GRIFFIS:
 2 Q. For marginal-zone lymphoma, no
 3 association; correct?
 4 A. Correct.
 5 Q. For follicular lymphoma, no
 6 association; correct?
 7 A. Correct.
 8 Q. For multiple myeloma, no
 9 association; correct?
 10 A. Correct.
 11 Q. For non-Hodgkin lymphoma T-cell, we
 12 have the smallest -- we have a very small
 13 exposed group so that they have to use
 14 moieties instead of breaking into three or
 15 four groups; right?
 16 A. Right. They can only break them
 17 into two groups.
 18 Q. Let's comment on that for a moment.
 19 When there was enough data, they broke it
 20 into four groups, into quartiles; right?
 21 MS. FORGIE: Object to the form.
 22 THE WITNESS: Tertiles or
 23 quartiles, yes.
 24 BY MR. GRIFFIS:
 25 Q. And when there was slightly less

Page 36

1 data, they broke it into tertiles, and when
 2 there was the least amount of data, they
 3 broke it into moieties, into halves; right?
 4 A. Correct.
 5 Q. This is one of the ones for which
 6 they had the least data, and these values
 7 are above one, but they are not significant;
 8 correct?
 9 A. Correct.
 10 MS. FORGIE: Objection.
 11 BY MR. GRIFFIS:
 12 Q. So, again, there's no association
 13 for non-Hodgkin's lymphoma T-cell in this
 14 data; correct?
 15 MS. FORGIE: Object to the form.
 16 THE WITNESS: There's no
 17 significant association.
 18 BY MR. GRIFFIS:
 19 Q. The .31 is a measure of the
 20 P-trend -- correct? -- whether there's an
 21 association across the data?
 22 A. .31 just looks at trend by
 23 comparing the different groups. So what the
 24 .31 is telling you is that the M2 group does
 25 not have a higher risk ratio than the M1; so

Page 37

1 that's why it's not significant.
 2 Q. This data would show -- you said
 3 there's an association but not a
 4 statistically significant one; right, sir?
 5 Is that what you said?
 6 A. Right. So you can see in the M1
 7 there's an over fourfold increase odds ratio
 8 for T-cell lymphoma, but since there's only
 9 six cases in the M2 group, there wasn't an
 10 increased -- there was a small increased
 11 odds ratio. So what this is telling you
 12 there isn't really what I would call a
 13 dose-response effect here, although it's a
 14 very crude analysis with very few cases and
 15 only two groups so . . .
 16 Q. So the data shows no-dose response?
 17 MS. FORGIE: Object to the form.
 18 THE WITNESS: Well, the data is so
 19 small that it's hard to draw any
 20 conclusions from that.
 21 MS. FORGIE: Counsel, when you get
 22 a chance, the reason I keep asking if
 23 we're still on Table 2 is maybe when you
 24 finish Table 2, we can take a break. I
 25 left my phone, I think, in the room so

Page 38

1 when you get to a good breaking point.
 2 That's why I keep saying are you still
 3 on table 2.
 4 MR. GRIFFIS: Okay. I'll stop when
 5 we're done with table 2.
 6 MS. FORGIE: Okay, or if there's an
 7 earlier one, whatever is best for you.
 8 BY MR. GRIFFIS:
 9 Q. So the data for non-Hodgkin
 10 lymphoma T-cell is so small you can't draw a
 11 reasonable conclusion; is that --
 12 MS. FORGIE: Object to the form.
 13 THE WITNESS: I would say that is
 14 true.
 15 BY MR. GRIFFIS:
 16 Q. You made a distinction earlier, and
 17 I'm not talking about non-Hodgkin lymphoma
 18 T-cell in particular, I'm talking in
 19 general. You made a distinction between
 20 whether there's an association or not and
 21 whether that association is statistically
 22 significant; right?
 23 A. Right.
 24 Q. What does "statistically
 25 significant" mean in epidemiology, sir?

Page 39

1 A. Well, it's a measure of the
 2 likelihood of -- that the association is due
 3 to chance. So if it is statistically
 4 significant, it's unlikely to be due to
 5 chance. It's very likely to be real.
 6 Q. When we're looking at each of these
 7 point estimates like under follicular
 8 lymphoma, the point estimate for the first
 9 tertile is 0.89; correct?
 10 A. Right.
 11 Q. Where we looked to see if it's
 12 statistically significant is the confidence
 13 interval, the parenthetical afterwards and
 14 to see if that spans or does not span the 1,
 15 the null value; correct?
 16 A. Yes.
 17 Q. If somebody said statistically
 18 significant means greater than one, and
 19 that's all it means, they don't know what
 20 they're talking about; right?
 21 MS. FORGIE: Well, object to the
 22 form.
 23 THE WITNESS: Well, it depends
 24 where the one is.
 25 ///

Page 40

1 BY MR. GRIFFIS:
 2 Q. A point estimate of greater than
 3 one without regard to the confidence
 4 interval.
 5 A. Yes, that's true.
 6 MR. GRIFFIS: We can take a break.
 7 MS. FORGIE: Thank you.
 8 THE VIDEOGRAPHER: We are going off
 9 the record at 9:14 a.m.
 10 (Recess taken from 9:14 a.m. to
 11 9:24 a.m.)
 12 THE VIDEOGRAPHER: This continues
 13 disk number 1. We are going back on the
 14 record. The time is 9:24 a.m.
 15 BY MR. GRIFFIS:
 16 Q. All right, Dr. Weisenburger, I'd
 17 like to go to Exhibit 3, which is your
 18 supplemental expert report.
 19 You told me earlier that there are
 20 a number of what you consider to be errors
 21 or weaknesses or flaws in the NCI 2018 paper
 22 that caused you to give it no more weight
 23 than you gave to De Roos 2005. What I want
 24 to do first is just enumerate the flaws you
 25 see in the NCI 2018 paper. Let's get that

Page 41

1 done first, and then we'll talk about them.
 2 So I'll give you some guidance but
 3 tell me if I'm wrong about anything. It
 4 seems to me that the first one that you
 5 identified, sir, is a response rate one.
 6 This is in the first -- the second
 7 paragraph. You raised the issue of problems
 8 that could happen if response rates to
 9 follow-up surveys are low, and then you say,
 10 "Only 44 percent of enrolled applicators
 11 completed and returned a supplemental
 12 questionnaire"; correct?
 13 A. Yes.
 14 Q. That 44 percent does not -- doesn't
 15 reflect a questionnaire that was actually
 16 used in the NCI 2018; right?
 17 A. Oh, I'm sure data to perform that
 18 supplemental questionnaire was used.
 19 MS. FORGIE: Object to the form.
 20 BY MR. GRIFFIS:
 21 Q. The two surveys that were used were
 22 the original one and the 1999 to 2005 one.
 23 You go on to describe 37 percent of
 24 applicators failing to respond to that one;
 25 correct?

Page 42

1 A. Right.

2 Q. And the two that are described in

3 the study and from which the data are pooled

4 in the NCI 2018 study and the text of the

5 study and the methods and analysis are the

6 1999 -- the original survey, 1993 to '97 and

7 the '99 to 2005 one; right?

8 A. Well, the supplemental

9 questionnaire in which only 40 percent of

10 the applicators responded was a take-home

11 questionnaire after they filled out the

12 initial questionnaire for enrollment. Okay?

13 And that data was used in many of the

14 studies and was probably used in -- it was

15 probably used in the analysis of the people

16 who responded to the second questionnaire.

17 And it was certainly used in the data from

18 De Roos 2000 -- the first De Roos paper.

19 Q. 2005?

20 A. Yeah, so it's supplemental

21 information that they had on a subset and

22 they used that data. They didn't just

23 discard that data.

24 Q. Okay. We'll come back to that.

25 A. They used what they had.

Page 43

1 Q. The first error -- should I call

2 them errors or biases or flaws or what?

3 A. I think they're flaws.

4 Q. The first flaw that you identified

5 in your supplemental expert report is the

6 non- -- the relatively high non-response

7 rate. The non-response rate; correct?

8 A. In the follow-up and supplemental

9 questionnaires, yes.

10 Q. Okay. And the way that was

11 addressed you discuss at the bottom of the

12 first page, the last paragraph there. The

13 imputation method; right?

14 A. Right. The imputation methods were

15 used to address the lack of response to the

16 first follow-up survey.

17 Q. Okay. So it's kind of --

18 A. Not that it was used to address the

19 lack of information from the supplemental

20 survey done at the time of enrollment.

21 Q. These are kind of the same

22 criticism. It's a lack of follow-up and

23 then the imputation method that was used to

24 address that you have critiques of; correct?

25 MS. FORGIE: Object to the form.

Page 44

1 THE WITNESS: You have to repeat

2 the question. I don't understand the

3 question.

4 BY MR. GRIFFIS:

5 Q. I'm just trying to get a list right

6 now so that we can go through and do them

7 one by one, a list of what you perceive to

8 be the flaws in the NCI 2018.

9 A. Okay.

10 Q. I'm trying to know whether the

11 response rate one goes with the imputation

12 one so we can address them together or if

13 they're distinct facets of those.

14 A. So, yeah, the lack of response from

15 37 percent of the applicators, the authors

16 of the paper tried to address using this

17 imputation method. So they basically used

18 their method to try and guess what the

19 responses would have been for those

20 37 percent of people who didn't respond.

21 Q. Okay. So the next flaw that you

22 identified is in the, if I'm reading it

23 correctly, it's in the second paragraph at

24 the end. You said that "For the responders,

25 pesticide use data was only obtained for the

Page 45

1 last year of farming prior to the follow-up

2 survey"; right?

3 MS. FORGIE: Object to the form.

4 THE WITNESS: Let's see. Where is

5 that?

6 BY MR. GRIFFIS:

7 Q. It's the second paragraph of your

8 supplemental expert report at the end of

9 that paragraph.

10 A. Yeah, so they only asked -- in this

11 first follow-up questionnaire, they only --

12 which occurred anywhere from, I guess,

13 probably 6 to 12 years after the initial

14 questionnaire, they only asked for

15 information on pesticide use for the last

16 year of farming. So they didn't ask for any

17 information in the period of time between

18 the last year of farming and the last year

19 that was included in the initial enrollment

20 questionnaire.

21 Q. So that's a second flaw, the first

22 one being the low response rate and the

23 attempt to fix it with imputation which you

24 feel was unsuccessful, and the second one

25 was asking only for the last year of farming

Page 46

1 in the follow-up survey.
 2 MS. FORGIE: Object to the form.
 3 BY MR. GRIFFIS:
 4 Q. Is that right, sir? Is that an
 5 accurate list so far?
 6 A. Yes, that's true.
 7 Q. And then the third that I see if
 8 I'm correct is that there was an increase in
 9 glyphosate use that you believe likely
 10 resulted in significant misclassification of
 11 some exposures; right?
 12 A. Right.
 13 Q. The next thing you write is
 14 imputation as we discussed. That kind of
 15 fits with the first criticism.
 16 MS. FORGIE: Object to the form.
 17 THE WITNESS: The third one that
 18 you mentioned, the dramatic increase,
 19 really reflects on how the cases were
 20 actually classified in the initial
 21 enrollment. It also complicates the
 22 attempt to impute or to guess what
 23 the -- what the exposure was for those
 24 that didn't respond. So these things
 25 are all tied together.

Page 47

1 BY MR. GRIFFIS:
 2 Q. Okay. The next one that I see --
 3 and tell me if I've missed one -- is on
 4 page 2, the first full paragraph, and you
 5 make the point that there was a high -- high
 6 usage of glyphosate, and so that's not an
 7 optimal distribution among exposed and
 8 unexposed; correct?
 9 A. That's correct, yes.
 10 Q. Is that the next one, or did I miss
 11 one?
 12 A. I think that's the next one.
 13 Q. Okay. And then the next, and I
 14 think last -- but you'll correct me if I'm
 15 wrong -- is a latency issue. You said, "The
 16 median lifetime years of glyphosate use was
 17 only 8.5 years with a median follow-up time
 18 of only about 18 years which may not be
 19 enough exposure and/or follow-up time to
 20 demonstrate an effect," and you called the
 21 NCI 2018 at best an interim analysis?
 22 A. Yeah, it's both an exposure and
 23 latency issue.
 24 Q. To recap, and again what I'm trying
 25 to do is get a complete list before we start

Page 48

1 digging in. The flaws that you identified
 2 are the relatively low response rate and the
 3 attempt to address that through imputation
 4 which you have criticisms of; two, the fact
 5 the pesticide use data was obtained on last
 6 year of farming in the second survey; three,
 7 that there were secular trends in the use of
 8 glyphosate that could affect exposure
 9 analysis and change the figures; four, that
 10 the relatively high frequency of exposure to
 11 glyphosate made the distribution among
 12 exposed and non-exposed non-optimal; and,
 13 five, that it's too short a study so far in
 14 terms of exposure and latency; is that
 15 correct?
 16 MS. FORGIE: Object to the form.
 17 THE WITNESS: I would agree. The
 18 last one is, you know, the median
 19 exposure was only 8.5 years which is
 20 really not a long period of exposure in
 21 a cohort study. And the follow-up
 22 probably needs to be even longer than it
 23 is in this most recent publication.
 24 BY MR. GRIFFIS:
 25 Q. Okay. But those are the five

Page 49

1 flaws; right?
 2 A. Yes.
 3 MS. FORGIE: Object to the form.
 4 BY MR. GRIFFIS:
 5 Q. And there weren't any flaws that I
 6 missed; correct?
 7 MS. FORGIE: Object to the form.
 8 THE WITNESS: Those are the ones
 9 that I outlined in my report.
 10 BY MR. GRIFFIS:
 11 Q. Did you have any in mind that you
 12 didn't outline in your report?
 13 A. No.
 14 Q. All right. I'd like to start with
 15 flaw number 2, "Pesticide use data was only
 16 obtained for the last year of farming."
 17 So tell me if I'm correct here.
 18 The concern is that someone may have started
 19 to use glyphosate after the first survey but
 20 continued to farm and not use glyphosate
 21 during their last year of farming and then
 22 reported no use of glyphosate in the second
 23 survey and thus been undercounted?
 24 MS. FORGIE: Object to the form.
 25 THE WITNESS: There are a whole

1 variety of errors that could have
 2 occurred there. That's one of them.
 3 For example, in the first survey they
 4 could have been a non-user of
 5 glyphosate, and in the second survey
 6 they could have become a user of
 7 glyphosate, but you wouldn't know when
 8 they started using glyphosate. Okay?
 9 There's no way to know that. The
 10 reverse is true too. So they may have
 11 not -- they may have been a user of
 12 glyphosate, and then they discontinued
 13 glyphosate, and you wouldn't know when
 14 they discontinued glyphosate. So
 15 there's no way to fill in the gap of the
 16 years between the first survey and the
 17 second survey. So I guess in the
 18 imputation you just guess what it was.

19 BY MR. GRIFFIS:

20 Q. The imputation does address those
 21 issues. We'll discuss your criticisms of
 22 imputation, but it does address those
 23 issues; right?

24 MS. FORGIE: Object to the form.

25 THE WITNESS: Well, it attempts to

1 question. This is a problem with cohort
 2 studies. They cut short to some extent
 3 on the way they gather the data, and
 4 they try to compensate it by having
 5 many, many more people in the study.
 6 But what it means is that the quality of
 7 the data is not as good as it should be.
 8 And had they taken more time in the
 9 follow-up questionnaire and asked the
 10 questions for each of the years, it
 11 wouldn't have added a lot of time to the
 12 question because the years were anywhere
 13 between maybe five and ten, maximum 12.
 14 So they could have asked three or four
 15 questions for each year and had all the
 16 data they needed to really do it
 17 properly.

18 BY MR. GRIFFIS:

19 Q. You say on page 2 --

20 A. So they have to actually impute the
 21 data for the respondents too because they
 22 don't know what they did in between. It's
 23 not just for the non-respondents, but it's
 24 also for the respondents.

25 Q. You say on page 2, sir, "Since all

1 address them.

2 BY MR. GRIFFIS:

3 Q. Okay. So it's one of the pieces of
 4 absent data that the imputation procedure is
 5 designed to address. That's fair?

6 MS. FORGIE: Object to the form.

7 THE WITNESS: Yes.

8 BY MR. GRIFFIS:

9 Q. Do you have any evidence that there
 10 was error introduced by asking people to
 11 report on their last year of farming?

12 A. Well, the reported data probably
 13 was accurate because it's the most recent
 14 year of farming. So they should remember
 15 that pretty accurately. So with regard to
 16 that there probably was not a lot of error.

17 Q. And do you know whether it was the
 18 best procedure to follow, for example, to
 19 give people a shorter questionnaire to fill
 20 out and increase their likelihood of
 21 responding to it?

22 MS. FORGIE: Object to the form.

23 THE WITNESS: So that's true, but
 24 what happens then is you don't have the
 25 data you really need to answer the

1 of these various errors and exposure
 2 classification were non-differential." And
 3 I don't want to ask you about the whole
 4 sentence right now, but just tell me what
 5 you mean by non-differential.

6 MS. FORGIE: Object to the form.

7 THE WITNESS: Non-differential
 8 means that the errors were not linked
 9 specifically to the exposure or to the
 10 disease in question. They were random
 11 errors.

12 BY MR. GRIFFIS:

13 Q. Okay. So one person might slightly
 14 underreport glyphosate. One person might
 15 slightly overreport glyphosate, and there's
 16 no consistency in the lack of data or the
 17 missing data in association with either
 18 non-Hodgkin lymphoma or glyphosate exposure.
 19 That's what non-differential means?

20 MS. FORGIE: Object to the form.

21 THE WITNESS: Non-differential
 22 means that it's just as likely that --
 23 well, it's just as -- it means that
 24 there's no direction in the bias, that
 25 the bias is going in both directions,

Page 54

1 yes. I guess that's what you said.
 2 BY MR. GRIFFIS:
 3 Q. Okay. And if there are a whole
 4 bunch of little randomnesses, some of them
 5 would be pointing in one direction and some
 6 in the other, and they would kind of tend to
 7 cancel out; is that right?
 8 MS. FORGIE: Object to the form.
 9 THE WITNESS: That's true, but what
 10 would happen is it decreases the ability
 11 of the study to detect a true finding.
 12 It biases any of the results in general.
 13 It biases the results towards the null.
 14 BY MR. GRIFFIS:
 15 Q. And that was the rest of the
 16 sentence?
 17 A. Right.
 18 Q. "Since all of these various errors
 19 in exposure classification were
 20 non-differential, they would result in a
 21 bias toward the null and attenuate or
 22 obliterate any true positive effect."
 23 So they wouldn't tend in any
 24 particular direction, but they would tend to
 25 obscure in the direction of the null towards

Page 55

1 1.0?
 2 A. Right.
 3 Q. So that the outcome that you
 4 measured, you say I found such and such a
 5 relative risk, that would, in fact, be
 6 closer to the null than it should be; is
 7 that right?
 8 A. Yeah, so if you have a true
 9 relative risk of say 3, and you have a
 10 significant amount of exposure
 11 misclassification, that could lower the risk
 12 from a significant 3 to a non-significant 2
 13 or a non-significant 1.8 or 1.2. So that's,
 14 in general, the effect of non-differential
 15 misclassification.
 16 Q. And bias towards the null when you
 17 have a point estimate that is below one
 18 suggests that the true point estimate would
 19 be even lower; right? It would be .5
 20 instead of .7, for example?
 21 MS. FORGIE: Object to the form.
 22 THE WITNESS: That would be -- that
 23 would also happen, yes.
 24 BY MR. GRIFFIS:
 25 Q. Okay. So last year of farming.

Page 56

1 You've also told us -- the very next thing
 2 you tell us is that there was a very major
 3 increase in glyphosate use after the
 4 introduction of glyphosate-resistant crops;
 5 right?
 6 A. Yes.
 7 Q. Glyphosate is used on -- tell me if
 8 you know. I don't know whether you do or
 9 not. Glyphosate is used on some of the most
 10 widely used crops in the country; right?
 11 A. Yes.
 12 Q. And there are glyphosate-resistant
 13 versions of those meaning -- you're talking
 14 about Roundup Ready; right?
 15 A. Yes.
 16 Q. So because of the introduction of
 17 Roundup Ready crops, lots of farmers were
 18 using glyphosate, and they were doing it
 19 consistently year after year; right?
 20 MS. FORGIE: Object to the form.
 21 THE WITNESS: Well, I would say, in
 22 general, that's true. Farmers do stop
 23 doing things. They don't continue to
 24 always do what they did before, but, in
 25 general, the use of these agents

Page 57

1 increase dramatically because farmers
 2 found that they could increase their
 3 yields by doing it. So it was -- it had
 4 a huge effect on how they farmed for
 5 certain crops.
 6 BY MR. GRIFFIS:
 7 Q. So if a farmer told you -- for
 8 glyphosate. If a farmer told you for
 9 glyphosate the last year I was farming I
 10 didn't use glyphosate, they probably weren't
 11 using it before then either; right?
 12 MS. FORGIE: Object to the form.
 13 THE WITNESS: Probably that's true,
 14 although we don't really know.
 15 BY MR. GRIFFIS:
 16 Q. Okay.
 17 A. There may have been another reason
 18 why they switched. They could have switched
 19 crops; right? They could have decided to
 20 plant something else in the field that year,
 21 rotate their crops.
 22 Q. Sure. We could think of scenarios,
 23 but it's a relatively unlikely scenario that
 24 somebody was using glyphosate and then the
 25 last year they were farming they stopped

Page 58

1 using glyphosate and then they stopped
 2 farming; right?
 3 MS. FORGIE: Object to the form.
 4 THE WITNESS: I don't know. I
 5 can't speculate.
 6 BY MR. GRIFFIS:
 7 Q. It also makes it pretty easy to
 8 impute and pretty easy to predict if you
 9 built that into the formula, glyphosate
 10 users are likely to continue to use
 11 glyphosate?
 12 MS. FORGIE: Object to the form.
 13 Calls for speculation.
 14 BY MR. GRIFFIS:
 15 Q. Correct?
 16 A. I can't answer that question
 17 either. I don't know whether it was easy or
 18 hard. The method they used is quite
 19 complicated. It may be easy to use, but I
 20 really -- there's no way to know how
 21 accurate it is or was.
 22 Q. Well, it should be easier at least,
 23 in general, to predict glyphosate use and
 24 you project glyphosate use if glyphosate is
 25 a widely used crop year after year -- widely

Page 59

1 used product year after year than if it's a
 2 relatively rarely used herbicide that
 3 someone might choose to use or not use;
 4 right?
 5 MS. FORGIE: Object to the form.
 6 Asked and answered.
 7 You can answer it again.
 8 THE WITNESS: Well, it would -- I
 9 suppose it would make it easier to
 10 predict, but again, for example, if you
 11 had somebody in the first survey they
 12 weren't using glyphosate, and in the
 13 second survey they were using
 14 glyphosate, you really wouldn't know
 15 when they started using it. You would
 16 have a window of when they started, but
 17 you wouldn't know when they started and
 18 you wouldn't know how many days per year
 19 they started. You wouldn't know
 20 anything about the metrics of use during
 21 that gap period. And so, you know, so,
 22 again, you've got to use the imputation
 23 method to guess.
 24 BY MR. GRIFFIS:
 25 Q. We'll talk about imputation in a

Page 60

1 minute, but at any point in using the
 2 imputation method, does any person sit there
 3 and make a guess, or do they apply a
 4 formula?
 5 A. Well, the formula they use is, I
 6 would say, an educated guess. Okay?
 7 Q. Have you ever designed an
 8 imputation formula yourself?
 9 A. No.
 10 Q. Would you be qualified to?
 11 MS. FORGIE: Object to the form.
 12 THE WITNESS: No.
 13 BY MR. GRIFFIS:
 14 Q. What kinds of people -- and I don't
 15 mean their personality traits but their
 16 qualifications and professional training
 17 would be qualified to generate an imputation
 18 formula?
 19 MS. FORGIE: Object to the form.
 20 THE WITNESS: Well, it would have
 21 to be -- it would have to be an
 22 epidemiologist or sophisticated
 23 biostatistician who understands the
 24 issues around what they're trying to
 25 impute.

Page 61

1 BY MR. GRIFFIS:
 2 Q. So an epidemiologist or
 3 biostatistician?
 4 A. Yes.
 5 Q. The optimal distribution issue,
 6 sir -- and you remember what I mean by that?
 7 This is on page 2, your statement that since
 8 lots of people were using glyphosate, you
 9 don't have an optimal 50 percent, 50 percent
 10 distribution between exposed and unexposed?
 11 A. Right. So yes.
 12 Q. So you're referring to a general
 13 principle of epidemiology that you can best
 14 compare two groups if your numbers are
 15 divided evenly between those two groups;
 16 right?
 17 A. Yes.
 18 MS. FORGIE: Object to the form.
 19 THE WITNESS: Yes. In fact, you
 20 know -- for example, in a case control
 21 study, you design the study to have a
 22 sometimes two- or three-to-one match of
 23 controls to cases. So you actually have
 24 more controls in the case control study
 25 than you do -- than you do cases. And

Page 62

1 in this study, because so many of the
 2 applicators used glyphosate, you've got
 3 a balance going in the other direction
 4 where you've got four patients or four
 5 applicators who are exposed versus only
 6 one that's unexposed. So it's balanced
 7 in the wrong direction.
 8 BY MR. GRIFFIS:
 9 Q. The same math you're talking about
 10 that makes 50/50 distribution give you the
 11 cleanest numbers in your statistical
 12 analysis for ever, never use tell you that
 13 if you're dividing it into four exposed
 14 groups and one unexposed group, then a
 15 20 percent, 20 percent, 20 percent,
 16 20 percent, 20 percent distribution is
 17 optimal; right?
 18 MS. FORGIE: Object to the form.
 19 BY MR. GRIFFIS:
 20 Q. Same numbers in each group?
 21 MS. FORGIE: Object to the form.
 22 THE WITNESS: In general, you want
 23 it to be 50/50; right? The fact you
 24 divide your cases with disease into
 25 sub-groups really -- I don't think --

Page 63

1 you know, I think, in general, when you
 2 design the study, you want to have a
 3 50/50 balance to get the best power to
 4 detect a difference.
 5 BY MR. GRIFFIS:
 6 Q. Okay. So as a biostats matter,
 7 biostatistics matter, do you know whether
 8 it's true or false that you get the most
 9 power in a division into four exposed groups
 10 and one unexposed group if your division is
 11 as close to 20, 20, 20, 20 as you can get?
 12 MR. ESFANDIARY: Wait. Object to
 13 the form.
 14 THE WITNESS: I don't know the
 15 answer to that. If I was to guess, I
 16 would say the power would be somewhat
 17 less if you did it that way.
 18 BY MR. GRIFFIS:
 19 Q. Less than what?
 20 A. It's less because you have less
 21 people with disease in each group, not
 22 because you have too many controls.
 23 Q. In the never ever, you can't do any
 24 sort of dose-response analysis, and in the
 25 group where you have four exposed groups at

Page 64

1 different levels and an unexposed you can.
 2 MS. FORGIE: Wait. Wait for a
 3 question.
 4 Is there a question?
 5 MR. GRIFFIS: You can; right? --
 6 is the end of the question. You stepped
 7 on it.
 8 MS. FORGIE: Object to the form.
 9 THE WITNESS: So there are two
 10 different -- you're asking two different
 11 questions, and the answer is the same
 12 for both, that you want to have equal
 13 numbers of cases or diseased and
 14 non-diseased people in your comparative
 15 groups. But if you take your diseased
 16 group and you divide it into three or
 17 four sub-groups, then you're going to
 18 somewhat increase the power to detect
 19 significant changes. But it's not --
 20 but it's because you divided your
 21 diseased group into three or four
 22 groups, okay, and decreased the numbers
 23 in each.
 24 BY MR. GRIFFIS:
 25 Q. If your intention is to look at

Page 65

1 dose response by dividing into multiple
 2 exposed groups, a lower-exposed group,
 3 medium-exposed group, higher-exposed group
 4 or four such groups, quartile, then the
 5 optimum distribution in terms of power to
 6 demonstrate or fail to demonstrate a dose
 7 response would be an equal distribution into
 8 each group. Do you know whether that's true
 9 or false?
 10 MS. FORGIE: Object to the form.
 11 Asked and answered.
 12 You can answer it again.
 13 THE WITNESS: I would say that --
 14 again I would -- I'm not sure, but I
 15 think that the greater numbers in any of
 16 the groups would improve the power.
 17 Okay? So by decreasing the number of
 18 cases or diseased people in each group
 19 versus controls, if you decrease the
 20 number of controls, again, you decrease
 21 the power to detect anything. So the
 22 fact that you have more controls than
 23 cases helps you. It doesn't hurt you.
 24 Okay?
 25 ///

Page 66

1 BY MR. GRIFFIS:
 2 Q. And power is a --
 3 MS. FORGIE: Were you finished?
 4 THE WITNESS: Yes.
 5 BY MR. GRIFFIS:
 6 Q. You listed this one under your
 7 sentence that since all of these various
 8 errors were non-differential which makes it
 9 not totally obvious to me --
 10 MS. FORGIE: What page are you on?
 11 MR. GRIFFIS: The second.
 12 BY MR. GRIFFIS:
 13 Q. Which makes me not know whether you
 14 mean to include this one in the list of the
 15 errors that are not differential, do you?
 16 MS. FORGIE: Object to the form.
 17 THE WITNESS: No. The issue we're
 18 talking about is -- has -- has nothing
 19 to do with classification differential
 20 or non-differential classification.
 21 BY MR. GRIFFIS:
 22 Q. Reducing the power of a study would
 23 just tend to make it less able to detect a
 24 variance from the null; correct?
 25 MS. FORGIE: Object.

Page 67

1 THE WITNESS: True variance from
 2 the null.
 3 BY MR. GRIFFIS:
 4 Q. Right. So the values that you find
 5 in the study, had you increased the power,
 6 you would tend to predict that that would be
 7 farther from the null?
 8 MS. FORGIE: Object to the form.
 9 BY MR. GRIFFIS:
 10 Q. Correct?
 11 A. As you increase the numbers and you
 12 increase the power, you're likely to find a
 13 true and significant result increases.
 14 Q. So the drift would be as you
 15 increase power, the drift would tend to be
 16 further from the null; correct?
 17 MS. FORGIE: Object to the form.
 18 Asked and answered.
 19 THE WITNESS: Not necessarily. But
 20 you're significant. You would be much
 21 more likely to show statistically
 22 significance. You can find the same
 23 number with small -- you can find the
 24 same result with smaller numbers, but it
 25 may not be statistically significant; so

Page 68

1 you increase the numbers in the study to
 2 allow you to show statistical
 3 significance.
 4 MR. GRIFFIS: I want to use the
 5 bathroom. Can we break for just five
 6 minutes? Not a long one.
 7 MS. FORGIE: Can we make it ten so
 8 we can all get another cup of coffee?
 9 MR. GRIFFIS: Ten is fine.
 10 THE VIDEOGRAPHER: We are going off
 11 the record at 9:58 a.m.
 12 (Recess taken from 9:58 a.m. to
 13 10:11 a.m.)
 14 THE VIDEOGRAPHER: This continues
 15 disk number 1. The time is 10:11 a.m.
 16 We are back on the record.
 17 BY MR. GRIFFIS:
 18 Q. So the fifth criticism we
 19 identified earlier that you have of the NCI
 20 2018 study is what you've titled, I believe,
 21 exposure and latency. It's a reference to
 22 the median lifetime years of glyphosate use
 23 in the study 8.5 and the median follow-up
 24 time 18 years being too short; correct?
 25 A. Yes.

Page 69

1 Q. Let's talk about the 8.5 years, the
 2 median lifetime years of glyphosate use
 3 first. What is your view of how long a
 4 person needs to be exposed to glyphosate to
 5 contract non-Hodgkin lymphoma if they will?
 6 A. Well, I don't think anybody knows
 7 the answer to that question. The longer,
 8 the better. So in typical cohort studies,
 9 the workers are exposed to a certain
 10 chemical during their careers, maybe 20,
 11 even 30 years of exposure with long
 12 follow-up. So in this situation, the
 13 exposure is a median of 8.5 years ranging
 14 from five or six years to 14 years is not a
 15 very long time of exposure for a cohort
 16 study.
 17 Q. Are you talking about cohort
 18 studies of non-Hodgkin lymphoma?
 19 A. I'm talking about cohort studies,
 20 in general.
 21 Q. Your expert report -- in your
 22 expert report you claim to be a specialist
 23 in non-Hodgkin lymphoma, somebody who
 24 focuses on that.
 25 A. Yes.

Page 70

1 Q. And you've been involved in a
 2 number of epidemiology studies as the
 3 pathologist on the study; correct?
 4 MS. FORGIE: Object to the form.
 5 THE WITNESS: Actually not only the
 6 pathologist, I was in charge and ran the
 7 studies in Nebraska; so I was the PI on
 8 the studies.
 9 BY MR. GRIFFIS:
 10 Q. Do you have a view as to how much
 11 exposure a person needs to have for
 12 non-Hodgkin lymphoma to a suspect substance
 13 in order to detect any effect?
 14 MS. FORGIE: Object to the form.
 15 THE WITNESS: It would depend
 16 entirely on the substance, whether it
 17 was a strong carcinogen or a weak
 18 carcinogen. So it's highly dependent on
 19 the substance. There's no one number
 20 for -- there's no one generic number.
 21 BY MR. GRIFFIS:
 22 Q. So what is your basis for saying
 23 that for glyphosate and non-Hodgkin
 24 lymphoma, 8.5 median years of exposure is
 25 too short?

Page 71

1 MS. FORGIE: Object to the form.
 2 THE WITNESS: It's probably too
 3 short. I don't know that it's too
 4 short, but it's probably too short based
 5 on how other cohort studies have
 6 evaluated other chemicals. In other
 7 words, the longer the better. In this
 8 case, it's relatively short. You know,
 9 what it means is that half of the people
 10 had less than 8.5 years of exposure.
 11 BY MR. GRIFFIS:
 12 Q. Is it the case that the sole basis
 13 for saying 8.5 years is probably too short
 14 for glyphosate and non-Hodgkin lymphoma in
 15 the study your knowledge of other cohort
 16 studies of other substances and other
 17 disease outcomes?
 18 A. I'm just making a general
 19 statement. If you read about cohort studies
 20 and how they're designed, you generally want
 21 a long period of exposure to really be sure
 22 that you have an adequate exposure to find a
 23 significant association. If you have short
 24 exposures or small exposures, your chances
 25 are much less defined in association than if

Page 72

1 you have long exposures and high exposures.
 2 Q. Okay. Other than those --
 3 A. So it's a general statement.
 4 Q. It's the general statement the
 5 longer the better for cohort studies; right?
 6 A. Right.
 7 MS. FORGIE: Object to the form.
 8 Asked and answered.
 9 BY MR. GRIFFIS:
 10 Q. And there's no specific thing about
 11 glyphosate and no specific thing about
 12 non-Hodgkin lymphoma that makes you say that
 13 8.5 years median is not enough to detect an
 14 effect; right?
 15 MS. FORGIE: Object to the form.
 16 THE WITNESS: Correct.
 17 BY MR. GRIFFIS:
 18 Q. The 18 years median follow-up time,
 19 median follow-up is something we discussed
 20 in your prior deposition; right?
 21 A. Correct.
 22 Q. You said in your expert report,
 23 your original expert report -- I'll mark
 24 that so we can look at it. This is
 25 Exhibit 7.

Page 73

1 (Exhibit Number 31-7 was marked
 2 for identification.)
 3 BY MR. GRIFFIS:
 4 Q. I'm on page 5, sir.
 5 A. Okay.
 6 Q. You said -- you're talking about
 7 the De Roos 2005 study in that paragraph;
 8 correct?
 9 A. Yes.
 10 Q. That first paragraph?
 11 A. Yes.
 12 Q. You see in the middle of the
 13 paragraph, "However, the median follow-up
 14 time in this study was only 6.7 years, too
 15 short a time to detect a meaningful increase
 16 in NHL or other cancers associated with
 17 glyphosate"; right?
 18 A. Yes.
 19 Q. And then at the deposition, sir, do
 20 you recall that I asked you for an
 21 association between a pesticide and
 22 non-Hodgkin lymphoma, "How long a period of
 23 time do you think you need between the
 24 exposures and the cancers that you're
 25 measuring?"

Page 74

1 And you said, "The longer the
 2 better."
 3 And I said, "Well, is ten years too
 4 short?"
 5 And you said "No, probably not?"
 6 MS. FORGIE: Object to the form.
 7 If you're going to ask him questions
 8 about his deposition, I think you have
 9 to show it to him.
 10 BY MR. GRIFFIS:
 11 Q. Do you recall that, sir?
 12 MS. FORGIE: Object to the form.
 13 THE WITNESS: I don't remember
 14 specifically, no.
 15 BY MR. GRIFFIS:
 16 Q. Do you recall me saying, "Okay, the
 17 longer the better, 6.7 is too short, 10 is
 18 probably long enough" and you couldn't be
 19 more specific between those two; is that
 20 fair?"
 21 And you said, "Yes."
 22 MS. FORGIE: Object to the form.
 23 THE WITNESS: I don't remember.
 24 BY MR. GRIFFIS:
 25 Q. Do you agree with that testimony

Page 75

1 today?
 2 A. Well, I agree with the testimony
 3 that the longer would be the better. I
 4 think probably ten years is when you would
 5 begin to see cases that are associated with
 6 the chemical. So what would be the best
 7 latency period? Well, the best latency
 8 period would be long so you would want to
 9 follow locations for 30 or more years, okay?
 10 And the median latency of 20 years is
 11 probably a minimum where you would begin to
 12 see a significant number of cases so that
 13 you could actually demonstrate significant
 14 increased risk.
 15 So the longer the better. Ten
 16 years might be the minimum where you would
 17 begin to see cases, an increase in cases.
 18 Actually, if you look at the Eriksson study,
 19 that's when they began to see statistically
 20 significantly increased cases after ten
 21 years.
 22 Q. Sir, when the data before you was
 23 6.7 years of follow-up in the De Roos 2005
 24 and you said ten years was probably enough
 25 and now you have 18 years of follow-up and

Page 76

1 you say 18 years isn't enough and the study
 2 is not done, you're moving the goalpost,
 3 aren't you?
 4 MS. FORGIE: Object to the form.
 5 It's unfair. You're not showing him the
 6 deposition.
 7 THE WITNESS: So 18 years is
 8 probably not enough. Okay? But it's
 9 interesting, if you look at Table 3 in
 10 the paper where they've got 20 years of
 11 follow-up, you begin to see elevated
 12 odds ratios for non-Hodgkin's lymphoma
 13 and its subtypes. So this sort of
 14 speaks to my point that you have to have
 15 a long period of follow-up after
 16 exposure to begin to see risk. In fact,
 17 if you look at Table 3, you see it.
 18 BY MR. GRIFFIS:
 19 Q. Is that because it takes a long
 20 time for non-Hodgkin lymphoma to show up
 21 after an exposure?
 22 A. Yes.
 23 Q. And is that because it takes a lot
 24 of exposure, like years and years of
 25 exposure, or is this in reference to your

Page 77

1 earlier point about 8.5 years of use in the
 2 study, it takes a lot of years of exposure
 3 to a substance for it to produce
 4 non-Hodgkin's lymphoma?
 5 MS. FORGIE: Object to the form.
 6 THE WITNESS: In general, I would
 7 say yes. The more exposure, the more
 8 likely you are to find elevated risks
 9 that are significant.
 10 BY MR. GRIFFIS:
 11 Q. The charts you're talking about,
 12 sir, Table 3, tell me which one you're
 13 pointing me to.
 14 A. Well, if you look at non-Hodgkin
 15 lymphoma as a group, you can see increased
 16 odds ratios in the higher-exposed group,
 17 15 percent, 12 percent. The same for B-cell
 18 non-Hodgkin lymphoma. And then if you look
 19 at chronic lymphocytic leukemia, anywhere
 20 between 19 and 25 percent increase. If you
 21 look at diffuse large B-cell lymphoma, you
 22 see a 35 percent increase. For T-cell
 23 lymphomas, you actually have a threefold
 24 increase that's statistically significant.
 25 So you're beginning to see increased risk

Page 78

1 ratios when you use a minimum of follow-up
 2 of 20 years. Okay?
 3 Q. You don't claim, sir, that any of
 4 these findings show that glyphosate causes
 5 those subtypes or causes non-Hodgkin's
 6 lymphoma; correct? You're not relying on
 7 this in support of your claim that
 8 glyphosate --
 9 (Simultaneous cross-talk
 10 interrupted by the reporter.)
 11 BY MR. GRIFFIS:
 12 Q. You're not relying on this for your
 13 claim that glyphosate causes non-Hodgkin
 14 lymphoma or its subtypes; right?
 15 MS. FORGIE: Object to the form.
 16 THE WITNESS: I'm not relying on
 17 it, but it is data that suggests that a
 18 longer follow-up is required to see
 19 increased risks. It's possible if we
 20 follow these patients another ten years
 21 with a 30-year lag, we'll have
 22 significantly increased risks. So this
 23 is why I say in my report that at best
 24 this is another interim analysis and to
 25 really know the results of the

Page 79

1 agricultural health study, you'll need
 2 longer follow-up.
 3 BY MR. GRIFFIS:
 4 Q. After a mean of 8.5 years of
 5 exposure to glyphosate, it's going to take
 6 more than 20 years to find a doubling of the
 7 risk in these patients; correct?
 8 MS. FORGIE: Object to the form.
 9 Mischaracterizes --
 10 BY MR. GRIFFIS:
 11 Q. If it happens?
 12 MS. FORGIE: Object to the form.
 13 Mischaracterizes his testimony --
 14 THE WITNESS: You'll need a
 15 longer --
 16 MS. FORGIE: You have to wait until
 17 I get my --
 18 THE WITNESS: I'm sorry.
 19 So what I'm saying is we probably
 20 need more exposure and we probably need
 21 longer follow-up if the Agricultural
 22 Health Study is going to show
 23 significant increases in risk. The data
 24 here in Table 3 suggests that now the
 25 risks are increasing for non-Hodgkin's

Page 80

1 lymphoma with longer follow-up.
 2 BY MR. GRIFFIS:
 3 Q. And there are no statistically
 4 significant associations at five years,
 5 10 years, 15 years, or 20 years for
 6 non-Hodgkin lymphoma; correct? It's the
 7 third row of the -- data row of the chart;
 8 right?
 9 A. There are increased risks, but
 10 they're not statistically significant.
 11 Q. And you wouldn't say that a
 12 non-statistically significant increased risk
 13 shows causation; correct?
 14 MS. FORGIE: Object to the form.
 15 THE WITNESS: Well, you would
 16 interpret it in the context of what you
 17 know about from other studies.
 18 BY MR. GRIFFIS:
 19 Q. There's no dose response even in
 20 the 20-year period for non-Hodgkin lymphoma;
 21 correct?
 22 MS. FORGIE: Object to the form.
 23 THE WITNESS: Well, the numbers are
 24 very small, and, you know, so with small
 25 numbers of cases in the various

Page 81

1 quartiles and tertiles, it's difficult
 2 to demonstrate. But you don't see a
 3 dose response here. It's true. You
 4 don't see a dose response.
 5 BY MR. GRIFFIS:
 6 Q. The least-exposed group has a
 7 higher point estimate than the most-exposed
 8 group; right?
 9 MS. FORGIE: Object to the form.
 10 THE WITNESS: In some of the
 11 categories that's true.
 12 BY MR. GRIFFIS:
 13 Q. For non-Hodgkin lymphoma overall
 14 that's true; right?
 15 MS. FORGIE: Object to the form.
 16 THE WITNESS: Yes.
 17 BY MR. GRIFFIS:
 18 Q. And that's one of the things that
 19 goes into the P-trend analysis; right?
 20 Whether there's a dose response; correct?
 21 A. Correct.
 22 Q. These P trends are all -- what is a
 23 P-trend? What is a statistically P-trend?
 24 0.05?
 25 A. Or less than 0.05.

Page 82

1 Q. And none of these P trends in
 2 Table 3 are below 0.05; right?
 3 A. Well, not for non-Hodgkin's
 4 lymphoma. For acute myeloid leukemia there
 5 is a P-trend of 0.04.
 6 Q. For the 20-year lag. That's the
 7 one we were just talking about --
 8 A. Okay.
 9 Q. -- that you were focusing me on?
 10 A. Right.
 11 Q. The P trends in Table 3 for a
 12 20-year lag, what is the smallest P-trend in
 13 that?
 14 A. For non-Hodgkin's lymphoma or for
 15 anything in the table?
 16 Q. Anything in the table, 0.3 for
 17 lymphohematopoietic overall; right?
 18 MS. FORGIE: Now you've got two
 19 questions pending. Which one do you
 20 want him to answer?
 21 Object to the form.
 22 THE WITNESS: So acute myeloid
 23 leukemia has a P-trend of 0.04 which is
 24 statistically significant.
 25 ///

Page 83

1 BY MR. GRIFFIS:
 2 Q. Do you believe that glyphosate
 3 causes AML?
 4 MS. FORGIE: Object to the form.
 5 Beyond the scope of this report.
 6 THE WITNESS: This data would
 7 suggest that it does, but there isn't
 8 other data out there to support it. So
 9 I would say we don't know the answer to
 10 that.
 11 BY MR. GRIFFIS:
 12 Q. So you're not going to give expert
 13 testimony unless there's more data that
 14 glyphosate causes AML; right?
 15 A. Correct.
 16 Q. That wouldn't be scientifically
 17 appropriate to do based on this data;
 18 correct?
 19 MS. FORGIE: Object to the form.
 20 THE WITNESS: Based on this data
 21 alone, you're correct.
 22 BY MR. GRIFFIS:
 23 Q. Now, for the 20-year lag, the
 24 smallest P-trend on the chart in
 25 supplemental Table 3 is for

Page 84

1 lymphohematopoietic overall 0.3; correct?
 2 MS. FORGIE: Object to the form.
 3 THE WITNESS: You're talking about
 4 the first item on Table 3,
 5 lymphohematopoietic neoplasms?
 6 BY MR. GRIFFIS:
 7 Q. Yeah. The question is is that the
 8 lowest P-trend in the 20-year lag column;
 9 right?
 10 A. Correct. .37.
 11 Q. Okay.
 12 A. Actually that's .31.
 13 Q. .37? What are you looking at, sir?
 14 A. I'm reading you the P-trend for
 15 lymphohematopoietic neoplasms.
 16 Q. In supplemental Table 3, 20-year
 17 lag?
 18 A. In supplemental Table 3?
 19 Q. Yeah.
 20 MS. FORGIE: What table are you?
 21 THE WITNESS: I don't have
 22 supplemental Table 3.
 23 BY MR. GRIFFIS:
 24 Q. You don't have the supplementary
 25 tables for this?

Page 85

1 A. I have them at home. Have you
 2 attached them to the --
 3 MS. FORGIE: I don't think they're
 4 attached to the exhibit -- oh, wait.
 5 THE WITNESS: Maybe they are. I'm
 6 sorry. I was looking at Table 3.
 7 You're talking about supplemental
 8 Table 3?
 9 BY MR. GRIFFIS:
 10 Q. We don't need to. This one shows
 11 5-year and 20-year lag and supplemental
 12 Table 3 shows five, ten, 15 and 20; right?
 13 A. Right.
 14 Q. So it just shows more columns.
 15 Table 3 works fine. It's the same data for
 16 the 20-year.
 17 MS. FORGIE: There's no question
 18 pending.
 19 BY MR. GRIFFIS:
 20 Q. But -- okay.
 21 At how many years of follow-up
 22 would you consider the AHS data to be
 23 complete, sir?
 24 MS. FORGIE: Object to the form.
 25 THE WITNESS: Well, you would want

Page 86

1 to -- actually ideally, you would want
 2 to follow the people for 20 or 30 or 40
 3 or more years until almost everyone or
 4 everyone is dead, and then you would
 5 have the ultimate database to do your
 6 final analysis of the data. So that's
 7 often the case in cohort studies. They
 8 go for 20, 30, 40 years.
 9 BY MR. GRIFFIS:
 10 Q. For the 8.5 years of exposure, sir,
 11 the exposure categories in the case control
 12 studies that you rely on are much, much,
 13 much lower than 8.5 years of exposure;
 14 correct?
 15 MS. FORGIE: Object to the form.
 16 Do you want him to look at those
 17 studies?
 18 THE WITNESS: I don't remember the
 19 details of those studies.
 20 BY MR. GRIFFIS:
 21 Q. Like Eriksson is greater or less
 22 than ten days; right?
 23 MS. FORGIE: Object to the form.
 24 BY MR. GRIFFIS:
 25 Q. Do you remember that?

Page 87

1 MS. FORGIE: Object to the form.
 2 THE WITNESS: So in Eriksson they
 3 looked at risk by days of exposure, and
 4 you're right. If it was less than -- if
 5 it was greater than ten days of
 6 exposure, they had a significantly
 7 elevated risk. That's true.
 8 BY MR. GRIFFIS:
 9 Q. And is it your claim that in
 10 Eriksson the greater than ten days the mean
 11 was -- the mean of exposure in that was at
 12 or greater than 8.5 years?
 13 MS. FORGIE: Object to the form.
 14 THE WITNESS: Well, again, I don't
 15 remember the details of Eriksson. I
 16 think they also looked at the number of
 17 years of exposure, and they looked at
 18 the number of days of exposure. In that
 19 study, the number of days of exposure
 20 resulted in an increased risk for
 21 non-Hodgkin's lymphoma, right.
 22 BY MR. GRIFFIS:
 23 Q. Do you know -- sorry.
 24 A. I don't have the study before me,
 25 and I don't remember the details -- I don't

Page 88

1 remember the details about years of
 2 exposure.
 3 Q. Let me just ask you this, sir,
 4 since you criticized the NCI 2018 study for
 5 8.5 median years of exposure being too
 6 short. Do you know of any study on
 7 glyphosate and non-Hodgkin's lymphoma where
 8 people were exposed as a median longer?
 9 MS. FORGIE: Object to the form.
 10 He doesn't have the studies in front of
 11 him.
 12 THE WITNESS: Off the top of my
 13 head, I don't know. I'd have to go back
 14 and look at the studies to answer your
 15 question properly.
 16 BY MR. GRIFFIS:
 17 Q. Do you know of any study where the
 18 median follow-up which you say was too short
 19 at 18 years in the NCI 2018 study was longer
 20 than 18 years?
 21 MS. FORGIE: Object to the form.
 22 Asked and answered.
 23 THE WITNESS: This was the only
 24 cohort study; so that question doesn't
 25 really apply to the case-control

Page 89

1 studies.
 2 BY MR. GRIFFIS:
 3 Q. Do you know of another study where
 4 the average time lapse between exposure and
 5 non-Hodgkin lymphoma was greater than
 6 18 years?
 7 MS. FORGIE: Object to the form.
 8 THE WITNESS: What --
 9 MS. FORGIE: Asked and answered.
 10 THE WITNESS: Study of glyphosate.
 11 BY MR. GRIFFIS:
 12 Q. Yes. Glyphosate and non-Hodgkin
 13 lymphoma.
 14 A. No. And, again, I don't have those
 15 studies before me, and I don't remember the
 16 details of those studies off the top of my
 17 head today.
 18 Q. It could be that your criticisms of
 19 8.5 years of exposure being too short and
 20 18 years of follow-up being too short apply
 21 with even greater force to the case-control
 22 studies than which you relied; correct?
 23 MS. FORGIE: Object to the form.
 24 Asked and answered, mischaracterizes the
 25 testimony.

Page 90

1 THE WITNESS: I don't know the
 2 answer to that.
 3 BY MR. GRIFFIS:
 4 Q. Have you read Dr. Portier's
 5 deposition, sir?
 6 A. Which deposition?
 7 Q. His recent deposition. Did you
 8 read it?
 9 A. Portier's deposition? No.
 10 Q. Yes. Okay.
 11 If he said in his deposition that
 12 the NCI 2018 study allowed for longer
 13 latency than any published study on
 14 glyphosate and non-Hodgkin lymphoma, do you
 15 have any basis to disagree with that?
 16 MS. FORGIE: Object to the form.
 17 THE WITNESS: I don't agree or
 18 disagree. I don't know the answer.
 19 That's his statement, not mine.
 20 BY MR. GRIFFIS:
 21 Q. As we discussed earlier, you have a
 22 criticism of the NCI 2018 study based on the
 23 follow-up rate and the imputation procedure
 24 used to address that; correct?
 25 MS. FORGIE: Object to the form.

Page 91

1 THE WITNESS: Yes.
 2 BY MR. GRIFFIS:
 3 Q. And the AHS investigators published
 4 their imputation procedure; correct?
 5 A. Yes, they published a paper on how
 6 they did it.
 7 Q. That's the Heltshe paper which you
 8 reviewed for your expert report; right?
 9 A. Yes.
 10 Q. There are also published papers in
 11 which the investigators assessed -- took
 12 their exposure calculations and fact-checked
 13 them with biometric data from actual
 14 exposures; correct?
 15 A. Yes.
 16 Q. The AHS -- the NCI 2018 study is
 17 the only one out of all the epidemiology on
 18 glyphosate and non-Hodgkin lymphoma that
 19 does a weighted analysis that has been
 20 published and checked with biometrics;
 21 right?
 22 MS. FORGIE: Object to the form.
 23 THE WITNESS: That's correct.
 24 BY MR. GRIFFIS:
 25 Q. It's the only one that does any

Page 92

1 kind of sophisticated weighted analysis at
 2 all; right?
 3 MS. FORGIE: Object to the form.
 4 THE WITNESS: That's correct. You
 5 only could do that kind of analysis in a
 6 cohort study.
 7 BY MR. GRIFFIS:
 8 Q. Being able to do that kind of
 9 analysis gives you better data than you
 10 could have otherwise; correct?
 11 MS. FORGIE: Object to the form.
 12 THE WITNESS: I'm not sure it gives
 13 you better data. It gives you some
 14 confidence, I guess, in the way you did
 15 your calculations, but the fact that
 16 correlations between biomonitoring and
 17 the algorithm that was used were quite
 18 different for different pesticides and
 19 different formulations and for some
 20 there was good correlation and in some
 21 there was poor correlation.
 22 So one of the other criticisms of
 23 the study which I didn't use, although
 24 it also would result in exposure
 25 misclassification, is if you use the

Page 93

1 same algorithm for every pesticide,
 2 you're going to have misclassification
 3 more or less for each pesticide.
 4 BY MR. GRIFFIS:
 5 Q. Do you know if that was done?
 6 A. That's what was done, yes.
 7 (Exhibit Numbers 31-8, 31-9 and
 8 31-10 were marked for identification.)
 9 BY MR. GRIFFIS:
 10 Q. Sir, I've marked as Exhibits 8
 11 through 10 published study by Bonner,
 12 et al., involving lung cancer from the
 13 Agricultural Health Study data, published
 14 study by Koutros, et al., on bladder cancer
 15 from the Agricultural Health Study, and a
 16 published study by Koutros, et al., on
 17 prostate cancer from the Agricultural Health
 18 Study. Correct, sir?
 19 A. Yes.
 20 Q. Have you seen those?
 21 A. I have not.
 22 Q. In the --
 23 MS. FORGIE: I'm going to just put
 24 a general objection in here to 31-8,
 25 which talks about lung cancer which he

1 has not read or cited in his
2 supplemental report. And I object to
3 the use of 31-9 which he has not read or
4 cited to in his supplemental report that
5 talks about bladder cancer, and I object
6 to 31-10 that talks about prostate
7 cancer, which is also not addressed or
8 referenced in his supplemental report.
9 I'll decide later depending on the
10 questions whether I decide to instruct
11 him not to answer.

12 BY MR. GRIFFIS:

13 Q. In the Bonner study, sir, on
14 page 545, middle column, last full
15 paragraph, do you see that they describe the
16 multiple imputation with logistic regression
17 procedure that was used in the AHS study?

18 MS. FORGIE: Take your time and
19 read whatever you want.

20 THE WITNESS: Yes.

21 BY MR. GRIFFIS:

22 Q. Similarly, sir, on the Koutros
23 bladder cancer study, page 794, under
24 "Exposure Assessment" towards the end of
25 that first paragraph, do you see that they,

1 past or either discontinued or the use was
2 pretty stable over time. In those kind of
3 situations it's much more plausible to
4 impute use. But for glyphosate, as you
5 know, the use increased dramatically right
6 in the middle of the enrollment period and
7 continued to increase dramatically over
8 time. It's impossible to capture that kind
9 of information which is critical to a cohort
10 study if you don't have adequate
11 participation in the follow-up
12 questionnaires. So that's one of the fatal
13 flaws of the Agricultural Health Study.
14 They don't have adequate follow-up
15 participation in their follow-up
16 questionnaires to get real data. So they
17 guess what the data is going to be.

18 Q. So is your statement that is unique
19 to glyphosate?

20 MS. FORGIE: Wait, wait. Were you
21 finished with your answer?

22 THE WITNESS: Yes.

23 BY MR. GRIFFIS:

24 Q. Is your statement it's unique to
25 glyphosate?

1 again, describe the imputation procedure?

2 A. Yes.

3 Q. The prostate cancer study, sir, on
4 page 64, do you see that, again, the AHS
5 imputation procedure is described? Page 64,
6 first column.

7 MS. FORGIE: Are you talking about
8 31-10? Exhibit 31-10.

9 MR. GRIFFIS: Yeah, the one that's
10 on prostate cancer.

11 MS. FORGIE: I object to him being
12 asked questions about this.

13 THE WITNESS: Yes.

14 BY MR. GRIFFIS:

15 Q. We talked in general earlier about
16 the fact that there have been multiple
17 publications from the AHS and multiple
18 publications in which the AHS imputation
19 procedure was discussed and went to peer
20 review; correct?

21 A. Yes, these papers were
22 peer-reviewed. The differences between
23 these papers and the recent glyphosate paper
24 is these papers are mainly looking at
25 pesticides in -- which were used in distant

1 A. It's actually unique to glyphosate,
2 yes.

3 Q. So the AHS study's imputation, not
4 that it's fine --

5 MR. ESFANDIARY: Object to the
6 form.

7 BY MR. GRIFFIS:

8 Q. -- works for everything else. It
9 doesn't work for glyphosate. Is that your
10 testimony?

11 MS. FORGIE: Object to the form.

12 THE WITNESS: I'm not sure it works
13 or doesn't work. They used it for these
14 other studies. It's an accepted method,
15 in general, when you don't have data and
16 you want to fill in blanks for data.
17 But for glyphosate, it's particularly
18 problematic in a situation where the use
19 of the chemical is increasing
20 dramatically over a relatively short
21 period of time right in the middle of
22 the enrollment period and right during
23 the first follow-up questionnaire.

24 BY MR. GRIFFIS:

25 Q. Is your --

Page 98

1 A. This is very different than it is
 2 for many of the other pesticides that have
 3 been studied in these others' papers.
 4 There's a big difference between what
 5 happened in the use of all these different
 6 pesticides compared to glyphosate.
 7 BY MR. GRIFFIS:
 8 Q. Okay. Is it your view that the
 9 imputation method used was scientifically
 10 acceptable for every other substance they
 11 examined except for glyphosate?
 12 MS. FORGIE: Asked and answered.
 13 You can answer it again. Objection.
 14 THE WITNESS: Well, it was
 15 acceptable -- I don't know whether it's
 16 acceptable or not. It was certainly
 17 acceptable to the people who did the
 18 studies and to the people who reviewed
 19 the studies. It's an acceptable method
 20 that epidemiologists use. I can't
 21 answer whether it's acceptable to me or
 22 not because I -- I suppose I would
 23 accept it. I don't know with what
 24 confidence one can accept this kind of
 25 methodology and particularly in the case

Page 99

1 of glyphosate, I don't have a lot of
 2 confidence in it.
 3 BY MR. GRIFFIS:
 4 Q. Okay. I'm not asking you to speak
 5 for the peer reviewers of all these
 6 journals, sir, or for the authors of NCI
 7 2018 but just for yourself. For yourself,
 8 is the scientific imputation procedure
 9 applied in the NCI 2018 paper scientifically
 10 acceptable for all those other substances
 11 but not for glyphosate?
 12 MS. FORGIE: Objection. Asked and
 13 answered. He's answered it twice, and
 14 you're asking about articles he has not
 15 read and not cited.
 16 You can answer the question in the
 17 same way.
 18 THE WITNESS: I would just answer
 19 that for me it's not acceptable for
 20 glyphosate. I cannot comment on the
 21 others. I have not reviewed them. I
 22 would say, in general, it's probably
 23 acceptable although it's much less
 24 scientifically valid than actually
 25 gathering the data. Okay? Guessing the

Page 100

1 data is not as valid as actually
 2 gathering the actual data.
 3 BY MR. GRIFFIS:
 4 Q. You would agree --
 5 A. They didn't do that in this --
 6 MS. FORGIE: Wait. Let him finish.
 7 THE WITNESS: They didn't do that
 8 in this study, and it's a fatal flaw in
 9 this study particularly in regard to
 10 glyphosate.
 11 BY MR. GRIFFIS:
 12 Q. You would agree, sir, that not
 13 being able to gather all the data is an
 14 extremely common issue in cohort studies?
 15 MS. FORGIE: Object to the form.
 16 THE WITNESS: It is in some cohort
 17 studies like the Agricultural Health
 18 Study. It's less common in other
 19 studies. It depends entirely on the
 20 loyalty of the cohort and their
 21 willingness to participate.
 22 BY MR. GRIFFIS:
 23 Q. You agree that multiple imputation
 24 is a very standard epidemiological technique
 25 for dealing with absent data; correct?

Page 101

1 MS. FORGIE: Object to the form.
 2 THE WITNESS: Yes.
 3 MS. FORGIE: Asked and answered
 4 three times. You're starting to badger
 5 the witness.
 6 THE WITNESS: Yes.
 7 BY MR. GRIFFIS:
 8 Q. Do you believe that glyphosate was
 9 not involved in the Koutros study, the other
 10 Koutros study on prostate cancer and the
 11 Bonner study, Exhibits 8, 9, and 10?
 12 MS. FORGIE: Object to the form.
 13 I'm not going to let him answer any more
 14 questions about these three studies,
 15 31-8, 31-9, and 31-10 which he has not
 16 read, not cited, do not deal with NHL,
 17 until he's had a chance to sit here and
 18 read them. So if you want him to read
 19 them and answer your questions, he can.
 20 MR. GRIFFIS: What I want to know
 21 is when he made the statements that he
 22 did about glyphosate and imputation, did
 23 you believe that glyphosate was not
 24 involved in these studies?
 25 MS. FORGIE: My objection stands.

Page 102

1 You can read them if you want
 2 before you answer those questions.
 3 THE WITNESS: I don't know whether
 4 they evaluate glyphosate in these
 5 studies or not. I don't know whether
 6 they used the same method they used in
 7 the 2018 study and the data is highly
 8 questionable.
 9 BY MR. GRIFFIS:
 10 Q. The peer reviewers of "The American
 11 Journal of Epidemiology," "International
 12 Journal of Epidemiology," and the
 13 "Environmental Health Perspective" passed
 14 that procedure; right?
 15 MS. FORGIE: Object to the form.
 16 Again, he hasn't looked at these. He's
 17 already stated he doesn't know what's in
 18 them. It's not fair. You're badgering
 19 him.
 20 You can answer one more time.
 21 THE WITNESS: They accepted the
 22 papers for publication but they -- it's
 23 unlikely that they understood the -- all
 24 the issues surrounding glyphosate and
 25 its use. And I . . .

Page 103

1 (Exhibit Number 30-11 was
 2 marked for identification.)
 3 BY MR. GRIFFIS:
 4 Q. Exhibit 11 is the Heltshe Study
 5 which you cited in your expert report;
 6 correct?
 7 A. Yes.
 8 Q. And this is a paper in which the
 9 imputation procedure was tested; correct?
 10 MS. FORGIE: Object to the form.
 11 THE WITNESS: Yes.
 12 BY MR. GRIFFIS:
 13 Q. And it was tested by withdrawing a
 14 random sample of people who did respond to
 15 the second survey and pretending that they
 16 didn't respond and seeing how well the
 17 imputation procedure predicted the actual
 18 responses that those people gave; right?
 19 A. Yes.
 20 Q. So it compared imputation to real
 21 responses, data that was actually gathered;
 22 right?
 23 A. Right.
 24 Q. To see how well those two matched
 25 up.

Page 104

1 In the introduction, sir, the
 2 left-hand column on the first page, it says
 3 halfway down first paragraph, "Multiple
 4 imputation has been widely accepted, and
 5 it's been used to account for missing data
 6 in large national surveys and studies," and
 7 it lists multiple studies including the
 8 Framingham Heart Study; right?
 9 A. Yes.
 10 Q. Do you have any criticism of the
 11 quality of the studies listed, NHANES III,
 12 National Assessment of Educational Progress,
 13 Children's Mental Health Initiative, and the
 14 Framingham Heart Study?
 15 MS. FORGIE: Object to the form.
 16 This deposition is not about those
 17 studies. I'm going to let him answer
 18 that question.
 19 THE WITNESS: I really don't know
 20 much about any of these studies.
 21 BY MR. GRIFFIS:
 22 Q. Are you able -- do you have the
 23 expertise and experience to be able to
 24 comment on whether multiple imputation is
 25 widely used in major national studies that

Page 105

1 are well respected like the ones listed
 2 here?
 3 MS. FORGIE: Objection. Asked and
 4 answered.
 5 You can answer it again.
 6 THE WITNESS: I would accept that
 7 statement.
 8 BY MR. GRIFFIS:
 9 Q. And the first sentence of the
 10 article, sir, "Missing data is a common
 11 problem in epidemiological studies and the
 12 statistical implications of ignoring missing
 13 data are well known, including loss of
 14 statistical power and potentially biased
 15 estimates of the association." And then
 16 they describe multiple imputation technique
 17 as one way to address that. Do you agree
 18 with that?
 19 MS. FORGIE: Objection. Asked and
 20 answered.
 21 You can answer it again.
 22 THE WITNESS: I agree that
 23 imputation is one way to address this
 24 problem, yes.
 25 ///

1 BY MR. GRIFFIS:
 2 Q. In the Heltshe --
 3 MS. FORGIE: How much time is
 4 there, please.
 5 THE VIDEOGRAPHER: Just for this
 6 tape.
 7 BY MR. GRIFFIS:
 8 Q. In the Heltshe study, sir,
 9 glyphosate was in the middle range for
 10 relative errors as calculated between the
 11 actual respondents and the imputed figures;
 12 correct?
 13 MS. FORGIE: Object to the form.
 14 BY MR. GRIFFIS:
 15 Q. I'm looking, for example, at
 16 Figure 2.
 17 A. You're looking at Figure 2?
 18 Q. Yes. You're welcome to look
 19 anywhere you like, but that's where I'm
 20 looking.
 21 A. Yes, it's kind of at the lower
 22 edge, but it's close to the middle.
 23 Q. Close to the middle. Looking at
 24 Table 3, sir, do you know -- do you know
 25 what a Brier skill score is and how to

1 BY MR. GRIFFIS:
 2 Q. And you know that there were
 3 multiple sensitivity tests that were done in
 4 the NCI 2018 study to test the accuracy of
 5 its imputation procedure; right?
 6 MS. FORGIE: Object to the form.
 7 THE WITNESS: Yes.
 8 BY MR. GRIFFIS:
 9 Q. None of those sensitivity tests
 10 itself relied on imputation; right? There
 11 are ways of checking the data without
 12 looking at it without imputation; right?
 13 MS. FORGIE: Object to the form.
 14 THE WITNESS: That's correct.
 15 BY MR. GRIFFIS:
 16 Q. And all three of those sensitivity
 17 checks came up with essentially the same
 18 result, i.e., no association between
 19 glyphosate and non-Hodgkin lymphoma;
 20 correct?
 21 MS. FORGIE: Object to the form.
 22 THE WITNESS: It's correct, but
 23 they all used the same basic flawed data
 24 due to exposure misclassification. So
 25 it's not surprising they came up with

1 assess it?
 2 A. I don't.
 3 Q. All right. Let's skip that then.
 4 In the discussion section on
 5 page 413, sir, of the Heltshe Study, it says
 6 three sentences in, "In analyses, imputation
 7 is generally preferable to omitting
 8 individuals who did not complete phase 2, in
 9 our case, 37 percent of enrolled
 10 individuals, due to possible selection bias
 11 in the subset with complete data and
 12 decreased precision of parameters estimates
 13 using only a subset of data."
 14 Do you see that, sir?
 15 A. Yes.
 16 Q. Do you agree that imputation is
 17 preferable to ignoring the data?
 18 MS. FORGIE: Objection. Are you
 19 talking about in general or with
 20 glyphosate?
 21 THE WITNESS: So -- yeah, so what
 22 they're saying here is that imputation
 23 is preferable to limiting the study to
 24 those with complete data.
 25 ///

1 the same result.
 2 BY MR. GRIFFIS:
 3 Q. They eliminated imputation entirely
 4 in those sensitivity analyses; right?
 5 MS. FORGIE: Objection. Asked and
 6 answered.
 7 You can answer it again.
 8 THE WITNESS: In some of the
 9 analyses that's true. I don't know
 10 whether they did in all of them. We'd
 11 have to talk about them one at a time.
 12 BY MR. GRIFFIS:
 13 Q. Let's do. Page 4, first column.
 14 MS. FORGIE: Are you back to the
 15 study?
 16 MR. GRIFFIS: Yeah.
 17 MS. FORGIE: That --
 18 THE WITNESS: Page 4? Where are
 19 you?
 20 BY MR. GRIFFIS:
 21 Q. I'm in the first column, first full
 22 paragraph within the paragraph that starts
 23 in primary analyses, about three sentences
 24 in. And the first sensitivity test is
 25 described -- they say "We conducted several

Page 110

1 sensitivity analyses."
 2 Do you see that?
 3 A. Right.
 4 Q. Okay. So the first one was they
 5 restricted to exposure report at enrollment,
 6 in other words, the first questionnaire;
 7 correct?
 8 A. Correct.
 9 Q. So people that answered the first
 10 questionnaire, they just looked at that data
 11 and left out the second questionnaire; so
 12 they didn't need to impute any missing data;
 13 right?
 14 A. Right.
 15 Q. And when they did that, when they
 16 used only exposure information reported at
 17 enrollment, rate ratio in the highest
 18 exposed quartile was 0.82 percent and they
 19 report the confidence interval expands one.
 20 So when they did the first
 21 sensitivity analysis leaving out imputation,
 22 there was, again, no association between
 23 glyphosate and non-Hodgkin lymphoma;
 24 correct?
 25 MS. FORGIE: Object to the form and

Page 111

1 asked and answered.
 2 You can answer it again.
 3 THE WITNESS: That's correct.
 4 BY MR. GRIFFIS:
 5 Q. Then they did a second sensitivity
 6 analysis a different way. "To evaluate the
 7 impact of using imputed exposure data for
 8 participants who did not complete the
 9 follow-up questionnaire, we limited the
 10 analysis to the 34,698 participants who
 11 completed both questionnaires." So if you
 12 didn't answer the second questionnaire, they
 13 left you out of this sensitivity test;
 14 right?
 15 A. Correct.
 16 Q. So, again, they didn't need to use
 17 imputation; right?
 18 MS. FORGIE: Object to the form.
 19 BY MR. GRIFFIS:
 20 Q. There was no imputation in this
 21 second sensitivity analysis?
 22 A. Well, there may have been some
 23 imputation for the people who answered the
 24 questionnaire because they had to impute
 25 what their use was during that gap period we

Page 112

1 talked about earlier. They had to do it.
 2 So they didn't include any imputation for
 3 the 37 percent who didn't complete the
 4 questionnaire, but they had to do some
 5 imputation for the people who did complete
 6 the questionnaire.
 7 Q. So you believe the imputation
 8 procedure and not some other statistical
 9 control is how the gaps were addressed in
 10 people who answered the second
 11 questionnaire; is that right?
 12 MS. FORGIE: Object to the form.
 13 THE WITNESS: I don't know the
 14 answer, but I suspect that's how they
 15 did it.
 16 BY MR. GRIFFIS:
 17 Q. They didn't need --
 18 A. They don't tell you how they did
 19 it.
 20 Q. Yes, sir. The 37 percent -- for
 21 the 37 percent, the second sensitivity
 22 analysis leaves out that whole imputation
 23 procedure; correct?
 24 A. Right, it leaves out all those
 25 people.

Page 113

1 Q. And when they're left out, again,
 2 there's no statistically significant
 3 association, no association at all between
 4 glyphosate and non-Hodgkin lymphoma;
 5 correct?
 6 MS. FORGIE: Objection. Asked and
 7 answered.
 8 You can answer it again.
 9 THE WITNESS: That's correct.
 10 BY MR. GRIFFIS:
 11 Q. Now, the third sensitivity test
 12 they truncated the follow-up period to 2005
 13 so that their latest exposure information
 14 that they had which was 2005 they stopped
 15 follow-up there; so if they had mistakenly
 16 imputed any exposures or non-exposures, that
 17 wouldn't matter because they wouldn't be
 18 looking into the future at those cancers;
 19 right?
 20 MS. FORGIE: Object to the form.
 21 THE WITNESS: So -- yeah. So they
 22 imputed it for everyone, but they
 23 stopped the follow-up at 2005. So
 24 presumably any exposure
 25 misclassification that occurred after

Page 114

1 that is not part of the issue.
 2 BY MR. GRIFFIS:
 3 Q. Right. It takes out that exposure
 4 misclassification issue --
 5 A. Right.
 6 Q. -- as a sensitivity test; right?
 7 A. Right.
 8 MS. FORGIE: Object to the form.
 9 BY MR. GRIFFIS:
 10 Q. And once again there is no
 11 association in the resulting figures; right?
 12 MS. FORGIE: Objection. Asked and
 13 answered.
 14 You can answer it again.
 15 THE WITNESS: Right, but, again,
 16 it's not surprising because the
 17 underlying data and the extent of the
 18 exposure misclassifications that
 19 occurred even at the time of enrollment
 20 you wouldn't see anything. So with each
 21 of these sensitivity analyses, there are
 22 still major issues and flaws just as
 23 there is in the overall analysis.
 24 BY MR. GRIFFIS:
 25 Q. Okay. Let's get the imputation

Page 115

1 addressed first. As far as the imputation
 2 procedure goes, the imputation procedure
 3 that was used to address the 37 percent
 4 non-respondents in the second questionnaire,
 5 the NCI 2018 investigators did three
 6 separate sensitivity analyses that didn't
 7 rely on that imputation and came up with the
 8 same lack of association between glyphosate
 9 and non-Hodgkin lymphoma; correct?
 10 MS. FORGIE: Wait. Object to the
 11 form. You've now asked him this four
 12 times. He can answer it one more time,
 13 but you're badgering the witness.
 14 You can answer it again.
 15 THE WITNESS: I believe the third
 16 one did include imputation up to 2005.
 17 BY MR. GRIFFIS:
 18 Q. Okay. Left out a big piece of
 19 imputation?
 20 MS. FORGIE: Object to the form.
 21 THE WITNESS: No, it included
 22 imputation up to 2005.
 23 BY MR. GRIFFIS:
 24 Q. And it left out a big piece of
 25 imputation as well; correct? -- in your

Page 116

1 view?
 2 MS. FORGIE: Object to the form.
 3 Asked and answered.
 4 You can answer it again.
 5 THE WITNESS: I don't know. I'd
 6 have to go back and look at that
 7 carefully but -- I'd have to go back and
 8 look at it carefully. I thought it did
 9 include imputation up to 2005.
 10 BY MR. GRIFFIS:
 11 Q. You're not sure?
 12 MS. FORGIE: Object to the form.
 13 Asked and answered.
 14 THE WITNESS: Let me look at it.
 15 I'm unclear on the last one whether the
 16 imputation was included or not.
 17 BY MR. GRIFFIS:
 18 Q. Okay.
 19 A. I'd have to go back and review the
 20 methods.
 21 Q. Okay.
 22 MS. FORGIE: Do you want him to do
 23 that?
 24 BY MR. GRIFFIS:
 25 Q. Since you're not clear about the

Page 117

1 third one, let's ask about the first two.
 2 They did two at least sensitivity tests that
 3 omitted the imputation procedure. Are we --
 4 THE VIDEOGRAPHER: I should switch.
 5 BY MR. GRIFFIS:
 6 Q. That omitted the imputation
 7 procedure and came up with the same lack of
 8 association between glyphosate and NHL;
 9 correct?
 10 MS. FORGIE: Object to the form.
 11 Asked and answered like five times.
 12 You can answer it again.
 13 THE WITNESS: I'm sorry. Ask the
 14 question again.
 15 MR. GRIFFIS: Switch tapes, and
 16 we'll ask it again.
 17 THE VIDEOGRAPHER: This will
 18 complete disk number 1. We're going off
 19 the record at 11:06 a.m.
 20 (Recess taken from 11:06 a.m.
 21 to 11:16 a.m.)
 22 THE VIDEOGRAPHER: This is the
 23 beginning of disk number 2. We are
 24 going back on the record. The time is
 25 11:16 a.m.

<p style="text-align: right;">Page 118</p> <p>1 THE WITNESS: So I'd just like to 2 correct myself. For the last 3 sensitivity analysis, they didn't use 4 imputed data for any of the 37 percent 5 who didn't complete the second 6 questionnaire. 7 BY MR. GRIFFIS: 8 Q. For the last one, the third one 9 that we were talking about, the truncated 10 follow-up period -- 11 A. Yes. 12 Q. -- to 2005, they didn't use any 13 imputed data? 14 A. Not for the 37 percent. 15 Q. Okay. And the purpose of these 16 three sensitivity tests was to test how 17 reliable imputation was in this study; 18 right? 19 MS. FORGIE: Object to the form. 20 THE WITNESS: Well, they're 21 comparing different types of analysis to 22 see whether there's any difference, and 23 there wasn't any difference. So they're 24 assuming that this confirms their 25 imputation calculations, but all this --</p>	<p style="text-align: right;">Page 120</p> <p>1 they're actually very different. So 2 this is the problem with just using this 3 kind of data because there's a selection 4 bias for people who actually answered 5 the questionnaire. And those people are 6 very different actually than people who 7 didn't answer the second phase of the 8 questionnaire; so you're trying to guess 9 what the people who didn't answer the 10 second phase of the questionnaire -- 11 you're trying to guess what exposure 12 they had when, in fact, they're very 13 different than the group that you used 14 to train your imputation. 15 BY MR. GRIFFIS: 16 Q. First of all, you said that you're 17 relying on people who answered the second 18 questionnaire being similar to people who 19 didn't answer the second questionnaire; 20 correct? 21 A. Yes. 22 MS. FORGIE: Objection -- 23 THE WITNESS: But they aren't -- 24 they're very different. 25 ///</p>
<p style="text-align: right;">Page 119</p> <p>1 all the analyses are using the same 2 flawed data; so it's not surprising that 3 the results are not different. 4 BY MR. GRIFFIS: 5 Q. Well, let's talk about imputation 6 first, not the same flawed data point which 7 we'll discuss with the imputation point. 8 As far as imputation goes, these 9 are three sensitivity tests that were done 10 to set aside imputation and see if similar 11 results were reached, and the answer was 12 yes. We get similar results without using 13 imputation; right? 14 MS. FORGIE: Objection. Asked and 15 answered. It mischaracterizes his 16 answer. 17 THE WITNESS: So, yes, you get 18 similar results, but there's a real 19 selection bias that occurs here because 20 you're only analyzing data on people who 21 actually answered the two parts of the 22 questionnaire. If you look at, you 23 know, are the people who didn't respond 24 to the second phase of the questionnaire 25 different than the ones who did respond,</p>	<p style="text-align: right;">Page 121</p> <p>1 BY MR. GRIFFIS: 2 Q. As to the first sensitivity 3 analysis, that's not an accurate criticism 4 because that was restricted to data from the 5 first questionnaire; right? 6 MS. FORGIE: Objection. Asked and 7 answered. 8 You can answer it again. 9 THE WITNESS: Right. So in the 10 first -- so in the first sensitivity 11 analysis, you just use the initial data, 12 right. 13 BY MR. GRIFFIS: 14 Q. Okay. And you said that we know 15 that the people who responded to the second 16 questionnaire were different than the people 17 who didn't respond to it. 18 A. Yes. 19 Q. What's the evidence for that? 20 A. Well, there's a paper by Montgomery 21 which I didn't cite, but there's a paper by 22 Rinsky which I did cite which also 23 references the paper by Montgomery, and both 24 those papers showed that the people who 25 answered the second questionnaire were</p>

Page 122

1 actually very different than the people who
 2 didn't answer the second questionnaire.
 3 MR. GRIFFIS: Let's mark Rinsky and
 4 Montgomery.
 5 (Exhibit Numbers 30-12 and
 6 30-13 were marked for
 7 identification.)
 8 BY MR. GRIFFIS:
 9 Q. Which one is Exhibit 12, sir?
 10 MS. SHIMADA: Montgomery.
 11 THE WITNESS: I'm sorry?
 12 BY MR. GRIFFIS:
 13 Q. Montgomery is 12?
 14 A. Yes.
 15 Q. In Montgomery, they looked at the
 16 difference between the people who responded
 17 to the second questionnaire and the people
 18 who didn't respond to it; right?
 19 A. Right. They compared the two
 20 groups.
 21 Q. In the abstract under
 22 "Conclusions," they said "Differences
 23 between non-participants and participants in
 24 the follow-up interview were generally
 25 small, and we did not find significant

Page 123

1 evidence of selection bias"; right?
 2 MS. FORGIE: Object to the form.
 3 THE WITNESS: That's what they say.
 4 BY MR. GRIFFIS:
 5 Q. In the Rinsky paper, sir, 13, this
 6 is a comparison of people who did and didn't
 7 respond to a third interview; right?
 8 A. Right. Response was even worse in
 9 the third questionnaire.
 10 Q. And the third interview doesn't
 11 have anything to do with NCI 2018; right?
 12 MS. FORGIE: Object to the form.
 13 THE WITNESS: It doesn't, but it
 14 shows you that there are going to be
 15 even more problems in future analyses if
 16 they're ever done.
 17 BY MR. GRIFFIS:
 18 Q. As far as the critique of the
 19 non-responders to the second questionnaire
 20 in NCI 2018, Rinsky doesn't speak to that;
 21 right?
 22 A. No, Montgomery does, but the
 23 findings are the same. And Rinsky
 24 references Montgomery.
 25 Q. You've said several times during

Page 124

1 this deposition that glyphosate is uniquely
 2 problematic for the NCI 2018 study and for
 3 the AHS dataset, in general, and that
 4 imputation will be biased with regard to it
 5 and that the basic data collection will be
 6 wrong with regard to it; correct?
 7 MS. FORGIE: Object to the form.
 8 Mischaracterizes his testimony.
 9 THE WITNESS: I think the marked
 10 change in the use of glyphosate right
 11 during the time of the enrollment and
 12 during the period after the enrollment
 13 has resulted in a significant amount of
 14 exposure misclassification, which is a
 15 problem for the study because this
 16 exposure misclassification is
 17 non-differential, and it biases any
 18 potential real findings to the null. So
 19 it gives you a negative study, and this
 20 is one reason why one in general has
 21 less confidence in negative studies than
 22 positive studies because when risk
 23 ratios are not high, they can just
 24 disappear with this kind of -- with this
 25 level of misclassification.

Page 125

1 BY MR. GRIFFIS:
 2 Q. And you have a hypothesis that
 3 changes in glyphosate use caused
 4 non-differential misclassification. Do you
 5 have any evidence that that is true?
 6 MS. FORGIE: Object to the form.
 7 THE WITNESS: No, but if you look
 8 at how the study was done and
 9 constructed, you'd know that there was
 10 significant amounts of exposure
 11 misclassification just by understanding
 12 the nature of how the study was done.
 13 BY MR. GRIFFIS:
 14 Q. Yes, sir. You have a hypothesis,
 15 but you don't have any evidence for it;
 16 right?
 17 MS. FORGIE: Objection.
 18 Mischaracterizes his testimony, asked
 19 and answered.
 20 You can answer it again.
 21 THE WITNESS: Well, I'm not part of
 22 the study; so how can I develop
 23 evidence? I don't have -- I don't have
 24 access to the raw data to develop
 25 evidence. How could I develop evidence?

Page 126

1 BY MR. GRIFFIS:
 2 Q. Well, for example, sir, the NCI
 3 2018 paper and the AHS pool of data, in
 4 general, has all sorts of supporting studies
 5 validating all sorts of different aspects of
 6 it, which is something the case-control
 7 studies don't have; right?
 8 MS. FORGIE: Object to the form.
 9 THE WITNESS: And many of those
 10 studies raised the issue of exposure
 11 misclassification and how it could be a
 12 major problem in the Agriculture Health
 13 Study.
 14 BY MR. GRIFFIS:
 15 Q. And none of them detected any
 16 exposure misclassification with regard to
 17 the glyphosate; correct?
 18 MS. FORGIE: Object to the form.
 19 THE WITNESS: The studies didn't
 20 necessarily focus on glyphosate.
 21 BY MR. GRIFFIS:
 22 Q. To close the loop, you can't point
 23 us to any evidence as opposed to your
 24 hypothesis that the glyphosate data
 25 incorporates differential misclassification;

Page 127

1 right?
 2 MS. FORGIE: Object to the form.
 3 Asked and answered.
 4 You can answer it again.
 5 THE WITNESS: So if you understand
 6 how the study was done, you know there
 7 was a significant amount of exposure
 8 misclassification, and basically the
 9 study does not address that issue.
 10 Okay? The study does not address that
 11 issue, and it should have been
 12 addressed.
 13 BY MR. GRIFFIS:
 14 Q. And imputation is designed to
 15 address the problem of exposure
 16 misclassification?
 17 MS. FORGIE: Objection.
 18 THE WITNESS: No, it's designed to
 19 fill in the gaps in information, but it
 20 can be also influenced by the initial
 21 exposure misclassification which
 22 occurred because that data is used as
 23 part of imputation method.
 24 BY MR. GRIFFIS:
 25 Q. And, again, so that the jury is

Page 128

1 clear, when you say "the exposure
 2 misclassification that occurred," it is the
 3 exposure misclassification that you
 4 hypothesized by looking at the study;
 5 correct?
 6 MS. FORGIE: Object to the form.
 7 THE WITNESS: I think it's pretty
 8 commonly -- if one studies the way the
 9 study was done, if one studies the
 10 methodology carefully, one can see that
 11 there's a significant likelihood of
 12 exposure misclassification which can't
 13 be addressed -- which can't be addressed
 14 and probably can't be measured because
 15 of the way the study was done.
 16 BY MR. GRIFFIS:
 17 Q. And there are no data or figures
 18 that you can point to for that?
 19 MS. FORGIE: Object to the form.
 20 Asked and answered.
 21 You can answer it again.
 22 THE WITNESS: No, other than the
 23 whole body of information that we know
 24 about the agricultural health study.
 25 ///

Page 129

1 BY MR. GRIFFIS:
 2 Q. All of the flaws or errors,
 3 whatever term you like to use, that you've
 4 discussed today and that you believe exist
 5 with regard to this study, those are
 6 non-differential, not differential; correct?
 7 MS. FORGIE: Object to the form.
 8 Mischaracterizes his testimony.
 9 THE WITNESS: Yes, I think they're
 10 non-differential.
 11 BY MR. GRIFFIS:
 12 Q. Okay.
 13 A. The other problem with the
 14 sensitivity analyses is that they're
 15 focusing only on people who actually
 16 responded to the questionnaires. So there's
 17 a selection bias in just analyzing that
 18 data, and the study doesn't recommend doing
 19 that because of the selection bias. That's
 20 why they decided to use the imputation data.
 21 Okay?
 22 Q. Because it was better; right?
 23 MS. FORGIE: Object to the form.
 24 THE WITNESS: Because they thought
 25 it would be better.

Page 130

1 BY MR. GRIFFIS:
 2 Q. They thought it would be better,
 3 and there are studies on whether it's better
 4 like the Heltshe Study, and you can't point
 5 anywhere where they found that it's worse;
 6 correct?
 7 MS. FORGIE: Object to the form.
 8 THE WITNESS: It's not a matter of
 9 whether it's worse or not. It's do you
 10 use the data, or do you not -- do you
 11 just drop out the people who didn't
 12 respond, and I think for most of the
 13 analysis they did the imputation data is
 14 acceptable. But for glyphosate because
 15 of the special circumstances, it is
 16 highly questionable.
 17 BY MR. GRIFFIS:
 18 Q. All three of the sensitivity tests
 19 that were done would, if they were published
 20 as a standalone study, would be the biggest
 21 study out there other than NCI 2018 itself
 22 on the subject of glyphosate and
 23 non-Hodgkin's lymphoma; correct?
 24 MS. FORGIE: Object to the form.
 25 THE WITNESS: It's true, but they

Page 131

1 would never be able to publish them that
 2 way because of the tremendous dropout of
 3 information and the selection bias that
 4 would have been introduced; so that's
 5 why they didn't do it.
 6 BY MR. GRIFFIS:
 7 Q. And in order for the dropout to
 8 matter, it would have to be differential;
 9 correct? It would have to -- people would
 10 have to not respond to the second
 11 questionnaire in a way that is correlated
 12 with their propensity to be exposed to
 13 glyphosate and contract non-Hodgkin's
 14 lymphoma from their exposure to glyphosate;
 15 correct?
 16 MS. FORGIE: Object to the form.
 17 THE WITNESS: We can't really know
 18 what the effect of having those
 19 37 percent of people respond. We can't
 20 really know what that is. We can only
 21 guess, and that's what they did. The
 22 fact is that the group that didn't
 23 respond to the second questionnaire was
 24 very different from the group that did,
 25 and so it's very likely that the

Page 132

1 imputation is flawed because of that
 2 because they used a group of people who
 3 were very different to impute the data
 4 to people who -- to another group of
 5 people.
 6 BY MR. GRIFFIS:
 7 Q. Montgomery says "Differences
 8 between non-participants and participants in
 9 the follow-up interview were generally small
 10 and we did not find significant evidence of
 11 selection bias"; right?
 12 MS. FORGIE: Are you asking him
 13 whether you're reading a section
 14 correctly?
 15 MR. GRIFFIS: I'm asking whether
 16 that was their conclusion.
 17 MS. FORGIE: Object to the form.
 18 THE WITNESS: That's what they say.
 19 That's what they say. If you look at
 20 the details, the group that didn't
 21 respond to the questionnaire were
 22 younger. They were less educated. They
 23 were more likely non-whites. They had
 24 poor health habits. They smoked more.
 25 They drank more. They ate -- had diets

Page 133

1 that weren't as good. They were less
 2 likely to use pesticides, to mix and
 3 apply pesticides; so there were all
 4 kinds of differences between the
 5 non-responders and the responders that
 6 call into question the whole imputation
 7 process.
 8 BY MR. GRIFFIS:
 9 Q. What evidence is there that any of
 10 those factors is correlated with being
 11 exposed to glyphosate and contracting
 12 non-Hodgkin's lymphoma?
 13 MS. FORGIE: Objection. Asked and
 14 answered.
 15 You can answer it again.
 16 THE WITNESS: We don't know the
 17 answer to that because they never
 18 gathered the data.
 19 BY MR. GRIFFIS:
 20 Q. Take a look, sir, again, at Table 2
 21 in Exhibit 5, the NCI 2018.
 22 A. Table 2?
 23 Q. Yes. Let's just look at the data
 24 for lymphohematopoietic -- no, let's do
 25 non-Hodgkin's lymphoma. Are you there?

Page 134

1 A. Your Table 2 of Andreotti?
 2 Q. Yes.
 3 A. Yes.
 4 Q. Table 2, Exhibit 5, the NCI 2018.
 5 So we have here data for people who were
 6 unexposed and people in four different
 7 quartiles of exposure, Q1 being lowest, Q4
 8 being highest; correct?
 9 A. Yes.
 10 MS. FORGIE: Object to the form.
 11 BY MR. GRIFFIS:
 12 Q. The relative risk pointed out to
 13 Mr. Gibbons 0.83, 0.83, 0.88, and 0.87.
 14 Those are the respective relative risks for
 15 quartiles 1 through 4; correct?
 16 A. Correct.
 17 Q. If there was non-differential
 18 classification in this study that biased
 19 results toward the null, then the true
 20 relative risks that you would get for
 21 non-Hodgkin lymphoma if you corrected for
 22 those would be figures smaller than 0.83,
 23 0.83, 0.88, and 0.87; correct?
 24 MS. FORGIE: Object to the form.
 25 THE WITNESS: If the data is

Page 135

1 correct, that's true. But there's no
 2 obvious reason to be able to understand
 3 why the risk ratios are lower than one.
 4 Okay? So if there's no risk --
 5 right? -- if there's no risk, they
 6 should be about one. So the fact that
 7 they're, you know, almost 20 percent
 8 lower for some categories tells you that
 9 there are also some methodologic issues
 10 in the study which we don't understand.
 11 Either the control group is very unlike
 12 the group that got diseased or there's
 13 some random error. There is some other
 14 issues here which is hard to understand,
 15 why would the odds ratios actually be
 16 lower than one? We don't really believe
 17 glyphosate is protective for disease;
 18 right.
 19 BY MR. GRIFFIS:
 20 Q. You testified earlier, sir, that
 21 this pattern, a pattern for all cancers, for
 22 oral cavity, colon, rectum, pancreas, lung,
 23 melanoma, prostate, et cetera, is exactly
 24 what you would expect to see in a substance
 25 that does not cause cancer, i.e., point

Page 136

1 value is somewhat higher than one, point
 2 value somewhat lower than one, all clustered
 3 tightly around one, all not significant,
 4 except possibly with some multiple
 5 comparison outliers here and there.
 6 A. You have --
 7 MS. FORGIE: Wait. Objection.
 8 Mischaracterizes his testimony.
 9 THE WITNESS: If you look at the
 10 data for most of these other cancers,
 11 the numbers are clustered around one.
 12 For non-Hodgkin lymphoma, there's
 13 significant -- they're lower than one,
 14 consistently lower than one. So what
 15 that tells you is there's something
 16 different here, and we don't understand
 17 why that is. Okay? So the questions
 18 about non-differential misclassification
 19 actually changing a value below one is
 20 nonsensical to me. It makes no sense.
 21 Okay?
 22 BY MR. GRIFFIS:
 23 Q. So in your epidemiologic view, bias
 24 towards the null only applies to increasing
 25 P values -- increasing relative risks that

Page 137

1 start out above one?
 2 MS. FORGIE: Object to the form.
 3 THE WITNESS: Well, if -- if they
 4 start out above one, it will decrease it
 5 towards the null. If they truly start
 6 below one, it will increase it towards
 7 the null, but there's no reason to
 8 believe that glyphosate actually
 9 prevents non-Hodgkin lymphoma, is there?
 10 No, there's not. So it's sort of
 11 nonsensical to make the argument below
 12 one. Okay?
 13 BY MR. GRIFFIS:
 14 Q. Okay. All of your points about
 15 non-differential bias, they wouldn't take
 16 something like the results that we see for
 17 lymphohematopoietic and move it towards one
 18 and beyond one and yield a statistically
 19 significant positive association because
 20 that would be the wrong direction for
 21 non-differential bias; right?
 22 MS. FORGIE: Object to the form.
 23 THE WITNESS: So if it was lower
 24 than one?
 25 ///

Page 138

1 BY MR. GRIFFIS:
 2 Q. Yeah, you're not going to get .87
 3 ticking up towards one and beyond it by
 4 correcting for non-differential bias by
 5 definition; right?
 6 MS. FORGIE: Object to the form.
 7 THE WITNESS: No, but that's why I
 8 say that the fact that the odds ratios
 9 are lower -- consistently lower than
 10 one, there must be another explanation
 11 for that. Okay? Other than the fact
 12 that glyphosate is protective of
 13 non-Hodgkin's lymphoma. That doesn't
 14 make any sense either.
 15 BY MR. GRIFFIS:
 16 Q. What is it?
 17 A. Uh-huh?
 18 Q. What is the other explanation?
 19 A. I don't know what the other
 20 explanation is. Either the control group is
 21 so different from the cases that it doesn't
 22 allow us to do a valid evaluation, or
 23 there's some random error. I don't know.
 24 My guess is that there -- my guess is that
 25 the control group is probably not a very

Page 139

1 good group to use because they're very
 2 different from the cases, and actually
 3 that's the reason in the De Roos -- the
 4 first De Roos paper that they did an
 5 analysis of the low exposed to the high
 6 exposed instead of using -- doing the
 7 analysis of the high exposed versus the
 8 controls. And, in fact, it would have been
 9 interesting for these folks to do the same
 10 thing just to see if there's a difference.
 11 Okay?
 12 My guess is that these risk ratios
 13 that are below one would have come much
 14 closer and clustered around one. So that's
 15 another issue with this study. The control
 16 group that they used probably isn't a very
 17 representative control group comparing the
 18 controls to the cases.
 19 Q. Sir, to be fair, I've got five
 20 minutes left. You're supposed to be giving
 21 expert testimony here. None of this is in
 22 your expert report.
 23 A. I'm answering your question.
 24 MS. FORGIE: Wait, wait, wait.
 25 ///

Page 140

1 BY MR. GRIFFIS:
 2 Q. Are you testifying to a reasonable
 3 degree of medical certainty that these
 4 figures represent a difference in the
 5 control group from the composed group, and
 6 that's the reason for this, and that's an
 7 additional source of error in the data? Is
 8 that your testimony to a reasonable degree
 9 of medical certainty?
 10 A. I'm suggesting that that may be an
 11 explanation for the lower than one odds
 12 ratios for non-Hodgkin's lymphoma. I'm
 13 suggesting that.
 14 Q. That's a speculation?
 15 MS. FORGIE: No. Objection.
 16 THE WITNESS: It is speculation
 17 because no one has explained why they
 18 are not clustering around one, why
 19 they're all low. There's some
 20 methodologic issue here that is not
 21 addressed in the paper.
 22 MR. GRIFFIS: Pass the witness.
 23 MS. FORGIE: Okay. We'll take a
 24 break.
 25 THE VIDEOGRAPHER: Going off the

Page 141

1 record at 11:41 a.m.
 2 (Recess taken from 11:41 a.m.
 3 to 11:55 a.m.)
 4 THE VIDEOGRAPHER: This is
 5 continuing disk number 2. The time is
 6 11:55. We are going back on the record.
 7
 8 EXAMINATION
 9 BY MS. FORGIE:
 10 Q. Doctor, you were asked a series of
 11 questions about your opinions about
 12 misclassification flaws in the AHS
 13 publication. Do you remember those
 14 questions?
 15 A. Yes.
 16 Q. And do some of those
 17 misclassification flaws apply to the
 18 63 percent that answered the second
 19 questionnaire?
 20 A. Yes, they do.
 21 Q. So it's not just the 37 percent
 22 that did not answer the second question that
 23 those misclassification flaws applied to;
 24 correct?
 25 A. Yes.

1 Q. You were also asked a series of
2 questions with regard to the 37 percent and
3 the questionnaires in there. You were asked
4 a series of questions with regards to the
5 statement at that follow-up, applicators
6 reported the number of days each pesticide
7 was used in the most recent year farm. Do
8 you remember those questions?

9 A. Yes.

10 Q. With regard to the other years for
11 which they did not answer that question,
12 what information, if any, do we have about
13 pesticide they were using?

14 A. We don't have any -- we don't know.
15 We don't know what they were using. We
16 don't know.

17 Q. How many years were involved in the
18 period which we don't know what they were
19 using and how long they were using it?

20 A. Somewhere between six and 12 years.

21 Q. And all that data is not in the
22 study; correct?

23 A. We don't know that data for any of
24 them.

25 Q. You mentioned that you've never

1 Q. If you collect the data, you don't
2 need to use an imputation process; correct?

3 A. Right. You want to use real data
4 whenever possible.

5 Q. And they could have -- the authors
6 of the AHS study could have gotten that data
7 if they had asked those questions; is that
8 correct?

9 A. They could have, yes.

10 Q. Are you aware of any peer-reviewed
11 publications that discuss the
12 misclassification flaws in the AHS
13 publication that you've addressed today?

14 A. Well, yes, there's the article by
15 Gray that I reference in my report that
16 talks about the fact that, you know, if you
17 don't gather data in the follow-up studies,
18 that there's a significant potential for
19 exposure misclassification. And then
20 there's the study by Acquavella and another
21 study by Blair where they did some
22 biomonitoring, and they both discuss the
23 issue of exposure misclassification in the
24 Agricultural Health Study and how it could
25 be a significant factor.

1 used an imputation formula in any of your
2 publications. Do you remember that
3 testimony?

4 A. Yes.

5 Q. And you mentioned that you don't
6 know exactly how you would use an imputation
7 method, but would you have access as
8 chairman of the department of pathology here
9 at a large cancer center, City of Hope,
10 would you have access to people who are
11 qualified to prepare an imputation process
12 if you needed it?

13 A. Yeah. So the studies I was
14 involved in remain case control studies
15 where we gathered nearly complete data on
16 all of the cases and controls so we didn't
17 have a need for imputation. So I never
18 needed to use imputation to create data for
19 any of my studies. But, you know, if there
20 had been a need, I would have engaged the
21 epidemiologists that I collaborated with to
22 do that.

23 Q. But if you have the data, you don't
24 need to use an imputation process?

25 A. Right.

1 Q. So the exposure misclassification
2 flaws in the AHS publication that you've
3 discussed today are also mentioned in
4 peer-reviewed publications, and you just
5 named three of those; correct?

6 MR. GRIFFIS: Objection. Leading.

7 THE WITNESS: Yes.

8 BY MS. FORGIE:

9 Q. You were asked several questions
10 about how long it takes to develop
11 non-Hodgkin's lymphoma after the use of
12 Roundup. Do you remember those questions?

13 A. Yes.

14 Q. Is it possible to develop
15 non-Hodgkin's lymphoma in one or two years?

16 A. It is possible after a short
17 exposure, but it would be quite unlikely.
18 But it's possible.

19 Q. And with regard to the answers that
20 you were giving, you were giving answers
21 about what you would want in an
22 epidemiological study as compared to what
23 would be exposure required in an individual;
24 is that correct?

25 A. Well, we were talking about median

1 times of exposure or median times of
2 follow-up. So, you know, as I said before,
3 the more exposure and the longer follow-up,
4 the better.

5 Q. For purposes of an epidemiological
6 study; correct?

7 A. Yes.

8 Q. Oh, one more question. You were
9 asked a question -- is the AHS publication a
10 prospective study or retrospective study?

11 A. It's actually both because it's
12 retrospective from the time of enrollment
13 because that data is all gathered prior to
14 enrollment. And then it is prospective in
15 the sense that as you go forward, they will
16 have additional follow-up questionnaires to
17 try to update the data and have a complete
18 and accurate database.

19 Q. Do you agree that the imputation
20 error with regard to no differential
21 misclassification of exposure is only asking
22 about the last year of pesticide use
23 compounds or makes the flaws in the AHS
24 publication more severe than in any of the
25 case-control studies?

1 MR. GRIFFIS: Objection. Leading.
2 MS. FORGIE: I'll withdraw it. I
3 don't have anything else.

4
5 FURTHER EXAMINATION
6 BY MR. GRIFFIS:

7 Q. Sir, you said that it's possible to
8 develop non-Hodgkin lymphoma in one to two
9 years. What's your evidence for that?

10 A. No, what I said is it's possible
11 that an exposure could cause non-Hodgkin's
12 lymphoma after a short period of time.
13 There's some evidence for that in studies of
14 chemotherapy, high-dose chemotherapy, that
15 when you use some high-dose chemotherapy
16 that you can develop non-Hodgkin's lymphoma
17 as a result of that, using it for another
18 purpose like for breast cancer or testicular
19 cancer or acute leukemia. But generally
20 those are using very toxic agents at high
21 doses. You could have a very short latency
22 in that kind of a situation. I discussed
23 that in my article that is referenced in my
24 first report.

25 MR. GRIFFIS: No further questions.

1 MS. FORGIE: Thank you.

2 THE VIDEOGRAPHER: We are going off
3 the record at 12:03 p.m. This will
4 complete disk number 2 and complete
5 today's deposition.

6 (Time noted: 12:03 p.m.)
7

8
9
10
11 _____
12 Dennis Weisenburger, M.D.
13

14 Subscribed and sworn to before me
15 this day of , 2018.
16

17
18 _____
19 (Notary Public)
20

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 22nd day of January, 2018.
18

19
20
21 _____
22 LISA MOSKOWITZ, CSR 10816, RPR, CRR, CLR
23 NCRA Realtime Systems Administrator
24
25

1 NAME OF CASE: Roundup Products Liability Litigation
2 DATE OF DEPOSITION: January 22, 2018
3 DEPONENT: DENNIS WEISENBURGER, M.D.
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 _____
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23 Page _____ Line _____ Reason _____
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A	51:1,5 90:24 105:17 105:23 115:3 127:9 127:10,15	Amended (1) 4:14	128:21 133:15,17 141:22 142:11	88:22 89:9,24 95:12 98:12 99:12 101:3 105:3,19 109:5 111:1 113:6 114:12 115:11 116:3,13 117:11 119:14 121:6 125:18 127:3 128:20 133:13 141:10 142:1,3 144:7 145:9 146:9
a.m (18) 2:6 7:2,16 40:9,10,11 40:14 68:11,12,13 68:15 117:19,20,21 117:25 141:1,2,3	addressed (10) 22:7 43:11 94:7 112:9 115:1 127:12 128:13,13 140:21 144:13	American (1) 102:10	answered (35) 6:1 59:6 65:11 67:18 72:8 88:22 89:9,24 98:12 99:13,13 101:3 105:4,20 109:6 110:9 111:1 111:23 112:10 113:7 114:13 116:3 116:13 117:11 119:15,21 120:4,17 121:7,25 125:19 127:3 128:20 133:14 141:18	asking (10) 19:8 37:22 45:25 51:10 64:10 99:4,14 132:12,15 146:21
ability (1) 54:10	addresses (1) 21:21	amount (4) 36:2 55:10 124:13 127:7	answering (1) 139:23	aspects (1) 126:5
able (7) 66:23 92:8 100:13 104:22,23 131:1 135:2	adequate (3) 71:22 96:10,14	amounts (1) 125:10	answers (2) 145:19,20	assess (1) 107:1
absent (2) 51:4 100:25	adjustment (1) 30:5	analyses (12) 30:4,6 107:6 109:4,9 109:23 110:1 114:21 115:6 119:1 123:15 129:14	anybody (1) 69:6	assessed (1) 91:11
abstract (2) 27:22 122:21	adjustments (1) 30:13	analysis (31) 12:23 13:11 14:18 29:8 37:14 42:5,15 47:21 48:9 62:12 63:24 78:24 81:19 86:6 91:19 92:1,5,9 110:21 111:6,10,21 112:22 114:23 118:3,21 121:3,11 130:13 139:5,7	apparent (1) 27:25	assessment (7) 9:21 20:6,10 21:22 22:12 94:24 104:12
accept (4) 26:19 98:23,24 105:6	Administrator (4) 1:24 2:14 149:5,23	analyzing (2) 119:20 129:17	applicators (8) 28:15 41:10,24 42:10 44:15 62:2,5 142:5	assignment (1) 20:11
acceptable (11) 14:23 98:10,15,16,17 98:19,21 99:10,19 99:23 130:14	admonish (2) 18:14,19	and/or (1) 47:19	applied (3) 14:5 99:9 141:23	associated (2) 73:16 75:5
accepted (3) 97:14 102:21 104:4	affect (1) 48:8	Andreotti (2) 5:5 134:1	applies (1) 136:24	association (33) 7:22 27:24 30:2,14,24 32:1 34:10,18,20,23 35:3,6,9 36:12,17 36:21 37:3 38:20,21 39:2 53:17 71:23,25 73:21 105:15 108:18 110:22 113:3,3 114:11 115:8 117:8 137:19
access (3) 125:24 143:7,10	agents (2) 56:25 147:20	Andrew (2) 3:22 7:17	apply (6) 16:9 60:3 88:25 89:20 133:3 141:17	associations (3) 28:16 29:25 80:4
account (2) 22:10 104:5	agree (14) 22:18,23 24:12 48:17 74:25 75:2 90:17 100:4,12,23 105:17 105:22 107:16 146:19	ANDRUS (1) 3:2	applying (1) 24:3	assume (1) 17:10
accuracy (1) 108:4	agriculture (13) 8:22 9:11 13:22 22:7 79:1,21 93:13,15,17 96:13 100:17 128:24 144:24	Angeles (2) 3:11 7:1	appropriate (2) 19:18 83:17	assuming (1) 118:24
accurate (8) 28:22 29:16 30:12 46:5 51:13 58:21 121:3 146:18	agriculture (2) 21:23 126:12	answer (58) 18:13 19:17 20:14,18 20:22 21:15,16 22:14,15 51:25 58:16 59:7 63:15 64:11 65:12 69:7 82:20 83:9 88:14 90:2,18 94:11 96:21 98:13,21 99:16,18 101:13,19 102:2,20 104:17 105:5,21 109:7 111:2,12 112:14 113:8 114:14 115:12,14 116:4 117:12 119:11,16 120:7,9 120:19 121:8 122:2 125:20 127:4	appropriateness (1) 25:17	attached (2) 85:2,4
accurately (2) 28:5 51:15	AHS (29) 5:3 9:19 11:18 16:24 18:6,7 19:16 20:23 21:1 22:19,23 23:7 30:6 85:22 91:3,16 94:17 95:4,17,18 97:3 124:3 126:3 141:12 144:6,12 145:2 146:9,23	answering (1) 7:15	approximately (1) 7:15	attempt (3) 45:23 46:22 48:3
Acquavella (1) 144:20	al (3) 93:12,14,16	argument (1) 137:11	article (4) 27:7 105:10 144:14 147:23	attempts (1) 50:25
action (1) 149:13	Alaska (1) 3:4	ARISTEI (1) 3:8	articles (2) 27:15 99:14	attenuate (1) 54:21
ACTIONS (1) 1:7	algorithm (2) 92:17 93:1	article (4) 27:7 105:10 144:14 147:23	aside (1) 119:10	Attorneys (4) 3:2,3,9,15
actual (5) 18:8 91:13 100:2 103:17 106:11	allow (2) 68:2 138:22	asked (40) 10:11 16:3 45:10,14 52:9,14 59:6 65:11 67:18 72:8 73:20	author (1)	
acute (3) 82:4,22 147:19	allowed (1) 90:12			
added (3) 12:21,21 52:11				
additional (7) 9:24 10:15,25 11:2 29:10 140:7 146:16				
address (20) 7:13 23:10 25:21 43:15,18,24 44:12 44:16 48:3 50:20,22				

27:23	78:23	Boulevard (1)	96:8	chairman (1)
authors (7)	better (14)	3:10	carcinogen (2)	143:8
27:9 28:12 29:4,24	69:8 71:7 72:5 74:2	break (5)	70:17,18	chance (4)
44:15 99:6 144:5	74:17 75:3,15 92:9	35:16 37:24 40:6 68:5	careers (1)	37:22 39:3,5 101:17
Avenue (1)	92:13 129:22,25	140:24	69:10	chances (1)
7:20	130:2,3 146:4	breakdown (4)	carefully (5)	71:24
average (1)	beyond (4)	32:9 33:23,24 34:13	27:14 32:20 116:7,8	change (4)
89:4	18:4 83:5 137:18	breaking (2)	128:10	12:7 14:1 48:9 124:10
aware (2)	138:3	35:14 38:1	case (16)	changed (1)
23:22 144:10	bias (20)	breast (1)	1:6 7:11 10:9 13:20	11:17
	15:14,20 16:2,15	147:18	15:20 16:10 61:20	changes (2)
B	53:24,25 54:21	Brier (1)	61:24 71:8,12 86:7	64:19 125:3
B (1)	55:16 107:10	106:25	86:11 98:25 107:9	changing (1)
4:8	119:19 120:4 123:1	broke (3)	143:14 150:1	136:19
B-cell (4)	129:17,19 131:3	35:19 36:1,3	case-control (4)	charge (1)
34:17,22 77:17,21	132:11 136:23	built (2)	88:25 89:21 126:6	70:6
back (12)	137:15,21 138:4	13:3 58:9	146:25	chart (2)
19:19 22:21 40:13	biased (3)	bunch (2)	cases (22)	80:7 83:24
42:24 68:16 88:13	105:14 124:4 134:18	31:8 54:4	12:21 14:16 29:12	charts (1)
109:14 116:6,7,19	biases (4)	busy (1)	37:9,14 46:19 61:23	77:11
117:24 141:6	43:2 54:12,13 124:17	26:23	61:25 62:24 64:13	checked (1)
badger (1)	big (3)		65:18,23 75:5,12,17	91:20
101:4	98:4 115:18,24	C	75:17,20 80:25	checking (1)
badgering (2)	biggest (1)	C (3)	138:21 139:2,18	108:11
102:18 115:13	130:20	3:1 149:1,1	143:16	checks (1)
balance (2)	Biomarkers (1)	calculated (1)	categories (3)	108:17
62:3 63:3	26:17	106:10	81:11 86:11 135:8	chemical (3)
balanced (1)	biometric (1)	calculations (3)	causation (5)	69:10 75:6 97:19
62:6	91:13	91:12 92:15 118:25	4:23 5:10 9:9,22	chemicals (1)
based (6)	biometrics (1)	California (8)	80:13	71:6
11:17 16:4 71:4 83:17	91:20	1:2,17 2:12,13 3:11	cause (7)	chemotherapy (3)
83:20 90:22	biomonitoring (2)	7:11,14 149:2	11:16,23 12:2,11	147:14,14,15
basic (2)	92:16 144:22	call (6)	31:14 135:25	Children's (1)
108:23 124:5	biostatistician (2)	13:15 25:5,23 37:12	147:11	104:13
basically (4)	60:23 61:3	43:1 133:6	caused (2)	choose (1)
12:19,24 44:17 127:8	biostatistics (1)	called (2)	40:22 125:3	59:3
basis (3)	63:7	8:14 47:20	causes (7)	chronic (2)
70:22 71:12 90:15	biostats (1)	Calls (1)	9:10 31:6 78:4,5,13	34:18 77:19
bathroom (1)	63:6	58:13	83:3,14	circumstances (1)
68:5	bit (3)	cancel (1)	cavity (2)	130:15
BAUM (1)	12:22 31:9,10	54:7	32:9 135:22	cite (2)
3:8	bladder (4)	cancer (28)	center (1)	121:21,22
began (1)	32:11 93:14 94:5,23	10:1,17 11:22 15:4	143:9	cited (5)
75:19	Blair (1)	20:12 25:13,17 26:6	certain (2)	94:1,4 99:15 101:16
beginning (2)	144:21	26:16 28:14,17 29:9	57:5 69:9	103:5
77:25 117:23	blanks (1)	29:12 31:14 93:12	certainly (4)	City (1)
behalf (2)	97:16	93:14,17,25 94:5,7	11:21 14:5 42:17	143:9
4:24 5:11	blood (1)	94:23 95:3,10	98:16	claim (7)
believe (11)	149:14	101:10 135:25	certainty (2)	15:14,17 69:22 78:3,7
15:9 46:9 68:20 83:2	body (1)	143:9 147:18,19	140:3,9	78:13 87:9
101:8,23 112:7	128:23	cancers (13)	Certified (1)	clarify (1)
115:15 129:4	Bonner (4)	28:18 30:20,21,23	149:6	150:4
135:16 137:8	5:12 93:11 94:13	32:2,8 33:11,15	certify (2)	classification (5)
best (8)	101:11	73:16,24 113:18	149:7,12	53:2 54:19 66:19,20
38:7 47:21 51:18	bottom (1)	135:21 136:10	cetera (2)	134:18
61:13 63:3 75:6,7	43:11	capture (1)	14:18 135:23	classified (1)

46:20 cleanest (1) 62:11 cleanly (1) 24:23 clear (3) 33:9 116:25 128:1 close (5) 32:24 63:11 106:22 106:23 126:22 closer (2) 55:6 139:14 CLR (4) 1:23 2:13 149:4,22 clustered (3) 136:2,11 139:14 clustering (1) 140:18 coffee (1) 68:8 cohort (22) 13:21 15:22 16:10 27:24 29:7 48:21 52:1 69:8,15,17,19 71:5,15,19 72:5 86:7 88:24 92:6 96:9 100:14,16,20 collaborated (1) 143:21 collect (1) 144:1 collection (1) 124:5 colon (2) 32:9 135:22 Colorado (1) 3:5 column (8) 29:3,23 84:8 94:14 95:6 104:2 109:13 109:21 columns (1) 85:14 come (2) 42:24 139:13 comment (5) 13:7 29:5 35:18 99:20 104:24 commented (1) 21:12 comments (1) 27:8 Commission (1) 148:20 common (3) 100:14,18 105:10	commonly (2) 26:8 128:8 comparative (1) 64:14 compare (2) 14:7 61:14 compared (7) 23:16 29:5,12 98:6 103:20 122:19 145:22 comparing (3) 36:23 118:21 139:17 comparison (3) 29:16 123:6 136:5 compensate (1) 52:4 complete (14) 47:25 85:23 107:8,11 107:24 111:8 112:3 112:5 117:18 118:5 143:15 146:17 148:4,4 completed (2) 41:11 111:11 completely (1) 18:4 complicated (2) 27:6 58:19 complicates (1) 46:21 composed (1) 140:5 compounds (1) 146:23 concern (3) 15:20,21 49:18 concluded (1) 27:23 conclusion (5) 11:15 12:18 14:11 38:11 132:16 conclusions (4) 14:22 27:22 37:20 122:22 condition (1) 16:5 conducted (1) 109:25 confidence (11) 31:12,23 33:4,17 39:12 40:3 92:14 98:24 99:2 110:19 124:21 confirms (1) 118:24 conform (1)	150:4 consider (4) 15:3 23:4 40:20 85:22 considered (2) 10:16 20:13 considering (2) 17:23,24 consistency (1) 53:16 consistent (1) 30:3 consistently (4) 31:10 56:19 136:14 138:9 constructed (1) 125:9 context (1) 80:16 continue (2) 56:23 58:10 continued (2) 49:20 96:7 continues (2) 40:12 68:14 continuing (1) 141:5 contract (2) 69:5 131:13 contracting (1) 133:11 control (14) 13:20 15:21 16:10 61:20,24 86:11 112:9 135:11 138:20,25 139:15 139:17 140:5 143:14 controls (9) 61:23,24 63:22 65:19 65:20,22 139:8,18 143:16 conviction (1) 12:9 copies (2) 10:25,25 copy (1) 11:2 correct (125) 9:13,15,23 10:23 11:19 13:5 14:9,12 14:18 16:7 21:7 22:4 29:18 30:14,21 30:25 32:3,18 33:6 33:12,18,25 34:11 34:12,15,20,21,23 34:25 35:3,4,6,7,9	35:10 36:4,8,9,14 36:20 39:9,15 41:12 41:25 43:7,24 46:8 47:8,9,14 48:15 49:6,17 58:15 66:24 67:10,16 68:24 70:3 72:16,21 73:8 78:6 79:7 80:6,13,21 81:20,21 83:15,18 83:21 84:1,10 86:14 89:22 90:24 91:4,14 91:23 92:4,10 93:18 95:20 100:25 103:6 103:9 106:12 108:14,20,22 110:7 110:8,24 111:3,15 112:23 113:5,9 115:9,25 117:9 118:2 120:20 124:6 126:17 128:5 129:6 130:6,23 131:9,15 134:8,15,16,23 135:1 141:24 142:22 144:2,8 145:5,24 146:6 150:5 corrected (2) 10:11 134:21 correcting (1) 138:4 correctly (4) 28:3 30:8 44:23 132:14 correlated (2) 131:11 133:10 correlation (2) 92:20,21 correlations (1) 92:16 counsel (6) 7:24 18:14,19 19:7,23 37:21 count (1) 14:6 country (1) 56:10 course (3) 13:5 27:10 31:21 court (5) 1:1 7:9,10,21 8:10 Courtyard (2) 2:10 7:13 create (1) 143:18 critical (2) 27:8 96:9	critically (1) 27:2 criticism (8) 21:6,9 43:22 46:15 68:18 90:22 104:10 121:3 criticisms (5) 31:20 48:4 50:21 89:18 92:22 criticized (1) 88:4 critique (1) 123:18 critiques (1) 43:24 crop (1) 58:25 crops (6) 56:4,10,17 57:5,19,21 cross-talk (1) 78:9 CRR (4) 1:23 2:13 149:4,22 crude (1) 37:14 CSR (4) 1:23 2:13 149:4,22 cup (1) 68:8 cut (1) 52:2
<hr/> D <hr/>				
D (5) 4:1,12,17,19 5:8				
D.C (1) 3:17				
data (115) 9:11,18,19,24,24 20:24 22:8,12 23:5 23:7 30:19 35:19 36:1,2,6,14,21 37:2 37:16,18 38:9 41:17 42:3,13,17,22,23 44:25 48:5 49:15 51:4,12,25 52:3,7 52:16,21 53:16,17 75:22 78:17 79:23 80:7 83:6,8,13,17 83:20 85:15,22 86:6 91:13 92:9,13 93:13 96:16,17 97:15,16 99:25 100:1,2,13,25 102:7 103:21 104:5 105:10,13 107:11 107:13,17,24				

108:11,23 110:10 110:12 111:7 114:17 118:4,13 119:2,6,20 120:3 121:4,11 124:5 125:24 126:3,24 127:22 128:17 129:18,20 130:10 130:13 132:3 133:18,23 134:5,25 136:10 140:7 142:21,23 143:15 143:18,23 144:1,3,6 144:17 146:13,17	degree (3) 14:2 140:3,8 demonstrate (5) 47:20 65:6,6 75:13 81:2 Dennis (11) 1:16 2:9 4:3,12,16,19 5:8 7:7 8:13 148:11 150:3 department (1) 143:8 depend (1) 70:15 dependent (1) 70:18 depending (1) 94:9 depends (2) 39:23 100:19 DEPONENT (1) 150:3 deposed (1) 10:11 deposition (28) 1:15 2:9 4:11,16 7:7 7:12 8:20 9:6,17 10:7,9,10 11:3 72:20 73:19 74:8 76:6 90:5,6,7,9,11 104:16 124:1 148:5 149:8,10 150:2 DeRoos (1) 9:12 describe (4) 41:23 94:15 95:1 105:16 described (3) 42:2 95:5 109:25 describes (1) 28:5 description (1) 28:22 design (2) 61:21 63:2 designed (5) 51:5 60:7 71:20 127:14,18 detail (1) 24:25 details (6) 86:19 87:15,25 88:1 89:16 132:20 detect (8) 54:11 63:4 64:18 65:21 66:23 70:13 72:13 73:15	detected (1) 126:15 develop (7) 125:22,24,25 145:10 145:14 147:8,16 diets (1) 132:25 difference (7) 63:4 98:4 118:22,23 122:16 139:10 140:4 differences (4) 95:22 122:22 132:7 133:4 different (28) 31:8 33:5 36:23 64:1 64:10,10 92:18,18 92:19 98:1,5 111:6 118:21 119:3,25 120:1,6,13,24 121:16 122:1 126:5 131:24 132:3 134:6 136:16 138:21 139:2 differential (7) 16:4 66:15,19 126:25 129:6 131:8 146:20 difficult (2) 27:6 81:1 diffuse (2) 34:22 77:21 digging (1) 48:1 direction (7) 53:24 54:5,24,25 62:3 62:7 137:20 directions (1) 53:25 disagree (3) 25:15 90:15,18 disappear (1) 124:24 discard (1) 42:23 discontinued (3) 50:12,14 96:1 discuss (5) 43:11 50:21 119:7 144:11,22 discussed (8) 9:19 46:14 72:19 90:21 95:19 129:4 145:3 147:22 discussion (3) 28:10,11 107:4 disease (5)	53:10 62:24 63:21 71:17 135:17 diseased (5) 64:13,15,21 65:18 135:12 disk (6) 40:13 68:15 117:18 117:23 141:5 148:4 distant (1) 95:25 distinct (1) 44:13 distinction (2) 38:16,19 distribution (8) 47:7 48:11 61:5,10 62:10,16 65:5,7 District (4) 1:1,2 7:10,10 divide (2) 62:24 64:16 divided (2) 61:15 64:20 dividing (3) 17:17 62:13 65:1 division (2) 63:9,10 Doctor (1) 141:10 document (2) 1:6 20:1 doing (5) 56:18,23 57:3 129:18 139:6 dose (6) 65:1,6 80:19 81:3,4 81:20 dose-response (2) 37:13 63:24 doses (1) 147:21 doubling (1) 79:6 Dr (7) 4:12,16,19 5:7 9:3 40:16 90:4 draft (1) 9:18 dramatic (1) 46:18 dramatically (4) 57:1 96:5,7 97:20 drank (1) 132:25 draw (3) 14:22 37:19 38:10	drift (2) 67:14,15 Drive (3) 2:11 3:4 7:14 drop (1) 130:11 dropout (2) 131:2,7 due (4) 39:2,4 107:10 108:24 duly (2) 8:15 149:9
<hr/> E <hr/>				
database (2) 86:5 146:18 dataset (1) 124:3 DATE (1) 150:2 day (3) 19:3 148:15 149:17 days (8) 59:18 86:22 87:3,5,10 87:18,19 142:6 De (15) 12:20 13:1,3,9 15:12 22:8 29:6,17 40:23 42:18,18 73:7 75:23 139:3,4 dead (1) 86:4 deal (1) 101:16 dealing (1) 100:25 debate (1) 19:11 decide (2) 94:9,10 decided (2) 57:19 129:20 decrease (3) 65:19,20 137:4 decreased (2) 64:22 107:12 decreases (1) 54:10 decreasing (1) 65:17 Defendant (1) 3:15 defined (1) 71:25 definition (1) 138:5	E (6) 3:1,1 4:1,8 149:1,1 earlier (9) 38:7,16 40:19 68:19 77:1 90:21 95:15 112:1 135:20 easier (2) 58:22 59:9 easy (4) 58:7,8,17,19 edge (1) 106:22 editor (1) 27:9 educated (2) 60:6 132:22 Educational (1) 104:12 effect (8) 37:13 47:20 54:22 55:14 57:4 70:13 72:14 131:18 either (7) 53:17 57:11 58:17 96:1 135:11 138:14 138:20 elevated (3) 76:11 77:8 87:7 eleven (1) 29:9 eliminated (1) 109:3 Elyse (2) 3:19 8:7 engaged (1) 143:20 enrolled (2) 41:10 107:9 enrollment (13) 42:12 43:20 45:19 46:21 96:6 97:22 110:5,17 114:19			

124:11,12 146:12 146:14 entirely (3) 70:16 100:19 109:3 enumerate (1) 40:24 Environmental (1) 102:13 epidemiologic (4) 13:19 14:17 16:21 136:23 epidemiological (5) 20:11 100:24 105:11 145:22 146:5 epidemiologically (1) 16:18 epidemiologist (2) 60:22 61:2 epidemiologists (2) 98:20 143:21 epidemiology (14) 21:22 26:14,17,18,20 26:25 31:5,24 38:25 61:13 70:2 91:17 102:11,12 equal (2) 64:12 65:7 equals (2) 29:12,13 Eriksson (5) 75:18 86:21 87:2,10 87:15 error (8) 43:1 51:10,16 135:13 138:23 140:7 146:20 150:5 errors (11) 40:20 43:2 50:1 53:1 53:8,11 54:18 66:8 66:15 106:10 129:2 Esfandiary (5) 3:12 8:3,3 63:12 97:5 ESQ (4) 3:6,12,18,19 essentially (1) 108:17 estimate (5) 39:8 40:2 55:17,18 81:7 estimates (4) 31:23 39:7 105:15 107:12 et (5) 14:18 93:12,14,16 135:23 evaluate (2)	102:4 111:6 evaluated (1) 71:6 evaluation (3) 13:4 28:13 138:22 evenly (1) 61:15 evidence (16) 12:1 13:19 14:24 51:9 121:19 123:1 125:5 125:15,23,25,25 126:23 132:10 133:9 147:9,13 exactly (2) 135:23 143:6 EXAMINATION (4) 4:2 9:1 141:8 147:5 examined (4) 8:15 32:2,3 98:11 example (7) 50:3 51:18 55:20 59:10 61:20 106:15 126:2 excluded (1) 30:6 exhibit (32) 4:10,14,18 5:2,5,6,7 5:12,13,14,15,16,17 10:8,9,19 11:12 18:23 19:3 27:19 40:17 72:25 73:1 85:4 93:7 95:8 103:1,4 122:5,9 133:21 134:4 Exhibits (2) 93:10 101:11 exist (2) 15:10 129:4 expanded (1) 29:8 expands (1) 110:19 expect (3) 31:13,24 135:24 experience (1) 104:23 expert (17) 5:7 10:14 11:11 13:5 15:5 40:18 43:5 45:8 69:21,22 72:22 72:23 83:12 91:8 103:5 139:21,22 expertise (1) 104:23 expires (1) 148:20	explain (1) 12:17 explained (1) 140:17 explanation (4) 138:10,18,20 140:11 exposed (19) 14:16 35:13 47:7 48:12 61:10 62:5,13 63:9,25 65:2 69:4,9 88:8 110:18 131:12 133:11 139:5,6,7 exposure (83) 20:6,10,12 30:3 31:6 33:5 46:23 47:19,22 48:8,10,14,19,20 53:1,9,18 54:19 55:10 68:21 69:11 69:13,15 70:11,24 71:10,21,22 76:16 76:21,24,25 77:2,7 79:5,20 86:10,11,13 87:3,6,11,17,18,19 88:2,5 89:4,19 91:12 92:24 94:24 108:24 110:5,16 111:7 113:13,24 114:3,18 120:11 124:14,16 125:10 126:10,16 127:7,15 127:21 128:1,3,12 131:14 134:7 144:19,23 145:1,17 145:23 146:1,3,21 147:11 exposures (9) 23:15 46:11 71:24,24 72:1,1 73:24 91:14 113:16 extent (2) 52:2 114:17 extremely (1) 100:14	fact-checked (1) 91:12 factor (2) 14:13 144:25 factors (1) 133:10 facts (1) 150:4 fail (1) 65:6 failing (1) 41:24 fair (8) 14:11 15:2,8,22 51:5 74:20 102:18 139:19 false (2) 63:8 65:9 far (5) 46:5 48:13 115:1 119:8 123:18 farm (2) 49:20 142:7 farmed (1) 57:4 farmer (2) 57:7,8 farmers (3) 56:17,22 57:1 farming (13) 45:1,16,18,25 48:6 49:16,21 51:11,14 55:25 57:9,25 58:2 farther (1) 67:7 fatal (2) 96:12 100:8 feel (1) 45:24 field (1) 57:20 fifth (1) 68:18 figure (3) 33:14 106:16,17 figures (6) 48:9 106:11 114:11 128:17 134:22 140:4 fill (4) 50:15 51:19 97:16 127:19 filled (1) 42:11 final (1) 86:6	find (9) 67:4,12,22,23 71:22 77:8 79:6 122:25 132:10 finding (4) 13:17 28:23 32:8 54:11 findings (8) 12:19,24 25:6 28:6 30:19 78:4 123:23 124:18 finds (1) 31:8 fine (4) 19:20 68:9 85:15 97:4 finish (2) 37:24 100:6 finished (2) 66:3 96:21 first (49) 11:15 28:10 29:3,23 39:8 40:24 41:1,4,6 42:18 43:1,4,12,16 45:11,21 46:15 47:4 49:19 50:3,16 59:11 69:3 73:10 84:4 94:25 95:6 97:23 104:2,3 105:9 109:13,21,21,24 110:4,6,9,20 115:1 117:1 119:6 120:16 121:2,5,10,10 139:4 147:24 fits (1) 46:15 five (9) 48:13,25 52:13 68:5 69:14 80:4 85:12 117:11 139:19 fix (1) 45:23 flaw (6) 15:15 43:4 44:21 45:21 49:15 100:8 flawed (4) 108:23 119:2,6 132:1 flaws (23) 12:6 13:14 15:4,9 25:5,22 40:21,24 43:2,3 44:8 48:1 49:1,5 96:13 114:22 129:2 141:12,17,23 144:12 145:2 146:23 focus (1) 126:20
---	--	---	--	---

focuses (1) 69:24	71:1 72:7,15 74:6 74:12,22 76:4 77:5	81:9,15 82:21 83:4 83:19 84:2 85:24	30:4 67:16 147:5,25 149:12	56:9,18 57:8,9,10 57:24 58:1,9,11,23
focusing (2) 82:9 129:15	78:15 79:8,12,16 80:14,22 81:9,15	86:15,23 87:1,13 88:9,21 89:7,23	future (2) 113:18 123:15	58:24,24 59:12,14 61:8 62:2 68:22
folks (1) 139:9	82:18 83:4,19 84:2 84:20 85:3,17,24	90:16,25 91:22 92:3 92:11 97:6,11	G	69:2,4 70:23 71:14 72:11 73:17 78:4,8
follicular (2) 35:5 39:7	86:15,23 87:1,13 88:9,21 89:7,9,23	100:15 101:1,12 102:15 103:10	gap (3) 50:15 59:21 111:25	78:13 79:5 83:2,14 88:7 89:10,12 90:14
follow (4) 51:18 75:9 78:20 86:2	90:16,25 91:22 92:3 92:11 93:23 94:18	104:15 106:13 108:6,13,21 110:25	gaps (2) 112:9 127:19	91:18 95:23 96:4,19 96:25 97:1,9,17
follow-up (50) 12:22 13:10 14:16	95:7,11 96:20 97:11 98:12 99:12 100:6	111:18 112:12 113:20 114:8	gather (3) 52:3 100:13 144:17	98:6,11 99:1,11,20 100:10 101:8,22,23
24:25 29:10 41:9	100:15 101:1,3,12 101:25 102:15	115:11,20 116:2,12 117:10 118:19	gathered (4) 103:21 133:18 143:15	102:4,24 106:9 107:20 108:19
43:8,16,22 45:1,11	103:10 104:15 105:3,19 106:3,13	123:2,12 124:7 125:6 126:8,18	146:13	110:23 113:4 115:8 117:8 124:1,10
46:1 47:17,19 48:21	107:18 108:6,13,21 109:5,14,17 110:25	127:2 128:6,19 129:7,23 130:7,24	gathering (2) 99:25 100:2	125:3 126:17,20,24 130:14,22 131:13
52:9 68:23 69:12	111:18 112:12 113:6,20 114:8,12	131:16 132:17 134:10,24 137:2,22	general (29) 4:23 5:10 23:1 26:19	131:14 133:11 135:17 137:8
72:18,19 73:13	115:10,20 116:2,12 116:22 117:10	138:6	31:17,19,21 38:19 54:12 55:14 56:22	138:12
75:23,25 76:11,15	118:19 119:14 120:22 121:6 123:2	formed (1) 9:8	56:25 58:23 61:12 62:22 63:1 69:20	glyphosate-containi... 12:1,10
78:1,18 79:2,21	123:12 124:7 125:6 125:17 126:8,18	formula (6) 58:9 60:4,5,8,18	71:18 72:3,4 77:6 93:24 95:15 97:15	glyphosate-exposed... 29:11
80:1 85:21 88:18	127:2,17 128:6,19 129:7,23 130:7,24	143:1	99:22 107:19 124:3 124:20 126:4	glyphosate-resistan... 56:4,12
89:20 90:23 96:11	131:16 132:12,17 133:13 134:10,24	formulations (1) 92:19	generally (7) 15:21 31:4 71:20	go (9) 40:17 41:23 44:6 86:8
96:14,15 97:23	136:7 137:2,22 138:6 139:24	forth (1) 149:9	107:7 122:24 132:9 147:19	88:13 116:6,7,19 146:15
111:9 113:12,15,23	140:15,23 141:9 145:8 147:2 148:1	forward (1) 146:15	generate (1) 60:17	goalpost (1) 76:2
118:10 122:24	form (139) 12:13 13:12 14:19	found (6) 16:24 30:13,23 55:4	generic (1) 70:20	goes (4) 44:11 81:19 115:2
132:9 142:5 144:17	15:16,23 16:12,19 17:2 18:3,16,21	57:2 130:5	Gibbons (1) 134:13	119:8
146:2,3,16	19:5,8,13,20 20:14 20:18,25 21:15	four (15) 29:11 35:15,20 48:9	give (11) 11:25 12:3,7,16,25	going (32) 10:2 18:3,13,18 19:10
follows (1) 8:16	22:14,20,25 23:20 24:9,16,21 25:19	52:14 62:4,4,13 63:9,25 64:17,21	13:8 40:22 41:2 51:19 62:10 83:12	19:12,17 20:21 22:15 27:21 40:8,13
force (1) 89:21	28:7,24 29:19 30:9 30:15 31:1,16 32:4	65:4 115:11 134:6	given (2) 15:10 149:11	53:25 62:3 64:17 68:10 74:7 79:5,22
Forgie (213) 3:6 4:5 8:1,1,18 9:14	32:12,15 33:19 34:1 34:6,24 35:21 36:10	fourfold (1) 37:7	gives (4) 92:9,12,13 124:19	83:12 93:2,23 96:17 101:13 104:17
10:22,24 11:4,7	36:15 37:17 38:12 39:22 41:19 43:25	Framingham (2) 104:8,14	giving (3) 139:20 145:20,20	117:18,24 123:14 138:2 140:25 141:6
12:13 13:12 14:19	45:3 46:2,16 48:16 49:3,7,24 50:24	free (1) 27:11	glyphosate (108) 9:10 11:16 17:13,18	148:2
15:16,23 16:12,19	51:6,22 53:6,20 54:8 55:21 56:20	frequency (1) 48:10	20:3,17 21:10,24 22:10 23:12 25:8	GOLDMAN (1) 3:8
17:2 18:3,16,21	57:12 58:3,12 59:5 60:11,19 61:18	front (2) 10:15 88:10	27:25 28:13,16 29:8 29:25 46:9 47:6,16	good (8) 7:4 9:3,4 38:1 52:7
19:5,8,13,20 20:14	62:18,21 63:13 64:8 65:10 66:16 67:8,17	full (5) 29:3,23 47:4 94:14	48:8,11 49:19,20,22 50:5,7,8,12,13,14	92:20 133:1 139:1
20:18,25 21:15	70:4,14 71:1 72:7 72:15 74:6,12,22	109:21	53:14,15,18 56:3,7	gotten (1) 144:6
22:14,20,25 23:20	76:4 77:5 78:15 79:8,12 80:14,22	full-time (1) 27:13		Gray (1) 144:15
24:9,16,21 25:19		further (5)		
28:7,24 29:19 30:9				
30:15 31:1,16 32:4				
32:12,15 33:19 34:1				
34:6,24 35:21 36:10				
36:15 37:17,21 38:6				
38:12 39:21 40:7				
41:19 43:25 45:3				
46:2,16 48:16 49:3				
49:7,24 50:24 51:6				
51:22 53:6,20 54:8				
55:21 56:20 57:12				
58:3,12 59:5 60:11				
60:19 61:18 62:18				
62:21 64:2,8 65:10				
66:3,10,16,25 67:8				
67:17 68:7 70:4,14				

<p>greater (9) 39:18 40:2 65:15 86:21 87:5,10,12 89:5,21</p> <p>Griffis (220) 3:18 4:4 8:5,5 9:2,16 11:1,10 12:15 14:3 15:1,19 16:1,14,22 17:4 18:14,19 19:1 19:7,10,19,22 20:15 20:23 21:5,18 22:17 22:22 23:3,21 24:11 24:19,22 26:4 28:9 29:1,21 30:11,17 31:3,18 32:6,14,16 33:21 34:3,9 35:1 35:24 36:11,18 38:4 38:8,15 40:1,6,15 41:20 44:4 45:6 46:3 47:1 48:24 49:4,10 50:19 51:2 51:8 52:18 53:12 54:2,14 55:24 57:6 57:15 58:6,14 59:24 60:13 61:1 62:8,19 63:5,18 64:5,24 66:1,5,11,12,21 67:3,9 68:4,9,17 70:9,21 71:11 72:9 72:17 73:3 74:10,15 74:24 76:18 77:10 78:11 79:3,10 80:2 80:18 81:5,12,17 83:1,11,22 84:6,23 85:9,19 86:9,20,24 87:8,22 88:16 89:2 89:11 90:3,20 91:2 91:24 92:7 93:4,9 94:12,21 95:9,14 96:23 97:7,24 98:7 99:3 100:3,11,22 101:7,20 102:9 103:3,12 104:21 105:8 106:1,7,14 108:1,8,15 109:2,12 109:16,20 111:4,19 112:16 113:10 114:2,9,24 115:17 115:23 116:10,17 116:24 117:5,15 118:7 119:4 120:15 121:1,13 122:3,8,12 123:4,17 125:1,13 126:1,14,21 127:13 127:24 128:16 129:1,11 130:1,17</p>	<p>131:6 132:6,15 133:8,19 134:11 135:19 136:22 137:13 138:1,15 140:1,22 145:6 147:1,6,25</p> <p>group (36) 22:18 33:3 35:13 36:24 37:9 62:14,20 63:10,21,25 64:16 64:21 65:2,3,3,8,18 77:15,16 81:6,8 120:13 131:22,24 132:2,4,20 135:11 135:12 138:20,25 139:1,16,17 140:5,5</p> <p>grouping (1) 30:7</p> <p>groups (17) 17:14 35:15,17,20 36:23 37:15 61:14 61:15 62:14 63:9,25 64:15,22 65:2,4,16 122:20</p> <p>guess (19) 32:22 44:18 45:12 46:22 50:17,18 54:1 59:23 60:3,6 63:15 92:14 96:17 120:8 120:11 131:21 138:24,24 139:12</p> <p>Guessing (1) 99:25</p> <p>guidance (1) 41:2</p> <hr/> <p style="text-align: center;">H</p> <hr/> <p>H (1) 4:8</p> <p>habits (1) 132:24</p> <p>half (1) 71:9</p> <p>halfway (1) 104:3</p> <p>halves (1) 36:3</p> <p>hand (1) 149:17</p> <p>happen (3) 41:8 54:10 55:23</p> <p>happened (1) 98:5</p> <p>happens (3) 16:15 51:24 79:11</p> <p>hard (3)</p>	<p>37:19 58:18 135:14</p> <p>head (3) 26:12 88:13 89:17</p> <p>headquartered (1) 7:19</p> <p>health (19) 8:23 9:12 13:22 21:23 22:8 23:15 79:1,22 93:13,15,17 96:13 100:17 102:13 104:13 126:12 128:24 132:24 144:24</p> <p>Heart (2) 104:8,14</p> <p>HEDLUND (1) 3:8</p> <p>held (2) 2:10 7:12</p> <p>helpful (1) 27:8</p> <p>helps (1) 65:23</p> <p>Heltshe (7) 5:15 91:7 103:4 106:2 106:8 107:5 130:4</p> <p>herbicide (1) 59:2</p> <p>hereinbefore (1) 149:9</p> <p>hereunto (1) 149:16</p> <p>high (9) 43:6 47:5,5 48:10 72:1 124:23 139:5,7 147:20</p> <p>high-dose (2) 147:14,15</p> <p>higher (3) 36:25 81:7 136:1</p> <p>higher-exposed (2) 65:3 77:16</p> <p>highest (2) 110:17 134:8</p> <p>highly (8) 16:24 22:19,24 24:14 24:20 70:18 102:7 130:16</p> <p>Hodgkin (2) 33:22 34:7</p> <p>holidays (1) 27:12</p> <p>Hollingsworth (3) 3:14 8:6,8</p> <p>home (1) 85:1</p>	<p>Hope (1) 143:9</p> <p>hours (3) 8:24 27:5,5</p> <p>huge (1) 57:4</p> <p>Huntington (2) 2:11 7:14</p> <p>hurt (1) 65:23</p> <p>hypothesis (3) 125:2,14 126:24</p> <p>hypothesized (1) 128:4</p> <hr/> <p style="text-align: center;">I</p> <hr/> <p>i.e (4) 9:9 34:10 108:18 135:25</p> <p>IARC (8) 16:24 17:10 18:12 21:11 22:7,23 24:7 24:13</p> <p>IARC's (1) 21:22</p> <p>ideally (1) 86:1</p> <p>identification (6) 10:21 18:24 73:2 93:8 103:2 122:7</p> <p>identified (6) 15:3 41:5 43:4 44:22 48:1 68:19</p> <p>ignoring (2) 105:12 107:17</p> <p>III (1) 104:11</p> <p>impact (1) 111:7</p> <p>implications (1) 105:12</p> <p>important (2) 14:13 18:22</p> <p>impossible (1) 96:8</p> <p>improve (1) 65:16</p> <p>imputation (92) 16:25 21:7,7,9,12 23:24 24:8 43:13,14 43:23 44:11,17 45:23 46:14 48:3 50:18,20,22 51:4 59:22,25 60:2,8,17 90:23 91:4 94:16 95:1,5,18 97:3 98:9</p>	<p>99:8 100:23 101:22 103:9,17,20 104:4 104:24 105:16,23 107:6,16,22 108:5 108:10,12 109:3 110:21 111:17,20 111:23 112:2,5,7,22 114:25 115:1,2,7,16 115:19,22,25 116:9 116:16 117:3,6 118:17,25 119:5,7,8 119:10,13 120:14 124:4 127:14,23 129:20 130:13 132:1 133:6 143:1,6 143:11,17,18,24 144:2 146:19</p> <p>impute (8) 46:22 52:20 58:8 60:25 96:4 110:12 111:24 132:3</p> <p>imputed (6) 106:11 111:7 113:16 113:22 118:4,13</p> <p>include (4) 66:14 112:2 115:16 116:9</p> <p>included (4) 9:20 45:19 115:21 116:16</p> <p>including (9) 16:25 17:20 20:17 21:23 22:8 28:2,18 104:7 105:13</p> <p>Incorporated (1) 7:19</p> <p>incorporates (1) 126:25</p> <p>increase (19) 37:7 46:8,18 51:20 56:3 57:1,2 64:18 67:11,12,15 68:1 73:15 75:17 77:20 77:22,24 96:7 137:6</p> <p>increased (13) 37:10,10 67:5 75:14 75:20 77:15,25 78:19,22 80:9,12 87:20 96:5</p> <p>increases (2) 67:13 79:23</p> <p>increasing (4) 79:25 97:19 136:24 136:25</p> <p>individual (1) 145:23</p>
--	--	---	--	--

individually (1) 14:21	investigators (3) 91:3,11 115:5	32:19 39:19 44:10 48:18 50:7,9,13 51:17 52:22 56:8,8 57:14 58:4,17,20 59:14,17,18,19,21 61:20 63:1,7,14 65:8 66:13 71:3,8 78:25 80:17,24 83:9 87:23 88:6,13,17 89:3 90:1,18 93:5 96:5 98:15,23 101:20 102:3,5,17 104:19 106:24,24 108:2 109:9 112:13 116:5 119:23 121:14 125:9 127:6 128:23 131:17,20 133:16 135:7 138:19,23 142:14 142:15,16,18,23 143:6,19 144:16 146:2	75:7,7,10 90:13 147:21	150:21,22,24
individuals (2) 107:8,10	involved (5) 70:1 101:9,24 142:17 143:14		latest (1) 113:13	linked (2) 30:5 53:8
influenced (1) 127:20	involving (1) 93:12		LAW (1) 3:2	Lisa (5) 1:23 2:12 7:21 149:4 149:22
information (13) 10:13 25:3 42:21 43:19 45:15,17 96:9 110:16 113:13 127:19 128:23 131:3 142:12	issue (14) 41:7 47:15,23 61:5 66:17 100:14 114:1 114:4 126:10 127:9 127:11 139:15 140:20 144:23		lays (1) 24:24	list (6) 10:16 44:5,7 46:5 47:25 66:14
informative (6) 16:25 22:19,24 24:20 25:2,23	issues (11) 12:5 13:14 25:4,22 50:21,23 60:24 102:24 114:22 135:9,14		lead (1) 12:6	listed (3) 66:6 104:11 105:1
initial (6) 42:12 45:13,19 46:20 121:11 127:20	item (1) 84:4		Leading (2) 145:6 147:1	listen (1) 19:12
Initiative (1) 104:13	<hr/> J <hr/>		least-exposed (1) 81:6	lists (2) 20:16 104:7
Institute (7) 10:2,18 11:22 15:4 25:13,17 26:6	January (6) 1:18 2:5 7:1,15 149:17 150:2	knowledge (1) 71:15	leaves (2) 112:22,24	literally (1) 27:5
instruct (4) 18:13 19:17 20:21 94:10	job (2) 1:25 27:13	known (1) 105:13	leaving (1) 110:21	literature (1) 27:3
intention (1) 64:25	journal (7) 10:1 12:5 25:12,16 26:5 102:11,12	knows (1) 69:6	left (7) 37:25 110:11 111:13 113:1 115:18,24 139:20	litigation (4) 1:4 7:9 9:9 150:1
interested (2) 27:16 149:15	journals (5) 26:14,15,19,20 99:6	knowledge (1) 71:15	left-hand (2) 29:22 104:2	little (3) 31:9,10 54:4
interesting (2) 76:9 139:9	jury (1) 127:25	known (1) 105:13	legal (1) 7:18	LLP (2) 8:6,8
interim (2) 47:21 78:24	<hr/> K <hr/>	knows (1) 69:6	length (1) 14:16	locations (1) 75:9
International (1) 102:11	Kathryn (2) 3:6 8:1	Koutros (7) 5:13,14 93:14,16 94:22 101:9,10	let's (14) 23:4 33:10 35:18 40:25 45:4 69:1 107:3 109:13 114:25 117:1 119:5 122:3 133:23,24	logistic (1) 94:16
interpret (1) 80:16	keep (2) 37:22 38:2	<hr/> L <hr/>	leukemia (5) 34:20 77:19 82:4,23 147:19	long (14) 48:20 68:6 69:3,11,15 71:21 72:1 73:22 74:18 75:8 76:15,19 142:19 145:10
interrupted (1) 78:10	kidney (1) 32:11	labeled (1) 7:5	leukemias (1) 33:12	longer (17) 48:22 69:7 71:7 72:5 74:1,17 75:3,15 78:18 79:2,15,21 80:1 88:8,19 90:12 146:3
interval (4) 31:12 39:13 40:4 110:19	kind (14) 43:17,21 46:14 54:6 92:1,5,8 96:2,8 98:24 106:21 120:3 124:24 147:22	lag (7) 78:21 82:6,12 83:23 84:8,17 85:11	level (1) 124:25	look (25) 11:8 14:20 20:5 27:19 32:19 64:25 72:24 75:18 76:9,17 77:14 77:18,21 86:16 88:14 106:18 116:6 116:8,14 119:22 125:7 132:19 133:20,23 136:9
intervals (3) 31:23 33:4,17	kinds (2) 60:14 133:4	lagged (1) 30:4	levels (2) 33:5 64:1	
interview (4) 122:24 123:7,10 132:9	Kirby (2) 3:18 8:5	Lakewood (1) 3:5	liability (3) 1:4 7:8 150:1	
introduce (1) 7:24	know (90) 11:5 13:18 16:23 17:8 17:12,20,22 21:11 21:13 23:6 24:6,24 25:1,25 26:1,2	lapse (1) 89:4	lifetime (3) 47:16 68:22 69:2	
introduced (2) 51:10 131:4		large (7) 27:23 28:14 31:24 34:22 77:21 104:6 143:9	likelihood (3) 39:2 51:20 128:11	
introduction (3) 56:4,16 104:1		larger (1) 13:10	limited (3) 8:22,24 111:9	
investigates (1) 31:5		latency (9) 47:15,23 48:14 68:21	limiting (1) 107:23	
			Line (14) 6:2 150:6,7,9,10,12 150:13,15,16,18,19	

106:17,20,23 108:12 113:18 128:4 looks (3) 13:18 31:7 36:22 loop (1) 126:22 Los (2) 3:11 7:1 loss (1) 105:13 lot (9) 26:22,24 27:1,10 51:16 52:11 76:23 77:2 99:1 lots (2) 56:17 61:8 low (5) 41:9 45:22 48:2 139:5 140:19 lower (14) 55:11,19 86:13 106:21 135:3,8,16 136:2,13,14 137:23 138:9,9 140:11 lower-exposed (1) 65:2 lowest (2) 84:8 134:7 loyalty (1) 100:20 lung (4) 32:10 93:12,25 135:22 lymphocytic (3) 34:19,19 77:19 lymphohematopoie... 28:18 30:21 33:11,15 82:17 84:1,5,15 133:24 137:17 lymphoid (1) 28:1 lymphoma (64) 9:10 12:11 23:11 33:23,24 34:14,17 34:19,22 35:2,5,11 36:13 37:8 38:10,17 39:8 53:18 69:5,18 69:23 70:12,24 71:14 72:12 73:22 76:12,20 77:4,15,18 77:21 78:6,14 80:1 80:6,20 81:13 82:4 82:14 87:21 88:7 89:5,13 90:14 91:18 108:19 110:23	113:4 115:9 130:23 131:14 133:12,25 134:21 136:12 137:9 138:13 140:12 145:11,15 147:8,12,16 lymphomas (2) 33:12 77:23 <hr/> M <hr/> M.D (7) 1:16 2:10 4:3,20 5:9 148:11 150:3 M1 (2) 36:25 37:6 M2 (2) 36:24 37:9 major (4) 56:2 104:25 114:22 126:12 making (1) 71:18 malathion (12) 5:6 17:5,9,11,20 18:1 18:12 21:17,20 22:3 22:6,16 malignancies (1) 28:1 man (1) 26:23 marginal-zone (1) 35:2 mark (2) 72:23 122:3 marked (13) 4:9 10:7,14,21 18:23 19:2 27:22 73:1 93:8,10 103:2 122:6 124:9 marriage (1) 149:14 Marriott (2) 2:11 7:13 match (1) 61:22 matched (1) 103:24 materials (2) 5:2 10:15 math (1) 62:9 matter (7) 7:8 63:6,7 113:17 130:8 131:8 149:15 maximum (1) 52:13	MD (1) 8:13 MDL (1) 1:5 mean (11) 17:8 24:15 25:24 38:25 53:5 60:15 61:6 66:14 79:4 87:10,11 meaning (1) 56:13 meaningful (1) 73:15 means (8) 39:18,19 52:6 53:8,19 53:22,23 71:9 measure (2) 36:19 39:1 measured (2) 55:4 128:14 measuring (1) 73:25 media (1) 7:5 median (18) 47:16,17 48:18 68:22 68:23 69:2,13 70:24 72:13,18,19 73:13 75:10 88:5,8,18 145:25 146:1 medical (2) 140:3,9 medium-exposed (1) 65:3 melanoma (2) 32:10 135:23 Mental (1) 104:13 mentioned (5) 13:13 46:18 142:25 143:5 145:3 met (1) 9:5 method (14) 23:24 43:13,23 44:17 44:18 58:18 59:23 60:2 97:14 98:9,19 102:6 127:23 143:7 methodologic (2) 135:9 140:20 methodology (6) 14:5 24:4 25:1 27:4 98:25 128:10 methods (4) 13:11 42:5 43:14 116:20	metrics (2) 30:3 59:20 middle (7) 73:12 94:14 96:6 97:21 106:9,22,23 mind (1) 49:11 mine (1) 90:19 minimum (3) 75:11,16 78:1 minute (1) 60:1 minutes (2) 68:6 139:20 mischaracterizes (8) 79:9,13 89:24 119:15 124:8 125:18 129:8 136:8 misclassification (31) 46:10 55:11,15 92:25 93:2 108:24 113:25 114:4 124:14,16,25 125:4,11 126:11,16 126:25 127:8,16,21 128:2,3,12 136:18 141:12,17,23 144:12,19,23 145:1 146:21 misclassifications (1) 114:18 misrepresent (1) 14:4 missed (2) 47:3 49:6 missing (5) 53:17 104:5 105:10 105:12 110:12 mistakenly (1) 113:15 mistakes (1) 16:3 mix (1) 133:2 moieties (2) 35:14 36:3 moment (2) 31:21 35:18 MONDAY (2) 1:18 7:1 monograms (1) 19:4 monograph (13) 5:6 17:6,9,10,13 18:2 18:12 20:3 21:20 22:3,6,11,16	monographs (1) 22:11 Monrovia (3) 1:17 2:12 7:14 Monsanto (3) 3:15 8:6,8 Montgomery (10) 5:16 121:20,23 122:4 122:10,13,15 123:22,24 132:7 morning (3) 7:4 9:3,4 Moskowitz (5) 1:23 2:12 7:22 149:4 149:22 most-exposed (1) 81:7 move (1) 137:17 moving (1) 76:2 multiple (24) 13:20,23 20:16 22:9 23:17,23 24:2 28:19 30:7,20 32:2,8 35:8 65:1 94:16 95:16,17 100:23 104:3,7,24 105:16 108:3 136:4 myeloid (2) 82:4,22 myeloma (3) 28:19 30:7 35:8 <hr/> N <hr/> n (4) 3:1 4:1 29:12,12 N.W (1) 3:16 name (2) 7:17 150:1 named (1) 145:5 national (10) 10:1,17 11:22 15:4 25:12,16 26:6 104:6 104:12,25 nature (1) 125:12 NCI (32) 11:22 15:15 21:8 23:5 23:24 24:13 25:10 27:19 29:4 40:21,25 41:16 42:4 44:8 47:21 68:19 88:4,19 90:12,22 91:16 99:6 99:9 108:4 115:5
---	--	--	---	---

123:11,20 124:2 126:2 130:21 133:21 134:4 NCRA (4) 1:24 2:13 149:5,23 nearly (1) 143:15 Nebraska (1) 70:7 necessarily (2) 67:19 126:20 need (15) 11:1 51:25 73:23 79:1 79:14,20,20 85:10 110:12 111:16 112:17 143:17,20 143:24 144:2 needed (3) 52:16 143:12,18 needs (3) 48:22 69:4 70:11 negative (10) 13:17,23,25 32:17,23 33:15,23,25 124:19 124:21 negatives (1) 14:7 neoplasms (2) 84:5,15 never (6) 62:12 63:23 131:1 133:17 142:25 143:17 new (3) 7:20,20 25:3 NHANES (1) 104:11 NHL (11) 11:16,23 12:2 28:2,18 29:25 30:5,7 73:16 101:16 117:8 nights (1) 27:11 no-dose (1) 37:16 non- (1) 43:6 non-differential (18) 53:2,5,7,19,21 54:20 55:14 66:8,20 124:17 125:4 129:6 129:10 134:17 136:18 137:15,21 138:4 non-diseased (1) 64:14	non-exposed (1) 48:12 non-exposures (1) 113:16 non-Hodgkin (34) 34:8,14,17 35:11 38:9 38:17 53:18 69:5,18 69:23 70:12,23 71:14 72:12 73:22 76:20 77:14,18 78:13 80:6,20 81:13 89:5,12 90:14 91:18 108:19 110:23 113:4 115:9 134:21 136:12 137:9 147:8 non-Hodgkin's (23) 9:10 12:11 23:11 33:24 36:13 76:12 77:4 78:5 79:25 82:3,14 87:21 88:7 130:23 131:13 133:12,25 138:13 140:12 145:11,15 147:11,16 non-optimal (1) 48:12 non-participants (2) 122:23 132:8 non-respondents (2) 52:23 115:4 non-responders (2) 123:19 133:5 non-response (2) 43:6,7 non-significant (4) 33:2,6 55:12,13 non-statistically (1) 80:12 non-user (1) 50:4 non-whites (1) 132:23 nonsensical (2) 136:20 137:11 Northern (2) 1:2 7:10 Notary (1) 148:18 noted (1) 148:6 notice (5) 4:10,14 10:8,10 11:2 null (16) 33:17 39:15 54:13,21 54:25 55:6,16 66:24 67:2,7,16 124:18	134:19 136:24 137:5,7 number (30) 4:9,21 7:6,11 8:21 14:15 15:3 18:23 29:11 40:13,20 49:15 65:17,20 67:23 68:15 70:2,19 70:20 73:1 75:12 87:16,18,19 103:1 117:18,23 141:5 142:6 148:4 numbers (15) 10:19 61:14 62:11,20 64:13,22 65:15 67:11,24 68:1 80:23 80:25 93:7 122:5 136:11 <hr/> O <hr/> o'clock (2) 10:12,12 object (144) 12:13 13:12 14:19 15:16,23 16:12,19 17:2 18:3 22:25 23:20 24:9,16,21 25:19 28:7,24 29:19 30:9,15 31:1,16 32:4 33:19 34:24 35:21 36:15 37:17 38:12 39:21 41:19 43:25 45:3 46:2,16 48:16 49:3,7,24 50:24 51:6,22 53:6 53:20 54:8 55:21 56:20 57:12 58:3,12 59:5 60:11,19 61:18 62:18,21 63:12 64:8 65:10 66:16,25 67:8 67:17 70:4,14 71:1 72:7,15 74:6,12,22 76:4 77:5 78:15 79:8,12 80:14,22 81:9,15 82:21 83:4 83:19 84:2 85:24 86:15,23 87:1,13 88:9,21 89:7,23 90:16,25 91:22 92:3 92:11 94:2,5 95:11 97:5,11 100:15 101:1,12 102:15 103:10 104:15 106:13 108:6,13,21 110:25 111:18 112:12 113:20	114:8 115:10,20 116:2,12 117:10 118:19 123:2,12 124:7 125:6 126:8 126:18 127:2 128:6 128:19 129:7,23 130:7,24 131:16 132:17 134:10,24 137:2,22 138:6 objection (23) 9:14 18:17 36:10 93:24 98:13 99:12 101:25 105:3,19 107:18 109:5 113:6 114:12 119:14 120:22 121:6 125:17 127:17 133:13 136:7 140:15 145:6 147:1 objections (1) 18:15 obliterate (1) 54:22 obscure (1) 54:25 observed (2) 28:15 29:24 obtained (3) 44:25 48:5 49:16 obvious (2) 66:9 135:2 occurred (6) 45:12 50:2 113:25 114:19 127:22 128:2 occurs (1) 119:19 odds (7) 37:7,11 76:12 77:16 135:15 138:8 140:11 oh (3) 41:17 85:4 146:8 okay (57) 11:9 16:23 26:13 34:6 38:4,6 42:12,24 43:10,17 44:9,21 47:2,13 48:25 50:8 51:3 53:13 54:3 55:25 57:16 60:6 63:6 64:22 65:17,24 72:2 73:5 74:16 75:9 76:8 78:2 82:8 84:11 85:20 90:10 98:8 99:4,25 110:4 114:25 115:18	116:18,21 118:15 121:14 127:10 129:12,21 135:4 136:17,21 137:12 137:14 138:11 139:11 140:23 omitted (2) 117:3,6 omitting (1) 107:7 once (1) 114:10 ones (4) 36:5 49:8 105:1 119:25 opinion (3) 11:15 12:8 14:2 opinions (2) 9:8 141:11 opposed (1) 126:23 optimal (4) 47:7 61:5,9 62:17 optimum (1) 65:5 oral (4) 4:10,15 32:9 135:22 order (3) 8:21 70:13 131:7 original (12) 9:20,21 10:8,13 12:20 13:1,3,4,5 41:22 42:6 72:23 originally (1) 15:11 others' (1) 98:3 outcome (3) 31:7 55:3 149:15 outcomes (4) 23:11,16 31:8 71:17 outliers (1) 136:5 outline (1) 49:12 outlined (1) 49:9 overall (9) 28:1,17 30:1 33:14,24 81:13 82:17 84:1 114:23 overreport (1) 53:15 <hr/> P <hr/> P (6)
--	--	---	---	--

3:1,1 81:22 82:1,11 136:25	97:17 98:25 100:9	period (18) 45:17 48:20 59:21 71:21 73:22 75:7,8 76:15 80:20 96:6 97:21,22 111:25 113:12 118:10 124:12 142:18 147:12	134:12	prevents (1) 137:9
P-trend (11) 33:2 36:20 81:19,23 81:23 82:5,12,23 83:24 84:8,14	parties (1) 149:13	person (5) 53:13,14 60:2 69:4 70:11	pointing (2) 54:5 77:13	previous (2) 29:8 30:6
p.m (2) 148:3,6	parts (1) 119:21	personality (1) 60:15	points (1) 137:14	primary (1) 109:23
page (37) 4:2 6:2 11:13,14 19:24 20:5 21:14 28:12 29:2 43:12 47:4 52:19,25 61:7 66:10 73:4 94:14,23 95:4,5 104:2 107:5 109:13,18 150:6,7,9 150:10,12,13,15,16 150:18,19,21,22,24	Pass (1) 140:22	perspective (4) 27:24 28:14 29:7 102:13	pool (3) 9:19 23:7 126:3	principle (1) 61:13
pancreas (2) 32:10 135:22	passed (1) 102:13	pesticide (11) 28:15 44:25 45:15 48:5 49:15 73:21 93:1,3 142:6,13 146:22	pooled (1) 42:3	prior (5) 9:5 10:7 45:1 72:20 146:13
paper (23) 13:9 23:25 24:14 25:11 27:2,20 40:21 40:25 42:18 44:16 76:10 91:5,7 95:23 99:9 103:8 121:20 121:21,23 123:5 126:3 139:4 140:21	pathologist (2) 70:3,6	pesticides (10) 17:22,24 20:12 30:5 92:18 95:25 98:2,6 133:2,3	poor (2) 92:21 132:24	probably (25) 25:14,21 42:14,15 45:13 48:22 51:12 51:16 57:10,13 71:2 71:4,13 74:5,18 75:4,11,24 76:8 79:19,20 99:22 128:14 138:25 139:16
papers (8) 24:3 91:10 95:21,23 95:24 98:3 102:22 121:24	pathology (1) 143:8	phase (4) 107:8 119:24 120:7 120:10	Portier's (2) 90:4,9	problem (8) 52:1 105:11,24 120:2 124:15 126:12 127:15 129:13
paragraph (18) 11:14 28:11 29:4,23 41:7 43:12 44:23 45:7,9 47:4 73:7,10 73:13 94:15,25 104:3 109:22,22	patients (3) 62:4 78:20 79:7	phone (1) 37:25	positive (5) 13:21,24 54:22 124:22 137:19	problematic (2) 97:18 124:2
parameters (1) 107:12	pattern (4) 31:22 34:8 135:21,21	PI (1) 70:7	positives (1) 14:6	problems (2) 41:7 123:15
parenthetical (1) 39:13	Pedram (2) 3:12 8:3	pick (1) 27:15	possible (10) 23:10,15 78:19 107:10 144:4 145:14,16,18 147:7 147:10	procedure (21) 21:12 24:8 51:4,18 90:23 91:4 94:17 95:1,5,19 99:8 102:14 103:9,17 108:5 112:8,23 115:2,2 117:3,7
part (6) 17:24 27:22 34:4 114:1 125:21 127:23	peer (9) 25:15,20,25 26:1,5,15 95:19 99:5 102:10	piece (2) 115:18,24	possibly (1) 136:4	procedures (1) 17:1
participants (4) 111:8,10 122:23 132:8	peer-reviewed (4) 24:3 95:22 144:10 145:4	pieces (1) 51:3	potential (2) 124:18 144:18	process (4) 133:7 143:11,24 144:2
participate (1) 100:21	pending (2) 82:19 85:18	plaintiffs (6) 3:3,9 4:24 5:11 8:2,4	potentially (1) 105:14	produce (1) 77:3
participation (2) 96:11,15	people (48) 16:3 42:15 44:20 51:10,19 52:5 60:14 61:8 63:21 64:14 65:18 71:9 86:2 88:8 98:17,18 103:14,18 110:9 111:23 112:5,10,25 119:20,23 120:4,5,6 120:9,17,18 121:15 121:16,24 122:1,16 122:17 123:6 129:15 130:11 131:9,19 132:2,4,5 134:5,6 143:10	plant (1) 57:20	preferable (3) 107:7,17,23	product (1) 59:1
particular (4) 31:6,7 38:18 54:24	perceive (1) 44:7	plausible (1) 96:3	prepare (1) 143:11	Products (3) 1:4 7:8 150:1
particularly (3)	percent (30) 41:10,14,23 42:9 44:15,20 61:9,9 62:15,15,15,16,16 77:17,17,20,22 107:9 110:18 112:3 112:20,21 115:3 118:4,14 131:19 135:7 141:18,21 142:2	please (8) 7:24 8:10 11:13 12:17 13:7 20:19 22:21 106:4	present (2) 3:21 20:13	professional (1) 60:16
	perform (1) 41:17	point (19) 31:22 38:1 39:7,8 40:2 47:5 55:17,18 60:1 76:14 77:1 81:7 119:6,7 126:22 128:18 130:4 135:25 136:1	presumably (1) 113:24	Progress (1) 104:12
		pointed (1)	pretending (1) 103:15	project (1) 58:24
			pretty (6) 18:7 51:15 58:7,8 96:2 128:7	proof (1) 11:23
			Prevention (1) 26:17	propensity (1) 131:12

proper (1) 27:6	quartile (2) 65:4 110:18	ran (1) 70:6	37:22 57:17 124:20	142:4
properly (2) 52:17 88:15	quartiles (5) 35:20,23 81:1 134:7 134:15	random (4) 53:10 103:14 135:13 138:23	135:2 137:7 139:3 140:6 150:6,7,9,10 150:12,13,15,16,18 150:19,21,22,24	regression (1) 94:16
prospective (2) 146:10,14	question (27) 13:16 22:1 25:6,24 44:2,3 52:1,12 53:10 58:16 64:3,4 64:6 69:7 84:7 85:17 88:15,24 99:16 104:18 117:14 133:6 139:23 141:22 142:11 146:8,9	randomnesses (1) 54:4	reasonable (3) 38:11 140:2,8	related (2) 5:3 149:12
prostate (7) 32:10 93:17 94:6 95:3 95:10 101:10 135:23	questionable (3) 13:25 102:8 130:16	range (1) 106:9	recall (11) 15:14,20 16:2,4,4,15 16:16 17:3 73:20 74:11,16	relates (1) 1:6
protective (2) 135:17 138:12	questioning (1) 8:25	ranging (1) 69:13	recap (1) 47:24	relative (12) 30:24 31:9,22 33:3,16 55:5,9 106:10 134:12,14,20 136:25
provides (1) 25:2	questionnaire (42) 41:12,15,18 42:9,11 42:12,16 45:11,14 45:20 51:19 52:9 97:23 110:6,10,11 111:9,12,24 112:4,6 112:11 115:4 118:6 119:22,24 120:5,8 120:10,18,19 121:5 121:16,25 122:2,17 123:9,19 131:11,23 132:21 141:19	rarely (1) 59:2	received (1) 10:16	relatively (7) 43:6 48:2,10 57:23 59:2 71:8 97:20
PTO (1) 4:21	questions (7) 43:9 96:12,16 111:11 129:16 142:3 146:16	rate (8) 41:5 43:7,7 44:11 45:22 48:2 90:23 110:17	recently-published ... 11:18	reliability (2) 14:10,14
Public (1) 148:18	questionnaires (7) 43:9 96:12,16 111:11 129:16 142:3 146:16	rates (1) 41:8	Recess (4) 40:10 68:12 117:20 141:2	reliable (2) 24:14 118:17
publication (21) 5:4 8:23 9:13,25 18:8 18:8,10 19:6,16 21:1,2 25:12,18 29:6 48:23 102:22 141:13 144:13 145:2 146:9,24	questions (23) 6:1 21:16 22:15 52:10 52:15 64:11 74:7 82:19 94:10 95:12 101:14,19 102:2 136:17 141:11,14 142:2,4,8 144:7 145:9,12 147:25	ratio (4) 36:25 37:7,11 110:17	recommend (1) 129:18	relied (2) 89:22 108:10
publications (9) 22:9 23:7,17,23 95:17 95:18 143:2 144:11 145:4	quick (1) 11:8	ratios (9) 76:12 77:16 78:1 124:23 135:3,15 138:8 139:12 140:12	recommended (1) 25:11	rely (3) 11:21 86:12 115:7
publish (1) 131:1	quickly (1) 18:7	raw (1) 125:24	record (13) 8:19 19:11 40:9,14 68:11,16 117:19,24 141:1,6 148:3 149:10 150:4	relying (4) 78:6,12,16 120:17
published (14) 9:25 12:4 18:9,11 21:1 90:13 91:3,5 91:10,20 93:11,13 93:16 130:19	quite (4) 10:16 58:18 92:17 145:17	reach (1) 14:11	record (13) 8:19 19:11 40:9,14 68:11,16 117:19,24 141:1,6 148:3 149:10 150:4	remain (1) 143:14
purpose (2) 118:15 147:18	quizzes (1) 18:7	reached (1) 119:11	rectum (2) 32:9 135:22	remember (17) 26:7,9,11 51:14 61:6 74:13,23 86:18,25 87:15,25 88:1 89:15 141:13 142:8 143:2 145:12
purposes (1) 146:5	quizzes (1) 18:7	read (18) 22:20 27:2,3 28:3,20 29:14 30:8 71:19 90:4,8 94:1,3,19 99:15 101:16,18,18 102:1	Reducing (1) 66:22	repeat (4) 21:25 22:1 29:24 44:1
pursuant (2) 4:21 8:21	quizzes (1) 18:7	reading (3) 44:22 84:14 132:13	reference (3) 68:21 76:25 144:15	report (31) 4:18 5:7 9:21 10:14 11:11 13:5 15:6 18:5 19:15 40:18 43:5 45:8 49:9,12 51:11 69:21,22 72:22,23 78:23 83:5 91:8 94:2,4,8 103:5 110:5,19 139:22 144:15 147:24
put (1) 93:23	quizzes (1) 18:7	Ready (2) 56:14,17	refer (1) 17:9	reported (5) 1:22 49:22 51:12 110:16 142:6
<hr/> Q <hr/>	quizzes (1) 18:7	real (7) 11:8 39:5 96:16 103:20 119:18 124:18 144:3	refers (1) 16:2	reporter (4) 7:21 8:10 78:10 149:6
Q1 (1) 134:7	quizzes (1) 18:7	really (19) 12:25 14:1 25:5 37:12 46:19 48:20 51:25 52:16 57:14 58:20 59:14 62:25 71:21 78:25 88:25 104:19 131:17,20 135:16	reflect (1) 41:15	Reporting (2) 7:19,23
Q4 (1) 134:7	quizzes (1) 18:7	Realtime (4) 1:24 2:14 149:5,23	reflects (1) 46:19	represent (1) 140:4
qualifications (1) 60:16	<hr/> R <hr/>	reason (20)	regard (12) 21:10 40:3 51:15 100:9 124:4,6 126:16 129:5 142:2 142:10 145:19 146:20	representative (1) 139:17
qualified (3) 60:10,17 143:11	R (2) 3:1 149:1		regards (1)	
quality (3) 22:12 52:6 104:11	raised (2) 41:7 126:10			

reputable (1) 12:4	20:2 25:25 26:5,15 27:1,6,8,15 95:20 116:19	123:5,20,23	second (38) 10:10 11:13 34:4 41:6 42:16 44:23 45:7,21 45:24 48:6 49:22 50:5,17 59:13 66:11 103:15 110:11 111:5,12,21 112:10 112:21 115:4 118:5 119:24 120:7,10,17 120:19 121:15,25 122:2,17 123:19 131:10,23 141:18 141:22	sentences (2) 107:6 109:23
required (2) 78:18 145:23	reviewed (10) 20:1 21:3,20,21 22:3 22:5 25:10 91:8 98:18 99:21	risk (22) 28:14,17 29:9 36:25 55:5,9,11 75:14 76:16 77:25 79:7,23 80:12 87:3,7,20 124:22 134:12 135:3,4,5 139:12	secret (1) 25:25	separate (1) 115:6
research (1) 27:17	reviewers (5) 25:16,21 26:1 99:5 102:10	risks (14) 23:15 30:24 31:9,22 33:3,16 77:8 78:19 78:22 79:25 80:9 134:14,20 136:25	section (7) 20:9 21:21 22:6 28:10 28:11 107:4 132:13	series (3) 141:10 142:1,4
respected (1) 105:1	reviews (4) 26:16,18,20,25	role (1) 11:16	secular (1) 48:7	set (3) 119:10 149:9,16
respective (1) 134:14	right (144) 9:6,22 10:3 11:23 14:20 15:6,15 16:11 16:18,21 20:3 21:24 22:13 23:8,12,18 24:4,8 26:10 28:6 28:20,23 29:14 30:25 31:15 34:10 35:15,16,20 36:3 37:4,6 38:22,23 39:10,20 40:16 41:16 42:1,7 43:13 43:14 44:5 45:2 46:4,11,12 49:1,14 50:23 53:4 54:7,17 55:2,7,19 56:5,10 56:14,19 57:11,19 58:2 59:4 61:11,16 62:17,23 64:5 67:4 72:5,6,14,20 73:17 78:14 80:8 81:8,14 81:19 82:2,10,17 83:14 84:9 85:12,13 86:22 87:4,21 91:8 91:21 92:2 96:5 97:21,22 102:14 103:18,22,23 104:8 107:3 108:5,10,12 109:4 110:3,13,14 111:14,17 112:11 112:24 113:19 114:3,5,6,7,11,15 118:18 119:13 121:5,9,12 122:18 122:19 123:1,7,8,11 123:21 124:10 125:16 126:7 127:1 129:22 132:11 135:5,18 137:21 138:5 143:25 144:3	rooms (1) 37:25	see (38) 20:7,9 31:13,24 37:6 39:11,14 40:25 45:4 46:7 47:2 73:12 75:5,12,17,19 76:11 76:16,17 77:15,22 77:25 78:18 81:2,4 94:15,25 95:4 103:24 107:14 110:2 114:20 118:22 119:10 128:10 135:24 137:16 139:10	severe (1) 146:24
respond (15) 41:24 44:20 46:24 103:14,16 119:23 119:25 121:17 122:18 123:7 130:12 131:10,19 131:23 132:21	rights (1) 9:6,22 10:3 11:23 14:20 15:6,15 16:11 16:18,21 20:3 21:24 22:13 23:8,12,18 24:4,8 26:10 28:6 28:20,23 29:14 30:25 31:15 34:10 35:15,16,20 36:3 37:4,6 38:22,23 39:10,20 40:16 41:16 42:1,7 43:13 43:14 44:5 45:2 46:4,11,12 49:1,14 50:23 53:4 54:7,17 55:2,7,19 56:5,10 56:14,19 57:11,19 58:2 59:4 61:11,16 62:17,23 64:5 67:4 72:5,6,14,20 73:17 78:14 80:8 81:8,14 81:19 82:2,10,17 83:14 84:9 85:12,13 86:22 87:4,21 91:8 91:21 92:2 96:5 97:21,22 102:14 103:18,22,23 104:8 107:3 108:5,10,12 109:4 110:3,13,14 111:14,17 112:11 112:24 113:19 114:3,5,6,7,11,15 118:18 119:13 121:5,9,12 122:18 122:19 123:1,7,8,11 123:21 124:10 125:16 126:7 127:1 129:22 132:11 135:5,18 137:21 138:5 143:25 144:3	Roos (15) 12:20 13:1,3,9 15:12 22:8 29:6,17 40:23 42:18,18 73:7 75:23 139:3,4	seeing (1) 103:16	Shimada (4) 3:19 8:7,7 122:10
responded (5) 42:10,16 121:15 122:16 129:16	rotations (1) 57:21	rotate (1) 57:21	short (21) 48:13 52:2 68:24 70:25 71:3,4,4,8,13 71:23 73:15 74:4,17 88:6,18 89:19,20 97:20 145:16 147:12,21	shorter (1) 51:19
respondents (3) 52:21,24 106:11	Roundup (9) 1:4 7:8 11:23 12:1,10 56:14,17 145:12 150:1	row (2) 80:7,7	show (9) 18:1 34:8 37:2 67:21 68:2 74:9 76:20 78:4 79:22	Shorthand (1) 149:6
responders (2) 44:24 133:5	RPR (4) 1:23 2:13 149:4,22	RPR (4) 1:23 2:13 149:4,22	showing (1) 76:5	shown (1) 17:5
responding (1) 51:21	rest (1) 54:15	rest (1) 54:15	shows (6) 37:16 80:13 85:10,12 85:14 123:14	showing (1) 76:5
response (15) 37:16 41:5,8 43:15 44:11,14 45:22 48:2 65:1,7 80:19 81:3,4 81:20 123:8	restricted (2) 110:5 121:4	restricted (2) 110:5 121:4	showed (2) 9:17 121:24	shown (1) 17:5
responds (3) 44:19 103:18,21	result (7) 54:20 67:13,24 92:24 108:18 109:1 147:17	result (7) 54:20 67:13,24 92:24 108:18 109:1 147:17	showing (1) 76:5	shows (6) 37:16 80:13 85:10,12 85:14 123:14
rest (1) 54:15	resulted (3) 46:10 87:20 124:13	resulted (3) 46:10 87:20 124:13	showing (1) 76:5	shown (1) 17:5
restricted (2) 110:5 121:4	resulting (1) 114:11	resulting (1) 114:11	shows (6) 37:16 80:13 85:10,12 85:14 123:14	shown (1) 17:5
result (7) 54:20 67:13,24 92:24 108:18 109:1 147:17	results (10) 12:23 54:12,13 78:25 119:3,11,12,18 134:19 137:16	results (10) 12:23 54:12,13 78:25 119:3,11,12,18 134:19 137:16	significance (2) 67:22 68:3	shown (1) 17:5
resulted (3) 46:10 87:20 124:13	retrospective (2) 146:10,12	retrospective (2) 146:10,12	significant (42) 12:5 13:14 25:4 31:11 36:7,17 37:1,4 38:22,25 39:4,12,18 46:10 55:10,12 64:19 67:13,20,25 71:23 75:12,13 77:9 77:24 79:23 80:4,10 80:12 82:24 113:2 122:25 124:13 125:10 127:7 128:11 132:10 136:3,13 137:19 144:18,25	shown (1) 17:5
resulting (1) 114:11	returned (1) 41:11	returned (1) 41:11	significantly (3) 75:20 78:22 87:6	similar (4) 119:10,12,18 120:18
reverse (1) 50:10	reverse (1) 50:10	reverse (1) 50:10	sentences (2) 107:6 109:23	
review (10)	Rinsky (6) 5:17 121:22 122:3	Rinsky (6) 5:17 121:22 122:3	sentence (5) 11:15 53:4 54:16 66:7 105:9	
		S		
		S (2) 3:1 4:8		
		sample (1) 103:14		
		saying (6) 38:2 70:22 71:13 74:16 79:19 107:22		
		says (4) 20:9 104:2 107:5 132:7		
		scenario (1) 57:23		
		scenarios (1) 57:22		
		scientific (1) 99:8		
		scientifically (4) 83:16 98:9 99:9,24		
		scope (3) 18:4 29:5 83:5		
		score (1) 106:25		

Similarly (1) 94:22	solid (3) 27:25 30:20 33:8	137:1,4,5	98:19 100:14,17,19	subset (3) 42:21 107:11,13
Simultaneous (1) 78:9	somebody (4) 39:17 57:24 59:11	started (6) 49:18 50:8 59:15,16	101:14,24 102:5	substance (8) 31:14 32:1 70:12,16
simultaneously (1) 17:14	69:23	59:17,19	104:6,7,11,17,20,25	70:19 77:3 98:10
sir (63) 10:23 11:12 12:16	somewhat (4) 63:16 64:18 136:1,2	starting (2) 10:7 101:4	105:11 124:21,22	135:24
14:5 16:23 17:6,21	sophisticated (4) 12:23 13:11 60:22	starts (1) 109:22	126:4,7,10,19 128:8	substances (8) 12:2,10 17:15,18
19:2 20:2 21:6,14	92:1	state (2) 19:25 149:2	128:9 130:3 143:13	20:16 23:14 71:16
21:19 22:2 23:6	sophistication (1) 14:17	stated (2) 21:3 102:17	143:14,19 144:17	99:10
24:15 26:15 27:20	sorry (7) 21:25 24:20 79:18	statement (12) 8:19 18:17 24:18 61:7	146:25 147:13	subtypes (7) 28:2 30:1 33:22 34:14
28:12 29:2,23 30:18	85:6 87:23 117:13	71:19 72:3,4 90:19	study (147) 5:5,12,13,14,15,16,17	76:13 78:5,14
31:5,21 32:21 37:4	122:11	96:18,24 105:7	8:23 9:12 10:18	suggest (1) 83:7
38:25 41:5 46:4	sort (3) 63:24 76:13 137:10	142:5	11:22 12:4,6,20	suggesting (2) 140:10,13
52:25 61:6 73:4,19	sorts (2) 126:4,5	statements (4) 18:20,22 19:14	13:1,3,15,16,21,22	suggests (3) 55:18 78:17 79:24
74:11 75:22 77:12	source (1) 140:7	101:21	13:25 14:10,15 15:5	summarizes (1) 20:10
78:3 84:13 85:23	span (1) 39:14	STATES (1) 1:1	15:10,15 16:6,25	supplemental (26) 4:18 5:2 10:6,14
86:10 88:3 90:5	spans (1) 39:14	statistical (5) 62:11 68:2 105:12,14	21:23 22:19,24 25:7	11:11 15:5 18:5
93:10,18 94:13,22	speak (2) 99:4 123:20	112:8	25:9,22,24 27:24	19:15 40:18 41:11
95:3 99:6 100:12	speaking (5) 16:18 18:15,20 25:8	statistically (17) 31:11 37:4 38:21,24	28:6,14,23 29:4,5,7	41:18 42:8,20 43:5
104:1 105:10 106:8	31:4	39:3,12,17 67:21,25	29:17,17 31:5,25	43:8,19 45:8 83:25
106:24 107:5,14	speaks (1) 76:14	75:19 77:24 80:3,10	42:3,4,5 48:13,21	84:16,18,22 85:7,11
112:20 122:9 123:5	special (1) 130:15	81:23 82:24 113:2	52:5 54:11 61:21,21	94:2,4,8
125:14 126:2	specialist (2) 7:18 69:22	137:18	61:24 62:1 63:2	supplementary (1) 84:24
133:20 135:20	specific (5) 30:20 31:20 72:10,11	stepped (1) 64:6	66:22 67:5 68:1,20	support (4) 4:22 5:9 78:7 83:8
139:19 147:7	74:19	64:6	68:23 69:16 70:3	supporting (1) 126:4
sit (2) 60:2 101:17	specifically (4) 23:5 25:8 53:9 74:14	stopped (4) 57:25 58:1 113:14,23	71:15 73:7,14 75:18	suppose (2) 59:9 98:22
situation (3) 69:12 97:18 147:22	speculate (1) 58:5	straddle (1) 33:17	76:1 77:2 79:1,22	supposed (1) 139:20
situations (1) 96:3	speculation (3) 58:13 140:14,16	straddling (1) 31:12	87:19,24 88:4,6,17	sure (8) 11:5 41:17 57:22
six (3) 37:9 69:14 142:20	stable (1) 96:2	Street (1) 3:16	88:19,24 89:3,10	65:14 71:21 92:12
size (1) 14:15	standalone (1) 130:20	strong (1) 70:17	90:12,13,22 91:16	97:12 116:11
skill (1) 106:25	standard (1) 100:24	studied (1) 98:3	92:6,23 93:11,13,14	surprising (3) 108:25 114:16 119:2
skip (1) 107:3	stands (1) 101:25	studies (63) 13:20,24 14:15,21,23	93:15,16,18 94:13	surrounding (1) 102:24
slightly (3) 35:25 53:13,15	start (7) 7:5 27:21 47:25 49:14	15:21,22 16:10	94:17,23 95:3 96:10	survey (16) 22:8 42:6 43:16,20
small (11) 34:19 35:12 37:10,19		20:11 42:14 52:2	96:13 100:8,9,18	45:2 46:1 48:6
38:10 67:23 71:24		69:8,18,19 70:2,7,8	101:9,10,11 102:7	49:19,23 50:3,5,16
80:24,24 122:25		71:5,16,19 72:5	103:4 104:8,14	50:17 59:11,13
132:9		80:17 86:7,12,17,19	106:8 107:5,23	103:15
smaller (2) 67:24 134:22		88:10,14 89:1,15,16	108:4 109:15	surveys (3) 41:9,21 104:6
smallest (3) 35:12 82:12 83:24		89:22 97:14 98:18	118:17 124:2,15,19	suspect (2)
smoked (1) 132:24			125:8,12,22 126:13	
sole (1) 71:12			127:6,9,10 128:4,9	
			128:15,24 129:5,18	
			130:4,20,21 134:18	
			135:10 139:15	
			142:22 144:6,20,21	
			144:24 145:22	
			146:6,10,10	
			study's (1) 97:3	
			sub-groups (2) 62:25 64:17	
			subject (1) 130:22	
			Subscribed (1) 148:14	
			subsequent (1) 22:9	

70:12 112:14 swear (1) 8:11 switch (2) 117:4,15 switched (2) 57:18,18 sworn (3) 8:15 148:14 149:9 Systems (4) 1:24 2:14 149:5,23	118:9 145:25 talks (4) 93:25 94:5,6 144:16 tape (1) 106:6 tapes (1) 117:15 technique (2) 100:24 105:16 tell (9) 41:3 47:3 49:17 53:4 56:2,7 62:12 77:12 112:18 telling (2) 36:24 37:11 tells (2) 135:8 136:15 ten (13) 52:13 68:7,9 74:3 75:4,15,20,24 78:20 85:12 86:22 87:5,10 tend (6) 54:6,23,24 66:23 67:6 67:15 tends (1) 16:9 term (1) 129:3 terms (4) 13:17 16:21 48:14 65:5 tertile (1) 39:9 tertiles (3) 35:22 36:1 81:1 test (6) 108:4 109:24 111:13 113:11 114:6 118:16 tested (2) 103:9,13 testicular (2) 32:11 147:18 testified (2) 8:16 135:20 testifying (1) 140:2 testimony (14) 74:25 75:2 79:13 83:13 89:25 97:10 124:8 125:18 129:8 136:8 139:21 140:8 143:3 149:11 tests (6) 108:3,9 117:2 118:16 119:9 130:18	text (1) 42:4 Thank (4) 8:9 32:15 40:7 148:1 thing (5) 46:13 56:1 72:10,11 139:10 things (5) 27:15,16 46:24 56:23 81:18 think (22) 10:24 13:15 25:4,20 37:25 43:3 47:12,14 57:22 62:25 63:1 65:15 69:6 73:23 74:8 75:4 85:3 87:16 124:9 128:7 129:9 130:12 third (11) 7:20 46:7,17 80:7 113:11 115:15 117:1 118:8 123:7,9 123:10 thought (3) 116:8 129:24 130:2 three (17) 19:5 21:2 35:14 48:6 52:14 64:16,21 101:4,14 107:6 108:16 109:23 115:5 118:16 119:9 130:18 145:5 three-to-one (1) 61:22 threefold (1) 77:23 ticking (1) 138:3 tie (2) 18:7 19:14 tied (1) 46:25 tightly (1) 136:3 time (40) 9:5 10:10 12:22 13:10 16:16 17:17 18:9,11 27:11 40:14 43:20 45:17 47:17,19 52:8 52:11 68:15,24 69:15 72:18 73:14 73:15,23 76:20 89:4 94:18 96:2,8 97:21 102:20 106:3 109:11 114:19 115:12 117:24	124:11 141:5 146:12 147:12 148:6 times (7) 29:11 101:4 115:12 117:11 123:25 146:1,1 titled (1) 68:20 today (8) 7:21 10:3 24:6 75:1 89:17 129:4 144:13 145:3 today's (1) 148:5 told (4) 40:19 56:1 57:7,8 top (3) 26:11 88:12 89:16 total (1) 28:17 totally (1) 66:9 toxic (1) 147:20 train (1) 120:14 training (1) 60:16 traits (1) 60:15 transcription (1) 150:5 tremendous (1) 131:2 trend (1) 36:22 trends (4) 48:7 81:22 82:1,11 tried (1) 44:16 true (28) 15:24 32:23 38:14 40:5 46:6 50:10 51:23 54:9,11,22 55:8,18 56:22 57:13 63:8 65:8 67:1,13 81:3,11,14 87:7 109:9 125:5 130:25 134:19 135:1 149:10 truly (1) 137:5 truncated (2) 113:12 118:9 try (3)	44:18 52:4 146:17 trying (6) 44:5,10 47:24 60:24 120:8,11 TSG (2) 7:18,22 tumors (2) 28:1 33:8 Turn (3) 19:2,24 21:14 Turner (2) 3:22 7:17 twice (1) 99:13 two (18) 35:17 37:15 41:21 42:2 48:4 61:14,15 64:9,10 74:19 82:18 103:24 117:1,2 119:21 122:19 145:15 147:8 two- (1) 61:22 two-and-a-half (1) 8:24 types (1) 118:21 typical (1) 69:8
T				U
T (3) 4:8 149:1,1 T-cell (6) 35:11 36:13 37:8 38:10,18 77:22 table (35) 30:18,18,19 32:13 34:1,2,3,5 37:23,24 38:3,5 76:9,17 77:12 79:24 82:2,11 82:15,16 83:25 84:4 84:16,18,20,22 85:6 85:8,12,15 106:24 133:20,22 134:1,4 tables (1) 84:25 take (15) 4:10,14 20:5 25:5,6 27:5,19 37:24 40:6 64:15 79:5 94:18 133:20 137:15 140:23 take-home (1) 42:10 taken (6) 8:20 40:10 52:8 68:12 117:20 141:2 takes (5) 76:19,23 77:2 114:3 145:10 talk (8) 23:5 31:19 33:10 41:1 59:25 69:1 109:11 119:5 talked (3) 32:7 95:15 112:1 talking (22) 10:2 16:17 18:10 19:9 19:16 38:17,18 39:20 56:13 62:9 66:18 69:17,19 73:6 77:11 82:7 84:3 85:7 95:7 107:19			U.S (1) 7:9 Uh-huh (1) 138:17 ultimate (1) 86:5 unclear (1) 116:15 undercounted (1) 49:23 underlying (1) 114:17 underreport (1) 53:14 understand (8) 16:17 27:4 44:2 127:5 135:2,10,14 136:16 understanding (1) 125:11 understands (1) 60:23 understood (1) 102:23 unexposed (7) 47:8 61:10 62:6,14	

63:10 64:1 134:6 unfair (1) 76:5 unique (3) 96:18,24 97:1 uniquely (1) 124:1 UNITED (1) 1:1 unlagged (1) 30:4 unpublished (1) 9:18 unsuccessful (1) 45:24 update (2) 11:18 146:17 updated (1) 28:13 usage (1) 47:6 use (63) 28:13,16 29:9,25 35:13 44:25 45:15 46:9 47:16 48:5,7 49:15,19,20,22 56:3 56:25 57:10 58:10 58:19,23,24 59:3,3 59:20,22 60:5 62:12 68:4,22 69:2 77:1 78:1 92:23,25 94:3 96:1,4,5 97:18 98:5 98:20 102:25 111:16,25 118:3,12 121:11 124:10 125:3 129:3,20 130:10 133:2 139:1 143:6,18,24 144:2,3 145:11 146:22 147:15 user (2) 50:6,11 users (1) 58:10 usually (2) 26:8 27:18	values (5) 32:25 33:1 36:6 67:4 136:25 variance (2) 66:24 67:1 variety (1) 50:1 various (5) 34:14 53:1 54:18 66:7 80:25 version (1) 9:5 versions (1) 56:13 versus (3) 62:5 65:19 139:7 video (3) 1:15 2:9 7:18 video-recorded (1) 7:6 VIDEOGRAPHER... 3:22 7:4 8:9 40:8,12 68:10,14 106:5 117:4,17,22 140:25 141:4 148:2 videotaped (2) 4:11,15 view (6) 22:7 69:3 70:10 98:8 116:1 136:23 volume (1) 20:13	50:15 52:3 58:20 63:17 92:14 99:17 105:17,23 111:6 128:8,15 131:2,11 149:14 ways (1) 108:11 we'll (10) 19:19 31:19 41:1 42:24 50:21 59:25 78:21 117:16 119:7 140:23 we're (10) 10:2 18:10 19:10,16 20:21 37:23 38:5 39:6 66:17 117:18 We've (1) 19:20 weak (1) 70:17 weaken (2) 12:9,18 weaknesses (1) 40:21 weekends (1) 27:11 weigh (2) 14:7,24 weighing (1) 14:14 weight (10) 11:25 12:3,7,16,25 13:2,2,8 15:11 40:22 weighted (2) 91:19 92:1 Weisenburger (13) 1:16 2:10 4:3,13,17 4:20 5:8 7:7 8:13 9:3 40:16 148:11 150:3 welcome (1) 106:18 went (1) 95:19 weren't (4) 49:5 57:10 59:12 133:1 West (3) 2:11 3:4 7:13 WHEREOF (1) 149:16 widely (5) 56:10 58:25,25 104:4 104:25 willingness (1)	100:21 Wilshire (1) 3:10 window (1) 59:16 withdraw (1) 147:2 withdrawing (1) 103:13 witness (166) 4:2 8:11,14 9:15 11:6 12:14 13:13 14:20 15:17,24 16:13,20 17:3 23:1 24:10,17 25:20 28:8,25 29:20 30:10,16 31:2,17 32:5 33:20 34:4,7 34:25 35:22 36:16 37:18 38:13 39:23 44:1 45:4 46:17 48:17 49:8,25 50:25 51:7,23 53:7,21 54:9 55:22 56:21 57:13 58:4 59:8 60:12,20 61:19 62:22 63:14 64:9 65:13 66:4,17 67:1 67:19 70:5,15 71:2 72:16 74:13,23 76:7 77:6 78:16 79:14,18 80:15,23 81:10,16 82:22 83:6,20 84:3 84:21 85:5,25 86:18 87:2,14 88:12,23 89:8,10 90:1,17 91:1,23 92:4,12 94:20 95:13 96:22 97:12 98:14 99:18 100:7,16 101:2,5,6 102:3,21 103:11 104:19 105:6,22 107:21 108:7,14,22 109:8,18 111:3 112:13 113:9,21 114:15 115:13,15 115:21 116:5,14 117:13 118:1,20 119:17 120:23 121:9 122:11 123:3 123:13 124:9 125:7 125:21 126:9,19 127:5,18 128:7,22 129:9,24 130:8,25 131:17 132:18 133:16 134:25 136:9 137:3,23	138:7 140:16,22 145:7 149:8,11,16 words (2) 71:7 110:6 work (7) 17:25 26:22,24 27:1 27:10 97:9,13 workers (1) 69:9 working (3) 17:14,14 22:18 works (3) 85:15 97:8,12 worse (3) 123:8 130:5,9 wouldn't (15) 16:17 50:7,13 52:11 54:23 59:14,17,18 59:19 80:11 83:16 113:17,17 114:20 137:15 write (3) 27:7 29:7 46:13 wrong (5) 41:3 47:15 62:7 124:6 137:20 wrote (1) 28:12
			X	
			X (2) 4:1,8	
			Y	
			yeah (14) 11:7 42:20 44:14 45:10 47:22 55:8 84:7,19 95:9 107:21 109:16 113:21 138:2 143:13 year (24) 45:1,16,18,18,25 48:6 49:16,21 51:11,14 52:15 55:25 56:19 56:19 57:9,20,25 58:25,25 59:1,1,18 142:7 146:22 years (68) 19:5 21:2 29:10 45:13 47:16,17,18 48:19 50:16 52:10,12 68:22,24 69:1,2,11 69:13,14,14 70:24 71:10,13 72:13,18 73:14 74:3 75:4,9 75:10,16,21,23,24	
V valid (3) 99:24 100:1 138:22 validating (1) 126:5 validity (3) 13:16 14:14 25:7 value (5) 14:8 39:15 136:1,2,19	W WAGSTAFF (1) 3:2 wait (13) 63:12 64:2,2 79:16 85:4 96:20,20 100:6 115:10 136:7 139:24,24,24 want (24) 8:18 11:4 14:4 19:14 40:23 53:3 62:22 63:2 64:12 68:4 71:20 75:8 82:20 85:25 86:1,16 94:19 97:16 101:18,20 102:1 116:22 144:3 145:21 Washington (1) 3:17 wasn't (2) 37:9 118:23 way (18) 25:23 33:3 43:10 50:9			

75:25 76:1,7,10,24 76:24 77:1,2 78:2 78:20 79:4,6 80:4,5 80:5,5 85:21 86:3,8 86:10,13 87:12,17 88:1,5,19,20 89:6 89:19,20 142:10,17 142:20 145:15 147:9	68:13,15 103 (1) 5:15 10816 (3) 1:23 2:13 149:22 11 (1) 103:4 11:06 (2) 117:19,20 11:16 (2) 117:21,25 11:41 (2) 141:1,2 11:55 (2) 141:3,6 12 (6) 45:13 52:13 77:17 122:9,13 142:20 12:03 (2) 148:3,6 12100 (1) 3:10 122 (2) 5:16,17 13 (1) 123:5 1350 (1) 3:16 136023 (1) 1:25 14 (2) 6:5 69:14 141 (1) 4:5 147 (1) 4:4 15 (3) 77:17 80:5 85:12 16 (1) 6:4 16-md-02741-VC (2) 1:7 7:11 18 (11) 5:6 47:18 68:24 72:18 75:25 76:1,7 88:19 88:20 89:6,20 19 (1) 77:20 1993 (1) 42:6 1999 (2) 41:22 42:6	34:2,3,5 37:23,24 38:3,5 47:4 49:15 52:19,25 55:12 61:7 106:16,17 107:8 117:23 133:20,22 134:1,4 141:5 148:4 150:4 20 (21) 6:3,4 62:15,15,15,16 62:16 63:11,11,11 63:11 69:10 75:10 76:10 78:2 79:6 80:5 85:12 86:2,8 135:7 20-year (8) 80:20 82:6,12 83:23 84:8,16 85:11,16 2000 (1) 42:18 20005 (1) 3:17 2005 (19) 9:12 13:9 15:12 22:8 29:6,17 40:23 41:22 42:7,19 73:7 75:23 113:12,14,23 115:16,22 116:9 118:12 2013 (1) 9:18 2015 (1) 19:5 2017 (1) 5:3 2018 (42) 1:18 2:5 7:1 9:25 10:18 11:22 15:5,15 21:8 23:5,25 24:14 25:10 27:20 29:4 40:21,25 41:16 42:4 44:8 47:21 68:20 88:4,19 90:12,22 91:16 99:7,9 102:7 108:4 115:5 123:11 123:20 124:2 126:3 130:21 133:21 134:4 148:15 149:17 150:2 21 (2) 6:5 21:14 22 (6) 1:18 2:5 6:6 7:1,15 150:2 22nd (1) 149:17 25 (1)	77:20 2741 (1) 1:5 <hr/> 3 <hr/> 3 (23) 10:13 11:12 34:1 40:17 55:9,12 76:9 76:17 77:12 79:24 82:2,11 83:25 84:4 84:16,18,22 85:6,8 85:12,15 106:24 150:5 30 (4) 69:11 75:9 86:2,8 30-11 (1) 103:1 30-12 (1) 122:5 30-13 (1) 122:6 30-year (1) 78:21 31 (4) 36:19,22,24 84:12 31-1 (2) 4:10 10:19 31-10 (6) 5:14 93:8 94:6 95:8,8 101:15 31-11 (1) 5:15 31-12 (1) 5:16 31-13 (1) 5:17 31-2 (2) 4:14 10:19 31-3 (2) 4:18 10:20 31-4 (2) 5:2 10:20 31-5 (2) 5:5 10:20 31-6 (2) 5:6 18:23 31-7 (2) 5:7 73:1 31-8 (4) 5:12 93:7,24 101:15 31-9 (4) 5:13 93:7 94:3 101:15 34 (2) 4:22 8:21 34,698 (1) 111:10	35 (1) 77:22 37 (15) 41:23 44:15,20 84:10 84:13 107:9 112:3 112:20,21 115:3 118:4,14 131:19 141:21 142:2 <hr/> 4 <hr/> 4 (4) 10:15 109:13,18 134:15 40 (3) 42:9 86:2,8 413 (1) 107:5 44 (2) 41:10,14 <hr/> 5 <hr/> 5 (8) 6:6 10:17 27:19 28:12 55:19 73:4 133:21 134:4 5-year (1) 85:11 5,779 (1) 29:12 50 (2) 61:9,9 50/50 (3) 62:10,23 63:3 545 (1) 94:14 <hr/> 6 <hr/> 6 (2) 19:3 45:13 6.7 (3) 73:14 74:17 75:23 63 (1) 141:18 64 (2) 95:4,5 <hr/> 7 <hr/> 7 (5) 19:24 20:5 29:2 55:20 72:25 700 (2) 2:11 7:13 7171 (1) 3:4 73 (1) 5:7
<hr/> Z <hr/> <hr/> 0 <hr/> 0.04 (2) 82:5,23 0.05 (3) 81:24,25 82:2 0.3 (2) 82:16 84:1 0.82 (1) 110:18 0.83 (4) 134:13,13,22,23 0.87 (2) 134:13,23 0.88 (2) 134:13,23 0.89 (1) 39:9	<hr/> 1 <hr/> 1 (9) 7:6 10:8,12 39:14 40:13 68:15 117:18 134:15 150:4 1,324 (1) 29:13 1.0 (1) 55:1 1.2 (1) 55:13 1.8 (1) 55:13 10 (9) 4:10,14,18 5:2,5 74:17 80:5 93:11 101:11 10:11 (2)	<hr/> 2 <hr/> 2 (28) 10:9 30:18,18 32:13	<hr/> 3 <hr/> 3 (23) 10:13 11:12 34:1 40:17 55:9,12 76:9 76:17 77:12 79:24 82:2,11 83:25 84:4 84:16,18,22 85:6,8 85:12,15 106:24 150:5 30 (4) 69:11 75:9 86:2,8 30-11 (1) 103:1 30-12 (1) 122:5 30-13 (1) 122:6 30-year (1) 78:21 31 (4) 36:19,22,24 84:12 31-1 (2) 4:10 10:19 31-10 (6) 5:14 93:8 94:6 95:8,8 101:15 31-11 (1) 5:15 31-12 (1) 5:16 31-13 (1) 5:17 31-2 (2) 4:14 10:19 31-3 (2) 4:18 10:20 31-4 (2) 5:2 10:20 31-5 (2) 5:5 10:20 31-6 (2) 5:6 18:23 31-7 (2) 5:7 73:1 31-8 (4) 5:12 93:7,24 101:15 31-9 (4) 5:13 93:7 94:3 101:15 34 (2) 4:22 8:21 34,698 (1) 111:10	<hr/> 4 <hr/> 4 (4) 10:15 109:13,18 134:15 40 (3) 42:9 86:2,8 413 (1) 107:5 44 (2) 41:10,14 <hr/> 5 <hr/> 5 (8) 6:6 10:17 27:19 28:12 55:19 73:4 133:21 134:4 5-year (1) 85:11 5,779 (1) 29:12 50 (2) 61:9,9 50/50 (3) 62:10,23 63:3 545 (1) 94:14 <hr/> 6 <hr/> 6 (2) 19:3 45:13 6.7 (3) 73:14 74:17 75:23 63 (1) 141:18 64 (2) 95:4,5 <hr/> 7 <hr/> 7 (5) 19:24 20:5 29:2 55:20 72:25 700 (2) 2:11 7:13 7171 (1) 3:4 73 (1) 5:7

747 (1)

7:20

794 (1)

94:23

8

8 (4)

28:12 29:2 93:10

101:11

8.5 (16)

47:17 48:19 68:23

69:1,13 70:24 71:10

71:13 72:13 77:1

79:4 86:10,13 87:12

88:5 89:19

8:41 (3)

2:6 7:2,16

80226 (1)

3:5

87 (1)

138:2

9

9 (4)

4:4 6:3 10:12 101:11

9:14 (2)

40:9,10

9:24 (2)

40:11,14

9:58 (2)

68:11,12

90025 (1)

3:11

91016 (1)

7:15

93 (3)

5:12,13,14

97 (1)

42:6

99 (1)

42:7