Exhibit 3

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA

IN RE: ROUNDUP PRODUCTS LIABILITY LITIGATION	MDL No. 2741 Case No. 16-md-02741-VC
This document relates to: ALL ACTIONS	

VIDEOTAPED DEPOSITION OF
ALFRED NEUGUT, M.D., Ph.D.
New York, New York
August 7, 2017

Reported by: BONNIE PRUSZYNSKI, RMR, RPR, CLR
JOB NO. 127893

August 7, 2017
9:01 A.M.

DEPOSITION OF ALFRED NEUGUT, M.D., Ph.D., held at the offices of Weitz & Luxenberg, P.C., 700 Broadway, New York, New York, before Bonnie Pruszynski, a Registered Professional Reporter, Registered Merit Reporter, Certified Livenote Reporter, and Notary Public of the State of New York.

A P P E A R A N C E S:

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BY: ERIC LASKER, ESQ.
GRANT HOLLINGSWORTH, ESQ.

Also Present: Lem Lattimer, CLVS

I N D E X

E X H I B I T S

THE VIDEOGRAPHER: This is the start of media labeled number one of the video recorded deposition of Dr. Alfred Neugut in the matter of In re: Roundup Products Litigation on August 7th, 2017, at approximately 9:01 a.m.

My name is Lem Lattimer. I'm the legal video specialist from TSG Reporting. The court reporter is Bonnie Pruszynski from TSG Reporting.

Counsels, please introduce yourselves.

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

MR. HOLLINGSWORTH: Grant Hollingsworth from Hollingsworth LLP for Monsanto.

MR. TRAVERS: Jeff Travers from the Miller Firm LLC for Dr. Neugut.

MS. ROBERTSON: Pearl Robertson with Weitz & Luxenberg for Dr. Neugut.

THE VIDEOGRAPHER: Will the court reporter please swear the witness in.

THE WITNESS: I will affirm.

ALFRED NEUGUT, M.D., Ph.D., called as a witness, having been first duly sworn, was examined and testified as follows:

EXAMINATION

BY MR. LASKER:

Q. Good morning, Dr. Neugut. Let's just jump right in. I know you have been through this process before, so I assume you understand the deposition process and what we will be doing for the next seven or eight hours today. Correct? You are familiar with that process?

A. Yes.

MR. LASKER: Let's mark as the first exhibit the deposition notice and document request. This will be Exhibit 14-1.

A. Could I ask that you speak a little louder? It's actually --

Q. Yeah, I will speak louder. Thank you. And anytime, obviously -- anytime, if you don't hear me, definitely let me know. We want to make sure you understand the questions that I am asking.

(Exhibit 14-1, Deposition Notice and Document Request marked for identification, as of this date.)

Q. For the record, Exhibit 14-1 is a deposition notice for your deposition here today. And there is a list at the end, request for production of certain types of documents.

We have been provided by your counsel with a copy of your CV and a copy of some billing records. But if you can review the request for production and confirm that you do not have any other documents that would be responsive to these requests.

A. No. Everything that I had I sent to Mr. Travers to forward to you.

Q. And that would be your billing records and your CV; correct?

A. I sent him a copy of a lecture that I gave to the Court on Science Day a few months ago, so that also, I think.

Q. Anything else?

A. Off the top of my head, I'm not recalling anything else that was responsive to this.

Q. Okay.

MR. LASKER: I am not sure if we received those slides from you, although I believe we have them.

MR. TRAVERS: Yeah. I sent Heather an e-mail asking if she needed us to resend them.

Q. Dr. Neugut, just so I can be clear starting off, am I correct in my understanding that prior to being retained by plaintiffs' counsel for purposes of this litigation, you had not conducted any review of the epidemiological literature with regard to glyphosate and cancer?

A. I don't believe so, not specifically, no.

Q. So, you had not looked at the literature of NHL and glyphosate or cancer and glyphosate?

A. No.

Q. So, it would be fair to say then that you had not formed any opinion with respect to any potential association between glyphosate and NHL or cancer; correct?

A. I didn't know anything about it.

Q. Let's mark as Exhibit 14-2 a declaration that you had submitted early on in this litigation.

(Exhibit 14-2, Declaration of Alfred Neugut marked for identification, as of this date.)

Q. Dr. Neugut, first of all, can you confirm that this is your signature on this document?

A. Yes.

Q. And this is dated April 28, is that 2015 or 2016?

A. It looks like 2016.

Q. '16.

And this is a declaration that you submitted setting forth your opinions as of April 28, 2016, with respect to glyphosate and cancer; correct?

A. Yes.

Q. I'm going to mark as Exhibit 14-3 one of the invoices that you provided for your time as of February 17, 2017.

(Exhibit 14-3, February 17. 2017 Invoice, Neugut to Miller Firm marked for identification, as of this date.)

Q. Dr. Neugut, can you identify Exhibit 14-3 as an invoice that you submitted with your time for services rendered in this litigation as of February 17, 2017?

A. Yes.

Q. As of February 17, 2017, you had spent ten hours of work in reviewing documents and literature and having various meetings with and preparing some documents with plaintiffs' counsel; correct?

A. I don't recall. It is my first bill.

Q. As of this bill, if this bill is accurate, as of February 2017, you had spent ten hours of work on this litigation; correct?

A. As I say, I would have to see all my bills to know how they are laid out. I don't have them in my head in terms of the history of this litigation and my billing, but if this is the first bill, then this would sort of compile, although I might have put time in previously unbilled prior to taking the case.

Q. Do you have any reason to believe,

first of all, that your invoice for -- that you have submitted to plaintiffs' counsel for your time as of February 2017 would be inaccurate?

MR. TRAVERS: Objection, asked and answered.

A. Not inaccurate in the sense of what I billed for my time working on the case on behalf of plaintiffs. But as I say, I wouldn't have taken the case without previously reviewing -- if I were asked to take the case, I would have spent some time on my own reviewing the literature, which I would not have billed for. So, I might have -- I'm sure that I put some time into reviewing the literature on glyphosate and lymphoma before agreeing to act as a witness.

Q. Do you recall, sitting here today, how much time you spent reviewing literature before you agreed to work with plaintiffs' counsel in this case?

A. I wouldn't have kept a record of that, and this is a while ago, but it would have been certainly on the order of a couple or a few hours.

Q. Do you recall how much time you had spent reviewing the literature as of the date of your April 2016 declaration, which would be approximately ten months, nine to ten months before your first bill here?

A. No.

Q. Would it have been more than five hours?

A. It would have been -- again, I'm reconstructing, going back to that time, but my -- my assumption is that at the time, I would not have taken -- my taking the case was heavily based on the IARC review, and if I had, I had read the IARC review, then -- I don't know if I am a fast or a slow reader, but it would have taken me a few hours to read, and I would have based my opinion heavily on that document, and I am assuming that would have been a few hours.

But I don't know if I particularly billed -- if my ten hours subsequently included that review, those hours, or if that was, as I say, part of my initial review prior to even taking the case, for which I didn't necessarily bill plaintiffs.

Q. Okay. I think I understand then. So, as of the time of this April 2016 declaration, you had reviewed the IARC monograph; correct?

A. I wouldn't have taken the case, I think, absent that.

Q. And it was subsequent to this declaration that you then started reviewing the underlying epidemiological literature in preparing the report.

A. I don't know the timing of that. That would have been probably more in line with -- well, what report are we talking about now?

Q. Your expert report in the MDL that you submitted.

A. That would be more in conjunction with the timing for that, yes.

Q. Okay. So, the actual review of the underlying studies, epidemiological studies, would have taken place after your April 2016 declaration.

A. Yes.

Q. You state -- well, let me ask it this way: Is it your opinion, Dr. Neugut,

that the IARC monograph classifying glyphosate as a probable carcinogen in and of itself provides a reliable scientific basis for you to opine that glyphosate causes NHL in humans?

A. I think that the IARC reviews are the most authoritative reviews in the field, and I think as a starting point, yes, it's a fair starting point, and unless there is a strong reason to disbelieve them for some reason, the answer is yes.

Q. Just to be clear, in your April 2016 declaration, at paragraph 16, you state in the second paragraph that IARC's assessment -- or second sentence of paragraph 16 --

MR. TRAVERS: Do you mean paragraph --

MR. LASKER: Let me start that again. I had the wrong number here.

Q. In your April 2016 declaration, paragraph six, the second sentence, you state quote, "IARC's assessment on glyphosate provides a reliable scientific basis for an opinion that glyphosate does cause

non-Hodgkin's lymphoma in humans; correct?
A. And we're talking about paragraph six?
Q. Yes.
A. Yes.
Q. And to be clear, in reaching your opinion that is expressed in your expert declaration in April 2016 that glyphosate causes non-Hodgkin's lymphoma in humans, you relied solely on the IARC monograph; correct?
A. I would not say solely, but I would say heavily.
Q. You had not reviewed any of the underlying literature at that time, though?
A. I cannot recall. My guess is, I may have looked up one or two of the papers, but heavily -- but predominantly, it was the monograph itself.
Q. Now, as a basis for your reliance on the IARC monograph, you also state in paragraph two of your April 2016 declaration, the last sentence, that you would -- and I am quoting from your declaration, "equate the term 'probable' as used in the IARC monograph as corresponding to my understanding of the

legal term 'within a reasonable degree of medical certainty'"; correct?
A. Yes, that's-- there I -- yes, that's what I wrote. Um-hum.
Q. Now, IARC in its preamble states that the term "probable" has no quantitative significance.
MR. TRAVERS: Objection.
Q. Correct?
MR. TRAVERS: Calls for a legal conclusion.
A. I don't know.
Q. Have you ever reviewed the preamble to the IARC monographs?
A. Yes, but I don't recall offhand that sentence, but --
Q. Okay.
MR. LASKER: Let's mark that as Exhibit 14-4.
(Exhibit 14-4, World Health Organization IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, Myon, France, 2006 marked for identification, as of this date.)
Q. And Dr. Neugut, if I could direct

you -- and for the record, this is, Exhibit 14-4 is the preamble to the IARC monographs dated 2006, that had been marked previously in this litigation, both by plaintiffs' counsel and by Monsanto in various depositions.
If I could direct you to page 22 of the preamble. And at this place in the preamble, IARC is setting forth it various classification schemes for -- for substances that they analyze; correct?
A. Yes.
Q. And for group two -- we are going to go through this. Group one would be if an agent is carcinogenic to humans according to IARC; correct?
A. Yes.
Q. And for IARC, that category is used when there is sufficient evidence of carcinogenicity in humans; correct?
A. Yes.
Q. So, group two is a category for substances that IARC defines as being either probably carcinogenic or possibly carcinogenic to humans; correct?

A. Yes.
Q. And in its preamble, IARC states, and it's at lines 29 and 30 on page 22, that the terms "probably carcinogenic" and "possibly carcinogenic" have no quantitive significance; correct?
A. Correct.
Q. And IARC also states in its monograph that IARC may ident- -- let me start that again.
IARC also states in its monograph that IARC may identify cancer hazards even when risks are very low with known patterns of use or exposure; correct?
A. I don't know where you are reading.
Q. Do you know that? You have reviewed the monograph, haven't you? You said that you have.
A. Yes.
Q. And does that sound familiar to you?
A. Yes.
Q. And just so we are clear, on page two of the monograph, lines 22 through 24, in the preamble, IARC states exactly that, makes

exactly that point; correct?
A. Yes.
Q. You also state in your April 2016 report, and this is in paragraph six, the first sentence, "In reviewing Monograph 112, it is my opinion that IARC continued its tradition of rigorous transparent analysis and used a sound methodological approach when reviewing the evidence on glyphosate." Correct?
A. Yes.
Q. What investigation did you conduct prior to signing this declaration to confirm for yourself that the Working Group 112 in its analysis of glyphosate had followed a rigorous transparent analysis and followed a sound methodological approach?
A. Because I read through the report carefully.
Q. Did you do anything other than reading the report in reaching this opinion?
A. No.
Q. What is your understanding of the amount of time that the working group spent in conducting its analysis of glyphosate

prior to issuing its classification?
MR. TRAVERS: Objection, calls for speculation.
THE WITNESS: Am I supposed to answer?
Q. Yes.
MR. TRAVERS: If you can.
Q. Unless he tells you not to answer, you should answer the question.
A. Well, the meetings run about a week or more, but I mean, the preparation for the meetings run weeks.
Q. And so, it's your understanding that the -- how much time then would you understand the working group spent in analyzing and evaluating glyphosate to reach its classification?
A. Weeks.
MR. TRAVERS: Objection, calls for speculation.
Q. Now, you know an individual named Dr. Aaron Blair?
A. I don't think -- I cannot -- I probably have met him at least once, like years ago, but I don't know him. We don't

play stickball together. But I mean, I certainly know him by reputation.
Q. Okay. Dr. Blair has -- what is your understanding of Dr. Blair's reputation?
A. It's outstanding.
Q. And Dr. Blair was the chairperson of Working Group 112 that conducted this analysis and evaluation of glyphosate; correct?
A. Yes.
Q. And Dr. Blair was deposed in this litigation about the IARC working group's analysis; correct?
A. Yes.
Q. And you have read that deposition; correct?
A. Yes.
Q. Dr. Blair testified specifically with respect to the Working Group 112 and glyphosate, that the working group only spent one or two days total in analyzing whether glyphosate can cause cancer; correct?
MR. TRAVERS: Objection, misstates his testimony.
A. I don't recall offhand, but I do

recall that it was only a couple of -- they were evaluating several carcinogens at the same time, so it was a limited amount of time on glyphosate specifically.
MR. LASKER: Just so we are clear, because of the objection, let's mark as Exhibit 14-4 -- I'm sorry, 14-5. I didn't mean to mess that up. I don't think we have to mark the declaration. Let's just use this as an exhibit.
MR. TRAVERS: Yeah. Do you have a copy?
MR. LASKER: Yes. We are not going to mark this as an exhibit. We will just use this for the witness' reference.
Q. So, if I could ask you to turn to pages 115, or page 115, and this in the minuscript version, so there is four pages per page, but page 115, line 12 to line 16, there was a question of Dr. Blair:
"So, you would have maybe a day or two of analysis and evaluation that went into the IARC working group classification of glyphosate; correct?"
"Answer: Roughly correct."

Do you see that?
A. Yes.
MR. TRAVERS: Objection. This takes it out of context.
Q. You have no reason to doubt Dr. Blair's testimony?
A. No.
Q. And to provide context, if I could ask you to look to page 114, lines 13 through 21, here Dr. Blair is being asked about that time period prior to the working group meeting; correct?
A. So, it's -- it will take me a minute to orient, if I can have that.
Q. That's fine.
A. Okay. Your question?
Q. And Dr. Blair on page 114 states that while there was some assembling of data tables prior to the working group meeting during that one-week period, the evaluation processes didn't start until the actual working group meeting; correct?
A. Yes.
Q. And in fact, Dr. Blair resists the suggestion that any analysis was done prior

to that one-week meeting, doesn't he?
A. I wouldn't know.
Q. Well, he states at line eight, in describing what happened beforehand, "Some of the time it's just putting things in a table. That's hardly an analysis, it's an assembly of the data." Correct?
MR. TRAVERS: Objection. I think your previous question misstates his testimony.
Q. That's what Dr. Blair testifies; correct?
A. That's what he says.
Q. And do you consider a one- to two-day review of all of the scientific evidence regarding glyphosate and cancer, and that would be not only the epidemiology but the animal studies and the genotox, to be a rigorous analysis?
MR. TRAVERS: Objection, misstates his testimony.
A. I would have no way of knowing.
Q. Now, the IARC working group also did not consider all of the glyphosate animal carcinogenicity data during that one-week

session because it did not have sufficient time; correct?
MR. TRAVERS: Objection, misstates the evidence.
A. I don't know.
Q. Do you know Dr. Charles Jameson?
A. No.
Q. Dr. Jameson chaired the animal cancer bioassay subcommittee on glyphosate for the IARC working group. Were you aware of that?
A. No.
Q. Do you know that Dr. Jameson was deposed in this litigation about his subgroup's work in analyzing the animal data for the IARC monograph?
A. Do I know that he was deposed?
Q. Yes.
A. I don't think I have a specific knowledge of that, no.
Q. Let me show you Dr. Jameson's deposition testimony. We will be going back to Dr. Blair's deposition testimony at some point. You can put that to the side for the moment.

MR. TRAVERS: I'm just going to object, because Dr. Neugut didn't review or rely upon this deposition, so --
MR. LASKER: I understand that, but Dr. --
MR. TRAVERS: He's not going to have sufficient time to fully analyze Dr. Jameson's testimony to accurately answer questions.
MR. LASKER: That -- I understand that, but Dr. Neugut is the one who offered an expert opinion that the IARC working group had put in a -- what was his words? -- rigorous analysis of the glyphosate data, and to that extent, his lack of knowledge of that process is relevant.
Q. Dr. Neugut, if I could direct you to Dr. Jameson's testimony on page 191, lines 12 to 24. And -- whoops, I'm sorry.
Lines 12 to 24 on page 191, Dr. Jameson is referring to the fact that some data tables were provided to him at some point at the meeting; correct? And just to be -- just to put this in context for you, on

line 190 -- on page 190, line nine, these were data tables with respect to underlying study data for tumor counts of 14 cancer bioassays on glyphosate.

And then we continue on to page 191, where he is asked whether he had access to those materials during the IARC working group meeting.

Do you see that?

A. Yes.

Q. And on -- further down, starting at line 25 on page 191, and then continuing on to 192, line six, question:

"You did not then proceed to actually review and look at the data that was provided in those supplemental tables; correct?"

And there is an objection, and then the answer:

"There was -- the amount of data in the tables was overwhelming, and it would not have been possible to review those, that data during the meeting."

Correct?

A. Yes.

Q. Do you believe that having insufficient time to consider all of the data on the animal cancer bioassays for glyphosate reflects a rigorous evaluation process?

MR. TRAVERS: Objection, misstates the testimony.

A. I would have no way of being able to characterize what he was able or not able to evaluate at the meeting. I mean, I think the data that was described in the monograph was consistent with, with the report of carcinogenicity that came out of the report.

Q. But just to be clear, in offering your opinion in April 2016 that glyphosate can cause NHL, in which you relied upon the rigorous process that the working group engaged in, you were not aware of the fact that there was animal data tables that the IARC working group did not review because they didn't have time; correct?

MR. TRAVERS: Objection, misstates the testimony, and it's inconsistent with IARC monographs.

A. Certainly, I'm not aware of whether they had or did not have data that wasn't

available, and relied on what they did report in their monograph and what they voted on as part of their process, as part of their normal process.

Q. Now, Dr. Jameson, you talked about the animal studies that IARC did discuss, and there were four animal studies that are discussed in the monograph as providing the data upon which the working group relied in reaching its conclusion or its classification that glyphosate was a probable carcinogen; correct?

MR. TRAVERS: Wait. Objection. Wait. You say "Dr. Jameson, you talked about." Do you mean, "Dr. Neugut, you talked about the animal studies"?

MR. LASKER: I'm sorry. I will start that again. Thank you.

Q. Dr. Neugut, you had previously in one of your previous answers -- you can keep that.

In one of your previous answers, you said you relied upon what IARC described in its monograph, what the working group described in its monograph with respect to

the animal studies; correct?

A. Yes.

Q. And the monograph relies upon four animal studies as providing the data that they used in reaching their classification; correct?

A. Yes.

Q. Now, Dr. Jameson testified that the IARC working group did not actually have the study documents for those four animal studies.

MR. TRAVERS: Objection.

Q. Are you aware of that?

A. No.

MR. TRAVERS: Misstates his testimony.

Q. Okay. Let's have you look to Dr. Jameson's deposition at page 279, lines six to 16. And here Dr. Jameson testifies that IARC relied on summaries of the studies provided by either EPA or JMPR as opposed to the actual studies themselves; correct?

A. I don't have the ability to absorb this at this point, but it looks like that.

Q. And Dr. Jameson also acknowledges,

continuing on, on page 279, lines 17 through 24, that the scientists who prepared those summaries at EPA or at the JMPR, which is part of the World Health Organization, they were the ones who had actually looked at the underlying study documents; correct?

A. I don't know where you are referencing.

Q. Lines -- page 279, line 17 through 24.

A. Yes.

Q. And those EPA and World Health Organization scientists, in the very same summaries upon which IARC relied, concluded that the four studies at issue did not provide evidence that glyphosate causes cancer; correct?

MR. TRAVERS: Objection, misstates the evidence.

Q. And if you want, I can direct you to page 284, lines eight through 17, and why don't we read that -- I will read that into the record. Question to Dr. Jameson:

"And with respect to all four of these studies, the findings that IARC

cited to as evidence in support of a sufficient evidence of carcinogenicity in animals, in all of those students, the EPA or the JMPR had concluded that those findings were not related to glyphosate; correct?"

There is an objection.

"Answer: That's what their document indicated."

Correct.

MR. TRAVERS: I'm going to object. We don't know which EPA document this is talking about. There are several EPA documents.

MR. LASKER: Okay. We are going to just note for the record the speaking objections and the sort of misinformed objections --

MR. TRAVERS: It's not misinformed. It's just unclear what document.

MR. LASKER: It may be unclear to you. It's very clear that there was some testimony. If you are going to continue to make those sort of objections to every question, we will have to seek relief

from that.

MR. TRAVERS: I mean, he just says that -- he references a document. We were just -- we don't know what document it is.

MR. LASKER: Well, maybe you should review the deposition testimony of Dr. Jameson, but the testimony is very clear.

MR. TRAVERS: Well --

MR. LASKER: Let me ask --

MR. TRAVERS: Can you offer the document so the witness knows which one it refers to?

BY MR. LASKER:

Q. If you're -- if -- Dr. Neugut, starting on 283, line 14, directly before the testimony I just read, Dr. Jameson is confirming that this is, the discussion is with respect to the four animal data -- four animal studies that IARC relied upon in its monograph; correct?

A. By now I have forgotten the question. I'm sorry. So --

Q. From page 283, line 14, through

284, line 17.

A. Um-hum.

Q. Dr. Jameson states that IARC's conclusion was based upon a summary or review document prepared, one by EPA and the other by JMPR, and that is the question starting line 283 on line 21, answering on 284, line seven; correct?

A. Yes.

MR. TRAVERS: I have got the same objection.

Q. And from line eight -- page 284, line eight to line 17, Dr. Jameson confirms that in that review document that IARC relied upon for those four studies, the EPA or the JMPR concluded that the findings were not related to glyphosate; correct?

MR. TRAVERS: I have got the same objection.

A. Correct.

Q. Dr. Neugut, is it your opinion that for a scientist, relying upon a summary document rather than the underlying study itself reflects a rigorous review process?

A. I don't know what Dr. Jameson

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relied upon, so I don't know, but I would say it's better of course to rely on the original data.

Q. Do you agree, sitting here today, with the IARC working group's assessment of the epidemiological literature regarding formulated glyphosate products and non-Hodgkin's lymphoma?

A. Specifically with regard only to the epidemiologic data?

Q. Yes.

A. Yes.

Q. The IARC working group on the monograph concluded that the epidemiological evidence associating glyphosate with non-Hodgkin's lymphoma was limited; correct?

A. Was limited, it's probably even a little stronger than that, but it's on -- let's say it's on the stronger side of limited, but I think limited is fair.

Q. As defined by IARC again in that preamble, the term "limited" means, quote, a positive association has been observed between exposure here to glyphosate and non-Hodgkin's lymphoma, for which a causal

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interpretation is credible, but chance, bias or confounding could not be ruled out with reasonable confidence; correct?

A. Purely on the basis of the epidemiologic studies, without taking into account, say, biology, toxicology, et cetera, et cetera.

Q. You agree with that assessment; correct?

A. Yes.

Q. Now, the IARC working group had the option and chose not to -- well, strike that.

The IARC working group concluded that the epidemiological evidence did not reach the level of being sufficient to establish a causal relationship between glyphosate and NHL; correct?

A. I'm sorry.

Q. The IARC working group determined that the epidemiological evidence did not reach the level where they could find it was sufficient to show a causal relationship between glyphosate and non-Hodgkin's --

A. Purely on the basis of the epidemiologic studies, without taking into

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account biology, et cetera, yes.

Q. You agree that the epidemiology alone is not sufficient to show a causal relationship between glyphosate and non-Hodgkin's lymphoma; is that correct?

A. For -- for the purposes for which they were evaluating it, I would say that's correct.

Q. The IARC working group also concluded that there was not even limited epidemiological evidence to associate glyphosate with any other type of cancer; correct?

A. That adds to the causal relationship.

Q. I'm not sure I understood your answer. Maybe my question wasn't clear.

The IARC working group in considering cancers other than non-Hodgkin's lymphoma concluded that there was not even limited evidence --

A. Correct.

Q. -- to support an association; correct?

A. Yes.

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Q. And you agree with that; correct?

A. Yes.

Q. So, let's break down the three qualifiers in the IARC -- in the definition of "limited" that we have spoken about with respect to the epidemiology.

So, when you talk about the fact that chance could not be ruled out, with respect to any epidemiological association between glyphosate and non-Hodgkin's lymphoma, that is addressing an issue that epidemiologists deal with, with tests for things like statistical significance; correct?

A. Part of it is statistical significance, yes.

Q. And the way that epidemiologists try to rule out chance is, they look to see whether the -- either the odds ratios or the relative risks are above 1.0 and are statistically significant; correct?

A. Yes.

Q. You would agree that for an epidemiological study to be considered a positive study with respect to a potential

exposure and an outcome, that study must report an odds ratio or relative risk that is above 1.0 and is statistically significant; correct?

A. Statistical significance nowadays is not really as much of a requirement as it might have been in the past, so I would not agree that it's totally mandated.

Q. Okay. Let me ask you, if I could -- and let's mark -- we will mark this, a deposition transcript, but this is deposition testimony that you gave in the Actos litigation in January of 2013. Just to set the -- to establish the precedent, you served as an expert for the Miller firm, the same plaintiffs' counsel here today, in connection with the Actos litigation; correct?

A. Yes.

Q. And you were deposed a number of times in that litigation, just like you are being deposed here today; correct?

A. Yes.

Q. So, I'm going to ask you about some of your testimony in that litigation at

various points today.

But if we could start just on your January 7, 2013 deposition testimony, and in particular, on page one -- I'm sorry, 233 of your testimony. And in particular, line nine through line 13. I think I asked this question the exact same way here today, but the question was asked of you, "When you say a positive study, are you saying a study that has an odds ratio relative risk of greater than one and is statistically significant?" And your answer is "yes"; correct?

A. Yes.

Q. And that is your -- you agree with that testimony; correct?

A. Yes.

Q. Now, when a study does not show a positive finding, it is considered -- well, strike that.

There is also the possibility of a negative study in which you have an odds ratio or relative risk below 1.0 that is not -- that is also statistically significant; correct?

A. Yes.

Q. So, when a study does not show a positive or a negative finding, it is considered a null study that has no finding; correct?

A. Or it's in a direction and not quite statistically significant.

Q. Let me ask you again. We will be switching from various testimony you have offered in the past, but let's take the October 22, 2014 testimony. And I'm sorry, I will be referring back and forth to some of these, so we will just have to work our way through that.

Here you go.

This is again testimony that you provided in that other Actos litigation, on October 22, 2014, and if I could turn you to page, or refer you to page 117 -- I'm sorry, page 113, lines 15 to 21, and just to give you a reference point, this is a fairly long answer that you are providing that starts on page 111, but it continues to be your testimony through to page 113.

And there you state that, on line 17 through 19, "When a study does not show a

positive finding, it is actually null. It has no finding." Correct?

MR. TRAVERS: Sorry, which page is this on again?

MR. LASKER: On page 113, from lines 17 through 19.

Q. Dr. Neugut, you testified that "when a study does not show a positive finding, it is actually null. It has no finding." Correct?

A. Yes.

Q. And you agree with that; correct?

A. Yes.

Q. And you would not label an exposure as being associated with an outcome unless there is a finding of an increased risk that is statistically significant; correct?

A. That's correct.

Q. Epidemiologists determine whether a finding is statistically significant -- they can do that in different ways. One is based upon a 95 percent confidence interval; is that correct?

A. Yes.

Q. And a finding would be then

statistically significant in the positive direction if the lower bound for the 95 percent confidence interval is greater than 1.0; correct?

A. Yes.

Q. Epidemiologists can also measure statistical significance with something called a P value; correct?

A. Yes.

Q. And a study is statistically significant if a P value is less than 0.05; correct?

A. Yes.

Q. The size of a study can also impact the ability, or can impact the ability of a study to find a statistically significant result; correct?

A. Yes.

Q. So, this is measured by what epidemiologists refer to as power, the power of a study; correct?

A. Yes.

Q. A study that has more power will be better able to identify statistically significant associations if they exist;

correct?

A. Yes.

Q. Epidemiologists generally give less weight to studies that have lower power; correct?

A. I'm sorry, that didn't --

Q. Say it again? I will do it again.

A. Yeah.

Q. Epidemiologists, in evaluating a study, would give it less weight if it has low power; correct?

A. Because you don't have the ability to assess significance.

Q. So yes --

A. Yes.

Q. -- low power means --

A. Um-hum.

Q. One way to measure, sort of a shorthand way of measuring the power of a study is to look at the width of the confidence intervals; correct?

A. Yes.

Q. So, the narrower the confidence interval, the greater the power of the study; correct?

A. Yes, but that's-- okay. Yes, that is -- that's sort of an a posteriori way of looking at it, but yes.

Q. You would agree that it's not proper epidemiological methodology to measure power based on the total number of individuals who are in the study; correct?

A. Can you rephrase that or give me a better -- tell me what you mean exactly.

Q. For example, if you have a case-control study, and in that case-control study there is a certain number of individuals whose data is reviewed who had the outcome of -- had the, let's say, non-Hodgkin's lymphoma. So, you have a case-control study, and there is a certain number of people who have non-Hodgkin's lymphoma in the study.

With respect to any one exposure measure --

A. Yes.

Q. -- it would not be appropriate to determine the power of the study based upon the number of individuals who were in the study; correct?

A. The power of the study is going to be determined by both -- by -- really by the number of endpoints, by the number of people with the disease, but also by the number of people who are likely to be exposed.

Q. Right.

So, with respect to a study, if you had 10,000 people in a study but only three of them were exposed to the substance at issue, the fact that there is 10,000 people in the study wouldn't make it a powerful study; correct?

A. That's correct.

Q. And it wouldn't be reasonable to call a case-control study a big study and say that it has more weight just because there is a large number of individuals who start out as potential cases in the study; correct?

MR. TRAVERS: Objection, calls for speculation.

A. So, you would have to look at each study and kind of assess it on a -- on its own merits with regard to those parameters.

Q. Okay. But as a general matter, you would want to look at the number of

individuals who are -- have the outcome and have the exposure you are looking at to determine power; correct?
A. Yes.
Q. It would not be a reasonable methodology just to look at the number of individuals in a case-control study that had the outcome of interest; correct?
MR. TRAVERS: Objection, asked and answered.
A. Yes.
Q. Let me show you a table listing some of the glyphosate epidemiological studies.
(Exhibit 14-5, Table of Studies marked for identification, as of this date.)
MR. TRAVERS: Who prepared this table?
MR. LASKER: We will address that shortly, but I have some questions first.
MR. TRAVERS: Can we --
Q. Dr. Neugut --
MR. TRAVERS: I object.
MR. LASKER: You can object. Your

objection is noted.
MR. TRAVERS: I think it's important to know who prepared the table before answering questions about it.
MR. LASKER: That's fine.
Q. Dr. Neugut, there is a table, and these are a listing of some of the studies, I take it you are familiar with as well, with respect to glyphosate and non-Hodgkin's lymphoma; correct?
A. Yes.
Q. And this has a listing of various studies with the number of cases in the study identified; correct?
MR. TRAVERS: I'm going to still object. We don't know where this table comes from or the accuracy of the members.
Q. Dr. Neugut?
A. Yes.
Q. Now, the table lists at the very top, the study that is listed at the very top of this table is the Cocco 2013 study; correct?
A. Yes.

Q. And the table indicates that this study included 1,869 individuals with non-Hodgkin's lymphoma; correct?
MR. TRAVERS: Same objection as to the source of this table.
A. Yes.
Q. Now, it would not be fair, though, to suggest from this table presentation that Cocco is the most powerful study looking at glyphosate and non-Hodgkin's lymphoma; correct?
MR. TRAVERS: Same objection to the source of the table.
A. Again, you would need to know the likelihood of exposure.
Q. Well, you know, in fact, that Cocco was the least powerful of all of the studies looking at glyphosate and non-Hodgkin's lymphoma; correct?
A. I don't have a good memory, and I don't know -- I can't relate to each paper without seeing it.
Q. Okay. Let's mark your expert report, because this is in your expert report.

MR. LASKER: And we can make this, I'm sorry, 14-6.
(Exhibit 14-6, Expert Report of Albert Neugut, M.D., Ph.D. marked for identification, as of this date.)
Q. And you discuss the Cocco paper, I believe it is on pages 16 and 17 of your report.
A. Um-hum, yes.
Q. And you can refresh your recollection, but specifically on page 17, you talk about the -- the numbers of exposed cases and controls and the power of the study; correct?
A. Yes.
Q. And does this refresh your recollection that this study that is listed in the table 14-5 as the largest of the studies in fact was the least powerful of all the epidemiological studies looking at glyphosate in non-Hodgkin's lymphoma?
A. It didn't have much exposure, correct.
Q. The table listing of Exhibit 14-5, which is based upon a total number of study

subjects, by itself does not provide any meaningful information regarding the relative power of these glyphosate studies, does it?

MR. TRAVERS: Objection, form.

A. Well, you can judge the power by the width of the 95 percent confidence interval.

Q. I understand. But if you could look to 14-5 in specific, the prior exhibit that we had.

A. 14-5?

Q. The table, I'm sorry. Not your report, the prior exhibit, which has this table listed.

So, this table 14-5 does not provide any meaningful information with respect to the relative power of the glyphosate epidemiological studies regarding non-Hodgkin's lymphoma; correct?

MR. TRAVERS: Objection to form.

A. I suppose not. It doesn't say anything about it.

Q. And you would not consider this to be a methodologically sound approach for an epidemiologist to take in analyzing the

relative power of these studies; correct?

A. I guess a priori it might have been a good try, but if in fact the exposures are rare, then it's -- you don't get a lot of power from -- even from a large study.

Q. So, for an epidemiologist who had actually looked at the underlying studies and understood the actual data, this would not be a methodologically sound way to present the data on these tables -- on these studies; correct?

MR. TRAVERS: Objection to form.

A. The question doesn't make sense to me, but -- so I can't answer the question.

Q. Okay. Let me restate the question then.

An expert who had reviewed the -- an expert epidemiologist who reviewed the underlying glyphosate literature would not present data in this fashion to compare the relative power of these studies; correct?

MR. TRAVERS: Objection, calls for speculation.

A. I mean, it would be a -- it might be one way to start, but it wouldn't

necessarily be totally informative.

Q. This table does not provide you with any information as it's presented on the relative power of these studies at all; correct?

A. It's not complete.

Q. And an epidemiologist who presented this table as an illustration of the relative power of these studies would not be following a reliable epidemiological methodology; correct?

MR. TRAVERS: Objection, calls for speculation, and takes the document out of context.

A. I'm -- I don't know what an epidemiologist would do. I wouldn't be able to assess power directly from this. Power is based on a number of factors that go beyond the sample size.

Q. Okay. You said you wouldn't know what an epidemiologist would -- you know, you are an epidemiologist; correct? You have been trained in epidemiology?

A. So, sample -- so power is not based solely on the sample size.

Q. So, this table does not follow standard epidemiological methodology of looking at questions like power; correct?

MR. TRAVERS: Objection, it takes it out of context.

A. It's not complete, I would say.

Q. You would not present the data in this way yourself; correct?

A. It depends on what I wanted to show to someone.

Q. If you wanted to talk about the relative power of a study, you would not present the data this way; correct?

A. It would be a beginning of showing it, but it wouldn't be a totality.

Q. But you would present other data if you were trying to present the power of studies; correct?

A. That's correct.

MR. TRAVERS: It's been about an hour, if you want to take a break.

MR. LASKER: Let's just put this into context.

Q. Dr. Neugut, you are aware that plaintiffs retained another epidemiology

expert in this litigation; correct?
A. You mean someone against me?
Q. No. Someone on the same side, plaintiffs' counsel.
A. Oh, plaintiffs.
Q. Yes.
A. I'm sorry. Yes.
Q. Dr. Ritz?
A. Yes.
Q. And I have shown --
MR. LASKER: Let's mark this as 14-6? 7, sorry.
(Exhibit 14-7, Expert Report of Dr. Beate Ritz, M.D., Ph.D. marked for identification, as of this date.)
Q. So, just to confirm, now, this is Dr. Ritz's expert report that she submitted in this litigation, and just to confirm, if you could turn to page 15.
A. Fifteen?
Q. Of Dr. Ritz's expert report. And on the top of page 15, Dr. Ritz states, "In reviewing the literature, the sample sizes, and especially the number of cases, should be noted because of their bearing on statistical

significance and the width of confidence intervals." Correct?
A. Yes.
Q. And she states, "Because many of the smaller studies had suggestive findings but wide confidence intervals, it is particularly important to instead consider pools and meta-analysis that summarize across these smaller studies and not only provide a much larger sample size but may allow us to assess NHL subtypes with sufficient precision." Correct?
A. Yes.
Q. And then it states, "Here I show the sample sizes of each human study of glyphosate in non-Hodgkin's lymphoma"; correct?
A. Yes.
Q. And the table that Dr. Ritz then presents in her expert report is the exact same table that has been marked as Exhibit 14-5; correct?
A. Yes.
MR. LASKER: We can take a break.
THE VIDEOGRAPHER: The time is

10:06 a.m. We are off the record.
(Recess taken.)
THE VIDEOGRAPHER: The time is 10:15 a.m. We are on the record.
BY MR. LASKER:
Q. So, Dr. Neugut, let's go back to the limited epidemiological evidence --
THE VIDEOGRAPHER: Sir, is your mike on?
MR. LASKER: Oh, I'm sorry. Let's not go back. Go back in a second. Thank you.
Q. We were discussing -- I'm sorry.
MR. LASKER: Is this good?
Q. Dr. Neugut, we were discussing the limited epidemiological evidence with respect to glyphosate and non-Hodgkin's lymphoma, and one of the other factors that you mentioned is that bias and confounding could not be excluded as an explanation for the findings in those studies; correct?
A. I don't believe I mentioned that, but --
Q. That is the definition of "limited"; correct? That bias and

confounding could not be ruled out as an explanation for the findings; correct?
A. So, again, we are now going along with the IARC definition of -- you know, with the IARC definition of "limited," yes.
Q. And we talked about your -- your testimony regarding the limited definition of --
A. Um-hum.
Q. -- the glyphosate epidemiology; correct?
A. Purely on the basis of the epidemiologic data.
Q. Right.
A. Correct, um-hum.
Q. So, looking just at the epidemiological data, bias and confounding cannot be excluded as an explanation for the findings in those studies; correct?
A. Yes.
Q. And these are additional and separate concerns that are not addressed by measures of statistical significance; correct?
A. I -- I would say that they are all

intertwined and bound together. It's hard to --

Q. Okay.

A. To say -- it's hard to separate one from the other.

Q. Okay. Let me restate --

A. This is all a -- I think in epidemiologic thinking, you can't so easily take one thread and separate it from the other threads.

Q. Let me restate the question.

A calculation of statistical significance does not answer the question about whether the underlying study has issues with bias or confounding; correct?

A. Correct.

Q. And a finding of a statistically significant association by itself does not mean that there is a cause and effect between an exposure and the outcome of interest; correct?

A. Correct.

Q. And that's because although a statistical -- a statistically significant association may exist, there is always the

concern that the finding may reflect bias in the way that the study was conducted or the presence of confounding factors; correct?

A. If we are talking about a single study, yes, um-hum.

Q. Confounding factors are factors that are associated with both exposure and the outcome, and therefore could lead to a reported association that is not truly a relationship between the two, exposure and outcome; right?

A. Yes.

Q. When an epidemiological study is conducted, it's therefore mandatory that the study collect information on potential confounders, so that the analysis can be controlled to measure the -- to properly measure the effect of the exposure of interest; correct?

A. "Mandatory" is a strong word. "Desirable" I think would be a better word.

Q. Okay. Let's mark -- this may be taking you back a ways, a little ways.

MR. LASKER: Let's mark this as 14-8.

(Exhibit 14-8, ASCO-SEP Medical Oncology Self-Evaluation Program, Third Edition Excerpt marked for identification, as of this date.)

A. That's going back to -- to --

Q. Not too far. I think this is 2014 or so.

A. You could be reading the -- I'm up to the sixth edition now. You guys are out of date.

Q. It's hard to get these.

But in any event, just for the record, chapter -- this is a book produced by ASCO-SEP Medical Oncology Self-Evaluation Program. And this is, as you note, the third edition, and I have copied here chapter one, which is the chapter that you prepared on epidemiology and prevention; correct?

A. Yes.

Q. And in this chapter, you discuss a number of issues, including how to properly evaluate epidemiological data; correct?

A. Yes.

Q. And on page five, you were discussing the issue of confounding in

connection with smoking and asbestos and lung cancer, I believe. In the middle of that first column, the first full paragraph that starts, "In analytical epidemiology, observational studies are carried out."

Do you see that?

A. Yes.

Q. And at the end of that paragraph, you state, last sentence, "It is mandatory in a study that looks at this exposure and outcome to collect smoking information so that it can be statistically controlled and the individual effects of asbestos exposure can be appropriately measured." Correct?

A. Yes.

Q. And so, there are circumstances in which you agree that it is mandatory to collect data on potential confounders; correct?

A. I think that that is true. So, again, are you asking me a question?

Q. I just did. I think that was a question, and you are answering, yeah.

A. So again, I mean, I think the answer is contextual. You know, let's say

that the -- how mandatory it is, is a contextual issue, and I would say if we are talking about asbestos, smoking and lung cancer, then where you have a risk factor which has a relative risk of ten, then yes, doing an asbestos study with lung cancer and not taking into account cigarette smoking is a very -- would be -- would be difficult -- or would be mandatory there or -- but that doesn't mean that in every instance, you can take into account every confounding factor. That would be almost impossible in real life.

And so, that's why I say it's desirable in many instances to take into account confounders, and it's done to varying degrees under different circumstances. But sure, one wants to take into account confounders to the degree that it's possible.

Q. Do you agree -- and we can go back to his deposition testimony if you want, but do you agree with Dr. Blair that there is evidence of an increased risk of non-Hodgkin's lymphoma in farmers that existed prior to the introduction of glyphosate?

A. Yes.

Q. So, there is something going on with farmers and their exposures that is leading to an increased risk of non-Hodgkin's lymphoma that we know for a fact is not glyphosate; correct?

A. Yes.

Q. So, farming, to the extent that glyphosate exposure is associated with farming, which is a fair assumption; correct? Farmers use glyphosate; correct?

A. Yes.

Q. So, farming or at last some other farming exposures would be confounders of any epidemiological analysis of glyphosate in non-Hodgkin's lymphoma; correct?

A. Yes.

Q. For -- strike that.

So, you agree that it would be mandatory or at least extremely desirable in trying to reach an epidemiological finding with respect to glyphosate and non-Hodgkin's lymphoma to control for these potentially confounding other farming exposures; correct?

MR. TRAVERS: Objection, misstates

his prior testimony.

A. Well, to some degree by -- if it's possible, yes.

Q. So, for example, any epidemiological analysis that is trying to properly measure a potential association between glyphosate and non-Hodgkin's lymphoma should be adjusted to control for potential confounding effects of exposures to other pesticides; correct?

MR. TRAVERS: Objection, calls for speculation.

A. Well, other pesticides that are known to cause lymphoma.

Q. And you, in fact, make that point a number of places in your expert report, that an epidemiological analysis of glyphosate and non-Hodgkin's lymphoma should control for exposures to these other pesticides; correct?

A. To the degree that it's possible, yes.

Q. Now, there are standard epidemiological methods that are used to try and adjust for confounding; correct?

A. Yes.

Q. So, there is -- one method is to do some statistical analyses or regression analyses to be able to adjust for exposures to other risk factors; correct?

MR. TRAVERS: Objection, compound question.

A. Yes.

Q. Another method is to conduct a stratified analysis; right?

A. Define that.

Q. Okay. So, in a stratified analysis, you compare -- you look at the odds ratios of individuals with exposure to the substance you are looking at, but not a confounding exposure, and you also have a measure that has it where they are exposed to that substance and the other factor. You have one that doesn't have the confounding and the other that does. Correct?

A. That could be done.

Q. So, the -- we talked about statistical significance. We talked about confounding. The third issue that is raised with respect to limited epidemiological evidence is bias; correct?

A. I don't know.
Q. Okay. Let me go back. The definition of "limited" that we have talked about for the epidemiological evidence in this case, for glyphosate and non-Hodgkin's lymphoma, cannot exclude the possibility of bias; correct?
A. Yes.
Q. How would you define the concept of bias in an epidemiological study?
A. Every study has bias.
Q. What is bias, just sort of the lay perspective?
A. Bias is a directional error. There are errors in every study. We are human beings, so every study, particularly in humans, that is conducted, has errors inherent in it. Every study, observational studies in particular.
So, the errors can be random or the errors can be directional. So, bias are directional errors where there is -- where the -- because of the nature of the error, it gives a tilt to the estimate that you get for the odds ratio, for the risk ratio, at the

end. It tends to give it a -- either a positive or a negative result because of the nature of the responses that the subjects give.
I mean, the truth is error is bad, but whether it's directional -- well, you can smile, but error -- nondirectional error is bad also, but biased error is worse than -- than non-biased error.
Q. And biased error is what you defined as a directional error.
A. Right.
Q. And a directional error means that you have a reported odds ratio, a risk ratio that is actually not reflective of the true association, because it has been artificially shifted in a certain direction, either higher or lower; correct?
A. Yes.
Q. Now, in your expert report, you discuss two study designs for observational epidemiology, cohort and case-control studies, that can be subject to different types of biases; correct?
A. Yes.

Q. Given the choice between these two study designs, most people prefer cohort studies, because the individuals in the study are unbiased at the beginning of the study when you get your data; correct?
MR. TRAVERS: Objection, calls for speculation.
A. I would say that in general, one prefers cohort studies to case-control studies, for the reason you give, but the reality is that the truth is, it's the quality with which the studies are conducted that in the end determine which one is really the better one.
Q. But just to confirm, as a general matter, most people prefer a cohort study, given the choice between the two, because people are unbiased at the beginning of the study when you get your data; correct?
MR. TRAVERS: Objection, asked and answered, calls for speculation.
A. I would say that -- let's say that cohort studies are preferred. I'm not sure I would agree with -- precisely with the reason that you are giving, but the answer is that

the cohort studies are generally preferred.
Q. Okay. Let's go back to your January 7, 2013 deposition. That should still be in front of you. It's going to be one of these transcripts. I think it's the top one there. Yeah.
A. Did I misquote myself?
Q. You disagreed with yourself a little bit, but --
MR. TRAVERS: Objection, move to strike.
Q. Let's look at page 174 in your deposition.
A. Is it -- is this the document?
Q. The January 7 one, yeah. It should have January.
Page 174, lines seven through ten, and I believe I quoted you correctly. "Most people prefer a cohort study, given the choice between the two, mainly because the people are unbiased at the beginning of the study when you get your data." Correct?
MR. TRAVERS: Objection. You didn't read the full answer.
A. So, yes. No, I'm not disagreeing

with what I said four years ago, but if you are asking me as I sit here now why people prefer a cohort to a case-control study, there are other reasons.

Q. What other reasons are there that people prefer a cohort study to a case-control study?

A. I think it's a more naturalistic -- it's more naturalistic.

Q. That is because you are actually following people over time to see outcomes?

A. Just it's prospective. I think it's prospective as opposed to retrospective.

Q. And given the choice between the two study designs, a prospective study design is --

A. It's more natural. It's the natural order of life.

Q. And as an epidemiologist, that is preferable in the study design?

A. Again, we are talking sort of do you prefer apples or do you prefer pears, but again, whether you like apples or pears, the truth is, when you look at the fruit, the one that has the bruises on it is the one you are

not going to eat. So, the quality of how you carry out the study is ultimately -- a bad cohort study is not as good as a good case-control study, and vice-versa, you know.

Q. We are going to look at the quality of the studies.

A. No, I understand, I'm sure we are. But I'm saying that --

Q. I want to make sure I got your full answer, though, because you had stated that there is testimony about cohort studies, the individuals are unbiased at the beginning of the study.

A. Um-hum.

Q. That was one. And two, you mentioned that cohort studies are more naturalistic than case-control studies. Are there --

A. Again, this brings up the issue of temporality, but again, temporality is not usually a major issue.

Q. Okay. So, with temporality, if I understand correctly, a cohort study allows you to make sure you have temporality, and a case-control study, you can't be as certain.

Is that correct?

A. Temporality is very rarely -- I would have to say uncommonly a major -- a major concern.

Q. Let's -- we will circle back to that. Let me just continue from your report.

In your report you mentioned that the main difficulty with cohort design is that they are expensive and time-consuming, particularly with outcomes like cancer; correct?

A. Yes.

Q. But as compared to a cohort study, a case-control study is more susceptible to bias; correct?

A. They are both susceptible to bias, just different biases.

Q. Let's look at your expert report.

A. I will say they are both susceptible to error, just different error.

Q. Your expert report, which I think was 14-6. It should be still in front of you, Dr. Neugut.

MR. LASKER: If you can give him his expert report.

Q. It's 14-6. They should be in order.

No, you can keep it. I have my own copy.

A. Sorry.

Q. And just on page eight of your expert report -- well, pages seven through nine, you are comparing the cohort study design to the case-control study design; correct?

A. Yes.

Q. And at the bottom of page eight, with respect to case-control studies, you state that a disadvantage of case-control studies, as compared to cohort studies, is that they have an increased susceptibility to bias; correct?

A. Yes.

Q. For example, one disadvantage of a case-control study that you don't have with cohort studies generally is the possibility of recall bias; correct?

A. Have less concern for recall bias, yes.

Q. So, recall bias occurs when cases,

for example, of NHL, people with NHL, are more likely to recall prior exposures than healthy controls that don't have the disease; correct?
A. Yes.
Q. Recall bias is not an issue in cohort studies because the study population is followed prospectively and the investigators gather the exposure information prior to any cancer diagnosis. I'll do it again.
Recall bias is not an issue in cohort studies because the study population is followed prospectively and the investigators gather exposure information prior to any cancer diagnosis; correct?
A. Recall bias is much less or not an issue, yes.
Q. It's not an issue at all; correct?
A. Not in the way it is in a case-control study, that's correct.
Q. Case-control studies are also more prone to selection bias than cohort studies; correct?
A. Yes.

Q. Selection bias can occur when a selection of individuals into a study is based both on the disease status and their exposure status; correct?
A. I'm sorry, say that again.
Q. Selection bias can occur when selection of individuals into a study is related both to their disease status and to their exposure status.
A. It's possible.
Q. And with a case-control study, you are specifically selecting subjects based upon their disease status. That's how you choose the cases; correct?
A. Yes.
Q. So, that takes you halfway to where you could have a selection bias problem; right? You have one of the --
A. You have to talk louder.
Q. That would take you halfway to where you could have a selection bias problem. You are already selecting based upon disease, so if there is anything in the methodology that creates selection based upon exposure, you have a selection bias issue; correct?
MR. TRAVERS: Objection, compound question.
A. I don't understand the point.
Q. Okay. If there is, in a case-control study, some difference in the selection of cases or controls that impact the likelihood of exposure, that can introduce a bias into the study; correct?
MR. TRAVERS: Objection, calls for speculation.
A. Again, I'm not following the question easily.
Q. In a case-control study --
A. Um-hum.
Q. -- if there is some difference in the selection method or the selection of cases and controls that is associated with the exposure of interest, that would create a selection bias; correct?
MR. TRAVERS: Objection, calls for speculation.
A. That would be -- that would be extraordinarily uncommon, if I'm understanding correctly what you are asking,

and I don't think it would be applicable in this particular -- I don't think it would be applicable in -- at least in the context of what we are talking about.
Q. Okay. But if there was some difference in the selection of cases or controls in a cohort study that was associated with the likelihood of exposure, that would create a selection bias; correct?
MR. TRAVERS: Objection, asked and answered.
A. Yes, it could, but as I say, I don't think it would be relevant in the context. There might be exposures and outcomes where that might play a role in a case-control study -- we're talking now of case-control studies or --
Q. Um-hum.
A. But I don't think that would be applicable here.
Q. If there was a difference in the response rate for inclusion in the study between cases and controls, in other words, cases participate in a study at a higher likelihood than controls, that can raise a

concern about selection bias; correct?
MR. TRAVERS: Objection, calls for speculation.
A. Yes, but then you might not know which way the -- again, the direction of the arrow could go either way.
Q. A cohort study -- strike that.
In your expert report, you talk about two types of biases with -- that can occur in a cohort study, and the first is loss to follow-up; correct?
A. Yes.
Q. And one method -- and loss to follow-up is, you are following them prospectively and you want to know what happens to them prospectively, and if ten years from now you lose track of that person, you can't track what happened to them, you have a loss to follow-up; correct?
A. Yes.
Q. So, one method that epidemiologists can use to reduce the problem of loss to follow-up, is if they have another source of information for outcomes, like a hospital database or a Medicare database, to be able

to track the outcome of those individuals prospectively; correct?
A. In a large cohort study, you hope you have such a database, but that is often difficult with free living individuals.
Q. But when you do have such a database, and in particular the AHS study had that, that addresses this concern of loss to follow-up; correct?
A. As long as the people stay in the area where the registry is.
Q. And with respect to the Agricultural Health Study, that was the case, in fact; they were able to continue to track those individuals through the database?
A. Yes.
Q. You also state --
MR. TRAVERS: I just want to -- just an objection. When you say "AHS," are you referring to De Roos 2005 or --
MR. LASKER: The Agricultural Health study. That would be De Roos 2005 as well, yes. The study is the study.
MR. TRAVERS: Well, it's two different -- there are different phases

to the study. I just want to -- just for clarity, I just want to make sure which --
MR. LASKER: There is an overall study, and there is lots and lots of publications --
MR. TRAVERS: Okay.
MR. LASKER: -- which by design is a study design.
A. I'm referring to the --
Q. De Roos 2005?
A. Yes.
Q. Okay. You also state that cohort studies may be subject to detection observer bias.
A. I'm sorry?
Q. In your expert report, you say that cohort studies may be subject to detection observer bias. What is that?
A. I knew you were going to ask me that.
Q. If you don't know, that's fine. This is mentioned in your expert report on page eight; right?
A. That -- it's basically the -- it's

the complement to what you -- we talked about earlier with regard to the case-control study, which is that the knowledge of the -- of the exposure affects the -- affects the diagnosis subsequently. So, it's sort of the prospective equivalent of what you were calling earlier -- what we were calling earlier selection or diagnostic bias, that knowing, for example, that someone was exposed to -- to an exposure, might influence how they are diagnosed subsequently.
Q. That issue, detection observer bias, is not a concern in the Agricultural Health Study; correct?
A. So, I was listing, you know, potential biases. To what degree it plays a role in this particular -- this was a theoretical, if you will, or general discussion of cohort versus case-control studies, and I wasn't specifically speaking with regard to the Agricultural Health Study. It was a general discussion of cohort versus case-control studies.
Q. Yeah, I understand that.
A. Right. So --

Q. I'm just trying to clarify that that issue, detection --
A. Right. So --
Q. Sorry. Detection observer bias is not a concern with the Agricultural Health Study; correct?
A. I would probably not rate it as a major bias in the analysis of the outcomes.
Q. It's not any bias. I mean, there is no issue of people being diagnosed with non-Hodgkin's lymphoma based upon their exposure; correct?
MR. TRAVERS: Objection to form.
A. I would doubt it.
Q. Now, in its conclusion that the epidemiological literature for glyphosate and non-Hodgkin's lymphoma is limited, IARC also considered an IARC meta-analysis of the epidemiological studies; correct?
A. Yes.
Q. Now, you have never conducted or published a meta-analysis yourself; correct?
MR. TRAVERS: Objection, compound question.
A. Personally, I have not. I think

one of our fellows has done one now that is sort of winding its way through the literature, but for all intents and purposes, the answer is no.
Q. You do agree, though, that meta-analyses usually do not substantially alter one's understanding of the underlying studies; correct?
MR. TRAVERS: Objection, calls for speculation.
A. I don't know what that means.
Q. Okay. Let's mark as 14-9 an article that you have published that I think states exactly that. Let's see if I am right.
(Exhibit 14-9, Etiology article, Meta-analysis: Use of combined oral contraceptive in the past ten years is associated with an increased risk for breast cancer, 1996 Nov-Dec marked for identification, as of this date.)
Q. And Dr. Neugut, I'm handing you a -- I think it was maybe a letter or an editorial, I'm not sure how you describe this -- that you prepared for the American

College of Physicians entitled "Meta-Analysis: Use of combined oral contraceptives in the past 10 years is associated with an increased risk for breast cancer."
MR. TRAVERS: I just have one question. Is this just the abstract or is there a full study?
MR. LASKER: This is the full document. It's a commentary.
MR. TRAVERS: Okay.
Q. And on page three of your commentary, or three of four, the first -- the second paragraph, I'm sorry, you state: "As is usual for meta-analysis -- for meta-analyses, the overall results do not substantially alter one's understanding of the previous studies."
And by "previous," you mean the underlying studies, I take it; correct?
A. Yes.
Q. And you agree with that; correct?
A. Yes.
Q. And in particular, when observational studies report small relative

risks, less than 2.0, it's your view that meta-analyses are probably as good as can be done and suggest that there is not a greater concern, or greater cause for concern; correct?
MR. TRAVERS: Objection, misstates his commentary.
A. Yes.
Q. Just to be clear, my question was, correct, you do believe that when observational studies report small relative risks, meta-analyses are probably as good as can be done and suggest that there is not a greater cause for concern; correct?
A. Yes.
Q. You have also cautioned, and cautioned in this commentary, about reaching causation opinions based upon statistically significant findings below 2.0 in meta-analyses; correct?
A. Yes.
Q. And in your opinion, we should refer to such findings -- or strike that.
We should not refer to such findings as small but statistically

significant, but instead should state that such findings are statistically significant but small; correct?

A. I would point out that this was written 20 years ago.

Q. That's why I am asking you today.

A. And this is --

Q. You agree --

A. And this is an old -- you know, I had hair then.

Q. That's good to know.

A. So --

Q. I'm asking if you agree with that statement today.

A. I think -- so, I agree that with smaller risk ratios, one has to exhibit more caution, but I think that the field has moved in that direction. And by "the field," I am referring to epidemiology in general. And that back in the 1990s, that there was more caution with going below risk ratios of two, and even legally, the Daubert -- if we are talking about a Daubert hearing, the legal field would have been more cautious below a risk ratio of two.

But now, risk ratios of 1.3 and 1.4 are taken seriously. Many risk factors that we take very seriously in public health are really at that level of 1.3 and 1.4, and even 1.2, and we consider them significant carcinogens and act on them in the public health sphere.

So, I would say that -- that while it is true that it's more difficult, it makes it more difficult methodologically to establish a risk in that range, and that's why we are for the most part sitting here talking about this risk ratio, but that doesn't mean it's unimportant. I would disagree with my statement to the degree that it's -- when I say statistically significant but small, "small" doesn't mean unimportant. "Small" means small and difficult to establish with -- to the degree that we would like to be comfortable and confident that it's a true causal association.

It makes it more difficult methodologically for us an epidemiologists and scientists to be -- to establish it as a probable carcinogen or a true or an absolute

carcinogen, which is why -- why we are -- why we are sitting here.

Q. Just so I understand your prior testimony, one of the factors that you mentioned in your consideration of these types of findings in meta-analysis is your understanding of the changes in the Daubert standard with respect to what courts are looking for?

A. No, I'm not making a legal -- I was not trying to make a legal conclusion for you guys. That's your job. I'm simply saying, I recognize that -- I'm simply saying that even in the legal field, the standard of what is big and small, if I am understanding the legal ramifications, has changed also in the last 20 years.

Q. There are certain guidelines that have been set forth on how to conduct meta-analyses; correct?

A. Yes.

Q. And you cite to such guidelines in your expert report; correct?

MR. TRAVERS: What page is that?

MR. LASKER: Page nine.

A. Yes.

Q. And in particular, you cite to an article, and this is the third full paragraph in the meta-analysis, in discussing how to perform a meta-analysis, you cite to a -- guidelines prepared by Walker, Hernandez and Kattan in 2008; correct?

A. 2008?

Q. Yes.

A. Um-hum.

Q. Is that correct?

A. Yes.

Q. This is an article that you rely upon as authoritative in providing guidelines on proper approaches for meta-analyses; correct?

A. Yes. Again, I don't do them personally, but as a reference.

MR. LASKER: Let's mark this paper as 14-10.

(Exhibit 14-10, Cleveland Clinic Journal of Medicine, June 2008, Meta-analysis: Its strengths and limitations marked for identification, as of this date.)

Q. Dr. Neugut, this is the guideline article that you cite in your expert report for meta-analyses; correct?
A. Yes.
Q. So, as one of the key points at the beginning on this first page of the Walker guidelines, one of the key points that is stated right under the abstract, is that there are many caveats in performing a valid meta-analysis, and in some cases a meta-analysis is not appropriate and the results can be misleading. Correct?
A. Yes.
Q. And you agree with that; correct?
A. I suppose, yes.
Q. And on page 436, there is a section on randomized control trials versus observational trials.
A. I'm sorry, page?
Q. 436. Do you see that?
A. Yes.
Q. And the Walker guidelines state that some researchers believe that meta-analysis -- meta-analyses should be conducted only on randomized control trials;

correct?
A. Yes.
Q. And that is because -- let's take a step back and define, a randomized control style -- a randomized control trial is a different type of epidemiological study where, for instance, in drug studies, where they will have a placebo group and a control group, and the investigators will provide the medication to the subjects and actually have a controlled study going forward; correct?
MR. TRAVERS: I object to the testimony of counsel.
A. A randomized control trial is a cohort study where the -- where the investigators provide the exposure to the subjects.
Q. Okay. So, let me make sure I understand your testimony then. Is it your testimony that a randomized control trial is a -- is a type of cohort study?
A. Yes. I mean it's a specialized form. It falls under -- there are only two kinds of studies in epidemiology, cohort studies and case-control studies. A

randomized trial is a specialized -- falls under the rubric of cohort studies. I mean --
Q. Okay. Fair enough.
A. But, I mean, it's an easy -- it's an easier form of study to analyze, because you have -- you are giving the exposure to the individual or not giving the exposure to the individual, rather than having it be decided upon by subject choice or by, you know, random -- by -- not random, but by -- well, by subject decision.
Q. The concern that the Walker guidelines are noting here with meta-analyses outside of randomized control trials is that observational trials are more prone to confounding and bias errors than randomized control trials; correct?
A. I think they are saying that to meta-analyze observational studies, there is going to be heterogeneity between the studies, so it makes it a little more difficult or makes it more difficult to combine them in a way where you can be confident that the result that you get is not

due to some -- something other than purely the exposure and outcome relationship.
Q. And there -- the meta-analysis methodology does not allow for the investigators to address problems of confounding or bias in the underlying studies; correct?
A. In the usual meta-analysis, the answer is, for the most part, no. For the most part, no. Again, I'm not an expert in meta -- I mean, I can read them, I can analyze them, but for the most part, the answer is no.
Q. Okay. Just to be clear for my question, so the answer is no, in a meta-analysis, you cannot fix problems of bias or confounding in the underlying studies.
MR. TRAVERS: Objection, misstates.
A. I don't want to misstate it. I mean, the truth is that generally speaking, if you put together several studies, the biases are going to dilute out presumably over the -- over the several studies, and it's probably not going to be as big a

problem as -- you know, as people think or as one might presume.

You can't -- bias is omnipresent. So, if you are going to start just throwing around the word "bias," and say, "Bias, bias, bias, the study sucks," then you can throw out 90 percent of the epidemiology studies, and then we know nothing about anything.

But you have to look at studies and use judgment and common sense, and assess how big the bias is, how important is the bias, how well does the study address the bias, and then put them together, and that's part of the methodology of putting -- of doing a meta-analysis, is to qualitatively assess them as well.

Q. Okay. So, just so the record is clear, if an underlying study has an issue with recall bias --

A. Every study has an issue with recall bias.

Q. I understand. Let me ask the question.

If an underlying study has a problem with recall bias, the meta-analysis

methodology will not change that; correct?

MR. TRAVERS: Objection, asked and answered.

A. Not necessarily, no, but then again, you have to ask yourself how big is the recall bias. You have to ask yourself why is it only in non-Hodgkin's lymphoma. You have to ask yourself why -- you know, how -- it's not enough to say recall bias, the study can't be looked at.

Q. I'm not -- that wasn't my question. Mine is a methodological question, and we will be discussing individual studies. But methodologically, a meta-analysis does not provide any -- does not fix an underlying recall bias in one of the underlying studies; correct?

MR. TRAVERS: Objection, asked and answered.

A. No, it does not.

Q. And the meta-analysis would not fix an underlying selection bias in any of the studies, underlying studies; correct?

A. No, it would not.

Q. And a meta-analysis would not fix a

problem with confounding in any of the underlying studies; correct?

A. Not if the study itself did not address it, no.

Q. Now, another concern raised about meta-analysis in these Walker guidelines, and you mention it as well in your expert report, is the issue of publication bias; correct?

A. Yes.

Q. And publication bias occurs where investigators will not submit findings where there is no showing of a statistically significant result because those data are, for whatever reason, perceived as being less interesting; correct?

MR. TRAVERS: Objection, misstates the evidence.

A. That is a little simplistic. I would say publication bias is more complicated than that.

Q. But the concern about publication bias is that statistically significant associations are published and findings that are null are not published. That would be a publication bias; correct?

MR. TRAVERS: Objection, asked and answered.

A. So, the entire epidemiology methodologic system is set up to be conservative, so that null findings are the norm. We don't want to find positive findings. The system is set up not to find positive findings. It's biased, for lack of a better word, to avoid finding positive findings. Sort of like the legal system, you don't want to find someone guilty, you want everyone to be innocent unless they are really guilty.

So, on some level that's how epidemiology is constructed. So, when you have a positive finding, it's taken more seriously than when you have a null finding. So, on a certain level, publication follows that -- that track or that scenario, so that when you do have a positive finding, an editor, a publisher, a reviewer takes a positive finding as something that is more significant than several negative findings or null findings. I don't mean negative, that may have been null.

And so, so it's more important to report positive findings. So yes, there is some bias towards publishing positive findings, but that is how the system -- that is not necessarily a, let's say a, a criticism. That is not necessarily a, a bad thing in the literature. That may be the way it should be, that -- I mean, it wasn't intended that everything should come out 50/50, you know, that 50 percent of the studies should be null and 50 percent of the studies should be positive.

But then again, some of the publication bias is also that some studies never reach -- there's publication bias in other ways, that some studies, if you started off and you wanted to recruit 200 patients into your sample, and you ended up running out of money after 100 people, so you never finished your study, so those studies don't get published either, because you only reached 100, and so a half study -- half studies don't get published either. So, that is part of publication bias also.

What happened to all those, you

know, incomplete -- there are incomplete studies that are part of publication bias, too. There are all sorts of -- if you want to call them biases that -- you know.

Q. Well, just to be clear, because "publication bias" is the term in your expert report, and it's also in the Walker guidelines that you cite to, just so I am understanding the term correctly, publication bias refers to the situation where positive findings are published but null findings in another study may not be published; correct?

A. Publication bias refers to where anything isn't published that could have been, should have been, might have been published. Could be positive findings. As I say, if you didn't finish a positive study and it never got published, or you dropped dead before your successor could -- and so no one ever picked up the study to submit it to a journal, that is also publication bias. It goes both ways.

I suspect, as you say, more null findings are not published than positive findings, but it's also true that there

are -- I'm sure there are positive findings. I have many papers that are sitting in my computer on my hard drive that I thought were the greatest studies ever done, and that have been rejected by ten or 12 journals and that are not published, and they are sitting there gathering dust in my computer that, you know, I think the world is waiting to see, and no journal will publish them, and who knows? You know, so, there is that bias, too.

Q. Okay. But specifically with respect to this, the guidelines for meta-analysis, the concern that you raise and that Dr. Walker raises in his guidelines is that positive findings may be published and null findings may not be published; correct?

MR. TRAVERS: Objection, misstates.

A. That tends to be the way it goes. Yes.

Q. And the meta-analysis guidelines you cite in your expert report state that, quote, to ameliorate the effects of publication bias on the results of meta-analysis --

A. I'm sorry. Are you quoting me now

or you're quoting this?

Q. I'm quoting your guidelines, and if you want, it's on page 432.

MR. TRAVERS: Objection. They are not his guidelines.

A. You are quoting this.

Q. Okay. The Walker guidelines cited in your expert report. The meta-analysis guidelines you cite in your expert report state on page 432, and it's in the second column, the third full paragraph, "to ameliorate the effect of publication bias on the results of meta-analysis, a serious effort should be made to identify unpublished studies." Right?

A. Yes.

Q. And the same guidelines that you cite in your expert report, on page 433, state, in the border, "Exclusion of non-published studies increases selection bias." Correct?

A. Yes.

Q. How can the exclusion of non-published studies from meta-analysis increase selection bias?

A. I'm sorry, say it again.
Q. How can the exclusion of non-published studies from a meta-analysis increase selection bias?
A. I suppose if you haven't included every study, then you are -- you have to be concerned that you are biasing the results upward.
Q. And these recommendations in the Walker guidelines that you cite in your expert report, they are consistent with lots of other meta-analyses guidelines on how to treat unpublished studies, aren't they?
A. I don't know.
Q. So, you have also written about the use of time trends for the incidence of specific cancers to provide some clues as to potential causes of cancer; correct?
A. I have?
Q. Yes.
A. I guess.
Q. Well, let's go back to your chapter on epidemiology and prevention in the ASCO-SEP, and I didn't write the number on this one. Which is this? 14-8.

A. That is the ASCO-SEP?
Q. Yes.
MR. TRAVERS: And this is a 1996 article?
MR. LASKER: No. This is 2014, maybe. I don't know when this -- the copyright is 2013.
Q. That's it. And on pages, I think two and three, you are discussing some sort of time trends that you -- to compare against exposures to sort of get some clues as to causation; correct?
A. Yes, um-hum.
Q. So, for example, you show how time trends in lung cancer incidence can be traced to increases and decreases in smoking; correct?
A. Yes.
Q. And when you do a time trend analysis for cancer, you need to account for latency; correct?
A. Oh, it depends, but depending on the context, yes.
Q. And generally, just so the record is clear, the issue for latency is that for

cancer, there is usually a period of years after an exposure before cancer would be developed and diagnosable; correct?
A. Depends on what the exposure and the outcome is.
Q. But the concept of latency is that there is some time period that elapses from exposure until a cancer; correct?
A. Yes.
Q. And you would then be looking -- for time trend, you would be looking for impacts on the cancer rate some years after changes in the exposure incidence; correct?
A. Again, it would depend on the specific context that we are talking about. It varies from -- every exposure and every outcome has its own unique idiosyncratic relationship.
Q. Plaintiffs' expert Dr. Weisenburger has, and he's an expert in this litigation for plaintiffs, has opined that the latency created for non-Hodgkin's lymphoma caused by pesticide exposure would be on the order of ten years or more. Does that sound right to you?

MR. TRAVERS: Objection. Do you have his report, if you are going to ask about it?
Q. First off, while we are getting the report, out, let me ask you, does ten years sound like a reasonable estimate of the latency for non-Hodgkin's lymphoma following pesticide exposure?
A. I wouldn't have any basis on which to make a judgment.
Q. You have not looked at that question?
A. No.
Q. You do agree that the issue of latency is a significant factor in analyzing epidemiological findings; correct? For cancer.
A. Say the question again.
Q. You do agree that this concept of latency is an important issue to be aware of in reviewing findings from epidemiological studies of an exposure and an cancer outcome.
A. I think if one has a specific epidemiologic association and mechanism, then the answer is yes.

Q. And Dr. Weisenburger's report --
MR. LASKER: Let's mark as -- what did I say it was? 14-11.
(Exhibit 14-11, Expert Report of Dr. Dennis Weisenburger, M.D. marked for identification, as of this date.)
Q. It's Dr. Weisenburger's report, and we are marking pages one through six, because that's the section in which he discusses the issue of latency.
MR. TRAVERS: I will object, that it's not the full report.
MR. LASKER: That's fine.
Q. And on page five of his expert report, Dr. Weisenburger is talking about the issue of latency; correct?
A. I'm on page five. Can you point out --
Q. The whole paragraph on page five.
A. The one that begins, "Only one large cohort study"?
Q. That's it.
A. Can I have a moment to look at it?
Q. You can.
A. Okay. What is the question?

Q. So, Dr. Weisenburger in this paragraph is talking about the issue of latency for pesticide exposure and non-Hodgkin's lymphoma; correct?
A. Yes.
Q. And Dr. Weisenburger talks about 6.7 years as perhaps being too short of a time period to account for latency between pesticide exposure and non-Hodgkin's lymphoma; correct?
A. In terms of latency?
Q. Yes.
A. Yes.
Q. And he talks about various studies and suggests a cutoff of ten years as being the, you know, reasonable estimate of the latency period for exposure to pesticide and non-Hodgkin's lymphoma; correct?
A. Yes.
MR. TRAVERS: Objection, misstates his opinion.
Q. And do you have any reason to disagree with Dr. Weisenburger's analysis of this issue of latency?
A. Do I have any reason to --

Q. Disagree with Dr. Weisenburger's analysis of latency.
MR. TRAVERS: Objection, calls for speculation.
A. I have no basis on which to agree or disagree. It would depend on what -- whether one thinks that glyphosate is a tumor initiator or a tumor promoter. You know, latency periods can be as short as one or two years, depending on the exposure and the outcome.
And I am not sure, even as I sit here, what the actual mechanism is by which -- that is not my expertise per se, what the precise mechanism is by which glyphosate causes non-Hodgkin's lymphoma biologically, so I would have difficulty characterizing the latency period, but I have no reason to doubt his expertise.
Q. So, just to be clear, you do not have an expert opinion on the latency period for glyphosate exposure and non-Hodgkin's lymphoma?
A. Correct.
Q. And you do not have an expert

opinion that glyphosate is a tumor promoter; correct?
A. As opposed to an initiator?
Q. Yes.
A. Well, it wasn't shown to be a mutagen, so I guess once it's not a mutagen or -- I don't know -- as I said, I don't know specifically its exact mechanism of how it's causing -- how it is precisely causing cancer.
Q. So for a -- if we are doing a time trend analysis of non-Hodgkin's lymphoma, if Dr. Weisenburger is correct with a ten-year latency period, we would want to look and see how incidence of non-Hodgkin's lymphoma changed ten years after exposures to glyphosate? Is that a correct understanding of how the time trend analysis would work?
MR. TRAVERS: Objection, compound and misstates Dr. Weisenburger's testimony.
A. Are you talking now on a population scale?
Q. Yes. Like the way you presented in your chapter.

A. So, when I talk about it in my chapter, we are talking about lifestyle factors that are prevalent across an entire population, like cigarette smoking or postmenopausal women taking hormonal -- you know, menopausal hormones, which is a very widespread phenomenon.

If you are talking about exposures where only a small fraction of the population is actually exposed, and where the relative risk is 1.2 or 1.3 or 1.4 -- let's say 1.3 or 1.4, then to see that impact on the -- you know, on the population prevalence of non-Hodgkin's lymphoma would require quite a -- that would be rather -- rather profound. I don't know if you would see it on a population scale.

Q. So, is it your understanding that exposures to glyphosate in the population are rare?

A. No. It's fairly common, but in a -- in a selective portion of the population.

Q. And those would be sort of agricultural populations?

A. Agricultural, gardeners, you know, my wife, I don't know, but she's got tomato plants now, but -- so, it may be profound. I don't know. It's not my -- again, I am not going to put myself up as an expert in that regard, in how much the attributable risk is going to be across the population.

I'm simply saying that if you want to see a population effect, it has to be a fairly prevalent -- it's not just -- it's both the risk and the prevalence of exposure that is significant in order to see a -- to see a population-based time trend change, you know.

Q. Fair enough.

A. In addition to the latency. You know, I mean then first latency will play a role and you might have to wait -- again, if he says ten years, you might have to wait ten years to first see it show up.

Q. Dr. Neugut, in your report, you -- your expert report, you note that epidemiological studies use a multistep process to establish causal inferences; correct?

A. Yeah.

MR. TRAVERS: What page?

Q. Well, if you need to refer to your expert report for this, it's at page six.

But first, principles of causal inference are used to construct theories which help us formulate testable hypotheses; correct?

A. Yes.

Q. Epidemiologists then design studies to test those causal hypotheses; correct?

A. Yes.

Q. And that is the definition of a scientific method; right? The formulation of hypotheses and the testing of those hypotheses to determine whether they can be validated; correct?

A. Yes.

Q. And you also agree that a hypothesis generally cannot be validated based upon the results of any one epidemiological study; correct?

MR. TRAVERS: Objection, calls for speculation.

A. Any one single -- well, I'm sorry,

say that question again.

Q. You would agree that a hypothesis generally cannot be validated based upon the results of any one epidemiologic study.

MR. TRAVERS: Same objection.

A. You mean could there be one single epidemiologic study which is so terrific or so profoundly good that I could reach a conclusion based solely on that? The answer is, there probably could be.

Q. But as a general matter?

A. But -- and there have been, so the answer is, I don't agree with that statement, but I think with -- with risk ratios like this, and prevalences like this, this isn't one of the contexts where that is probably going to be true.

Q. Okay. So, in the context particularly that we are dealing with here, a scientist following the scientific method would be formulating hypotheses, testing those hypotheses to see if they could be validated, and then testing those hypotheses again to determine whether those findings are replicated; correct?

A. Yes.
Q. Epidemiologist studies also -- strike that.
Epidemiological studies sometimes will report out results that are not linked to any preset hypothesis; correct?
A. So, could you just define that a little better for me?
Q. So you -- epidemiological studies, they can have a hypothesis that they are designed to test.
A. Right.
Q. But they can also report out other results that are not part of the original hypothesis, but they have the data; correct?
A. Yes.
Q. And those types of studies are often studies that report out a large number of different potential associations relating to different exposures; correct?
MR. TRAVERS: Objection, calls for speculation.
A. Yes.
Q. Those are often referred to as exploratory studies; correct?

A. Sometimes, yes.
Q. And in those studies, the results can generate future hypotheses that then must be tested through studies that are designed to test those hypotheses; correct?
MR. TRAVERS: Objection, calls for speculation.
A. So, again, how much weight you put on them really is again a contextual question, but in general, I would probably agree with what you are saying.
MR. LASKER: And just in -- objection, calls for speculation, with an expert witness I have never heard before. All of his testimony is his opinion, none of it is speculation, so I'm going to object to your objection.
MR. TRAVERS: Well, you are asking for speculation.
MR. LASKER: I'm asking for his opinions.
Q. So, just so I understand, when an epidemiologist reviews the findings of an epidemiological study, one question that must be considered is whether the study was

designed -- let me state that again.
When an epidemiologist is analyzing the finding of an epidemiological study, one question that must be considered is whether that study was designed to test the hypothesis that is the subject of that epidemiologist's inquiry; correct?
MR. TRAVERS: Objections, calls for speculation.
A. Whether it was the primary hypothesis?
Q. Correct.
A. Yes.
Q. Okay. Let's talk about the -- some of the specific epidemiological studies you mentioned in your expert report. And let's start with the De Roos study, 2005 De Roos study. There is two of them.
MR. LASKER: We will mark that as Exhibit 14-12.
(Exhibit 14-12, Environmental Health Perspectives, January 2005, Cancer Incidence among Glyphosate-Exposed Pesticide Applicators in the Agricultural Health Study marked for identification,

as of this date.)
Q. And Dr. Neugut, we have already had some brief mention of this study. The De Roos 2005 is part of a larger initiative called the Agricultural Health Study; correct?
A. Yes.
Q. And the Agricultural Health Study is funded by the National Cancer Institute and the National Institute of Environmental Health Sciences in collaboration with EPA and the National Institution of Occupational Safety and Health; correct?
A. Yes.
Q. The AHS study is not funded by private companies; correct?
A. Not to my knowledge.
Q. Monsanto does not fund the Agricultural Health Study; correct?
A. I don't think so.
MR. TRAVERS: Objection, which -- I think we have to be specific, because there is one AHS study funded by Monsanto.
MR. LASKER: That's not correct.

MR. TRAVERS: It's from the AHS cohort.
Q. Dr. Neugut, specifically, De Roos 2005 was not funded by Monsanto; correct?
A. I would have no idea, but not to my knowledge.
Q. The Agricultural Health Study, and specifically De Roos -- well, the Agricultural Health Study is the only prospective cohort study that has looked for a possible association between glyphosate and cancer; correct?
A. The only cohort study, yes.
Q. Yes.
The Agricultural Health Study was initiated to address some of the limitations of case-control studies that had looked at potential associations between farming exposure and cancer; correct?
MR. TRAVERS: Objection, calls for speculation.
A. I don't know, but I assume.
Q. Okay. Can you pull out Dr. Blair's deposition testimony again. It should still be in front of you. I think it's probably

over there.
Dr. Blair is one of the initiators, one of the original investigators for the Agricultural Health Study; correct?
A. He's a coworker.
Q. And if I can refer you to Dr. Blair's deposition testimony at page 94, specifically, line -- page 94, lines six to 16, Dr. Blair testifies that the Agricultural Health Study was initiated to address some of the limitations of case-control studies that had looked at potential associations between farming exposures and cancers; correct?
A. And his answer was, "It was initiated and formed to provide a different design to look at the same issue."
Q. And then the next question:
"It was initiated at least in part to address some of the limitations of case controlled studies; correct?
"Answer: Yes."
A. Yes.
Q. You have no reason to doubt that, do you?
A. No.

Q. The AHS study was initiated to avoid the problem of recall bias in case-control studies; correct?
A. Yes.
Q. The Agricultural Health Study also was designed to avoid misclassification bias; correct?
A. Misclassification bias of what type?
Q. Misclassification of exposures.
A. How did it do that?
Q. By going to farmers that had better recall and also periodic follow-up.
MR. TRAVERS: Objection, move to strike.
A. So, you are saying it did not have misclassification bias? Misclassification error?
Q. I direct you to Dr. Blair's deposition testimony at page 96, line two through seven.
A. To try and deal with issues of misclassification.
Q. Yes.
"The Agricultural Health Study was

also designed to try and deal with issues of misclassification of exposures by going to farmers, who you testified earlier had better recall, and also periodic follow-up; correct?
Answer by Dr. Blair: "Yes."
A. I emphasize the word "tried."
Q. You have no reason to believe that that was part of the effort in the design of the Agricultural Health Study; correct?
A. That was part of the --
Q. Effort in the design of the Agricultural Health Study.
A. Effort?
Q. You have no reason to doubt Dr. Blair's testimony that --
A. That was part of the effort?
Q. Yes.
A. Okay. Fair enough.
Q. Now, the Agricultural Health Study, I think as you note in your report, includes some 57,311 private and commercial applicators who are licensed to apply restricted-use pesticide at the time of

enrollment into the study; correct?
A. Yes.
Q. And Dr. Neugut, I think it's going to be easier for the videographer if you could remove your hand --
A. I apologize.
Q. No problem. I think the court reporter is getting it, but --
MR. TRAVERS: We have been going over an hour.
MR. LASKER: Do you want to take a break?
MR. TRAVERS: Yeah, before you get into it.
MR. LASKER: That's fine.
THE VIDEOGRAPHER: The time is 11:35 a.m. We are off the record.
(Recess taken.)
THE VIDEOGRAPHER: The time is 11:41 a.m. We are on the record.
THE WITNESS: Thank you.
BY MR. LASKER:
Q. Dr. Neugut, before the break, we were talking about the Agricultural Health Study. The Agricultural Health Study focused

on private and commercial applicators of pesticide because they were likely to have the highest levels of exposures to pesticides; correct?
A. Yes.
Q. The hypothesis being tested in De Roos 2005 was whether glyphosate exposure was associated with cancer or cancer subtypes; correct?
A. Oh. Yes.
Q. And we will -- I'm going to turn to some of the comments you have in your expert report in a minute, but you would agree, I take it, that De Roos 2005 does not provide evidence that would validate the hypothesis that glyphosate exposure causes non-Hodgkin's lymphoma; correct?
A. Yes.
Q. And De Roos 2005 did not find an association between glyphosate exposure and non-Hodgkin's lymphoma either in its analysis adjusted solely for age or in its analysis controlling for other pesticides or other potential confounders; correct?
A. Correct.

Q. De Roos 2005 also does not find any increased association with non-Hodgkin's lymphoma with higher exposure levels to glyphosate either measured by duration or measured by duration and intensity of exposure; correct?
A. Correct.
Q. The days of exposure to glyphosate-based herbicides in the exposed members in the Agricultural Health Study cohort in De Roos 2005 was significantly higher than any reported days of exposure in the glyphosate case-control studies; correct?
A. In the glyphosate --
Q. Case-control studies.
A. Yes.
Q. The lowest exposure group in De Roos 2005 had between one and 20 total days of glyphosate exposure; correct?
A. Yes.
Q. The lowest exposure group in De Roos 2005 includes individuals who would be categorized in the highest exposure groups in both McDuffie and the Eriksson 2008 studies; correct?

A. Yes.
Q. The highest exposure group in the Eriksson study was ten days or more; correct?
MR. TRAVERS: Objection. If we are going to ask about specific studies, I think we need the --
A. I don't recall offhand.
MR. LASKER: Okay. Well, if you want to refer to the study, we can do that.
Mark this as 14-13.
(Exhibit 14-13, Pesticide exposure as risk factor for non-Hodgkin lymphoma including histopathological subgroup analysis marked for identification, as of this date.)
Q. So, this is the Eriksson study and -- a 2008 study, and at page 1659 in that study --
MR. TRAVERS: Sorry, do you have a copy?
MR. LASKER: I'm sorry, I didn't include you?
MR. TRAVERS: Or did you?
MR. LASKER: Is that what's in your

hand?
MR. TRAVERS: No. This is De Roos.
MR. LASKER: I'm sorry.
Q. So table two of Eriksson shows that their breakout for the low exposure group and the high exposure group is ten days; correct?
A. Yes.
Q. So, the lowest exposure group in -- or the highest exposure group in the Eriksson study included -- would be within the lowest exposure group in De Roos 2005; correct?
A. Well, maybe yes or maybe no. It could have been --
Q. Partially.
A. Overlapped it.
Q. The highest exposure group in the McDuffie study, and if you need to, I will show you that study, was greater than two days per year; correct?
A. Yes.
MR. TRAVERS: I'm going to object. If we are going to ask about the specific figures in a study, I think we need to --
Q. If at any time, you need to refer to a study, let me know.

A. That one I remember.
Q. Okay. So, the middle exposure group and the dose response analysis in De Roos 2005, and this is the De Roos 2005 paper at 52, table three, that middle exposure group had between 21 and 56 days of exposure; correct?
A. Yes.
Q. And compared to this lowest dose group, individuals with this higher duration of glyphosate exposure had a non-statistically significant 30 percent lower risk of non-Hodgkin's lymphoma; correct?
A. Yes.
Q. The highest exposure group in De Roos 2005, in the dose-response analysis, had between 57 and 2,678 days of glyphosate exposure; correct?
A. Yes.
Q. So, there was at least one individual in the De Roos 2005 study that had the equivalent of more than seven years' worth of daily glyphosate exposure; correct?
A. Yes.

Q. And compared to the lowest dose group, the risk of non-Hodgkin's lymphoma in this highest dose group, up to as much as seven years of daily glyphosate exposure, was also reduced; correct?
A. Yes.
Q. De Roos 2005 also analyzed dose-response for glyphosate based upon the intensity of glyphosate exposure; correct?
A. Yes.
Q. And De Roos 2005 calculated intensity of exposure based upon factors like how glyphosate was used and whether the applicator used protective gear; correct?
A. Yes.
Q. None of the case-control studies in the glyphosate literature included any measure of the intensity of exposure to glyphosate.
MR. TRAVERS: Objection, misstates evidence.
A. None of the --
Q. None of the case-control studies in the glyphosate epidemiological literature include any measure of the intensity of

exposure to glyphosate; correct?
MR. TRAVERS: Same objection.
A. I don't believe they do.
Q. De Roos 2005 also reported that there were lower risks of non-Hodgkin's lymphoma with increased duration and intensity of glyphosate exposure; correct?
A. Yes.
Q. There is no data anywhere in the epidemiologic literature reporting a higher risk of non-Hodgkin's lymphoma with greater intensity exposures to glyphosate; correct?
MR. TRAVERS: Objection, misstates evidence.
A. I'm sorry.
Q. There is no data anywhere in the epidemiologic literature reporting a higher risk of non-Hodgkin's lymphoma with greater intensity exposure to glyphosate; correct?
A. Not to my knowledge.
Q. So, there is no such data; correct?
MR. TRAVERS: Objection, asked and answered.
A. Again, to my knowledge, no.
Q. Now, in your expert report, you

identify four criticisms of De Roos 2005; correct? And we can go -- it's on your report at pages 12 to 13.

A. Yeah, I mean --

Q. If you want to pull your report out, we can walk through this. And in your report on page 12, you identify four limitations in the De Roos 2005 paper; correct?

A. Yes.

Q. I would like to talk with you a bit about those criticisms.

First, I believe I am correct that three of these criticisms relate in some way to the length of follow-up in the study, and when exposures to glyphosate would have occurred in comparison to the development of non-Hodgkin's lymphoma. Correct? Criticisms one, two, and four?

A. Yes, but -- well, four is more complicated, but the one and two, you are correct.

Q. Okay. Well, we will get to four in a minute, and we will also get to one and two in a minute.

Let's start with number three. I want to understand that one first. I'm putting those into one category and three in the other.

A. Okay.

Q. So, with respect to your third criticism, and this is set forth on page 13, in this criticism you are, if I understand correctly, raising the concern that there may be an elevated risk of non-Hodgkin's lymphoma in the control group due to exposure to another pesticide; correct?

A. As you stated earlier, farmers are at elevated risk -- forget about why, whether it's because of other pesticides, herbicides, et cetera, farmers are at elevated risk of lymphoma. I mean, I think it's a good study design to use farmers as the overall sample population, mainly because it's a population in which you are going to get a large number of people exposed. That's why it's a good sample, you know, sample universe, but then when you are looking for a risk ratio, you are already starting off with a higher risk in the unexposed group.

Q. Well, correct, but there is no differential with farmers. There is farmers in the numerator and there's farmers in the denominator; correct?

MR. TRAVERS: Objection. I think that misstates the study design.

A. Yes, but it's harder to see a -- to see an elevation when you are starting off with a higher -- from a higher platform, or it may be -- it may be harder to see an elevation when you are starting off from a higher platform.

Q. Well, I'm a little bit confused about that. If you were, for example, to do a study of -- an epidemiological study of asbestos and smoking, to be able to do that study, you might want to start off with a full cohort of smokers and then look at asbestos in the differential; right?

A. You are right.

Q. Having smokers be your entire population doesn't undercut the study. It actually allows you to look at the exposure you are interested in; right?

A. It --

Q. Dr. Neugut, is that correct?

A. I'm thinking.

Q. Okay. No, continue. I'm sorry. I didn't know if your mind was turning to something else.

A. So, even in the context of multicausal phenomena, which is essentially what we are in a sense talking about, it is still a little harder to see elevated risk ratios in that. While yes, you can still account for an elevated risk in the context of other causes, like other herbicides or other risk factors that farmers may have for lymphoma, but it's still harder to see it on top of that elevated risk than if you were in a population where there was no elevated risk of non-Hodgkin's lymphoma.

Q. Well, all populations have different risk factors that could impact an outcome. What you are trying to do in an epidemiological study is -- and specifically with glyphosate, is to tease out the glyphosate impact; correct?

A. Correct.

Q. And in that context, you don't want

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to have different -- you know, where you have more farmers in the numerator and less farmers in the denominator.
A. No, that is true, but it's a tradeoff of sorts. You know, you also have -- you're comparing high exposed to low exposed, which is different than comparing high exposed to unexposed.
Q. Yes, I understand. That is a different issue, but not the issue we are talking about on page 13 of your report. Correct?
A. No.
Q. Okay. So, specifically on page 13 of your report, this third criticism, though, the concern you are mentioning is that the control group, the individuals not exposed to glyphosate, would have had exposures to other pesticides, and specifically you mentioned 2,4-D; correct?
A. Um-hum, yes.
Q. And the point you are making there is that 2,4-D might be associated with non-Hodgkin's lymphoma.
A. Yes.

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Q. And therefore, the cases, the denominators that are in the -- in the risk ratio, would have a higher incidence of non-Hodgkin's lymphoma that is not attributable to glyphosate; correct?
A. Yes.
Q. And the reason that would occur is, as you hypothesize in your expert report, if individuals -- individuals who use glyphosate are less likely to use 2,4-D; correct?
A. Okay. Yes.
Q. And that is because you would have fewer 2,4-D exposure, less 2,4-D exposure in the glyphosate-exposed individuals that could push their risk up; correct? As compared to the cases. Strike that.
A. I don't know.
Q. I will restate that.
The concern that you are raising in your report is that if there are -- if there is a difference in the incidence of exposure to 2,4-D between the glyphosate exposed and the glyphosate non-exposed, that would potentially bias your outcome for the glyphosate -- reported glyphosate risk ratio;

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correct?
A. Well, more if they are misclassified between the two of them, but yes.
Q. And your concern here is that because there are 2,4-D exposure -- 53 percent of the control group has exposure to 2,4-D, that can result in De Roos reporting an underestimation of the true NHL risk with respect to glyphosate; correct? That's what you state in your report.
A. Yes.
Q. Now, you were able to determine that 53.3 percent data point for the use of 2,4-D in controls from De Roos 2005; correct? That's data you got from the De Roos study?
A. I believe so.
Q. Let's pull out the De Roos study again. That is page -- Exhibit 14-12, and it's on page 50, table one, I believe. And the data point for never exposed to glyphosate and exposure to 2,4-D is in that first column of table one, towards the bottom; correct?
A. Yes.

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Q. And there it reports that individuals never exposed to glyphosate, 53.3 percent of them were exposed to 2,4-D; correct?
A. Yes.
Q. Now, directly to the right of that, the second column reports the prevalence of exposure to 2,4-D among individuals with the lowest exposure level of glyphosate; correct?
A. Yes.
Q. And they actually had a higher exposure rate to 2,4-D than those who were never exposed; correct?
A. Yes.
Q. And in the highest exposure group for glyphosate, the third column, those individuals had an even higher exposure rate to 2,4-D; correct? 85 percent?
A. Um-hum, yes.
Q. So, based upon the analysis in your expert report, if 2,4-D was associated with an increased risk in non-Hodgkin's lymphoma, then that means that the effect reported by De Roos for glyphosate would actually be an overestimation of the NHL risk, not an

underestimation; correct?
A. If 2,4-D is associated with non-Hodgkin's lymphoma, correct.
Q. So, your expert report analysis here, your criticism number three was incorrect; right?
A. It's probably not a problem.
Q. If I could ask you to turn back to table one for De Roos 2005. There is also data on -- one, two, three, four, five, six, seven, eight -- I think nine other pesticides; correct?
A. Yes.
Q. And in every instance, with each one of these pesticides, individuals who have exposure to glyphosate also have higher exposures to those other pesticides; correct?
A. Yes.
Q. And in every instance, individuals with the highest level of exposure to glyphosate have the highest level of exposure to each of those other pesticides; correct?
A. Yes.
Q. And based upon your -- the analysis you presented in your expert report, that

would also create a bias that could artificially suggest a dose-response analysis with glyphosate exposure; correct?
A. Yes.
Q. So, the results in the study, to be clear, because exposure to glyphosate is associated with higher exposures to other pesticides, if you were to look simply at exposure to glyphosate and not adjust for exposures to other pesticides, you could find an apparent dose-response that in fact was due to confounding; correct?
A. If they were associated with NHL, yes.
Q. Now, I want to move to some of your other criticisms of the AHS study. On page 12 of your report, you talk about the follow-up period for the De Roos study, a median follow-up period of 6.7 years; correct?
A. Yes.
Q. And just so I am clear, you weren't stating here that De Roos 2005 only considered exposures that took place a median of 6.7 years prior to NHL diagnosis, are you?

A. No.
Q. The follow-up time is just the number of years after AHS had gathered information on prior exposures; correct?
A. Had gathered --
Q. Information on prior exposures.
A. Yes.
Q. At the time of -- that the AHS gathered information on prior exposures, the cohort on average had 15 years of prior exposure; correct?
A. I don't know, but I -- I believe they certainly had exposure prior to the time of entry.
Q. You read Dr. -- again, Dr. Blair's deposition.
A. Yes.
Q. Do you recall him testifying about this?
A. Yes.
Q. And Dr. Blair testified that at the time AHS gathered information at the inception, the cohort on average had 15 years of prior exposure; correct?
A. I don't recall that it was on

average. I know some had that much exposure. I don't know the distribution.
Q. Okay. Why don't we look at Dr. Blair's deposition testimony again. And this is at pages 96 -- page 96, lines 11 to 15. If you can read that and see if that refreshes your recollection.
A. I'm sorry, the page?
Q. Ninety-six. And lines 11 through 15.
Does that refresh your recollection that at the time that the AHS started gathering information --
A. Yes.
Q. -- there is an average of 15 years of prior exposure; correct?
A. Yes.
Q. And at the time that the Agricultural Health Study gathered information on the cohort's prior exposures, which was over the mid 1990s, glyphosate had been on the market for about 20 years or more; correct?
A. Yes.
Q. So, the AHS study allows for a

sufficient latency period between exposure to glyphosate and potential NHL; correct?
A. Yes.
Q. And the potential latency period in the De Roos 2005 study is up to 27 years; correct?
A. Yes, I think -- yeah, I don't think latency period is a major problem.
Q. Now, your concern, if I understand correctly, regarding the follow-up period in the AHS study is that longer follow-up would have resulted in more cases of non-Hodgkin's lymphoma; correct?
A. Yes.
Q. And that relates back to this issue about power; correct? More cases of NHL would give the study more power.
A. Yes.
Q. And that's also your point with respect to the age of the cohort. If the cohort was older, then would have more cases of NHL; correct?
A. Yes.
Q. Now, also, just to be clear, when you state in your expert report the age of

the cohort, that is data that is based upon the age at enrollment; correct?
A. At study entry, yes.
Q. So, the age of the cohort at the time of the actual De Roos analysis would be a median of 6.7 years older; correct?
A. Sure.
Q. So, the population at the time of the 2005 De Roos paper, for purposes of the analysis, would have been within that 50- to 55-year age range that you state in your report is where you see that exponential increase in cancer incidence; correct?
A. Well, "exponential" is a strong word, but let's say where you see an increase.
Q. Okay. I thought "exponential" was your word.
A. Oh.
Q. On page 12, you state in your report, "Ages" -- it's sort of towards the bottom on page 12. "Ages of 50 to 55 years, when we see an exponential increase in cancer incidence," about five or six lines from the bottom.

A. Then I guess it's a good word.
Q. So, the age of the cohort at the time of De Roos 2005 is right in that spot where we are seeing that exponential increase.
A. But it's just starting at -- it's still a young group.
Q. But again, the issue is, you want to get enough cases of NHL; correct?
A. And there are too few to really have enough power.
Q. So, now the -- now, the NHL -- I'm sorry. The De Roos study 2005 has 92 cases of non-Hodgkin's lymphoma; correct?
A. Yes.
Q. And the De Roos study in fact is one of the most powerful epidemiologic studies of glyphosate and non-Hodgkin's lymphoma, isn't it?
A. I don't know offhand, but does it have the tightest confidence limits?
Q. Well, let's look at your expert report. You have that information there, don't you?
Have you -- let me ask this

question. Have you looked to determine the relative power of the De Roos 2005 study as compared to the case-control studies for glyphosate in non-Hodgkin's lymphoma?
A. I haven't done power analyses on them, but in the -- you know, the --
Q. Can you state, sitting here today, whether there is any case-control study that is more powerful in answering the question whether glyphosate is associated with non-Hodgkin's lymphoma?
A. We don't talk about statistical power after a study is completed a posteriori. If you have a positive finding, then that is a more powerful study.
Q. Well, let me take a step back.
First of all, it's your criticism here that the Agricultural Health Study does not have sufficient power because of the years of the follow-up and the age of the cohort; correct? That is your criticism.
MR. TRAVERS: In.
A. And that in part because the -- yes.
Q. And in offering that criticism, you

do not know whether in fact the Agricultural Health Study, De Roos 2005, is the most powerful of all the epidemiologic studies to answer the question of whether glyphosate causes non-Hodgkin's lymphoma.

A. I did not do a power analysis.

Q. Let's look at -- you mentioned that one way you can determine the power of a study is by looking at the confidence intervals and the range of the confidence intervals. We talked about that earlier; right?

A. Yes.

Q. And in your expert report, you actually provide information on that on page 43, particularly where there is these forest plots of the different studies; correct?

A. Yes.

Q. And those forest plots, both the forest plot from Schinasi and Leon and the forest plot in Chang and Delzell, would allow you to look and see the relative weight of these different epidemiological studies and the different power -- relative power;

correct?

A. Yes.

Q. And of the case-control studies, the only case-control study that has -- is reported in these forest plots as having higher power than De Roos 2005 is the McDuffie study; correct?

A. Is what?

Q. Is McDuffie.

A. I'm sorry, is?

Q. McDuffie.

A. You are talking about in Chang and Delzell?

Q. Either one.

A. Yes.

Q. And the McDuffie study, the risk ratio there is not adjusted for other pesticides; correct?

A. I don't know offhand.

Q. Okay. Should we go to McDuffie and check that out?

MR. LASKER: And this is 14-14.

(Exhibit 14-14, Cancer Epidemiology, Biomarkers & Prevention by McDuffie, et al marked for

identification, as of this date.)

Q. And in particular, if you can look at table three on page 1159 of McDuffie. I'm sorry, table three. No, it's table two. Sorry, table two.

And they have the odds ratio for glyphosate of 1.2, which is the odds ratio you report on in your expert report and on page 43; correct? About midway through the table, the farthest to the right column.

A. Okay.

Q. And you can see that odds radio adjusted footnote B; correct?

A. Yes.

Q. And the footnote on the bottom explains what the odds ratio is adjusted for; correct?

A. Yes.

Q. It's not adjusted for exposure to other pesticides; correct?

A. Yes.

Q. So, of the odds ratios adjusted for other pesticide exposure, De Roos 2005 is the most powerful study that exists for glyphosate and non-Hodgkin's lymphoma;

correct?

A. I may or -- I don't know. Perhaps.

Q. Not perhaps. You have the numbers right here. De Roos 2005 is the most powerful study with respect to non-Hodgkin's lymphoma and glyphosate adjusted for exposure to other pesticides; correct?

MR. TRAVERS: Objection, asked and answered.

A. Okay. That may be.

Q. It is; correct?

MR. TRAVERS: Objection to the testimony of counsel.

A. Again, it's a little hard for me to be definitive as I sit here now and trying to make a decision in 30 seconds, in a minute, but okay, I will agree. But --

Q. This is not something that you considered in preparing your expert report and your criticism of the Agricultural Health Study.

A. That doesn't mean -- whether it has the most or the least, it doesn't have adequate power.

Q. And so then I take it your

testimony would be that none of the case-control studies have adequate power.

MR. TRAVERS: Objection.

Q. Correct?

MR. TRAVERS: Misstates the testimony.

A. Having power, having a positive finding is -- a posteriori is really enough. If you have a positive finding, the question of whether you had statistic power up front is really -- sort of begs the question.

Q. So, is it your testimony then that an epidemiologist would only consider the power of a study if the finding of a study is null?

A. I would say that in designing a study, you would be concerned about the statistical power in designing the study, but once you have a positive finding, the question of how much power you had up front is much less of a concern.

Q. So, if a study has --

A. Statistical power is -- statistical power is a concern in the context of the null find.

Q. So, if you have a study with very low power, very wide confidence intervals, but it's a positive finding, it's your testimony that you would not be concerned about the power of the study in weighing the importance of that study?

A. I'm sorry, can you repeat the question?

Q. Sure.

If you have a study that reports a positive finding with very, very wide confidence intervals, a very low power study, is it your testimony as an epidemiologist that you are no longer concerned about the power of that study?

A. Of course you are. Then you don't have a positive finding.

Q. No, no, let me strike that. Let me repeat it to make sure I am clear.

If you have a study that reports a statistically significant result with very wide confidence intervals, so it's a study with very low power but a statistically significant result, is it your testimony that as an epidemiologist, you are no longer

concerned with the power of that study?

MR. TRAVERS: Objection, asked and answered.

A. So, of course, if you are talking about a sample size where you get down to the level of six cases versus one, then you can consider it, and an epidemiologist would use his logic and his common sense, his or her logic or common sense to evaluate the study and all of that.

But the answer is, if you have a positive finding and it's statistically significant, then the consideration of statistical power in the context of a positive finding is less of a concern than it is in the context of a null finding.

And the issue of statistical power is an issue in the design of a study up front and whether you should be doing the study in the first place or whether you have enough power to do the study and whether it's going to give you the ability to define an outcome with enough confidence that you are going to get an answer.

If you end up with a null finding

and wide confidence limits, then you haven't answered the question that you started out with, which is basically what happened at least in the first report, in this report from 2005 with glyphosate.

Q. Dr. Neugut, there is no epidemiological study anywhere in the literature which reports in its most fully adjusted model a statistically significant increased risk of non-Hodgkin's lymphoma with glyphosate, is there?

MR. TRAVERS: Objection, misstates the evidence.

A. I'm unaware when you go up to the higher levels, maybe not with the ever/never analyses, but I think in some of the dose-responses, there are. What about De Roos 2003?

Q. De Roos 2003 did not have a dose-response -- the fully adjusted model, which is set forth on page 43 of your report, is not statistically significant.

MR. TRAVERS: Move to strike testimony of counsel.

Q. That's correct; right?

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A. Yes.
Q. So, again, and you're talking about dose-response analyses, the only dose-response analysis anywhere in the epidemiological literature for glyphosate and non-Hodgkin's lymphoma adjusted for other exposures is De Roos 2005; right?
A. Yes.
MR. TRAVERS: Objection, misstates the evidence.
Q. So it is correct to state --
A. I'm sorry. Say the last point again before I say yes to that one.
Q. The only dose-response analysis adjusted for exposures to other pesticides anywhere in the literature --
A. Um-hum.
Q. -- in the epidemiological literature, is De Roos 2005; correct?
MR. TRAVERS: Objection, misstates evidence.
A. I don't know, but it sounds right.
Q. There is no odds ratio anywhere in the epidemiological literature that reports for glyphosate and non-Hodgkin's lymphoma an

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adjusted odds ratio positive association statistically significant; correct?
MR. TRAVERS: Objection, misstates the evidence.
A. Not that -- correct, for the herbicides, for the -- um-hum.
Q. So, going back now to the issue of power, to the extent that you have a criticism of power with respect to the Agricultural Health Study, that same criticism in your mind applies to all of the case-control studies for glyphosate and non-Hodgkin's lymphoma; correct?
A. All of them have difficulties with power, yes. Non-Hodgkin's lymphoma is a rare outcome, and glyphosate is -- in many of them is an uncommon exposure, too.
Q. So, let's look now at the -- I think it's your -- I think it's your final criticism, maybe your second. Go back to page 12 of your expert report.
So, your second criticism is talking about the inability to determine disease latency for NHL in the AHS cohort; correct?

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A. Yes.
Q. And this is that concept that we were talking about earlier, you want to have some period of time that has passed between the exposure and the outcome to account for this latency period for the development of the cancer; correct?
A. Yes.
Q. Okay. And your criticism here is that there might not be sufficient latency, or there is not -- there is not a way to tell whether there is latency between exposure and diagnosis; correct?
A. Yes.
Q. Now, the De Roos 2005 study, though, takes exposure data from that period of 1993 to 1997; correct? It considers exposures back in that 1990s time period; correct?
A. Yes.
Q. And so, there is in effect a lag time in that study, because you are looking at cancers that developed later in time than the exposures, than the latest possible exposure that you are looking at; correct?

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A. I don't follow the question.
Q. So, at the time of enrollment, we had data for De Roos 2005 of exposures from the mid '90s back; correct?
A. Back?
Q. Into history. It could be as early as whenever they first were exposed.
A. I see.
Q. So, your exposure period is mid 1970s to the mid 1990s.
A. Yeah.
Q. Correct?
And then you are looking at non-Hodgkin's lymphomas that can develop as late as December 31, 2001; correct?
A. Yes.
Q. And to deal with the issue of latency, studies often will have this sort of lag period where they are looking for development of cancer at some period of time after the period of exposure; correct?
A. Yes.
Q. That is what De Roos 2005 in effect did; correct?
A. How did they do it?

Q. By having exposures that were up to the mid 1990s and having cancer development --
A. I see.
Q. -- at that later date; correct?
A. Yes. I don't think the latency thing is necessarily a problem here.
Q. Okay. So, criticism two in your report is not really as much of an issues as it might be otherwise.
A. So, it will vary from -- depending on the -- if you say -- if everyone truly had 15 years of exposure on average beforehand, then latency is probably not going to be a major problem.
Q. Okay. So, again, this is -- for your criticism two, I just want to make sure we are clear on your testimony. The second criticism you have of the AHS De Roos 2005 study in your report at 12, pages 12 to 13, it's probably not a major concern; is that fair?
A. I won't speak for the Weisenburger, but again, I will be -- you know, to my knowledge, I will say I am agnostic on the

subject.
Q. Okay. Let's talk about your final criticism then, your fourth criticism of the AHS study. And this is -- you are dealing here with non-differential exposure misclassification, and I think your point, your point here -- let me make sure I understand your -- your criticism.
You state that intensity of exposure to glyphosate was collected only for enrollment from 1993 to 1997; correct?
A. Yes.
Q. And your concern here is that there would have been a dramatic increase in the intensity of exposure potentially after that time period; correct?
A. Well, I really have two concerns, and I may not have stated it correctly here. I think we have been talking primarily about biases, but in a cohort study, you also have -- in every study, you also have the problem, as we said earlier, of non-differential misclassification, and I think there is probably enough non-differential misclassification that it

would have -- again, in the context of a null study -- if a null study, again, because epidemiologic analyses are conservative, they mitigate against positive findings, so non-differential misclassification attenuates risk ratios, so, having a null finding could easily arise from having significant misclassification of exposure.
Q. I have a few follow-ups on that. First of all, let me make sure, you said there are two issues here. One is non-differential misclassification.
A. That's in the first place, from the time of enrollment.
Q. And the second one is intensity of exposure.
A. Well, but --
Q. I'm just trying to understand if those are the two.
A. Those two. One is that, in the first place, when they filled out the questionnaires at enrollment, that they incorrectly stated their exposure.
Q. Okay. So that let me make sure I understand this. I just want to break out

the two opinions, so I understand them. The first opinion is that there would have been more intensity of exposure if they had subsequent measure --
A. More or less, or if they weren't exposed to glyphosate and confused it with a different --
Q. Well --
A. -- herbicide, or vice versa.
MR. TRAVERS: You have to let him finish answering.
Q. Okay. I just want to break it out. You said there is two.
A. So one is that -- so, when you fill out -- when you are asked about were you exposed to glyphosate, some people are going to say no when it's a yes; some people are going to say yes when it's a no. That's not recall bias, but just fill out the questionnaire wrong.
Q. I understand.
A. So, in general on questionnaires like that, there is a 10, 20 percent kind of error. If I ask you how much broccoli do you eat, you know, you are not going to --

Q. Well, I eat a lot of broccoli, but I get your point.

A. So, you are not going to fill it out -- you are not going to be right about -- and that degree of misclassification, when we are talking about a risk ratio of 1.3 or something of that sort, is enough to -- to nullify a -- a risk ratio in the realm of 1.3 or 1.4, again. So, when you get -- again, as I said, epidemiologic analysis is conservative. It -- errors generally attenuate -- generally are biased towards giving you a null finding. So that kind of an error or random misclassification -- again, this is not biased error, this is just people are just making innocent errors in filling out a form, that are random -- will bias the error toward -- will bias the estimate towards one.

Q. So, I understand that point, and I want to ask you questions about that, but I want to make sure I am clear. Is there any other criticism that you were trying to address in this paragraph four?

A. If you filled out -- if you entered

the study in 1993 or 1994, something like that, that your use of the -- of the herbicide may have changed subsequently, and that may have a change -- that may affect your subsequent risk of developing the disease. I realize that there were -- I think there were subsequent attempts to fill out follow-up questionnaires to kind of re- -- reestimate the -- to requantify the, the -- I don't know, call it the true exposure or the -- certainly if we are talking about the intensity of exposure, we are not talking now about never-ever, but say the quantity, but that wasn't reflected, at least in the De Roos 2005 paper. If there are subsequent analyses, then that may play a role.

But again, if someone changed their exposure pattern over time, that would be -- that would be something significant and may be important in terms of their risk.

Q. So let me just -- I'm going to take each one of those in turn.

First of all, with respect to the intensity of exposure of the 2005 cohort, we

do have the actual intensity data for that cohort. Whether they had other intense exposures in the future after the enrollment period, we do know the intensity of exposure at the time of enrollment; correct?

A. Yes.

Q. So, we are able to, and in fact De Roos 2005 does do an assessment of actual intensities of exposure to determine whether more intense exposures give rise to a greater risk of non-Hodgkin's lymphoma; correct?

A. Yes, but I believe there was some -- as I mentioned here, I believe there was some change in 1996 that actually, there was some secular change that actually caused a change in the overall use of Roundup, in 1996, in the middle of this study, that may have made a more dramatic or may have occasioned a more dramatic impact.

And how much it may or may not have affected risk, I don't know. I'm just raising it as a potential issue.

Q. Okay. But just so I am clear, the -- first of all, the fact that there was a change in the use pattern in '96, '97 would

not alter the findings in De Roos 2005 with respect to the analysis that they had and the data they had that more intense exposures did not increase the risk of non-Hodgkin's lymphoma; correct?

MR. TRAVERS: Objection, compound.

A. I don't know. I mean, it wouldn't have -- I guess it depends on how much change there was in the farmers, in the pesticide applicators' use of the agents, you know, of Roundup, and in the 6.7 years, it depends how many cases you are getting subsequently and what the latency period is.

It's a complicated issue. We are not talking about a lot of cases here either. You know, change of a few subjects is going to change -- change of a few cases, one way or another, exposure and outcome, is going to change the risk ratio fairly substantially.

Q. And with respect to this latency issue, the time period you are talking about of -- after 1996, of a potential change in the pattern of use of glyphosate, if Dr. Weisenburger is correct with respect to latency, that would be irrelevant to the

findings for De Roos 2005; correct?
A. If Dr. Weisenburger is correct, you mean with regard to a ten-year latency --
Q. Yes.
A. -- then yes, it would be irrelevant to what I am saying.
Q. And we will get to --
A. It would be irrelevant for the De Roos 2005 analysis.
Q. We have also talked about, there is a subsequent analysis, and we will get to that in a moment.
With respect to the first point about exposure and misclassification, that's, if I understand correctly, an issue that arises in every study that obtains exposure data through questionnaire; correct? There is nothing unusual about --
A. You mean like recall bias?
Q. Well, no. Here you are talking about exposure misclassification. Maybe I misunderstood. You not talking about recall bias in --
A. No. But I'm saying that it arises in every cohort study, like recall bias

arises in every case-control study?
Q. No. As in -- let's start that again. I will restate the question.
The issue that you talked about with respect to exposure misclassification would be an issue not only with De Roos 2005, but every case-control study for glyphosate; correct? They are all based on questionnaires.
A. So, I am saying that if you are going to start to throw around recall bias for every case-control study, then you have to throw around non-differential misclassification for every cohort study. But it's been assessed, and there is a paper on it by Blair which assessed it and shows that the degree of misclassification would have been sufficient -- they estimated it to some degree, and it suggests that it would have been -- even a reasonable amount, reasonable meaning even a, shall we say a -- what one would expect under normal circumstances of everyone doing it correctly, and doing even a decent quality, recruitment of subjects, and everyone doing their best

filling out the questionnaires, that the degree of misclassification was sufficient to have attenuated a risk ratio in the -- in the realm that we are talking about, to null.
That's why I was saying earlier, when you get null findings, you have to be very suspicious, that there -- that they're not meaningful in a sense, that they're-- that they're-- that they arise out of errors or out of -- that's why there's publication bias and things like that.
Q. Let me just make sure I understand this concept of bias towards the null. Now, in the AHS study, when they looked at the dose-response analysis, they were finding risk ratios below 1.0 for the higher exposure groups; correct?
A. Yes.
Q. So, a bias towards the null then would mean that those risk ratios were actually increased as compared to what they would have been; correct?
A. Yes.
Q. So, the issue of differential exposure misclassification for the

Agricultural Health Study would not have lowered those odds ratios, it would have increased them; correct?
A. I'm -- I can't follow that logic. That is too complicated for me to --
Q. Okay. Let me step back. Maybe it's the way I asked the question. I will frame it correctly.
In the De Roos 2005 paper, if there was this non-differential exposure misclassification, that would mean that the odds ratios reported for that dose-response below one were actually lower than the reported numbers; correct?
A. It would not solely be from exposure misclassification.
Q. Right. But any differential -- non-differential error, including the exposure misclassification error you identify as your concern for the Agricultural Health Study, would have increased those odds ratios as reported in the De Roos 2005 dose-response; correct?
A. Yes.
Q. So, that is not a concern, then,

that the De Roos study is missing a positive association. It's that the De Roos study might be missing a negative association; correct?

A. That's getting too complicated for me to -- again, to work out sitting here.

Q. Okay. But it is correct then, though, that in the AHS study, if there was non-differential misclassification, including non-differential exposure misclassification, the risks of glyphosate in association with non-Hodgkin's lymphoma would have been overestimated; correct?

MR. TRAVERS: Objection, asked and answered.

A. Would have been overestimated? No, it would have been -- it would have been attenuated. It would have been --

Q. Or not?

A. Why would it have been --

Q. You're biasing towards the null; correct? It's going closer to 1.0; correct?

A. Yes.

Q. The reported odds ratios were below 1.0; correct?

A. Now we are getting into it, but -- so I -- it's getting too complicated to, like, tease out now what that means in real terms, so you are going to tell me that glyphosate has a protective effect on -- we should all be taking glyphosate so we don't get lymphoma?

Q. I'm trying to understand your criticism, Dr. Neugut.

A. It's really -- it's getting too complex to -- you know, there are too many variables involved in this and too many assumptions to really make a -- to, as we sit here, make a -- make a meaningful statement about what a -- what a 0.9 means as opposed to a 1.0, or whether it's just, you know, within the bounds of statistical analysis.

Q. Dr. Neugut, this is your criticism number four on page 13 of your expert report. And in your expert report, you state that because of this non-differential exposure misclassification, there could be a bias towards the null, and that the reported association between glyphosate and NHL would be underestimated.

A. Yes.

Q. That's what you state in your report.

A. Absolutely.

Q. If there is -- and in fact, we know for a fact that there is, that the AHS study in its dose-response analysis reports risk ratios for the higher exposure groups below 1.0, a bias towards the null would be pushing those numbers up, not down; correct?

MR. TRAVERS: Objection, asked and answered.

A. The glyphosate analysis, as I recall it, is still above 1.0 in the AHS study for ever/never, and for most of the exposure categories. I don't think it really comes out that --

Q. Let's look back at 2005 De Roos.

MR. TRAVERS: Eric, just whenever you get a break in a subject, we have got -- lunch is here.

MR. LASKER: Yes. Once we get through this.

Q. I just want to make sure we are clear, because I thought we had discussed

this previously. The -- on page 52 --

A. I'm sorry.

Q. -- of the De Roos study, 2005 study.

A. Fifty-two?

Q. Page 52. The odds ratios for glyphosate and non-Hodgkin's lymphoma, for the two -- for the increased dose groups, as you increase cumulative exposure, and as you increase intensity-weighted exposure, those odds ratios are below 1.0; correct?

A. Yes, but --

Q. If there is non-differential misclassification, those numbers have been biased upwards toward the null of 1.0; correct?

A. Yes.

Q. Which means that the true relationship between glyphosate and non-Hodgkin's lymphoma as you increase dose is an even lower odds ratio, a greater reduced risk than is reported; correct?

MR. TRAVERS: Objection, asked and answered.

A. So, I was referring to

misclassification in terms of being exposed at all, not talking about the misclassification, or classification of how much intensity or how long people were exposed. I don't know -- I didn't think through or analyze the exposure intensity part of it, and I don't know how that would affect the attenuation here.

Q. Dr. Neugut, if there was non-differential misclassification biasing these numbers towards the null, as you suggest would occur in your expert report, for AHS -- for the De Roos 2005 paper, that would have resulted in an overstatement or overestimate of the odds ratio that increased dose of exposure, not an underestimation; correct?

MR. TRAVERS: Objection, asked and answered.

A. Could you say the question again.

Q. Sure.

If your -- again, we are talking about your criticism of AHS, the De Roos 2005, your fourth criticism. If there is this non-differential exposure

misclassification, then --

A. It's not my criticism. It's Aaron Blair's. I'm just quoting a paper. But go ahead.

Q. Okay. Well, okay. But is it not your opinion in here?

A. No, no, no. The paper is good.

Q. Okay. So, your criticism then of the AHS paper, of the De Roos 2005, is there could be this non-differential exposure misclassification, and if that in fact occurred, the dose-response analysis that is reported in the 2005 De Roos paper is actually overestimating the risk of glyphosate exposure for non-Hodgkin's lymphoma, and not underestimating it; correct?

MR. TRAVERS: Objection, mischaracterizes his testimony. It's asked and answered.

A. It's overestimating?

Q. You state in your expert report that if there is a bias towards the null, the association of exposure to glyphosate and association with non-Hodgkin's lymphoma would

be underestimated, because there is a bias towards the null, meaning the numbers have been artificially pushed towards one.

A. I'm looking at table two, not at table three.

Q. I know, but I am asking you about table three.

A. Well, I can't answer with regard to the exposure. That's not -- that's a different categorization.

Q. So, sitting here today, if there is non-differential exposure misclassification, you cannot state what biasing towards the null would mean with respect to the numbers reported in the 2005 De Roos paper?

MR. TRAVERS: Objection, asked and answered.

A. That's correct.

Q. So, with respect to the dose-response analysis then in De Roos 2005, am I correct in my understanding that you do not have a criticism of that finding based upon non-differential exposure misclassification?

A. Specifically, no.

MR. LASKER: Why don't we take a break here.

MR. TRAVERS: Okay.

THE VIDEOGRAPHER: The time is 12:47 p.m. We are off the record.

(Luncheon recess taken.)

AFTERNOON SESSION

THE VIDEOGRAPHER: The time is 1:50 p.m. We are on the record.

BY MR. LASKER:

Q. Dr. Neugut, good afternoon.

We talked previously about Dr. Blair's deposition that you have read. And you are aware from that deposition, I take it, that there is a 2013 update of the Agricultural Health Study data that contains additional data for glyphosate and non-Hodgkin's lymphoma; correct?

A. Yes.

Q. You have not offered any expert opinion regarding that study in your expert report; correct?

A. Yes.

Q. You are aware, though, that the 2013 AHS analysis included five years of additional exposure data beyond the data in De Roos 2005; correct?

MR. TRAVERS: Objection, mischaracterizes the study.

A. I am aware that it exists. Is that what you are asking me?

Q. No. My question is, are you aware that the 2013 analysis included five years of additional exposure data beyond the data in De Roos 2005?

MR. TRAVERS: Same objection.

A. What is -- am I aware of it?

Q. I will ask the question again.

A. I'm sorry.

Q. You are aware that the 2013 analysis of the Agricultural Health Study data includes five years of additional exposure data beyond the data in De Roos 2005; correct?

A. Yes.

Q. You are also aware that the 2013 analysis had an additional seven years of follow-up for non-Hodgkin's lymphoma; correct?

MR. TRAVERS: Objection, mischaracterizes the study.

A. I don't know the details, but I know that it has additional follow-up. I don't know -- I couldn't quote you the numbers, but --

Q. Okay. Let's take a look at Dr. Blair's deposition testimony on this. And if you have Dr. Blair's deposition before you, pages -- on page 168.

A. What page?

Q. 168. And specifically lines six to line 16.

And having reviewed Dr. Blair's deposition testimony, does that refresh your recollection that the 2013 AHS analysis had an additional seven years of follow-up for NHL beyond De Roos 2005?

A. Yes.

Q. The 2013 analysis of the AHS data was three to four times larger than the De Roos 2005 study; correct?

MR. TRAVERS: Objection, mischaracterizes the study.

A. Can -- I don't know. If it's in Dr. Blair's testimony, then I read it at some point, but --

Q. Let me refer you to page 171, specifically lines 21 through 24. Dr. Blair testifies here that the 2013 cohort study, with results for glyphosate and non-Hodgkin's lymphoma, is more than four times larger than

the De Roos 2005 study; correct?

A. Yes.

Q. The answer is yes. You have no reason to disagree with Dr. Blair on that; correct?

A. No.

Q. The 2013 study, with even longer follow-up, also analyzes applicators that had even higher levels of cumulative exposure to glyphosate than in De Roos 2005; correct?

A. I believe so.

Q. That goes to one of the issues you had talked about in your report, about additional years and different uses of glyphosate and more intense exposures; correct?

A. I don't recall offhand, but yes, I -- I don't recall.

Q. And according -- Dr. Blair was one of the listed investigators that prepared that 2013 analysis; correct?

A. I wouldn't know.

Q. Dr. Blair testified -- well, let me just state -- let me just ask this. The ever/never risk ratio for glyphosate and NHL

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in this larger 2013 AHS analysis was below 1.0. It was around 0.9; correct?
A. I don't know.
Q. Let's look at Dr. Blair's testimony on page 172, line 16 to line 24.
A. Okay.
Q. Dr. Blair reports that this 2013 analysis of the AHS data reported an ever/never odds ratio or risk ratio for glyphosate and non-Hodgkin's lymphoma of approximately 0.9; correct?
MR. TRAVERS: Objection, that misstates his testimony.
A. "Reports" means what?
Q. Dr. Blair states --
MR. LASKER: And if we are going to have speaking objections, we can switch you and you can be the witness, but otherwise, please do not provide speaking objections, counsel.
MR. TRAVERS: Well, you can't misrepresent --
MR. LASKER: Dr. Neugut can respond to the questions. You cannot.
MR. TRAVERS: I'm just giving

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reasonable objections. You are misstating the testimony.
MR. LASKER: Well, if you continue, we'll have a whole record of this --
MR. TRAVERS: Okay, it's on the record.
MR. LASKER: And we can bring this to the judge if you want, but your objections have been ridiculous all day.
Q. Dr. Neugut, once again, Dr. Blair testifies that the ever/never ratio for glyphosate and non-Hodgkin's lymphoma in this larger 2013 AHS analysis was below 1.0, approximately 0.9; correct?
MR. TRAVERS: Objection, misstates his testimony. You can just read the transcript.
A. Yes, but obviously it's unpublished and all of that, but -- yes.
Q. But this 2013 study, just so the record is clear, this 2013 AHS study reports a risk ratio for glyphosate and non-Hodgkin's lymphoma for ever/never use of below 1.0 at around 0.9; correct?
A. Yes.

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Q. And Dr. Blair also reports that there was in fact, in one of the dose-response analyses, a statistically significant negative finding for diffuse large B-cell lymphoma; correct?
MR. TRAVERS: What page is that?
A. I don't recall.
Q. I will refer you to page 195.
A. 195?
Q. Yes. And particularly lines nine through 21.
The 2013 AHS data finds a statistically significant negative association between increased glyphosate exposure and diffuse large B-cell lymphoma; correct?
A. Yes.
Q. Now, the 2013 AHS analysis that Dr. Blair testified to, that was attached as an exhibit to Dr. Blair's deposition; correct?
A. I don't know.
Q. You have reviewed Dr. Blair's deposition; correct?
A. Yes.

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Q. Did you, in reading his deposition, note that that study was marked as an exhibit to the deposition?
A. I don't notice things like that when I read depositions. I don't look at the index. I don't look at the supplements.
Q. Well, in the testimony, as we are going into the questions that you are reading, it was marked as an exhibit. You saw that; correct?
MR. TRAVERS: Objection, asked and answered.
A. As I said, I don't know that I did.
Q. Have you ever looked at the 2013 AHS analysis?
A. No.
Q. Now, you have -- well, strike that.
I take it then you have no opinions with regard to the methodology or the findings in that 2013 AHS analysis.
A. No.
Q. Now, you previously -- well, let me make sure the record is clear there.
Am I correct in my understanding then that you don't have any opinions with

regard to the 2013 AHS analysis?
A. It didn't play a role in my opinions.
Q. Now, you have previously, I think we have discussed, been retained as an expert witness by the same attorneys who are representing the plaintiffs in this case; correct? In other litigation?
A. Only for the Actos, I believe for the Actos litigation.
Q. And in that litigation, like in this one, you were retained to provide an opinion based upon epidemiologic evidence that a substance, there it was a drug, caused cancer; correct?
A. Yes.
Q. And in that litigation, you relied upon a non-published, non-peer-reviewed epidemiological study in support of your opinion, didn't you?
A. I don't recall.
Q. Okay. Let's go back to your January 7, 2013 deposition, and it should be in front of you. Dr. Neugut, it looks like this.

If I could direct you to page 157, 158, and you can, I think -- it starts on page 157, line 20, to 158, line six. You may recall this -- well, you will recall this better than I would. I wasn't there.
But does this testimony refresh your recollection --
A. Which line, which page?
Q. From page 157, line 20, through 158, line six.
A. Yes.
Q. Does that refresh your recollection, Dr. Neugut, that in the Actos litigation, where you were represented by the same plaintiffs' counsel that you are represented here today, in offering your opinion as to whether exposure can cause cancer, you relied upon a non-published, non-peer-reviewed study?
A. I wasn't aware at the time that it wasn't published, I think, or I was in error at the time, or I had some confusion about it, as I say here. This was a series. It was in the same context of a cohort study, where this was the fourth, if I recall --

again, it's a while ago. But if I recall, it was the fourth follow-up from the same study, and it was not -- I did not rely upon it in actual litigation subsequently in any of the testimony that I gave in any of the trials.
Q. Just to be clear, Dr. Neugut, in this deposition testimony we just reviewed, you stated that you were going to be relying upon the non-published, non-peer-reviewed results of a nested case control, and your answer was yes; correct?
A. So I -- yes, it is, but I do not recall in what way I did rely on it and how I did or did not.
Q. But just for the record, in other litigation in which you were represented by this same plaintiffs' counsel who represents you here today, in which you were asked to assess the epidemiology for exposure causing cancer, you relied upon a non-published, non-peer-reviewed study, and in this case, you chose not even to look at the 2013 AHS data; correct?
A. Yes.
Q. Let's take a look at some of the

case-control studies for the glyphosate and non-Hodgkin's lymphoma. One of those was a study by Cantor in 1992; correct?
A. I'm sorry, I am -- I was -- my mind was wandering.
Q. That's all right. 1992 Cantor study.
A. What about it?
Q. That was one of the studies you looked at in your analysis; correct?
A. Yes.
MR. LASKER: And let's mark the Cantor study as Exhibit 14-15.
(Exhibit 14-15, Cancer Bulletin, May 1, 1992, Pesticides and Other Agricultural Risk Factors for Non-Hodgkin's Lymphoma among Men in Iowa and Minnesota marked for identification, as of this date.)
Q. And for the record, this is the Cantor 1992 study that you discussed in your report; correct?
A. Yes.
Q. What was the testable hypothesis for this study?

A. I'm sorry, ask your question again.
Q. What was the testable hypothesis in the Cantor 1992 study?
A. What does "testable hypothesis" mean?
Q. Well, I was, I thought, taking that from you. You had described your methodology for reviewing epidemiological studies, and you talked about the fact that you first formulated a hypothesis.
A. You mean the primary hypothesis?
Q. If that's what you meant. Just to make sure we are talking on the same page here, in your expert report on -- let's see, where was it? Page six. You talk about this multistep process to establish causal inferences; correct?
A. Um-hum.
Q. And so you -- you first formulate a testable hypothesis, and then you design studies to test the hypothesis; correct?
A. Yes.
Q. So, my question for you with respect to Cantor 1992 is, what was the testable hypothesis of that study?

A. I guess it was being a farmer, or being a -- having a farming occupation, or however you want to phrase the -- however you want to phrase that.
Q. Okay. Would it be fair to say that Cantor 1992 was not designed to test the hypothesis whether glyphosate can cause non-Hodgkin's lymphoma?
A. Yes. That was a secondary -- secondary aim, analysis, however you want to phrase it.
Q. Now, the Cantor study looks at individuals who are diagnosed with non-Hodgkin's lymphoma between 1980 and 1983; correct? And if you look at the methods section for case selection on the first page.
A. Yes. Um-hum, yes.
Q. So, the cases of NHL in this study were diagnosed somewhere between -- well, certainly less than ten years after glyphosate first became available for use in the market; correct?
A. Something less than that, yes.
Q. Now, we talked earlier about Dr. Ritz, and I believe her expert report is

still in front of you. Can you just pull out Dr. Ritz's expert report.
It's thicker than that, about this thick.
A. Is this it?
Q. No. Maybe on the bottom.
A. The very bottom. I'm sorry.
Q. Always the way.
So, Dr. Ritz, she is another expert witness epidemiologist on behalf of plaintiffs in this litigation; correct?
A. Yes.
Q. And if you could turn to page 18 and 19 of her report. Dr. Ritz states that "the findings of Cantor are less informative because there was not sufficient time to account for the latency of non-Hodgkin's lymphoma."
Do you see that?
A. Yes.
Q. And she states that "one would like to see a medium potential latency period of at least ten years for an epidemiologic study of glyphosate and non-Hodgkin's lymphoma to be informative." Correct?

A. Yes.
Q. Do you agree with Dr. Ritz on that?
A. I stated earlier that I am agnostic with regard to the question of latency period. We have spoken earlier about Weisenburger's opinion. I don't know what the latency period is, so I don't know the answer.
Q. Do you agree that this question of latency period is important in analyzing what one can glean from the Cantor 1992 study with respect to glyphosate?
A. If one knew what the latency period -- if one knew what the mechanism is of how glyphosate -- if one was -- one knew definitively how glyphosate causes lymphoma, so that one could definitively establish the latency period, then yes, it would be very important. But otherwise, it's difficult to be able to know how to apply it in this instance.
Q. If Dr. Weisenburger is correct that the latency period is ten years for glyphosate and non-Hodgkin's lymphoma, do you agree with Dr. Ritz that that would mean that

the Cantor study is not informative with respect to glyphosate and non-Hodgkin's lymphoma?
A. I would say that it would be difficult to say how it would have enough cases to be able -- how it would be informative.
Q. That's because the individuals in the study would have been exposed too close in time to their diagnosis for latency to have occurred and for the exposure to have been related to non-Hodgkin's lymphoma; correct?
A. It wouldn't have been impossible for a few of them to have been, but for at least for some -- for a large number of them, it would have been probably not possible.
Q. And in your expert report, you state that Cantor had again low power because there were only 26 cases of NHL with exposure to glyphosate; correct?
A. Yes.
Q. And this goes back to our earlier discussion. The key number for power is the number of individuals who were both exposed

and had the outcome of interest; correct?
A. Yes.
Q. And you believe that a study that has only 26 individuals with exposure to glyphosate and NHL does not have sufficient power to provide reliable information regarding any potential causal relationship between glyphosate and non-Hodgkin's lymphoma; right?
MR. TRAVERS: Objection, misstates his testimony.
A. I didn't say that.
Q. Let me make sure I understand your testimony then. Okay. So let me -- let me rephrase the question.
Do you believe that a study with only 26 individuals with exposure to glyphosate and NHL is severely limited in its ability to provide information regarding any potential causal relationship between glyphosate and NHL?
A. If you have a -- if you have a null finding, then you have to -- then I think you have to be limited in terms of how you interpret a null finding in that context,

because you didn't have enough statistical power to be able to find the positive association.
Q. With respect to power, is it your opinion then that power only matters for a finding of a positive association and doesn't matter with respect to reaching an opinion about a causal relationship?
MR. TRAVERS: Objection, asked and answered.
A. That question doesn't make sense.
Q. Okay. Let me restate.
If a study is insufficiently powered, in your opinion does that severely limit your ability to reach a causal opinion based upon that study?
A. If a power is insufficiently -- if a study is insufficiently powered, then you have to interpret a null finding with extreme caution or with -- or -- or not be able to draw a -- not be able to draw a definitive conclusion from it. In other words, if there was insufficient power to start with, and you have a null finding, then you certainly are limited in being able to conclude that there

is no positive association.
Q. Okay. I understand that, but I'm asking the other direction as well. Is it fair to say that if a power -- if a study is insufficiently powered, it is severely limited in providing you with the type of evidence that you would want to have as an epidemiologist to reach a causation opinion?
MR. TRAVERS: Objection, asked and answered.
A. I'm not sure that isn't saying the same thing. How is that question different?
Q. The answer may be yes, but let me just make sure I understand in my own mind.
A. If I -- if I had an insufficiently -- if I had a study that a priori was -- had poor -- was small, so it didn't have sufficient power in the first place that I was happy doing it, but having then conducted the study, I had a positive association, I would still take the positive -- I would still have to take the positive association at least -- seriously, and take it -- because, as I said in our morning discussion, I think positive

associations always have to be at least seriously entertained and analyzed, because -- because the system, the structure of epidemiologic and statistical analysis militates against positive findings.

Of course, if the numbers are really tiny, then you can take that into consideration and say it's really so small, that even though it's statistically significant, that the numbers are so small, I'm not going to really give it that much credit, or maybe it's a statistical artifact or maybe it's bias.

But that's why we are given brains, and we are supposed to use our logic and our judgment and our common sense, and that is what epidemiology is all about. Epidemiology is the ultimate in judgment, causal considerations, the application of logic, common sense, and intelligence to taking data and trying to analyze it, and to be able to interpret what you find, because you will never have pure, unadorned, perfect data to -- well, you will almost never have pure, absolute data that you can interpret without

having to use your brain to, to analyze.

So you have -- as with everything else, you have to apply your, your logic and thinking to what you see, and to come up with the best interpretation you can. Reasonable people may reasonably disagree, as in every other -- as in many other walks of life, but in epidemiology, that is particularly a -- more so than in most other scientific endeavors, that is a particularly crucial part of what we do in our daily endeavors.

Q. Dr. Neugut, let me ask the question again, because I still don't understand the answer.

Do you believe, if a study has insufficient power, that that is a significant limitation in your ability to use that study to reach a causation opinion?

MR. TRAVERS: Objection, asked and answered.

A. I think it certainly limits the ability of the study to be able to give you a correct answer.

Q. Now, many of the other case-control studies of glyphosate and non-Hodgkin's

lymphoma discussed in your report had even less power than the Cantor study; correct?

A. I would think so, yes.

Q. The Hardell study in 2002, that has less power than the Cantor study; correct?

A. Yes.

Q. The Cocco study, the Cocco, C-O-C-C-O, study we looked at earlier, that has less power than the Cantor study; correct?

A. Yes.

Q. The Orsi study, that has less power than the Cantor study; correct?

A. Yes.

Q. And the Eriksson study, that one, let's look at that one, because that is a little bit more involved. I think I marked that Exhibit 14-13, so you should have that in front of you. Exhibit 14-13.

A. That's -- oh, I see. That's Eriksson?

Q. Yes. 14-13. Eriksson 2008, and the information is -- can be determined from table two for all exposures with glyphosate, table two on page 1659. That study involved

29 individuals with exposure to glyphosate who had non-Hodgkin's lymphoma; correct?

A. Yes.

Q. And the Eriksson -- so that's -- I think there is three more cases in Eriksson than there was in Cantor 1992; correct?

A. Yes.

Q. The Eriksson study had only 18 controls, though; correct?

A. Yes. Exposed controls, you mean. Or am I mischaracterizing it?

Q. You're looking at the study.

A. Am I looking at table two?

Q. Yes. 18 exposed controls -- 18 controls for 29 cases; correct?

A. This is the number of exposed cases and number of exposed controls.

Q. And in Cantor 1992, they actually had, I believe, 49 controls. Correct? And you can look back to that, if you need to. Do you need to look back at the Cantor study to confirm if they had 49 controls for glyphosate? It's on table six.

A. Table six?

Okay.

Q. And the power of a case-control study is determined both by the number of cases and the number of controls; right?
A. Yes.
Q. And so from this data, it appears that Eriksson also had lower power than Cantor with respect to glyphosate and non-Hodgkin's lymphoma; correct?
A. Which one has lower power?
Q. Eriksson.
A. A priori, yes.
Q. Now, to put these numbers into context, we have been talking about 26 exposed cases or 29 exposed cases, the updated 2013 Agricultural Health Study analysis, depending on which definition of non-Hodgkin's lymphoma you used, was studying between 250 and 350 individuals with exposure to glyphosate and non-Hodgkin's lymphoma; correct?
A. Yes.
Q. So, that is somewhere between ten to maybe 13 times larger than any of these case-control studies; correct?
A. Well, the statistical power doesn't

exactly go by multiplication, but it's larger, certainly.
Q. Mathematically, it's ten to 13 times larger, the AHS 2013 study, than any of these case-control studies --
A. Yeah.
Q. -- we talked about.
A. Um-hum.
Q. And the earlier De Roos 2005 study, the published study that we talked about that you have looked at, that had 92 individuals with exposure to glyphosate and who had been diagnosed with non-Hodgkin's lymphoma; correct?
A. Yes.
Q. So, again, numerically, much larger than these case-control studies; correct?
A. Yes.
Q. Now, the other comment you make in your expert report about the Cantor study is that it is also limited by the lack of adjustment for other herbicides used in the cohort. And that's page 14 of your expert report; correct?
A. Yes.

Q. And that's your opinion; correct?
A. It's limited by that, yes.
Q. And you have -- I think you testified earlier that this lack of adjustment for other exposures to pesticides limits a study's ability to tell us anything about the true association between glyphosate and non-Hodgkin's lymphoma; correct?
A. I didn't say "anything about." I said it limits our ability to tell us precisely what's going on.
Q. And as you already discussed -- strike that.
Well, as you already discussed, the McDuffie study does not adjust for exposures to other pesticides; correct?
A. No.
Q. It's correct that it doesn't; right? Let me restate that question, because I gave you a double negative.
The McDuffie study does not adjust for exposures to other herbicides or other pesticides; correct?
A. No, it does not.
Q. And the Lee study, which you also

address in your expert report, it does not adjust for exposures to other pesticides; correct?
A. Correct.
Q. And the Eriksson study, except for -- well, the Eriksson study in its analysis of latency and its analysis of dose-response and its analysis of NHL subtypes, it does not adjust for exposures to other pesticides; correct?
A. Correct.
Q. Now, let me just make sure I understand the bases for your testimony that the Cantor study -- and first of all, the Cantor study reports an odds ratio for glyphosate of 1.1 with confidence intervals of 0.7 to 1.9; correct?
I'm not sure you are looking at the right study, Dr. Neugut. The Cantor study.
A. Oh, I'm sorry. Getting out of hand here. Cantor study.
What was the question, please?
Q. The Cantor study reported an odds ratio of 1.1 with confidence intervals of 0.7 to 1.9.

A. Yes.
Q. That is a null finding for glyphosate and non-Hodgkin's lymphoma; correct?
A. Not an elevated finding, yes.
Q. It's a null finding.
A. Essentially.
Q. And now you state here that -- in your expert report, that this finding was not adjusted for other pesticide exposures, but Cantor adjusted for other high-risk exposures; correct?
And if you could look at the Cantor study at page 2448, at the top of the second column.
A. He adjusted for other risk factors, if that's what you are asking.
Q. Well, for other exposures that he looked at in the study; correct?
A. Yes.
Q. And to the extent that any of -- and he looked at a number of different pesticides and herbicides and insecticides in this study; correct? You can look to table three and table four and table five and table

six. And table seven, table eight.
A. Yes.
Q. And by a high-risk exposure, Dr. Cantor means that he adjusted for any exposure with an odds ratio above 1.5 when it was adjusted solely for age and state of residence; correct?
A. Yes.
Q. So, to the extent that the -- any of these other pesticide exposures met that criteria, Dr. Cantor did control for those pesticide exposures; correct?
A. Yes.
Q. So, that limitation that you noted in your expert report is actually -- for the Cantor study, is actually incorrect; right?
A. What limitation?
Q. You state that there was a lack of adjustments for other herbicides used by the cohort, is the word you used in your expert report.
A. Did I make an error?
Q. That is my question of you. It's on page 14 of your expert report. I think your expert report is up there. And on the

top, page 13 to 14, you are talking about the Cantor 1992 study. At the very top of 14, the last line in your discussion of Cantor, you state that "interpretation of the results is also limited by lack of adjustments for other herbicides used by the cohort." Correct?
A. I guess I was referring specifically to the one where he was using the 26 versus -- that that specific analysis, but perhaps in the other analyses --
Q. Well, table -- we look at the analysis on table six; correct? In Cantor.
A. I may have made an error.
Q. Just so we are clear, the criticism in your expert report of the Cantor study, that it was limited by lack of adjustment for other herbicides, that is incorrect.
A. I missed that.
Q. Let's turn to the McDuffie study. And I think -- have we already marked this? Yeah. This was 14-14, so you have that already in front of you.
And Dr. Neugut, the McDuffie study also was not designed to test the hypothesis

that glyphosate might be associated with non-Hodgkin's lymphoma; correct?
A. Not specifically.
Q. That would be a secondary finding in the study; correct?
A. I'm not sure that that is accurate. I mean, it was to look at pesticides and non-Hodgkin's lymphoma. I mean, and if you say that glyphosate was one of them -- I don't think glyphosate was particularly the one that they were targeting, but they were looking at pesticides in general.
Q. Well, McDuffie in their study actually specifically discusses -- and I will refer you to page 1161.
A. 11 --
Q. 1161.
A. 61, um-hum.
Q. And this is in the second column of the text on that page, the full bottom paragraph on the right side, full complete paragraph that starts, "We reported results," on the right-hand column.
A. Um-hum.
Q. And the authors of the McDuffie

paper themselves describe their analyses in this study as exploratory; correct?
A. And so?
Q. I'm just asking if it's correct that this was an exploratory study. We talked about that before.
A. That's -- that may or may not be true, but that may -- their aim may have been to do a study to look at exploratory -- to do an exploratory study.
Q. Right. No, I'm not -- I just want to make sure I understand. The McDuffie study with respect to glyphosate was an exploratory study.
A. That's -- yes. I mean, they may not have had a specific villain in mind when they were looking -- when they were setting up the study, to say this particular agent is what we are primarily focused on. We are looking in general at pesticides and lymphoma, and here is a list, and we will look at all of them and see what pops up associated or not associated with lymphoma.
Q. Right. That's what we were talking about earlier this morning, that there are

epidemiological studies that are exploratory studies, and then there are -- that are not actually testing hypotheses, but they are generating additional hypotheses. Correct?
A. Yes.
Q. Now, in the -- in your expert report discussing McDuffie, you state, on page 14, that the McDuffie odds ratio of 1.2 was adjusted for high-risk exposures. That is on page 14 of your report.
A. Yes.
Q. And so, this is the type of adjustment we were just discussing about with -- in the Cantor study; correct?
A. Yes.
Q. Now, in fact, the McDuffie study did not adjust for high-risk exposures, did it?
A. No.
Q. So that's another mistake in your report?
A. Okay.
Q. Yes?
A. Yes.
Q. In its most adjusted odds ratio,

McDuffie adjusted for medical variables, age and study area; correct?
A. Family history, but -- is that what you mean by "medical variables"?
Q. Yes. Yes.
A. Um-hum.
Q. And that is set forth on table two in the odds ratio of 1.2 that you mentioned in your expert report for glyphosate; correct?
A. Yes.
Q. Why would an epidemiologist, in this case Dr. McDuffie, adjust for medical variables like family history of cancer or specific medical conditions?
A. Well, family history may or may not be related to risk of lymphoma. I mean, conditions tend to run in families, so, if you had a family history of lymphoma, you may be at increased risk of getting a lymphoma, so that is a fair variable to adjust for.
Q. You agree with Dr. McDuffie then that to try and zero in on whether there is a true association for pesticide exposure and non-Hodgkin's lymphoma, you would want to

adjust for medical variables like family history and these medical conditions?
A. Certain medical conditions that may or may not be related to risk of -- of getting lymphoma, yes.
Q. So, just so I am clear then, do you believe that Dr. McDuffie's adjustment of her findings for medical variables like family history of cancer, and the specific conditions she lays out, improves the reliability of the findings in her study?
A. At worst, it doesn't hurt it. At best, maybe it improves it.
Q. Now, in your report, you point to an analysis of odds ratios for, I think less than or equal to two days per year and greater than two days per year. Do you recall that?
A. We are talking now still about McDuffie?
Q. Yes.
A. Yes, I believe so.
Q. And you rely on these findings from McDuffie in your expert report as evidence of a dose-response in support of your Bradford

Hill analysis; correct?
A. Yes.
Q. Now, this analysis of less than or equal to two days versus greater than two days exposure for glyphosate, in McDuffie, that was not adjusted for exposures to other pesticides; correct?
A. Correct.
Q. And as we were talking about this morning, in the De Roos 2005 study, if that finding in De Roos 2005 is correct that there is greater exposures to other pesticides at greater levels of glyphosate exposure, then the failure to adjust for other pesticide exposures could confound and create an artificial appearing dose-response that doesn't exist; correct?
A. Could or could not. I don't know.
Q. So, it's certainly possible that confounding could artificially increase the reported odds ratios for high exposure to glyphosate in the McDuffie study; correct?
A. I would really not be able to say.
Q. The -- now, the analysis in McDuffie that you cite as evidence for

dose-response was not even adjusted for those other medical variables and family history that we just discussed; correct?
A. Yes.
Q. The analysis in McDuffie for dose-response also does not take into account duration of exposure; correct?
A. Correct.
Q. So, if there was an individual who used glyphosate twice a year, let's say, for each of ten years, they would be categorized in the low exposure group with 20 cumulative days of exposure; correct?
A. I'm sorry, I missed -- I didn't follow the last question.
Q. If there is an individual in McDuffie who had used glyphosate every year for ten years two times a year, they would be in the low exposure group; correct?
A. Yes.
Q. And they would have 20 days of cumulative exposure; correct?
A. Yes.
Q. If there was another individual who used glyphosate for only one year but used it

on three different occasions, they would be characterized in McDuffie as high exposure; correct?
A. Yes.
Q. So under McDuffie, you could have in your dose-response analysis someone with three days of exposure being classified as high exposure and someone with 20 days of cumulative exposure being classified as low exposure; correct?
A. Yes.
Q. And in your own epidemiological research, when you have looked at pesticides and you've looked at dose-response, you have actually -- you looked at cumulative exposure, not per time period exposure; correct?
A. Have I done pesticide exposure?
Q. In your -- in your research, in your epidemiological research, when you do a study like this and you are doing a dose-response analysis, you look at cumulative exposure; correct?
A. Sometimes you do, sometimes -- I mean, you know, you never know what is the

right -- what is the right way to analyze dose and dose-response. Sometimes you do cumulative, sometimes you do it other ways.
MR. LASKER: Let's mark as Exhibit 14-16...
(Exhibit 14-16, American Journal of Epidemiology, Reported Residential Pesticide use and Breast Cancer Risk on Long Island, New York marked for identification, as of this date.)
Q. And Dr. Neugut, Exhibit 14-16 is one of the epidemiological studies that you conducted; correct?
A. Jesus Christ. Don't put that in the record.
Q. She can't do that, unfortunately. She has to take everything down.
Dr. Neugut, Exhibit 14-16 is one of the studies that you were an investigator on; correct?
A. Yes.
Q. Looking at pesticide exposure and the potential risk of breast cancer; correct?
A. Yes. Yes.
Q. And in this study, you conducted a

dose-response analysis; correct?
A. Yes.
Q. And you used cumulative exposure as your measure for dose-response; correct?
A. Yes.
Q. And we in fact know, going back to the glyphosate findings in McDuffie, that if one were to look at cumulative exposure, there is no increased risks in the high exposure group; correct?
MR. TRAVERS: Objection, misclassifies, or mischaracterizes the study.
A. I'm sorry, can you repeat the question?
Q. We know in fact that for the McDuffie data, because the McDuffie data has now been analyzed further by the North American Pooled Project, that when you look at cumulative exposure, there is no evidence of increased risk of non-Hodgkin's lymphoma with glyphosate; correct?
MR. TRAVERS: Objection, mischaracterizes the studies.
A. I don't know that study.

Q. You don't know the North American Pooled Project study?
A. No. I haven't looked at it.
Q. Well, we will talk about that in a moment.
Now, in your expert report, you also note that McDuffie had a low response rate; correct?
A. Yes.
Q. And McDuffie had a 67 percent response rate among cases and only a 48 percent response rate among controls; correct?
A. Yes.
Q. And that is -- that differential goes back to one of the potential concerns we discussed this morning about potential selection bias; correct?
A. Yes.
Q. So that's an issue with the De Roos study as well; correct?
A. It's an issue, but I would say --
Q. I'm sorry, let me go back.
This issue of selection bias is an issue of concern for McDuffie, the McDuffie

study; correct?
A. Yeah, although I would say that in the studies of that type, it's not as big a differential as it may sound. I mean, you get differentials like that in case-control studies. But yes, it's an issue.
Q. And the goal of the case-control study is not to have this sort of a differential in your response rates between cases and controls; correct?
A. Correct.
Q. Let's talk about the Hardell study. So this is a study -- Exhibit 14-17.
(Exhibit 14-17, Exposure to Pesticides as Risk Factor for Non-Hodgkin's Lymphoma and Hair Cell Leukemia: Pooled Analysis of Two Swedish Case-control Studies marked for identification, as of this date.)
Q. And Dr. Neugut, this is, I think, one of the studies that we spoke about earlier that had very low power to analyze a question of an association between glyphosate and non-Hodgkin's lymphoma; correct?
A. Yes.

Q. And that is because there were only eight cases and eight controls, I think, in this study.
A. I don't remember the exact number, but it was a very small number.
Q. Now, when Hardell -- Hardell has in his analysis, he has a multivariate analysis that he presents in this study; correct?
A. Yes.
Q. What confounders did Hardell adjust for in his multivariate analysis?
A. I think he adjusted for exposure to other herbicides or pesticides.
Q. Where do you see that in Dr. Hardell's study?
A. "When risk estimates for different pesticides are analyzed" --
Q. What page are you on?
A. 1045. The first paragraph.
Q. In 1045?
A. Top paragraph.
Q. Okay.
A. "When risk estimates for different pesticides were analyzed, only subjects with no pesticide exposure were taken as unexposed

whereas subjects exposed to other pesticides were disregarded."

I'm assuming that means they were excluded from analysis.

Q. They were excluded from the definition of "unexposed."

A. I am not exactly sure what he means, but --

Q. What Dr. Hardell is stating here, and this is a methodology that carries through in all the Swedish studies, is that their definition of "unexposed" excluded not only individuals unexposed to glyphosate, but individuals unexposed to any pesticide; correct?

A. Correct. That's a different way of -- that's a different way of adjusting for herbicide exposure.

Q. Well, if you are taking out information from the controls so that the cases have exposures to glyphosate and exposures to other herbicides, but the controls don't have exposure to any pesticides --

A. No. I would assume then, you have

to take them out of both groups.

Q. But it's not -- there is -- is there anywhere where it's stated that they take that out of both groups?

A. Kind of ambiguous.

Q. If in fact the Swedish case-control studies defined unexposed so that there was no exposure to any pesticide and allowed other exposures, exposures to other pesticides to occur with the glyphosate exposed cases, that would be a methodological flaw in the study; correct?

A. Probably, yes.

Q. That would make it impossible to actually adjust for the potential impact of other exposures; correct?

A. Yes.

Q. Now, the Hardell study pools the findings from two other case-control studies, an earlier study by Hardell and a study by -- I don't know if I am getting this correctly. Is it Nordstrom? Is that correct? Dr. Neugut?

A. I'm sorry?

Q. The Hardell study 2002 pools the

findings from two earlier case control studies, one by Hardell and Eriksson and one by Nordstrom; correct?

A. I'm sorry, I was still -- I was still in the middle of this one.

Q. No, we're still with Hardell.

A. Yeah.

Q. The Hardell study, Exhibit 14-17, pools the data from two earlier case-control studies, one by Hardell and Eriksson and one by Nordstrom; correct?

A. Yes, um-hum.

Q. And you do not discuss those earlier case-control studies in your expert report; correct?

A. Right.

Q. Is it fair to say once you pool those studies into a larger study, it's the later pooled study that provides all the data relevant to a causation theme?

A. Yes.

Q. Let's turn to De Roos 2003, which is the De Roos case-control study. And this would be Exhibit 14-18.

(Exhibit 14-18, Integrative

assessment of multiple pesticides as risk factors for non-Hodgkin's lymphoma among men, Occup Environ Med 2003 marked for identification, as of this date.)

Q. And the De Roos paper pools all of the -- all of the prior North American -- I'm sorry, U.S.-based case-control studies that looked at glyphosate and non-Hodgkin's lymphoma; correct?

A. Yes.

Q. And this De Roos study has -- 2003 case-control study, has the same latency issue or problem that Dr. Ritz identified with respect to the Cantor study; correct?

A. You mean that the cases were diagnosed between '83 and '86?

Q. Well, if we look at the data from the De Roos study, and it's on page -- table two, page four of nine, and you will have to actually look back to the study population, because there are three different studies that are pooled there.

A. Um-hum.

Q. But if you look at page one and two, you will see the three different

populations, and when they were diagnosed. Correct?
A. Yes.
Q. And so for Iowa and Minnesota and Kansas, those exposures were between 1979 and 1983; correct?
A. Yes.
Q. And if you look at table two in the -- and that is -- just to step back, that is the problem that Dr. Ritz was highlighting in the Cantor study; correct? Those dates of exposure?
A. I don't recall what she was highlighting, but that is an issue, yes.
Q. And if you look at table two in De Roos 2003, the case control study, and you look at the data that was included in the analysis for the pesticides, roughly 82.6 percent of the cases would have been diagnosed with non-Hodgkin's lymphoma between 1979 and 1983; correct?
A. Yes.
Q. And so, those exposures, those cases, again, at the very earliest, the very earliest, still could not have been exposed

to glyphosate more than nine years prior to their diagnosis; correct?
A. Yes.
Q. And so that did not come close to the median ten-year latency period that Dr. Ritz opined would be necessary to look for a potential association between glyphosate and non-Hodgkin's lymphoma; correct?
A. Yes.
MR. TRAVERS: Objection, misstates Dr. Ritz's testimony.
Q. And the remaining 17.4 percent of the cases were diagnosed between June 1983 and June 1986; correct?
A. Are you talking about the Kansas cases or --
Q. Yes. I'm sorry, the Nebraska cases.
A. The Nebraska cases.
Q. Let me just confirm, so that the record is clear, you can go back and look at the study populations. And once you look at that, am I correct in my understanding that the remaining 17.4 percent of cases were

diagnosed between June 1983 and June 1986?
A. Yes.
Q. So, even for these Nebraska cases, they would not have had a median ten-year latency period to examine with respect to glyphosate and non-Hodgkin's lymphoma; correct?
A. They would have had just barely ten years.
Q. That would have been the maximum, not the median; correct?
A. It's hard for me to figure out, but if it was starting in '74 -- right? '75, '74?
Q. Let's say -- we can talk about '74 or '75. I don't think it matters for this question.
A. Um-hum.
Q. If the question is whether or not there would be a median of ten years --
A. Oh, I see.
Q. -- of latency, which Dr. Ritz identified --
A. So, I guess it would be about eight years, seven or eight years.

Q. Eight years would be maximum.
A. Okay.
Q. Correct?
A. Yes.
Q. It wouldn't be a ten-year median latency, even for that smaller --
A. Yes.
Q. -- population; correct?
A. Yes.
Q. Now, de Roos 2003 --
A. And again, I'm not subscribing to the ten-year -- I told you, I'm personally not --
Q. You're agnostic.
A. I'm agnostic on the latency period.
Q. I understand.
A. But I respect my colleagues.
Q. Now, De Roos in the 2003 study presents results for a logistic and a hierarchal regression analysis; correct?
A. Yes.
Q. And those analyses are described on page two of the De Roos 2003 study; correct? The left-hand column, middle of the page talks about statistical analyses?

A. Yes.
Q. And as explained in that statistical analysis section, De Roos controlled for other pesticide exposures in the hierarchal regression analysis; correct?
A. Yes.
Q. Did not -- De Roos did not control for these other pesticide exposures in the logistic regression analysis; correct?
A. No.
Q. Again, the answer is unclear from my question. Is it correct that Dr. De Roos did not control for the other pesticide exposures in the logistic analysis?
A. That's correct.
Q. Let's move on to the Lee study.
MR. LASKER: And this will be Exhibit 14-19.
(Exhibit 14-19, Non-Hodgkin's Lymphoma Among Asthmatics exposed to Pesticides marked for identification, as of this date.)
Q. So, Lee, the Lee study likewise uses pooled data from the same case-control studies in the United States; correct?

A. Yes.
Q. So, Lee would have the same latency issue as Cantor and De Roos 2003; correct?
A. Yes.
Q. The odds ratio I think you have already noted for Lee for glyphosate was not adjusted for exposure to other pesticides; correct?
A. Yes.
Q. Now, in your report, you discuss the fact that there was odds ratios provided for glyphosate for non-asthmatics and then for asthmatics; correct? Page 15 of your expert report.
A. Yes.
Q. And there are different point estimates of 1.4 and 1.2 that were found in that study, but you state that there was no evidence or no indication of an effect modification in that study; correct?
A. Yes.
Q. So, the fact that you have point estimates of odds ratios that are different, that in and of itself, just a different number, doesn't provide you with an

indication of a true difference; correct?
A. Yes.
Q. What sort of analysis would you need to see to determine whether there has been an actual meaningful difference between two different groups in a study?
A. Well, there is an analysis called effect modification, which is some kind of -- I'm not a statistician, but that analyzes for whether the two analyses are statistically different from each other. It's basically looking at whether subgroups differ from each other, and whether the fact that being asthmatic would somehow make you more or less, or being not asthmatic would somehow make you somehow respond differently, let's say, to an herbicide than being not -- than -- whether having asthma somehow plays a role in your susceptibility to the exposure vis-a-vis the outcome.
Q. So, if I understand correctly, as an epidemiologist, when you see different point estimates for different groups that are being studied, to determine whether that is a meaningful difference, you would like to see

some sort of statistical analysis to see if they are -- those two groups are statistically significantly different; correct?
A. Correct.
Q. Okay. I would like to refer you back again to Dr. Ritz's report, at pages 15 to 16.
A. Dr. Ritz's report?
Q. Yes.
A. Which page?
Q. Pages 15 and 16. And at these pages in Dr. Ritz's report, she is discussing the findings of, as I call it, the North American Pooled Project; correct?
A. You mean on the bottom of 15?
Q. And over to -- and continuing on to page 16.
A. Okay.
Q. Now, the North American Pooled Project was also discussed in Dr. Blair's deposition, which you read; correct?
A. Yes.
Q. And the North American Pooled Project pooled the data from all of the

case-control studies in the United States and Canada; correct?
A. I believe so, yes.
Q. So, the North American Pooled Project contains all the data that is in De Roos 2003 and then also the data in McDuffie 2000; correct?
A. McDuffie --
Q. 2001.
A. Yes.
Q. So, just like we talked about earlier with Hardell, the NAPP analysis now is a later study that pools all the data from the earlier case-control studies, and that's the study that you can look to for the most up-to-date data from all those studies. Correct?
A. I wouldn't know.
Q. As a general matter, if it is in -- strike that.
If it is correct that the North American Pooled Project has pooled the data from the De Roos 2003 and McDuffie 2001 study, then that study would provide the most fulsome information and would be the study

that you would look to for any conclusions from all of those case-control studies; correct?
A. Again, I -- since I haven't looked at it and I don't know what it exactly did, I wouldn't know.
Q. Okay. Well I'm not talking about -- let me just back up.
So, we already talked about the Hardell study and the fact that that pooled two earlier studies, and so in your analysis, you looked at the later pooled analysis from Hardell 2002; correct?
A. Yes.
Q. And if in fact, and I will ask you to assume, but you have read Dr. Blair's deposition as well, the NAPP pooled the data in De Roos 2003 and McDuffie 2001, then you would look to that NAPP data for the -- to analyze the full set of case-control information from the North American case-control studies; correct?
A. I'm sorry, say that last question again.
Q. Okay. So, if it is correct, as

Dr. Blair testified, that the North American Pooled Project pooled all the data from McDuffie 2001 and De Roos 2003, then you would no longer look at those earlier studies, you would look at the pooled analysis in the North American Pooled Project, to determine whether that data provides evidence of an association between glyphosate and NHL; correct?
A. Since you are telling me this out of a context that I don't know, I -- I -- it's difficult for me to answer the question with any degree of confidence.
Q. As a methodological question, though, just so I am clear, when you have a case-control study that pools data from earlier case-control studies, you look at that later pooled analysis; correct? That's what you did in your report; correct?
A. That's what I did for those particular studies. Whether I would do it for this other study, I don't know.
Q. Do you agree with Dr. Ritz, and maybe you just don't have an opinion, that the findings in the North American Pooled

Project are relevant to the causation analysis for glyphosate and non-Hodgkin's lymphoma?
A. I have no way of knowing, since I haven't looked at it, evaluated it or assessed it. Aside from what I read in the transcript from Dr. Blair, I think, I really don't have any knowledge or information about it.
Q. You are aware that the findings from the North American Pooled Project have been presented at a number of scientific conferences; correct?
A. I know they were presented at the one meeting. I don't know that they keep repeating the same data at different meetings. That is not usually considered kosher.
Q. And why is it not considered kosher to keep --
A. To keep presenting the same data over and over again?
Q. Yes.
A. It's like, you know -- I guess that's like repeat publications, you know. I

mean, I'm not criticizing them. I'm simply saying, you know, you don't usually publish the same thing over and over again. Repeat publications.

There may be different meetings where, you know, under different circumstances, where, with modifications, you know, and updates, different analyses are included, updated, variations.

I'm not criticizing other scientists. I'm simply saying you wouldn't just repeat -- you wouldn't do the same thing several times at different places. That would be -- you know, it would be like -- I don't know what word to use. It would be -- it would be like publishing the same thing two different places. You would get two publications out of one, you know.

Q. So, in her expert report, Dr. Ritz only discusses the odds ratios found by the NAPP before it adjusted for the use of other pesticides; correct?

A. Shall I read her paragraph? Is that --

Q. You don't know one way or the

other?

A. The question is, what does she say?

Q. The question is what she reported, whether she reported adjusted odds ratios or unadjusted odds ratios for other pesticide exposures.

MR. ADLER: You mean Dr. Ritz?

MR. LASKER: Dr. Ritz.

A. So, I can't tell. She doesn't say. She doesn't say what it's adjusted for.

Q. Let's -- I'm going to have you take a look at the next exhibit in line, and this was --

MR. LASKER: We will mark this as Exhibit 14-20.

(Exhibit 14-20, An Evaluation of Glyphosate Use and the Risk of Non-Hodgkin Lymphoma Major Histological Sub-Types in the North American Pooled Project marked for identification, as of this date.)

Q. And Dr. Neugut, this is a slide presentation that was marked as an exhibit in Dr. Blair's deposition, and I believe you read his testimony about the data presented

with respect to this study. Correct?

A. A while ago, but yes.

Q. And if I could ask you to turn to -- and I will represent to you that this slide deck is for the same conference, the ISEE conference in Brazil, that Dr. Ritz is discussing in her expert report. On page 15, she talks about the presentation of ISEE.

Do you see that?

A. Yes.

Q. So, the -- on the ninth -- unfortunately, they are not numbered. If you could count nine pages into the slide presentation, there is a data table of glyphosate use and NHL risks.

Do you see that?

A. It's two-sided.

Q. It's open, pointing up. Right there?

A. This one?

Q. Yeah.

MR. TRAVERS: Eric, just to clarify, do you recall which exhibit this was from the Blair deposition?

MR. LASKER: I do not, I'm sorry.

Q. This table presents an ever/never overall odds ratio for glyphosate and NHL; correct? Both for NHL in total and for various subtypes; correct?

MR. TRAVERS: I'm just going to object. He hasn't relied on this for his expert opinion and hasn't previously reviewed any of this data.

A. What he said.

Q. Okay. Just so I am clear, I know you haven't looked at this before, but I'm asking you, the data presented there --

A. Yes.

Q. -- is from the North American Pooled Project for glyphosate use and NHL risks overall and for various subtypes; correct?

A. Yes.

Q. And for the overall odds ratio, they present one odds ratio that is not adjusted for other pesticide exposures; correct? That is ORA.

A. Yes.

Q. And then another odds ratio, or ORB, that is adjusted for the use of 2,4-D,

dicamba and malathion; correct?
A. Yes.
Q. For ever/never use, the odds ratio for glyphosate and non-Hodgkin's lymphoma, after adjusting for exposure to 2,4-D, dicamba and malathion, is 1.13 and it is not statistically significant; correct?
A. Yes.
Q. So, the NAPP, for its adjusted odds ratio, pooling all the case-control data from North America, had a null finding for ever/never glyphosate use and non-Hodgkin's lymphoma; correct?
A. Had a positive but null finding, yes.
Q. We talked earlier about your definition of "positive." Under your definition we talked about this morning, the North American Pooled Project, pooling all of the data from the De Roos 2003 and the McDuffie 2001 study, adjusted for use of other pesticides, had a null finding for glyphosate and non-Hodgkin's lymphoma; correct?
MR. TRAVERS: Objection, misstates

his prior testimony.
Q. That's correct?
A. Yes.
Q. If you could turn to -- and this is the slide that is the third slide from the end of the entire deck, so go to the end of the slide deck and count sort of three from the end. You will see another table. It says "Proxies versus Self-Respondents." It looks, Dr. Neugut, like this. Just go to very end of the study, and then count back. There you go. Do you see that?
So, here we see the results of the North American Pooled Project for this dose-response analysis, and they have duration, they have frequency, and they have lifetime days; correct?
A. Yes.
Q. So, the frequency is the measure that McDuffie reported just for Canada, and now we have the full pooled dataset. McDuffie reported frequency in her study; correct?
A. McDuffie reported --
Q. Frequency, days per year.

A. Yes.
Q. We now have, with the North American Pooled Project pooling all of that data together, we have information on cumulative exposures, which multiplies frequency by duration; correct?
A. Yes.
Q. So, that doesn't have the potential misclassification issue for dose-response that we talked about in McDuffie; correct?
A. Correct.
Q. And when you look at the complete pooled data from McDuffie and from De Roos 2003, for this cumulative exposure measurement, glyphosate does not show evidence of a dose-response; correct?
A. Which line are you looking at?
Q. The bottom line, lifetime days. That would be cumulative exposure; correct? Duration times frequency.
A. Yes. It doesn't show, um-hum.
Q. So, just to be clear, the complete data pooled from McDuffie and from De Roos 2003 for cumulative exposure to glyphosate, does not provide evidence of a dose-response;

correct?
A. I wouldn't go that far. I mean, you have the frequency showing -- showing a relationship.
Q. Again, let me -- let me state the question again.
You have -- you have duration, you have frequency, and you have lifetime days; correct?
A. Yes.
Q. And lifetime days, that is a cumulative exposure measure of the type that you used in that study in Long Island; correct?
A. So, you know, you don't know what is the right association or the right -- the variable to use in any given analysis. To say because you did it in that study in 2006, that's what you should be doing in this study in 2017, or that they should be doing with a different outcome, that's-- that's foolish.
Q. Let me ask this question, and let's see if I can get a clear answer.
For cumulative exposure --
A. Hmm?

Q. For cumulative exposure --
A. Right.
Q. -- the complete pool of data from McDuffie and from De Roos 2003 does not show evidence of a dose-response for glyphosate and non-Hodgkin's lymphoma; correct?
A. So, cumulative exposure as measured this way, and as they analyzed it here, and as I am not seeing in a fully published report that is peer reviewed in a journal, and as I am not having the ability to analyze it carefully, then yes, as you are showing it to me in this table, you are correct. But to say that this is the be all and end all of everything is not -- not fair.
Q. Just to be clear, the North American Pooled Project pooled together all the data from McDuffie and from De Roos 2003; correct?
A. I don't know. I told you I haven't had a chance to look at it, and you are giving it to me now for the first time to look at in a slide like this. I didn't even get to hear the speaker say it out loud or go to Brazil. So, to -- you know.

Q. Dr. Neugut, you did have the opportunity to read Dr. Blair's deposition testimony when he talked about these findings; correct?
A. But they weren't published, and I didn't consider them in my report.
Q. You had the opportunity to review these findings, if you wanted to. They were exhibits to Dr. Blair's deposition.
A. They weren't published.
Q. You considered unpublished data for these plaintiffs' attorneys, as an expert witness --
A. I told you that was under other circumstances and a different context. To bring it now into this is a different issue. Here we are considering a different question under different circumstances.
Q. And you made a decision not to consider the data in the North American Pooled Project or in the 2013 AHS analysis after reading Dr. Blair's deposition, but without actually yourself looking at the data; correct?
A. Yes.

Q. So, after reviewing Dr. Blair's deposition and his testimony of the findings of those -- of the North American Pooled Project and the 2013 AHS data --
A. Wait. I'm sorry. You are mischaracterizing my statement. I didn't look at the answers and then say I'm not going to include it. A priori, I didn't include anything that wasn't published.
The fact that he then happened to then -- I happened to then read his transcript, and in his transcript there was a characterization or description of unpublished data didn't then come into -- didn't then -- I didn't then say, oh, look at that, I'm now not going to include that because it either bears on or doesn't bear on. The decision up front was not to include unpublished data, up front.
Q. Were you aware prior to reading Dr. Blair's deposition that there was additional data from the Agricultural Health Study?
A. No.
Q. Were you aware prior to reading

Dr. Blair's deposition that there was additional data that had been presented in scientific --
A. No, I wasn't aware of the NAPP study.
Q. -- conferences from the North American Pooled Project?
A. No, I was not, but as I said in my report, my takeoff for this entire evaluation was from the original IARC study, and I have tried to follow the -- take that as my --
Q. I understand.
A. My, shall we say takeout point, and to follow the guidelines of IARC and to stick more or less closely or reasonably to, to whatever their characterization has been, and I have -- and -- and if things have been published subsequent to that, that's been fair to include, and I have reviewed whatever publications, et cetera, have emanated subsequent to that, peer-reviewed, et cetera.
But I have followed the IARC guidelines, and I state that in my -- I believe somewhere in my report, or say something to that effect, and I have stuck to

that, and --
Q. That wasn't clear to me, so let me --
A. And I have been -- I believe I have tried to be consistent with that. If subsequently there were other unpublished things, and I -- it is stated specifically in my report, and I -- I believe, and I have tried to adhere to that, and if you want to say that in a different litigation, that wasn't the rules or that I in one particular unpublished thing -- again, as I say, I believe that was an error on my part, because I misunderstood that particular follow-up study, but that's a different issue.
But -- but in general, I think peer-reviewed published things should be, you know, the name of the game.
Q. Let me just make sure I understand your testimony then, because I didn't appreciate this.
Am I correct then in my -- let me just ask the question. Am I correct then in my understanding, Dr. Neugut, that in assessing the epidemiological evidence for

this case, for glyphosate and non-Hodgkin's lymphoma, you followed the methodology that is used by IARC?
A. I don't want to say I got 17 people together and put them in a room and, you know, talked to them that way.
Q. Fair enough.
A. But I tried to adhere -- since I -- I believe that they are the most authoritative and reasonable way to do this, they were certainly the takeoff point. They were what initially, shall I say, convinced me or persuaded me that glyphosate and NHL had an association, and I have tried -- at least insofar as trying to subsequently form opinions in this case, since IARC was the original platform from which this all emanated, I have tried to adhere to their criteria and methodologies for establishing, I guess what I would consider to be public policy, as well as judgments with regard to this issue.
Q. Okay. So just -- that's fair. So, I understand then that for your expert opinion in this case, you have, in analyzing

the epidemiological literature, sought to adhere to the preamble and the guidelines as to how that data would be considered by IARC; correct?
A. Yes. I mean, if I may have deviated or made a few mistakes along the way, a couple of mistakes, you know, in interpreting a couple of the papers, that is on my head, but -- and if I -- I may make errors. I'm human, too. But then, that's on me, but -- but I have tried to follow that methodology, because I think it is a reasonable one, and I think it's a correct one for public policy.
Q. Okay. And for other cases, where you were not starting off with an IARC monograph, you employed a different methodology for reaching a causation opinion from epidemiological studies. Is that fair?
A. Not necessarily. I mean, as I say, I am not sure in the Actos case that I didn't make an error with regard to the particular instance where you pointed it out. I think I misread -- I think I may have mischaracterized the follow-up data there. I

think I thought -- there was a fourth follow-up, and I think I thought, given how it was presented to me, I thought it was actually a publication.
If you would have seen -- I mean, this is a couple of years ago. I believe that the way the fourth -- that was the fourth follow-up to a large cohort study, and I believe the way it was presented to me, it looked to me like a publication, and I believe at the time I thought it was actually a publication.
But putting that aside, I don't know that I was -- that I actually had a different attitude at the time, but it may well be that under other circumstances, I might use a different approach, depending on the context or the circumstances and whatever it might demand in a certain case.
Q. And let's just take it outside of litigation altogether. When you are doing an epidemiological analysis as part of your independent scientific research, do you follow the IARC methodology then, or do you have other methodologies that you use for

your independent assessments?
A. It depends on the context. Again, for the purposes of public policy, and where you are making true public health or issues that affect standard of care, public people, public health, et cetera, then I think you have to adhere strictly to peer -- the IARC rules and public policy, peer-reviewed things.
If I am sitting around trying to decide how to do my next study, then I can have more informality and look at things that are not necessarily published. When I am talking to my peers or to my schleppers or to -- you know, to my students, and we are looking at someone down the hall has data, so obviously that is not published, and we are looking at someone's data from down the hall, to look at, so then I have -- I am entitled to do whatever I want to do, but then I am not also publishing it in the public sphere necessarily.
But occasionally, of course, you do publish -- even in peer-reviewed publications, you might publish something and

say it's un- --
Q. Referring to unpublished data?
A. You may refer to unpublished data, but then you say that it is, but then it doesn't carry the same weight. It doesn't carry the same weight, and it's subject to criticism, and you can never be certain about it, and it doesn't have the same veracity or the same, you know, confidence, et cetera.
And as I have said, I have had my own articles. You know, I once thought I had the solution to colon cancer, you know, which got turned down by 12 journals in a row, and before I finally got through my head that it really was wrong.
MR. LASKER: Well, that's -- we are running out of tape, so why don't we take a break here, because the tape is going to run out, and if it's not being taped, it doesn't actually count.
So, let's take a break and we'll start again.
THE VIDEOGRAPHER: The time is 3:36 p.m. We are off the record.
(Recess taken.)

THE VIDEOGRAPHER: The time is 3:42 p.m. We are on the record.
BY MR. LASKER:
Q. Dr. Neugut, I just want to follow up on something you said before we went on the break. I first want to put my microphone on, and then I'm going to say it again.
Before we took a break, you were talking about reaching or conducting assessments for public policy, public health issues; correct? I think that was one of the things you mentioned. Where you are trying to reach an assessment for public health determination, you would follow the IARC criteria; correct?
A. Yes.
Q. And part of this public health analysis that you are doing is intended to provide a level of precaution for populations; correct?
A. Yes.
Q. And there is something called the precautionary principle. You are familiar with that?
A. No.

Q. Now, you also, though, in other contexts would do an assessment of a potential causal inference where you are not looking at a public health question, but you are trying to zero in on a scientific assessment of what the true answer is, as opposed to what it might be; correct?
A. Possibly.
Q. When you are conducting an assessment of the epidemiological literature for this other purpose, for a scientific assessment, to dig down and be able to reach a scientific as opposed to a public health conclusion, you might have a different methodology that you would use. Is that fair to say?
A. Possibly.
Q. With respect to the -- I just have one more question on --
A. I might add to that, that we are not in a scientific context here either. Here we are -- we are in a legal context, and the rules for the law are different than the rules for science. And I am not a lawyer.
But, for example, you know, when --

when IARC says that something is a probable carcinogen, that is well beyond what would be legalese, in my -- in my unexpert opinion, that would be well beyond what would be sufficient to define a causal association for legal purposes. So, if we are going to start fooling around with definitions of different causal definitions, based on different contexts, then you are going to have to change -- you are going to have to define what context we are standing in, to be able to define what are the rules by which we are going to play the game.

Q. Okay. And it would be fair then for me to understand that you have followed a methodology in this case that is not a methodology that would be as -- what one would do for purposes of science, but is one that you -- in your understanding, is sufficient for purposes of the legal question in this case. Is that fair?

A. I would say, if anything, it's more -- it's more rigorous than would be necessary for legal purposes, because again, the IARC rules are -- in my understanding,

are beyond -- are more stringent than legal rules.

Q. And that understanding has --

A. That's my understanding, not as a lawyer, as a, I don't know, scientist or academic.

Q. And that understanding has helped determine how you approached the question of -- in your analysis of the epidemiological literature for this case.

A. I am approaching it from that perspective here. Again, whether that applies or does not apply for your purposes or for their purposes, or in the context of cases when they come up in subsequent litigation, is different, and if modifications will then be necessary in terms of how to use unpublished data or things like that, it -- because we'll then be in a different context or different framework, that may or may not be necessary or reasonable.

Q. Understood.

So, I just want to finish up, though, on the NAPP slide deck, which is

Exhibit 14-20, because we were looking at the third page from the end, this proxies versus self-respondents, and there was another column here that I want to ask you about, because they have the results for proxy and self-respondents, and then they have a separate column that is self-respondents only. Do you see that?

A. Yes.

Q. And do you agree with Dr. Blair, and he testified to this in his deposition, we can look at it if you would like, that in epidemiological analyses, information provided by cases are generally considered more reliable than information provided by proxies?

A. Yes.

Q. So, when the NAPP investigators focused on the data without proxies and cases only, or the pooled data from McDuffie and De Roos 2003, they found an ever-never odds ratio for glyphosate and non-Hodgkin's lymphoma of 0.95; correct?

A. Yes.

Q. And so, this most reliable odds

ratio for ever-never use of glyphosate from the U.S. and Canadian case-control studies is to the left, if you will, of the null finding or below 1.0; correct?

MR. TRAVERS: Objection to form.

A. Well, you know, you give up something when you -- that's true, but you're also -- it means you have more empty spaces, too. You have more unanswered -- I don't know that -- again, as I said before, I don't know this data. I'm not looking at tables. That means there is going to be more empty boxes in your -- there are going to be more non-respondents in both the cases -- in the cases and the controls, so you have given up something as well.

Q. Power. You have given up some power; correct?

A. It goes beyond power. It goes -- again, we were talking before about random classification. You have empty cells. It's -- there is -- nothing is free.

Q. But as between proxy and self-respondent data, and self-respondent data alone, you can have, at least with

respect to the information reported, more confidence in the data that is reported by the respondents; correct?
A. The validity of the data is better.
Q. And you are aware that the North American Pooled Project has published in the peer-reviewed literature its findings for the U.S. and Canadian case-control studies for glyphosate and multiple myeloma; correct?
A. I know they published some of their results. I don't know offhand specifically which. I will take your word for it.
Q. And you are aware that the Agricultural Health Study has also published its findings, updated findings, for other types of pesticides and non-Hodgkin's lymphoma; correct?
A. Yes.
Q. And sitting here today, you cannot say that any of the methodologies that were used in the 2013 AHS data that we discussed, or in this North American Pooled Project slide deck that we just discussed for glyphosate and non-Hodgkin's lymphoma, differs from the methodologies that were used

in these peer-reviewed published studies; correct?
A. Correct.
Q. Let's look at the Eriksson study. I know we have looked at it before, but I have a few more questions.
A. Eriksson?
Q. Eriksson, and I don't know what number that is. 14-13.
Now, this is also, like the McDuffie study, an exploratory analysis; correct?
A. Exploratory meaning that they did not start off with a particular specific pesticide or herbicide in mind to test, if that's what you mean.
Q. Correct.
A. Is that what you mean?
Q. Yes.
A. Yes.
Q. And in your expert report, you state that the odds ratios in this study were adjusted to account for possible confounding from use of other pesticides; correct? It's page 16 of your report, if that helps.

A. Yes.
Q. Now, in fact, the only adjusted odds ratio -- the only odds ratio that is reported in Eriksson that was controlled for the bounding by other pesticides is in that single table seven on page 1661 of the study; correct? Where they have the multivariate findings.
A. Yes.
Q. So, none of the other odds ratios reported in Eriksson, other than that multivariate odds ratio reported in table seven, are adjusted for confounding by other pesticides; correct?
A. That's correct.
Q. And if I could direct you to page 1658, in the left-hand column, all the way to the bottom, when they are talking about their statistical methods. Do you see that?
A. Yes.
Q. And the last three lines on that column, in the univariate analysis, and that is the analysis that they use in presenting all the other odds ratios in this report; correct?

A. Yes.
Q. In the univariate analysis, different pesticides were analyzed separately, and the unexposed category consisted of subjects that were unexposed to all included pesticides.
Do you see that?
A. Yes.
Q. That was the same issue we saw in the Hardell 2002 study; correct?
A. I don't recall, but okay.
Q. And that is, as you testified with respect to Hardell, a methodological flaw, because it prevents any analysis that accounts for other pesticide exposures; correct?
A. I'm not following.
Q. If the unexposed category is defined as individuals unexposed to all included pesticides, and the exposed category for glyphosate can include individuals with glyphosate exposures who were also exposed to other pesticides, that is a methodological flaw in the study; correct?
A. Why?

Q. Because in a case-control study, you are trying to pull populations of exposed individuals from the same population. You want to have the controls be from the same population as the cases; correct?
A. But that's not a flaw in the study. That is simply the reality of the universe and of people in the population. I mean, people are exposed or they are unexposed.
Q. Well, I understand that. But if you are defining "unexposed" to exclude individuals with exposures to other pesticides, and you are not doing that for the cases --
A. Then that would mean then that -- so, so that essentially what you are saying then is, if I may analogize, if you want to -- let's say we took asbestos and cigarette smoking and lung cancer --
Q. Sure?
A. -- as an analogy, and I said I wanted to know what the effect of asbestos was on lung cancer, but I wanted to control for tobacco use, so I could only take cigarette smokers, I would have to have

everybody be a smoker both in the case group and the control group, because if I had someone who wasn't exposed to cigarette smoking, I wouldn't know what to do with them.
Q. No, I think it would be a little bit --
MR. TRAVERS: He is still talking, I think.
A. No, I was finished.
Q. It would be a little bit different, I guess. If you were to do a study of asbestos and tobacco, smokers, and you had for your exposed group individuals with exposure to asbestos who might be exposed to cigarettes, but for your unexposed group you excluded anybody who had exposure to cigarettes, as a definition, that would be a problem; correct?
A. I don't agree. I mean, I think the best you can do is, you can put the exposures in everybody's way. You know, you can take a group where everyone has got an equal chance of being exposed to all the exposures. That's the way to do a -- that's the, shall

we say, the methodologically appropriate and sound way to do it.
Q. Okay.
A. As opposed to, let's say, taking people who live on -- in the 10021 area code, where they are never going to see, you know, herbicides in any meaningful way, as the control group for farmers, so to speak. So, you want to take everybody, let's say, being a farmer, where everybody has an equal chance of being exposed to herbicides.
Now, it may well turn out that in one particular farmer or that some group of farmers isn't going to use herbicides, because they are organic --
Q. Understood, understood.
A. -- or something like that. So, that's fine. They're still -- they're still fine. They're still in the thing. To say that therefore, they are screwing up your study in some methodological way is not fair. That's -- if that's what you are implying, then --
Q. No. I think you are misunderstanding me.

A. Then I am misunderstanding you.
Q. Let's go back to this.
The statement in the Eriksson study is that for the unexposed category, for the unexposed group --
A. Unexposed to herbicides.
Q. Well, the unexposed for glyphosate would be unexposed to glyphosate; correct?
A. But I think here they are talking about unexposed to any pesticide.
Q. Right.
So, each of the different pesticides was analyzed separately, so you look at a group that was exposed to that pesticide, and you are looking at, as your unexposed group, an individual that is not exposed to any pesticides. So, there you have farmers --
A. But he is a farmer and he chose not to be exposed. That was his -- that's life. That's his lifestyle or whatever choice.
Q. Well, no, I understand if they happen to have somebody who is not exposed. That is one thing. But here, in order to be part of the analysis, they define "unexposed"

as requiring that there is no exposure to other pesticides; correct? That's what Eriksson is stating here.
A. The unexposed were not exposed to other pesticides, yes.
Q. Any pesticides.
A. Any pesticides, right.
Q. So, that would be taking a non-farmer and putting them in the exposed group --
A. No.
Q. -- and having a farmer in the exposed group.
A. I don't agree. It would be taking, as I said, a farmer who wasn't exposed to pesticides. Well, I don't know. What was the control group? Maybe I am -- maybe I am misunderstanding what the control group is here.
Q. Well, let me --
A. Oh, I see. These are just general population controls. Okay. So, these are people who are not exposed to any pesticides, yeah.
Q. If the analysis or case-control

study allows for exposure to other pesticides when you are measuring, let's say glyphosate, as an exposed case, you can have somebody who is exposed to glyphosate and also exposed to 2,4-D and malathion, but for your control -- for your unexposed, I'm sorry, you are not allowing them to be counted if they have exposures to any pesticide. Then your unexposed population now is not the same population as your exposed population; correct? You are drawing from different populations now.
A. So, but you are allowed to do that as long as you create the same condition for both the cases and the controls. So, therefore, you could specify that, if you also specify that the case group cannot be exposed to any other herbicide.
Q. If you define "unexposed," though, as not allowing for exposures to any other pesticides at all --
A. Except for glyphosate.
Q. No. The unexposed would be none. The exposed group would have glyphosate and others.

A. And no other herbicide.
Q. Okay. So, if the exposed group is glyphosate and no other pesticide --
A. Correct.
Q. -- and the unexposed group is no pesticide, that's fine.
A. Correct. That's legal. That's, that's -- that is -- wrong word. That's --
Q. Allowed.
A. Allowed.
Q. If the exposed group, though, is exposure to glyphosate and other pesticides, then it would not be proper to --
A. Correct.
Q. -- define "unexposed" as having no pesticide exposures.
A. Absolutely right.
Q. And if that's what was done in the Eriksson study, that would be a flaw.
A. Right. And, you know, recognizing that you're -- what word would I use -- manipulating or playing with the data to some degree or -- and since, as you said at the beginning when we picked up this paper, this is an exploratory study, the term -- that is

precisely what an exploratory study is all about. It allows you to explore to see what's going on and to do sort of the subgroup analyses to see what happens if you do this or if you do that, as long as you adhere to some reasonable guidelines to make everything kind of logical and commonsensical, and not be too biased, if you will, in terms of how you play the data or play the subgroups against each other.
Q. And so, for all of the analyses that are reported in Eriksson, other than that one multivariate analysis on table seven, they have used this methodological design that you need to keep in mind and might be okay for an exploratory analysis; is that correct?
A. I think that's fair, yes. Wait. Are we still in -- wait. Is this the first one?
Q. Eriksson two thousand and --
A. Yes.
Q. -- eight.
But in analyzing Eriksson 2008, you would also want to be aware of the fact that

because of the way they defined the unexposed population, that that creates an issue as far as how you can actually analyze the findings in the study; correct?

A. You can interpret, I would say.

Q. Why don't we just put that aside. Let's start that again, and maybe you can just put your wallet --

A. I'm cool, I'm cool. I'm sorry.

Q. So, for Eriksson 2008, because of this fact, that they defined unexposed alone as not having exposure to any other pesticides, that -- that fact has to be taken into account in how you interpret all of the data reported in that study; correct?

A. All the data?

Q. Other than the multivariate analysis on table seven.

A. That is one analysis, and again, as long as they apply the same rules to both the cases and the controls, they can do whatever they like, or that would be a legitimate analysis, and then you -- as I told you earlier, in epidemiology you have the freedom to do whatever you like, as long as it has

logic, common sense, and intellectual validity to it.

Someone else may think it's silly. They are welcome to think whatever they like. And you can interpret or not, and think it reasonable or not think it reasonable, that you are free -- that you are -- that's your -- that's your freedom, you know, to do.

Q. Just so the record is clear, though, in the Eriksson study, the only analysis that does not define "unexposed" as being unexposed to all pesticides is that one data point in table seven for the multivariate analysis. All of the other data presented in that table uses this experimental approach of defining "unexposed" as unexposed to all pesticides; correct?

MR. TRAVERS: Objection to form, asked and answered.

A. So in table two, when they do the ten days versus greater than ten days, that is excluding anyone with any other herbicide exposure?

Q. Yeah. If you look at the univariate analysis on table seven, you can

actually cross-reference. You will see that the univariate odds ratios in table seven, and the univariate is where they do the analysis defining "unexposed" that way --

A. Okay.

Q. -- they match up. Correct?

A. All right.

Q. So, I am correct that for all of the analyses other than the one multivariate analysis on table seven, Eriksson uses this sort of exploratory methodology in which they define "unexposed" as unexposed to all other pesticides; correct?

A. Yes, but --

Q. And that's okay for an exploratory analysis. Isn't that your testimony?

A. And it may well turn out that that is, as I say -- depending on how you want to think or how you want to analyze it, that may be -- maybe this is the smartest analysis or the best analysis. It depends on how -- how you think through how glyphosate operates or how one -- I mean, if you are concerned about confounding by other herbicide, then perhaps taking all the herbicides out of the picture

in this way is the smartest. I'm not saying it is or it isn't. I'm saying at least that is one approach to how to analyze the data that addresses that question, and see what the answer is, is one way to address that issue.

Q. Just to be clear, we are not taking all the other pesticides out, because the exposed population, exposed to glyphosate, also has exposures to other pesticides; correct?

A. If they did that, then I would say it wasn't a legitimate analysis. I mean, as I said, if you are going to take it out of the control -- whatever you do to the case-control group, you have to do to the case group. You have to be consistent between cases and controls.

Q. And between exposed and unexposed with respect to other pesticides; correct?

A. So again, here, this is a case-control study.

Q. Right.

A. So, again, whatever you do to the cases, you have to do to the controls.

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Q. Right.
A. So, if you are taking all herbicide exposures aside from glyphosate out of the picture, you have to do it to both groups.
Q. And with respect to the --
A. Aside from glyphosate.
Q. And if you are doing that, by the same token, if you are taking all the other pesticide exposures out of the unexposed group in this study, you would need to take all those other pesticide exposures out of the exposed group for your analysis; correct?
A. Yes, but that wouldn't be the way you would -- I would say in a case-control study, you wouldn't -- that wouldn't be the logical way to approach it.
Q. Right.
A. I mean, you might get that as the out -- that might be the way it would end up, but that wouldn't be the way you would logically approach it.
Q. Okay. So, it wouldn't be logical to define -- if you are going to have exposed -- allow for exposure to other pesticides, it wouldn't be logical for your

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unexposed to an individual pesticide to exclude all other pesticides; correct?
A. No.
Q. Okay. So, with respect to the Eriksson study, the odds ratios, all the other odds ratios that are reported, except for this hierarchal odds ratio, are also -- they are not adjusted for smoking or drinking or any other lifestyle factors; correct?
A. No.
Q. They are only adjusted for age, sex and year of diagnosis; correct?
A. Age, sex, year of -- yes.
Q. And virtually every one of the approximately 20 different pesticides that Eriksson looked at is reported to have unadjusted odds ratios above 1.0; right?
A. So, are we now back in table two or table --
Q. All of the tables.
A. Huh?
Q. All of the tables.
A. Yes.
Q. Is it your testimony that every one of, looks like maybe 20 or more different

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herbicides and insecticides and rodenticides and fungicides that are looked at in Eriksson 2008 cause non-Hodgkin's lymphoma?
A. I'm not addressing these other agents, so I don't have testimony regarding them.
Q. Is it your opinion, based upon the Eriksson study, based upon the findings of that study, that all of the -- every one of these 20 or so different herbicides, insecticides, rodenticides and fungicides cause non-Hodgkin's lymphoma?
A. DDT probably does. So, if we are going to add by analogy to the Bradford Hill criteria -- I won't do that, but the answer is, you know, I don't know, but it's not --
Q. Let me ask you this, Dr. Neugut. When a study uniformly reports odds ratios in excess of 1.0, for every exposure that it reports out, without controlling for confounding, that points to the possibility of a systematic bias in the study, doesn't it?
A. Yes.
Q. And --

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A. It points to a concern. I mean, you know, again, if everything -- if all the exposures are related to each other in some significant way, or if most of them are, they don't all have to be, but if most of them are, then it's not totally inconceivable that they do elevate some risk.
But the answer is yes, generally speaking, that the -- that's what is referred to as specificity in the Bradford Hill criteria, and it would -- it should raise a concern that it's not purely -- that it's not -- that it's not -- well, that it's not a causal association, that there is something else going on that is methodological or statistical rather than causal.
Q. If there is confounding by other pesticide exposures, it's impossible from this study results to identify any one of the studied pesticides, including glyphosate, as having a true association with non-Hodgkin's lymphoma; correct?
A. Say that question again.
Q. If there is confounding by other pesticide exposures, it's impossible from

this study to identify any one of individually studied pesticides, including glyphosate, as having a true association with non-Hodgkin's lymphoma; correct?

A. I would not worry about confounding here. That is not -- or at least that would not be my -- I don't know that that would be the issue I would be concerned about. I mean, the --

Q. What issue would you be concerned about?

A. We have already said these are farmers. Farmers have a higher risk of lymphoma than the general population. The control group is the general population. So, you are seeing a slight increase in, if you want to call it an occupational risk, then -- so, this is -- this is an occupational risk ratio. You are seeing that farmers have an elevated risk of lymphoma.

Over and above that, the question is, do herbicides, within the farming group, or within the farmers, also convey an additional risk ratio over and above being a farmer. So, that is a question that the

study can address over and above.

Q. But this study, because of its design, can't provide you with that answer; correct?

A. Because?

Q. Because everything is above one in the study, so you can't actually differentiate any finding with respect to a specific pesticide; correct?

A. Well, you can see if the risk ratio for specific subgroups are higher than they are for the over -- for the overall group. If farmers exposed to glyphosate have a higher risk than farmers not exposed to glyphosate, I would worry about glyphosate. If -- again, we are talking about an exploratory study. If, if -- if there is a dose -- if people who have five times the amount of glyphosate as compared to those who have one-tenth the amount of glyphosate, have a higher risk than those --

Q. I understand. Sure.

A. -- then, as I said before, you have to apply your thinking and your logic and your common sense to looking at the data.

That's why it's called exploratory or -- and all of that, to see what makes sense within the data.

Q. But specifically with the Eriksson 2008 study, because of what we are seeing with elevated odds ratios, and if you look at table seven, glyphosate is in the middle, I guess, of the different pesticides, as far as the reported odds ratios, because of this systemic bias in the Eriksson study, it's impossible to reach any conclusion with respect to glyphosate; correct?

MR. TRAVERS: Objection to the compound question.

A. I would say that with this paper in general, I would be -- I might be concerned about all of these things, you know.

Q. Okay.

A. These are pretty high risk -- we are already getting up into higher risk ratios than I might expect purely from biases alone.

Q. How about with respect to when you have every finding above 1.0, so you have evidence of a systemic bias in the study,

it's impossible to reach a conclusion with respect to any individual exposure reported out of this study; correct?

A. I would say that that would be true of any -- I would have said that before I did the study, or it would have been impossible to reach a conclusion before I did the study no matter what I found.

Q. Because it's an exploratory study?

A. Correct.

Q. Now, with respect to the analysis here of latency, there is analysis of exposures for the categories of one to ten years, and then there is a category of greater than ten years; correct? And that is reported, I believe, on -- where is this document? Page 1659. 1658 and 1659.

A. Yes.

Q. But for -- and they report here, or Eriksson reports here on MCPA, 2,4,5-T, 2,4-D, and glyphosate; correct? In this analysis.

A. The question is what?

Q. The Eriksson paper reports results in this latency analysis for glyphosate, for

MCPA, and for 2,4,5-T and 2,4-D; correct?
A. Yes.
Q. But for MCPA, 2,4,5-T and 2,4-D, there were no exposed cases in that one- to ten-year latency period; correct? That's on the top of page 1659.
A. Yeah.
Q. So, we know for these pesticides at least that they could not have confounded the results for glyphosate within one to ten years of diagnosis; correct?
A. Okay. Yes. Um-hum.
Q. And the glyphosate odds ratio for that one- to ten-year latency period was 1.11. That's not even remotely close to statistical significance. That is a null result; correct?
A. Yes.
Q. Now, for the latency period of greater than ten years, the glyphosate odds ratios reported by Eriksson could be confounded by exposures to MCPA, 2,4,5-T and 2,4-D; correct?
A. Yes.
Q. And in your expert report, you note

in particular that MCPA is commonly used together with glyphosate; correct?
A. Yes.
Q. Eriksson reported an odds ratio for MCPA of 2.81 for that greater than ten-year latency period, which is higher than the unadjusted odds ratio reported for glyphosate for that same greater than ten-year period; correct?
A. Yes.
Q. And it's impossible to tell from Eriksson whether the odds ratio for glyphosate, if it had been controlled for the use of MCPA, would be elevated at all for greater than ten years latency; correct?
A. Yes.
Q. Now, in your expert report, you also point to the dose-response analysis in the Eriksson study for glyphosate; correct?
A. Yes.
Q. And this -- again, this dose-response analysis reported by Eriksson is not controlled or not adjusted for potential confounding by exposure to other pesticides; correct?

A. Correct.
Q. And if the data from De Roos 2005 is correct in showing higher exposure levels to other pesticides with higher exposure level to glyphosate, the finding of increased odds ratios at higher exposure levels of glyphosate could be an artifact due to confounding; correct?
A. Could be.
Q. And Eriksson also does not report any -- does not conduct any analysis to determine whether the findings for glyphosate exposure of less than ten days are statistically different than the finding for glyphosate, the odds ratio of greater than ten days; correct?
A. I mean that's -- the numbers are really too small to do anything statistically, to address what you just said.
Q. And going back to what we were discussing earlier, with respect to the Lee study, which had those two different odds ratios or point estimates.
A. Right.
Q. There is really no way to tell from

the glyphosate -- or from the data in Eriksson whether there is any meaningful difference between the reported odds ratios for less than ten days exposure as opposed to greater than ten days exposure of glyphosate; correct?
A. No, but I mean, you can't statistically confirm it.
Q. And just like you said in the Lee paper, when you can't statistically differentiate the two groups. It's not appropriate to say, as an epidemiologist, that you have shown that they are actually different; correct?
A. You can't say with definitiveness.
Q. Let's talk about the meta-analysis, and you talk about those on page 17.
First of all, the -- each of those meta-analyses that were presented, and this would be both Schinasi and the Chang and Delzell 2016 paper, they limited their analyses only to the most updated and comprehensive analysis of each epidemiology study population; correct?
A. Yes.

Q. Now, you are aware, are you not, that Chang and Delzell have updated their meta-analysis to include the data from the 2013 Agricultural Health Study and from the NAPP study; right?
A. I'm aware of it, but I haven't seen the -- I don't believe I have seen it.
Q. Were you not provided with the 2017 Chang and Delzell meta-analysis that was provided to your counsel with Monsanto's expert reports?
A. I didn't read Monsanto's expert reports.
Q. So, you have not looked at the Chang and Delzell study that is cited in those reports?
A. No.
MR. LASKER: Let me mark as the next exhibit in line, 14-21.
(Exhibit 14-21, Exponent, May 24, 2017 Meta-Analysis of Glyphosate Use and Risk of Non-Hodgkin Lymphoma marked for identification, as of this date.)
Q. And Dr. Neugut, if you look to page seven of this document, Exhibit 14-21, this

is --
A. I'm sorry, where am I looking?
Q. Page seven.
A. Page seven.
Q. This is analysis by Dr. Chang and Dr. Delzell; correct?
A. Yes.
Q. And if you look on page four, at the very top, they state that for purposes of this analysis, they are using "the same meta-analysis statistical methods as described in our publication Chang and Delzell, 2016." Correct?
A. Yes.
Q. And that is the meta-analysis that you cite to in your expert report; correct?
A. Yes.
Q. Now, plaintiffs' -- Dr. Ritz, plaintiffs' other epidemiology expert, stated in her expert report, and we can go back to her report, Dr. Ritz's report, at page 15 and 16, I believe. She is talking about the NAPP data again.
A. Um-hum.
Q. And on the -- on page 16, she notes

that the NAPP data were not included in any of the meta-analyses. Do you see that?
A. Are you in the middle of 16 or --
Q. Sort of the top, maybe one-third of the way down. The bottom of that last carryover paragraph, the final sentence.
A. Up here or down here?
Q. Right up here, the top paragraph. At the very end, it says, "The study results were published in 2014, and as such were not included in any of the meta-analysis." Correct?
A. The study results of the NAPP is she referring to?
Q. Yes. Well, you should confirm that for yourself, because that's what is discussed on page 15 and 16, but that is my understanding. I want to make sure that is your understanding as well of Dr. Ritz's --
A. Okay. Yes, okay.
Q. So, Dr. Ritz is pointing to the fact that, as we have discussed, using the methodology for meta-analyses that was used in the studies and was used both by Schinasi and Chang and Delzell, you would use the most

recent updated complete dataset for the meta-analysis; correct?
A. Yes.
Q. And so the NAPP dataset then would be used as the pooled analysis as compared to the De Roos 2003 and the McDuffie 2001 studies; correct?
A. Yes.
Q. And if the NAPP data -- and let me actually go back to Exhibit 14-21 for you. That is the 2017 meta-analysis. If you go back -- if you can go to the pages, page nine and page ten.
A. That is in the Exponent section?
Q. Yes. In Chang and Delzell, 2017. Pages nine and ten list all of the epidemiological studies that we have been discussing today, with the number one, Alavanja 2013, being the 2013 AHS data. Number two is the De Roos 2003, which is the De Roos case-control study. Are you with me?
A. Yeah, I just found it. Alavanja, De Roos.
Q. And then number three is De Roos 2005 AHS study; correct?

A. Yes.
Q. Number four is Eriksson 2008.
A. Um-hum.
Q. Number five is Hardell 2002.
A. Yes.
Q. Number six is Hohenadel, and Hohenadel did an analysis of -- another analysis of McDuffie; correct? The same data set. Correct?
A. Yes.
Q. McDuffie 2001; correct?
A. Yes.
Q. Orsi 2009?
A. Um-hum.
Q. And then number nine is Pahwa, et al, 2015, and that is the NAPP data; correct?
A. Yes.
Q. And so they then conduct, using the same methodology as they did in the 2016 meta-analysis that you cite in your report, they do meta-analysis looking at these different studies and considering different studies for -- to determine what the meta-relative risk is with those different

studies; correct? And they identify which studies they are including in the meta-analyses; correct?
A. Yes.
Q. So, for their model 26, if you can look at that, that's on page 11, using their same meta-analysis methodology that they used for the 2016 publication, and they are looking here now at studies three, four, five, eight and nine, so they have used the NAPP data in place of De Roos 2003 and McDuffie, but then continuing to use the 2005 Agricultural Health Study data; correct?
A. Yes.
Q. So, if you were to use the NAPP and substitute that for -- for De Roos 2003 and McDuffie per the -- per the normal methodology for a meta-analysis, you find that there is a meta-relative risk of 1.2 that is not statistically significant; correct?
A. Yes.
Q. And if you look at model 21 of their meta-analyses, this is the finding if you were to use both the 2013 Agricultural

Health Study data and the NAPP data and then all of the other studies that you analyzed; correct?
A. I'm not -- are we talking about --
Q. Model 21.
A. Back here?
Q. And you should reference it back, so what they have done in this analysis, if I understand it correctly, but you should correct me if I am wrong, is that they used the updated AHS analysis from 2013 in place of the 2005 analysis, and they have used the pooled analysis for the North American Pooled Project in place of the studies that were pooled into that study, McDuffie and De Roos; correct?
A. To be honest, I'm -- it's a little difficult for me to absorb all of this as I sit here.
Q. The reported finding at least, and I understand that you have not had a chance to look at this -- well, let me strike that.
I understand that you haven't looked at this, but the analysis, as reported by Chang and Delzell, 2017, for a

meta-analysis, when you look at the most updated AHS data and the most recent pooled data from North America, and in combination with the rest of the glyphosate epidemiology, your meta-relative risk is 1.0 with a confidence interval of 0.86 to 1.2; correct?
A. Yes.
Q. And that is a null finding for the meta-analysis; correct?
A. Yes.
Q. And that finding that Chang and Delzell report is consistent with what Dr. Blair testified that he would expect a meta-analysis to show, using that updated AHS data and updated Pooled Project data; correct? In his deposition testimony.
A. Yes.
Q. So, this 2017 meta-analysis finding of Chang and Delzell with the most updated epidemiological data does not provide evidence of an association between glyphosate and non-Hodgkin's lymphoma; correct?
MR. TRAVERS: Objection to form.
A. I don't know that it does or it doesn't. Again, I am not -- I haven't

incorporated it into my opinion and am not -- and you are putting into it data that I am not including in my opinion, and so, if you are asking me to form my opinion based on it, I am not willing to.

Q. And that's because you are following the methodology prescribed by IARC; correct?

A. Plus this is also not peer reviewed or published or -- and it's including data that wasn't itself peer reviewed or published.

Q. And we went through this before, but are you aware of any guidelines -- I know your -- the meta-analysis guidelines that you cite to in your report talk about using unpublished data in the meta-analysis. Are you aware of any guidelines for meta-analysis that state you should not consider unpublished studies in a meta-analysis?

A. So, you run the risk of -- what about the study that they didn't include?

Q. Let me -- let me ask the question again, and let me see if I have an answer.

Are you aware of any guidelines for

meta-analyses that state that you should not consider unpublished studies in your meta-analysis?

A. No.

Q. Let me turn to pages 17 to 20 of your expert report.

A. I'm sorry, where?

Q. Seventeen to 20 of your expert report. And this is where you are dealing with toxicity studies and mechanisms, and I think this may be a quick line of questions, but I want to make sure.

The type of evidence that you are presenting on pages 17 through 20, this is dealing with toxicological studies; correct?

A. Oh, this isn't --

Q. In your report, your own report again. Sorry.

A. I'm sorry. I'm looking at the Dr. Ritz report.

Q. Let's go back again. In your report, on pages 17 to 20, you are reporting on certain toxicity studies; correct?

A. Yes.

Q. And am I correct in my

understanding that you have basically taken this data from the IARC, IARC monograph?

A. Primarily. I mean, some of it may have come also from some of Portier's stuff or from other sources of a similar ilk.

Q. But it would be fair to say that this type of cited data is outside of your expertise as an epidemiologist?

A. It's not what I deal with on a daily basis, but I am familiar with this sort of data, and certainly to the degree of being able to incorporate it into, say, biological plausibility arguments, and I have a Ph.D. in chemical carcinogenesis, so, you know, at least going back, I have a fairly good familiarity with this sort of data, at least fundamental. I don't work in a lab anymore, and I wouldn't want to, but -- but I understand it fair enough. But it's not primarily what I deal with.

Q. Okay. And would I be correct in my understanding that you haven't actually read any of the toxicity studies or mechanistic studies for glyphosate?

A. I did read a couple of them, just

there were one or two that I probably went back and did read. But I did not -- I did not certainly do the literature review and then summarize it here.

Q. And you have not, for purposes of your opinion here, you don't purport to have done an expert analysis of the toxicity data or the mechanistic data. You are deferring to other experts for that; correct?

A. That's correct.

Q. Let's talk about your Bradford Hill analysis. And that is -- I believe it starts on page 20.

Now, Bradford Hill, we talk about Bradford Hill criteria. Bradford Hill is not a location, it's actually a person; right?

A. It's actually what?

Q. A person. There is a Sir Bradford Hill; correct?

A. Austin Bradford Hill.

Q. Austin Bradford Hill, right.

And he came up with these criteria for causation in a speech or presentation that he gave in 1965; correct?

A. Yes.

Q. And that is the source of the Bradford Hill, what we know as the Bradford Hill criteria; correct?
A. Yes.
Q. And in that seminal article laying out his criteria, Sir Bradford Hill stated that you should not even consider the criteria he specifies for determining whether or not there is causation unless you first have a statistically significant finding that cannot be explained by confounding or bias; correct?
A. It's a long time from 1965 to 2017. I mean, so, you know, that's like saying, you know, we are still doing what George Washington told us to do, and then based on that is how we are now interpreting the Constitution.
Q. Okay. There's two -- well, that is a separate issue that I am not going to go into. But let's just make sure I understand the answer to my question.
A. Yes.
Q. Because I think you are answering a different question.

So, Bradford Hill, when he set forth his criteria, it was his statement that you should not go move on to consider those other criteria unless you first have epidemiological findings that are statistically significant, positive findings that cannot be explained by confounding or bias; correct?
A. I don't recall. I mean, I'm not going to tell you I read the paper yesterday.
Q. You might not be surprised to learn that we are going to be looking at the paper right now. Expect nothing different.
A. Here we go down memory lane.
MR. LASKER: 14-22.
(Exhibit 14-22, Section of Occupational Medicine, Meeting January 14, 1965, The Environment and Disease: association or Causation?, marked for identification, as of this date.)
Q. And this is in fact the president's address by Sir Bradford Hill that sets forth the Bradford Hill criteria; correct?
A. Yes.
Q. And in the second column on the

first page in 295, Sir Bradford Hill, in introducing his -- these criteria that we will be discussing, states, "As a predicate, our observations reveal an association between two variables perfectly clearcut and beyond what we would care to attribute to the play of chance." Correct?
A. Yes.
Q. So, for Sir Bradford Hill, for -- under his analysis, the first threshold question is: Do you have a statistically significant finding; correct?
A. Yes.
Q. And also, that you have a clearcut finding that would not be explained by bias or confounding; correct?
A. Yes.
Q. And then you would move on to the criteria that he lays out and you lay out in your expert report; correct?
A. Yes.
Q. Let's move on then to -- well, strike that.
I'm correct in my understanding that you did not apply that predicate

requirement for your decision then to consider the Bradford Hill criteria; is that fair?
A. I think Bradford Hill would be absolutely appalled that about 90 percent of the causal things that are now commonplace in modern epidemiology, if he were to apply those criteria 50 years after the statement. He was working with regard to tobacco and lung cancer, where the relative risk is ten to 20, and would have been totally -- I think, you know, wouldn't have had any concept of thinking about risk ratios in even the two to three range, much less in the under two range, to be able to talk about such issues, if he wouldn't be able to read a modern epidemiology textbook.
So, to apply his -- this from 1965 to now, to make it some kind of criterion for how to approach causal thinking, I mean, certainly if this were true, we wouldn't have to even be sitting here talking, but that's out of -- it's so out of date --
Q. Let me just break this down, because you are using the Bradford Hill

criteria in your expert report; correct?
A. I'm not -- I mean, that's like saying I'm using Koch's postulates for figuring out whether someone has an infection with tuberculosis bacillus.
Q. My guess is that's not going to be meaningful to anybody who listens to this, so let me ask the question again.
You are using -- Bradford Hill in this paper lays out various criteria for making a causation assessment; correct?
A. Yes.
Q. And you follow that methodology and look at the same criteria in making your causation assessment; correct?
A. Yes.
Q. But in making your assessment in this case, you do not require as a predicate, the way Sir Bradford Hill would, that you start off with a statistically significant increased risk that cannot be attributed to chance or -- to confounding or bias; correct?
A. I think in modern epidemiology, it's not necessarily required, and I will base it on the -- the meta-analysis that says

that there is an elevated association.
Q. Let me just make sure I understand your testimony. With respect to the Bradford Hill criteria, you are -- you do not consider there to be, or maybe you do, but in conducting your analysis, am I correct in my understanding that you do not believe you need to have a statistically significant increased risk that cannot be attributed to confounding or bias, to then consider the Bradford Hill criteria?
A. You would never know, you can never know ever whether something is causal or not with 100 percent surety. That is the whole point. So, when -- what would be causal or not?
Q. Well, I think we are missing each other. I'm asking a simple question here.
In applying the Bradford Hill criteria in this case, am I correct that you did not require for -- before reaching the criteria, the -- that you start off, as Sir Bradford Hill states in his setting forth of the methodology, with an association that is statistically significant, positive, that

cannot be explained by confounding and bias.
A. That doesn't exist.
Q. Okay. So am I correct then that you do not believe that you need to have an observation that reveals an association between two variables that is perfectly clearcut and beyond what we would care to attribute to the play of chance before considering the Bradford Hill criteria?
MR. TRAVERS: Objection, asked and answered.
A. If there were a statistical association between two variables that could not be explained by bias or confounding, then it would almost -- you almost wouldn't have to have the Bradford Hill criteria to discuss it further.
It's -- secondly, the Bradford Hill criteria are not criteria in the sense of requirements. They are guidelines in the sense of how to approach thinking about causality. Whether you are quoting some speech of his, the point is that they're -- they're guidelines for how to think, how to think about causality, not how -- they are

not rules that are required, you have to have this, you have to have that, you have to have a third thing.
Some, they -- are judgment criteria, rules of judgment that we apply in thinking about whether the association between an exposed -- putative association and outcome are associated with each other, that I can evaluate -- you can evaluate or some other -- your expert can evaluate, and we can agree or disagree about.
Q. But just so I am clear, because it's a pretty long answer, you do not consider in your approach to the Bradford Hill criteria, you do not believe that you would need to have this association between two variables that are perfectly clearcut and beyond what we care to attribute to the play of chance before then going to the criteria laid out. Is that correct?
MR. TRAVERS: Objection, asked and answered.
A. I think they need to have an association -- a putative association or a suspected association between an exposure and

an outcome, where there may or may not be the possibility of bias or confounding, and I am evaluating whether bias or confounding are playing a role or whether causality or some other association or some other factor is leading to the association.

Q. So, your methodology then in applying the Bradford Hill criteria, at least to that extent, is different than the methodology that Dr. Bradford Hill would have followed. Is that fair to say?

A. Different than Dr. Bradford Hill would have applied in 1965.

Q. Correct?

A. Possibly.

Q. Now, with respect to these criteria, the first Bradford Hill criteria you discuss in your expert report is temporality; correct?

A. Yes.

Q. And you state in your expert report that there is no doubt that this criteria was met with the glyphosate epidemiology; correct?

A. Yes.

Q. But as we discussed earlier, with respect to cancer epidemiology, temporality also has to consider latency issues; correct?

A. Does it?

Q. Well, that's a question to you. If there is a latent disease, like cancer, and you are trying to determine whether an exposure is in the proper time frame to be a causal association -- for a causal association to be --

A. Well, since I don't -- again, since I am agnostic on the subject of latency, latency to me is not a key issue here personally. Again, Dr. Weisenburger or Dr. Ritz can address it in their own rules.

To me, the question is, did glyphosate exposure precede the onset of non-Hodgkin's lymphoma. That's what temporality means to me. And I think in at least all the studies that I am seeing, that was -- that was pretty clearcut.

Q. Okay. Well, if I -- just if I understand correctly, and I understand you have said you are agnostic on the issue of latency, which means you don't -- you haven't

formed an opinion one way or the other on latency; correct?

A. With regard to how long the latency needs to be.

Q. Right.

So, depending on the answer to that question of latency, for non-Hodgkin's lymphoma and glyphosate, temporality may be satisfied or it may not be satisfied for some of the glyphosate epidemiology; correct?

A. The question is whether there is -- if there is an association between glyphosate and non-Hodgkin's lymphoma -- the question is whether there is an association between glyphosate and non-Hodgkin's lymphoma. If there is an association between the two, then either glyphosate precedes non-Hodgkin's lymphoma, or non-Hodgkin's lymphoma precedes glyphosate.

So either glyphosate is -- now, from all the studies that we seem to have been reading, people, as you yourself have pointed out, and for most of the studies, 15 years, ten years, five years, whatever, glyphosate exposure preceded the onset of the

disease. Now, if there is an association, indeed it seems like that would be consistent with the causal association.

Our other interpretation or Plan B would be to say that getting a lymphoma makes you want to have glyphosate. Monsanto could have another remedy, could have another use for using Roundup to give to people who have lymphoma, if that's their preference, but the arrow has to go one way or the other. It's either glyphosate precedes lymphoma, or lymphoma precedes glyphosate.

Q. Dr. Neugut, to be clear, what you are purporting to try to do with Bradford Hill is answer the question of causation, not association; right?

A. Association, I think what Bradford Hill was saying, or what you were interpreting in his paragraph earlier, is that there -- that the -- that to address the question of causality, first there has to be an association between the exposure and the outcome.

Q. And then you look at temporality as one of the factors.

A. Then you look at these criteria to see what the interpretation of the association is, whether it's causal or confounding or bias or some other -- or whether the arrow goes in the opposite direction, protopathic bias or something of that sort.

Q. With respect to temporality for cancer outcome, for it to support a conclusion of causation, you would want to consider latency; isn't that fair?

A. Yes, but since latency can be anything or can be -- I don't see that it's an issue in this particular case.

Q. When you did your breast cancer epidemiological research, if you were looking at somebody and they said I used pesticides yesterday and then today I went to the doctor -- the first time I used it, and today I went to the doctor and they diagnosed me with breast cancer, would you say that temporality had been met for that exposure?

A. Of course not. But now you are talking about something absurd.

Q. Okay. So, it's not just the case

that exposure has to be before the diagnosis. It has to be before the diagnosis in the proper time frame for latency; correct?

A. I think in this particular instance, with regard to glyphosate and lymphoma, I think the criteria is fairly straightforward.

Q. And you say that without having any opinion one way or the other on what the latency period is.

A. If it's more than a couple of years, then I think that that is a fair statement. The ambiguity with regard to temporality in most cancer epidemiology studies arises in the context of physiologic phenomena, not in the context of external exposures.

So, I mean, when you are talking about something like weight loss, where you don't know if someone lost weight because they had the disease or if the weight loss somehow led to the disease, you can have ambiguity with regard to what the direction of the arrow is, if the two are associated with each other. So, there you can have

ambiguity.

If you are talking about being exposed to cigarette smoking and lung cancer, so either you are going to say that the cigarette smoking causes the lung cancer, or you are going to say that having lung cancer makes you -- cigarette smoking makes someone with lung cancer feel better when they smoke, so you have your choice of which way to interpret the association between the two.

So, on some level, if you want to say that glyphosate follows -- glyphosate exposure follows having a lymphoma, that may be your interpretation of the association between the two. But I don't think that is the logical, or that is not what seems to arise from the various case-control and cohort studies here.

Q. Dr. Neugut, that wasn't what I said, and I am not sure why we are miscommunicating here.

For purposes of cancer, when you are looking at epidemiological studies, and we have already discussed the fact that cancer epidemiology studies will include

things like lag time; correct?

A. Yes.

Q. In the analysis, and a variety of different analyses, in cancer epidemiology in particular, to make sure that you have taken into account --

A. Yes. Yes.

Q. -- latency; correct?

MR. TRAVERS: Objection.

A. But latency can be as little as a year.

Q. I understand that. But for you, for glyphosate and non-Hodgkin's lymphoma, you don't have an opinion about what the latency is. It could be a year, it could be ten years, you don't know. Is that your testimony?

A. That's correct, but --

Q. And --

A. But the key thing is that the exposure to glyphosate was more than a year prior to the development of lymphoma.

Q. Or more than ten years prior.

A. Or more than ten years, fine. I'm happy with that, too.

Q. And if that were the criteria, that the exposure of glyphosate for temporality has to be more than ten years before exposure, then at least for De Roos 2003, we don't have temporality that has been satisfied; correct?

MR. TRAVERS: Objection, asked and answered.

A. Disagree.

Q. There are no exposures in the De Roos or -- study, or that would have exposures more than ten years before diagnosis.

A. Temporality is not a question of whether latency applies. Temporality is a question of does the cause precede the effect. As long as the glyphosate exposure is prior to the disease, temporality is met.

Q. Let's talk about the next criteria you mention, which is -- Bradford Hill criteria, which is consistency; correct?

A. Correct.

Q. And this is -- now, again, Sir Bradford Hill in his assessment, when he was talking about consistency, he was looking to

consistency across studies finding statistically significant results; correct?

A. Yes.

Q. You do not define in your methodology "consistency" that way; is that correct?

A. The modern epidemiologic -- in modern epidemiology, statistical significance isn't considered essential.

Q. That is not my question. In your application of the Bradford Hill criteria, you are defining "consistency" differently than Bradford Hill did; correct?

MR. TRAVERS: Objection, asked and answered.

A. I don't know how he exactly defined it, but I would assume that he was more strict about statistical significance.

Q. And you have stated in your report, as a basis for your conclusion that there is consistency in the epidemiological studies, that all of the reported odds ratios --

(Telephone interruption.)

A. Sorry.

Q. I will start again.

You have stated in your report that you believe the criteria for consistency to be met, because the reported odds ratios in each -- all of the reported odds ratios in the epidemiological literature that you reviewed were above 1.0; correct?

A. Yes.

Q. Now, first of all, that would not include the dose-response analysis in the 2005 De Roos study; correct?

A. In the --

Q. The 2005 De Roos study, the dose-response analysis, the highest exposures were below 1.0 for the odds ratio; correct? So that finding in De Roos 2005 is inconsistent.

A. Okay.

Q. Is that correct?

A. Yes.

Q. And in order for you to also reach the conclusion -- well, strike that.

Your conclusion that all of the odds ratios are above 1.0 is based upon your analysis following the IARC methodology and not considering the updated Agricultural

Health Study data; correct?

A. Yes.

Q. And it also doesn't consider the self-respondent data that we looked at for the North American Pooled Project; correct?

A. Yes.

Q. And if those analyses are considered, there is no consistency among the epidemiological studies; correct?

MR. TRAVERS: Objection, mischaracterizes.

A. I don't know.

Q. Well, there would be then the AHS study, updated study that's below 1.0; correct?

A. So, again, I don't know the quality of the study or whether to consider it or how to consider it.

Q. I understand.

A. So, I am not going to give credit to a study that I don't know anything about or that I don't know much about.

Q. But just to understand your consistency analysis, and I understand you can't opine, you didn't look at the AHS 2013,

you didn't look at the NAPP data, but I'm just understanding your definition of "consistency."

If we were to consider the updated AHS data from 2013, that has an odds ratio of 0.9, so that would be below 1.0; correct?

MR. TRAVERS: Objection, assumes facts not in evidence.

A. Yes.

Q. And we would have the Orsi study, which is exactly 1.0; correct?

A. Yes.

Q. And we would have the NAPP data, which is either just above 1.0, if we include proxy respondents, or just below 1.0, if we only look at self-respondents; correct?

A. Yes.

Q. And then we would have the Swedish case-control study, the Eriksson study, which would be slightly above 1.0; correct?

A. Um-hum. Yes.

Q. So those data points, if those were the correct data points, and I understand you have not reviewed some of them, but those data points would not be consistent; correct?

A. Might or might not be. Again, I haven't looked at them, so I am not willing to opine on that.

Q. But we would have some above one, some below one, some directly at one; correct?

A. Um-hum.

Q. Yes?

A. Yes.

Q. And we already talked about dose-response. We talked about biological plausibility, and biological plausibility, I take it you defer to the toxicologists; correct?

A. To the degree that I am able to opine, I think it seems decent to me, but I would defer.

Q. And then the final criteria you discuss is strength of association; correct? In your expert report, that is the final criteria you mentioned.

A. Don't I mention specificity?

Q. You may mention specificity. You say that is not important.

A. I don't?

Q. Okay. Well, we will talk about specificity then.

In your opinion, you believe -- let me see if I am correct. It's your opinion that glyphosate has not been associated with any cancer other than non-Hodgkin's lymphoma; correct?

A. That is specificity?

Q. Well, I'm asking this question.

A. Or is that strength?

Q. Is it your opinion that glyphosate and glyphosate-based herbicides have not been shown to be a cause of any type of cancer other than non-Hodgkin's lymphoma?

A. That's my sense of the literature, yes.

Q. So, if glyphosate or glyphosate-based herbicides causes any cancer, it would be non-Hodgkin's lymphoma. That is the only --

A. Based on the literature as I have read it to date, yes. I mean, obviously, everything I am saying today is based on --

Q. Your review.

A. -- what I have read until today.

If anything changes --

Q. Right, I understand that.

But you looked at, for example, the IARC monograph, and they reviewed other types of cancer as well, and you agree that there is no association shown there between glyphosate and those other types of cancer, correct, besides NHL?

A. Yes.

Q. So, then for you, is it -- am I correct in my understanding that you think specificity has been met because if it causes any cancer, it only causes non-Hodgkin's lymphoma?

A. Yes.

Q. You would agree that there are lots of other causes for non-Hodgkin's lymphoma, though; correct?

A. I don't know lots. I mean, I have trouble thinking of more than a few, but I don't know how many would apply generally, but --

Q. Non-Hodgkin's lymphoma, certainly it's not a signature disease for glyphosate; correct. Like mesothelioma or -- and

asbestos.
A. I don't know how to answer that question.
Q. Okay. Well, that's fair.
Is it your opinion that non-Hodgkin's lymphoma may be a signature disease for glyphosate?
A. I don't know what a signature disease means.
Q. Ah, okay. You would agree that there are lots of other causes for non-Hodgkin's lymphoma, either known or unknown, besides glyphosate; correct?
A. I think most lymphoma is unexplained.
Q. So, you can't say that if you see NHL, you would think that it would have to be glyphosate; correct?
A. No, that's correct.
Q. All right. So then the -- you are correct, the fifth, I think, of the criteria, you talk about analogy, which you say is not applicable, and then specificity. But before that, you talk about strength; correct?
A. Yes.

Q. And that in fact is the first criteria that Dr. Bradford Hill, or Sir Bradford Hill discusses, correct, in his criteria?
A. I didn't follow his order.
Q. That's fine.
And with respect to strength, you are pointing to that range of 1.3 to 1.5; correct?
A. Yes.
Q. And that is based upon that earlier meta-analyses that you not take into account the 2013 AHS data or the NAPP data; correct?
A. It did not take into account the follow-up AHS data, correct.
Q. Now, with respect to that, that -- those numbers, 1.3 to 1.5, you would agree that that is not a very convincing number with respect to strength; correct?
A. Call it modest to moderate.
Q. You would agree it did not provide a strong push towards causality; correct?
A. It's not an overwhelming number, no.
Q. In fact, I think you have testified

in other cases that that 1.3 to 1.5 is, I think the term you used was bupkis; right?
A. Have I used that expression?
Q. You've used that expression with respect to 1.3 to 1.5, haven't you?
A. I don't know. But as I say, it's not a large number.
Q. So, 1.3 to 1.5 is not what you would -- well, strike that.
When you have a number like 1.3 to 1.5, you would have concerns that those findings can be explained by something other than causation, such as bias and confounding; correct?
A. I would have that concern for even larger numbers, but -- so, again, the number that you see, we are talking about ever/never, generally we are talking about ever/never. You know, when you see a number like that number, there is also the issue of dose-response. So that means there are those who are more exposed and therefore potentially have higher risk. So that may reflect a subgroup that might have a significantly higher risk within it, but on

the whole, it's a modest risk.
Q. I mean, we have talked about dose-response. We can go back to that. That is a separate criteria for Bradford Hill; correct?
A. Yes.
Q. But as far as the strength criteria is concerned, it would be fair to say that even with your understanding of the glyphosate literature, that is not a particularly powerful finding for that criteria for Bradford Hill; correct?
A. It's not a number that would -- that would build your confidence that this was a -- that there was a causal relationship. It's enough, it's -- what do they say -- it's sufficient, but not -- but not something that would add to your -- add to your confidence that there were a causal association.
MR. LASKER: Why don't we take a break now? I'm just going to look and see what more questions I have.
MR. TRAVERS: Yeah, sure.
THE VIDEOGRAPHER: The time is

5:12 p.m. We are off the record.
(Recess taken.)
THE VIDEOGRAPHER: The time is 5:27 p.m. We are on the record.
MR. LASKER: Dr. Neugut, I have no further questions. Thank you very much.
THE WITNESS: Oh, thank you.
MR. TRAVERS: Excellent.
I have just got a few follow-up questions. Let's see. Do we have exhibit stickers?
I want to enter as an exhibit, this is the Blair paper from 2011.
MR. LASKER: So what number is this?
MR. TRAVERS: 14-23.
(Exhibit 14-23, NIH Public Access, Impact of Pesticide Exposure Misclassification on estimates of Relative Risks in the Agricultural Health Study marked for identification, as of this date.)
EXAMINATION
BY MR. TRAVERS:
Q. And do you recognize this paper,

Dr. Neugut?
A. Yes.
Q. And this paper deals with the non-differential misclassification bias; is that correct?
A. Yes.
Q. And this paper authored by -- and you see that Aaron Blair is the lead author on this paper; correct?
A. Yes.
Q. And it's referencing the AHS study cohort?
A. Yes.
Q. And I would just like to refer you to the conclusion of this paper, and page six. You have been there.
The last paragraph on page six, it states, "We draw several conclusions from our methodological work in the AHS. First, the accuracy of reporting of pesticide use by farmers is comparable to that for many other factors commonly assessed by questionnaire for epidemiological studies."
MR. LASKER: I lost track. Where are you?

MR. TRAVERS: Sorry. The last paragraph, page six.
MR. LASKER: Okay. Starting, "First, the accuracy."
MR. TRAVERS: Yeah.
MR. LASKER: Okay.
BY MR. TRAVERS:
Q. Then it goes on to say, "Second, except in situations where exposure estimation is quite accurate, i.e., correlations of .7 or greater with true exposure, and true relative risk of 3.0 or more, pesticide misclassification may diminish risk estimates to such an extent that no association is obvious, which indicates false negative findings might be common."
Do you see that?
A. Yes.
Q. And with that bias in the AHS study, how would that affect the findings on glyphosate from the De Roos 2005 study?
A. Well, since we are talking about a relative risk in a range of 1.3 or -- or theoretically, a relative risk in the range

of 1.3 to 1.5, and misclassification error, then it would be very easy, based on the degree of misclassification error that they are talking about, for that kind of a risk ratio to be attenuated and to disappear in this study, which is basically what they are -- what they are describing.
Q. So, if there is a negative finding --
A. A null finding.
Q. Okay. And you said you read the deposition of Aaron Blair; correct?
A. Yes.
Q. And do you recall he is an author of the NAPP abstract?
A. Yes.
Q. And he is a lead investigator on the AHS, AHS study?
A. Yes.
Q. And it was still his opinion as the chair of the IARC working group that glyphosate was a probable human carcinogen; correct?
MR. LASKER: Objection to form.
A. Yes.

Q. And do you recall at the end of his deposition, he stated that his opinion had not changed at all after questioning by defense counsel? Do you recall that?
A. I recall that.
Q. And does Aaron Blair's testimony support your -- or support your opinion that Roundup can cause cancer in humans?
A. Yes.
Q. And after the almost seven hours of questioning, do you stand by the conclusion in your expert report?
A. Yes.
Q. Okay. I would like to get Exhibit 14-21, and this is the memo by Exponent, the updated meta-analysis.
MR. LASKER: Excuse me just a second.
Q. And is Exponent a peer-reviewed journal?
A. Exponent is a company, to my knowledge.
Q. And you are not aware of this paper being submitted for peer review?
A. I don't know anything about it.

Q. And I would like to ask, if you could, to read footnotes one and two. You don't have to read them out loud. If you can review footnotes one and two.
A. On the first page?
Q. Yes.
A. Okay.
Q. And if you recall from earlier in the testimony, this -- this memo to Hollingsworth, or this meta-analysis, the only updated information was the unfinished draft manuscript of the 2013 AHS study and the abstract from the NAPP study; correct?
A. Yes.
MR. LASKER: Objection to form, misstates the document.
Q. And reviewing footnotes one or two, can you tell who provided those documents to Chang and Delzell?
A. Mr. Lasker.
Q. And generally, when you are conducting a scientific study that you would submit for peer review, if you are going to update a study, would you rely solely on data provided by an attorney you are consulting

for?
A. Not commonly.
Q. Okay. Go back to Aaron Blair's deposition. If you could go -- if you could go to page 206.
A. 206?
Q. Yes. If you go to line 20, Mr. Lasker asked of Aaron Blair:
"But just so the record is clear, IARC was not relying upon the most updated analysis that you are aware from the AHS data with respect to glyphosate and non-Hodgkin's lymphoma; correct?"
And then Aaron Blair answers:
"Now you present it as if the analysis were completed. Analyses were done, manuscripts are in description, but the work wasn't finished, which means it's incomplete, and that you don't want to be reporting on, and we didn't."
Does that support your decision not to rely upon the 2013 unpublished manuscript?
A. Yes. You know, data that is not peer reviewed or published is not peer reviewed or published. You don't know why

it's not. It might not have been finished, might not have been accepted by the journal, it might not have been in good shape. You have no idea why it's not published.
Q. I just want to clarify, when you reference -- we talked a lot about the AHS study. But when you reference the AHS study in your report, what are you referring to?
A. 2005 paper.
Q. Okay. And I would just like -- if you have got your report, I would like to go to page three.
MR. LASKER: Just a moment. Page three?
MR. TRAVERS: Yes.
Q. And at the top, it says you were asked to review the scientific literature on glyphosate and glyphosate-based formulations and to provide an opinion to a reasonable degree of medical and scientific certainty as to whether glyphosate and glyphosate-based formulations can cause non-Hodgkin's lymphoma; correct?
A. Yes.
Q. If you were to do a literature

review for scientific journals, say like the Lancet, would you rely on unpublished, unpeer-reviewed data?

A. I might under certain circumstances report a fact or a bit of information, citing it as un- -- unpublished, but -- but as a -- almost as a -- more in the context of a bit of information, not in the context necessarily of, say, in a data table or something of that sort. So, I might express an opinion by someone or -- that is not published, or a factoid, but I don't think I would express data per se that was not published.

Q. And in your report, you also talk about meta-analyses, and there are meta-analyses in the IARC report as well; correct?

A. Yes.

Q. Those are in fact statistically significant; correct?

A. Yes.

Q. Okay. And in the -- and also in your report, you note that McDuffie shared an odds ratio, a statistically significant odds

ratio of 2.12 for people who used glyphosate greater than two days per year; correct?

A. Yes.

Q. And Eriksson showed an odds ratio of 2.36 for people who used glyphosate longer than ten years; correct?

MR. LASKER: Objection to form.

A. Yes.

MR. LASKER: I don't think that's what you meant to say. More than ten years?

MR. TRAVERS: Who used glyphosate longer than ten years.

MR. LASKER: Is that what he says in his report? Where are you reading?

MR. TRAVERS: Page 22.

MR. LASKER: Hmm. Okay. It is what he has in his report.

Q. And you have worked -- you have worked with the Miller Firm before on the Actos case; correct?

A. Yes.

Q. Have you ever worked for defendants as an expert?

A. Yes.

Q. What percentage of cases would you say are for defendant -- that you take are for defendants compared to plaintiffs?

A. Nowadays, I do about two-thirds plaintiff and about a third defendant.

Q. All right. Have you ever turned down -- have you ever turned down cases from plaintiffs' firms?

A. Sure. And from Miller.

Q. And defense counsel showed you an article from 1965 by Bradford Hill. Let's see. Has the application of Bradford Hill been modified at all from 1965 to present time?

MR. LASKER: Objection to form.

A. I mean, I don't want to say it's been modified in terms of its skeletal structure, but the interpretation of the nomenclature and the, the intent or the -- the interpretation of the criteria that are there have certainly been modified and adapted and adjusted over the years. They are not the same as they were in 1965.

I mean, remarkably, it's actually retained its -- the nomenclature has actually

stayed more or less the same as -- for 50 years, but the words don't necessarily -- are not applied -- the terminology and the applications are not applied in the same way now as they were 50 years ago.

Q. And that would be, what you are saying would be, that would be the general consensus of the scientific community?

MR. LASKER: Objection to form.

A. Sure. I would think so, yes.

Q. Would you -- do you agree with the following statement? Would you -- I'm sorry.

Would you agree that IARC is a well-regarded international public health agency?

A. Sure.

Q. Would you agree that when IARC monographs are available, they are generally recognized as authoritative?

A. The ones on carcinogenesis, yes.

Q. Let's see. And would you agree that IARC is one of the most well-respected and prestigious scientific bodies?

MR. LASKER: Objection to form.

A. When you say "most," you sort of

have to have a concluding phrase.
Q. Would you agree that IARC is a well-respected and prestigious scientific body?
A. Yes.
MR. TRAVERS: Those are all the questions I have got.
EXAMINATION
BY MR. LASKER:
Q. Just a few follow-ups, Dr. Neugut.
You do state in your expert report that Eriksson showed, on page 22, an odds ratio for -- of 2.36 for people who were -- used glyphosate longer than ten years. Does Eriksson actually report that data? Because I don't remember that from the glyphosate study.
A. What page are you on?
Q. In your report, page 22, you say that Eriksson showed an odds ratio of 2.36 for people who used glyphosate longer than ten years. You were asked that by plaintiffs' counsel and agreed that's what Eriksson found. It's on page 22, under strength of association.

A. If I said it, then I must have thought it.
Q. Okay. I believe, and you can -- you can correct me if I am wrong, that at least the number you are citing there is greater than ten days, not ten years, from Eriksson's report, and this is table two.
A. You are right. It's greater than ten days. I apologize, it's an error.
Q. Just so we are clear, that is a mistake in your expert report.
A. Um-hum.
Q. And that 2.36 number that we -- for greater than ten days, that is the number that we were talking about previously that you agreed there is no measure or indication that that is statistically different than the odds ratio for less than ten days; correct?
A. There is no number for that, but yes, it's larger.
Q. So, we don't know if -- we don't have any statistical indication from this study from Eriksson that there is a greater odds ratio with greater exposure, because we don't have that statistical analysis;

correct?
A. Right.
Q. With respect to the 2013 AHS study, did you rely upon anything that Dr. Blair said in his deposition in deciding not to consider or not to even look at that data?
A. What's the -- oh, the AHS follow-up?
Q. Yes.
A. No.
Q. With respect to -- plaintiffs' counsel asked you about the Chang and Delzell 2017 analysis, and he pointed out that the AHS 2013 analysis and the NAPP analysis were provided to Exponent by myself.
Now, just to be clear, you agree that I did not create that data; correct?
A. You did not --
Q. Create that data.
A. I assume not.
Q. And you have read Dr. Blair's deposition. You know that this was data that Dr. Blair had in his files; correct?
A. Yes.
Q. And this was data that Dr. Blair

did not disclose to IARC; correct?
A. Yes.
Q. And this is data that Dr. Blair did not disclose to the EPA; correct?
A. I don't recall offhand about EPA, but -- I don't know about that. I don't recall.
Q. And there was no way for investigators who were conducting a meta-analysis prior to the deposition of Dr. Blair, where this data became public, for any investigator at IARC or elsewhere doing a meta-analysis to include that 2013 data or the NAPP data; correct?
A. Correct.
Q. With respect to Exhibit 14-23, which is the paper, the Blair paper on exposure misclassification, plaintiffs' counsel asked you a couple of questions about that. Do you recall?
A. Which document?
Q. This would be Exhibit 14-23, and it is a paper by Blair entitled "Impact of pesticide exposure misclassification on estimates of relative risks in the

Agricultural Health Study." Correct?
A. Yes.
Q. And this study again is referring to the possibility of misclassification biasing results towards the null; correct?
A. I wouldn't use the word "biasing." I would say --
Q. Shifting towards the null.
A. Okay.
Q. And as we discussed previously, if the reported odds ratio is below 1.0, then this type of exposure misclassification would bump those numbers up a little bit.
MR. TRAVERS: Objection.
Q. And if it's above 1.0, this type of exposure misclassification might lower it. Correct?
MR. TRAVERS: Objection.
A. Yes.
MR. TRAVERS: Asked and answered, mischaracterizes his previous testimony.
Q. And with respect to the Agricultural Health Study, to the extent that there are odds ratios reported for glyphosate and non-Hodgkin's lymphoma below 1.0, the

type of exposure misclassification that is discussed in the Blair paper would bump those numbers up; correct?
MR. TRAVERS: Objection, asked and answered, mischaracterizes previous testimony.
A. A misclassification error would work on the opposite side as well.
Q. It would work in both directions.
A. Yes.
Q. And in fact, in this paper, at page 11, they have tables that show that if the risk ratio is below one, this misclassification would -- would tend to increase those numbers to make them higher; correct?
A. Yes.
Q. And so, with the Agricultural Health Study, both the 2005 study for their dose-response and the 2013 analysis for all of its findings, they reported odds ratios for glyphosate and non-Hodgkin's lymphoma that were below 1.0; correct?
A. Yes.
Q. So, the impact of this

misclassification, if it occurred, to -- for those numbers in the AHS studies for glyphosate and non-Hodgkin's lymphoma would actually push those numbers up; correct?
A. Yes.
Q. The Blair paper, the 2011 paper, Exhibit 14-23, also states that if the relative risks are -- the true relative risk is 1.0, misclassification -- the misclassification that they are discussing here does not actually impact the results at all; correct?
A. That's correct.
Q. And the other finding in this paper is that the attempt to make some measurement of intensity of exposure, which is what is done in the Agricultural Health Study, does improve the study as compared to just asking whether or not an individual had used or been exposed to pesticide in the past; correct?
A. I'm sorry, say that one again.
Q. That the Blair 2011 paper reports that when they look to their intensity measure in the Agricultural Health Study, intensity of exposure, that did correlate

with exposure levels better than simply asking the individual whether they had been exposed or not; correct?
A. I don't recall that, but -- I don't recall seeing that.
Q. Well, take a look to the last page, is actually where you were being asked questions by plaintiffs' counsel, on page six. And it is right where he stopped off on his questioning of you.
It states, "Third, it appears that an algorithm that incorporates several exposure determinants into an estimate of exposure intensity predicts urinary levels better than the individual exposure determinants considered here and would result in less attenuation of relative risk estimates." Correct?
A. Yes.
Q. One of the findings in this analysis by Blair is that the AHS, through using an algorithm to try to estimate intensity of exposure, does reduce this potential bias as compared to studies that don't include an intensity measure; correct?

A. Yes.
Q. And the case-control studies that we talked about for glyphosate, none of them included any algorithm to try and assess intensity of exposure; correct?
A. I don't think any of them did, no.
Q. The Blair paper in 2011, that resulted in modifications for the algorithm for intensity that was used in agricultural study analyses going forward; correct?
A. I don't know.
MR. LASKER: Let's mark as Exhibit -- I'm sorry.
(Exhibit 14-24, An Updated Algorithm for Estimation of Pesticide Exposure Intensity in the Agricultural Health Study marked for identification, as of this date.)
Q. This is a 2011 paper by Coble, et al, including Dr. Blair as well, "An updated algorithm for estimation of pesticide exposure intensity in the Agricultural Health Study." Correct?
A. Yes.
Q. And it states in this abstract that

an algorithm developed to estimate pesticide exposure intensity for use in epidemiological analyses was revised based on data from two exposure monitoring studies; correct?
A. Yes. But I am -- it's a little hard for me to absorb. This is a pretty complicated paper. It's a little hard for me to sit here and absorb here now.
Q. Okay. But it does appear, and I recognize that you have not reviewed this in connection with reaching your opinion, but it does appear that in response to some of the analyses that were in the paper we looked at, 14-23, there was an update in the algorithm for the Agricultural Health Study for intensity of exposure; correct?
A. Perhaps. I don't know, and I don't know for what particular exposures, and in particular, I don't know whether it applies to glyphosate in particular or not.
Q. And with respect to -- and let's -- I don't think we marked it, but I think we are going to have to now. The 2013 Agricultural Health Study analyses, do you know whether or not that analysis used the

algorithm that was being discussed in the paper you cited, 14-23, or the updated algorithm that was derived subsequently?
A. I don't know anything about the 2013 analysis.
Q. Okay. If in fact the 2013 analysis used an updated algorithm cited here in the Coble paper, that would at least potentially address some of the issues that you raised with respect to the Blair 2011 paper; correct?
A. Again, I would have to beg off on that. I don't know.
Q. Okay.
(Continued on next page with witness jurat.)

MR. LASKER: I have no further questions. We are done.
THE VIDEOGRAPHER: The time is 6 p.m. We are off the record.
oOo
I, ALFRED NEUGUT, M.D., , the witness herein, do hereby certify that the foregoing testimony of the pages of this deposition to be a true and correct transcript, subject to the corrections, if any, shown on the attached page.

_____

Subscribed and sworn to before me this _____day of _____,_____.

_____
NOTARY PUBLIC

STATE OF NEW YORK) Pg. of Pgs.
COUNTY OF NEW YORK)

I wish to make the following changes for the following reasons:

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ALFRED NEUGUT, M.D.,

C E R T I F I C A T E

STATE OF NEW YORK)
: SS.
COUNTY OF NEW YORK)

I, BONNIE PRUSZYNSKI, a Notary Public with and for the State of New York, do hereby certify:

That ALFRED NEUGUT, M.D., , the witness whose deposition is hereinbefore set forth, was duly sworn by me and that such deposition is a true record of the testimony given by the witness.

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

IN WITNESS WHEREOF, I have hereunto set my hand this 7th of August, 2017.

_____
Bonnie Pruszynski

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