SUPERIOR COURT OF THE STATE OF CALIFORNIA

COUNTY OF SAN FRANCISCO

DEWAYNE JOHNSON,

Plaintiff,

vs. Case No. CGC-16-550128

MONSANTO COMPANY, et al.,

Defendants.

_____/

Proceedings held on Wednesday, July 18, 2018, Volume 12, Afternoon Session, before the Honorable Suzanne R. Bolanos, at 1:31 p.m.

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INDEX OF PROCEEDINGS

EXHIBITS ADMITTED

(None.)

Wednesday, July 18, 2018

1:31 p.m.

Volume 12

Afternoon Session

San Francisco, California

Department 504

Judge Suzanne Ramos Bolanos

PROCEEDINGS

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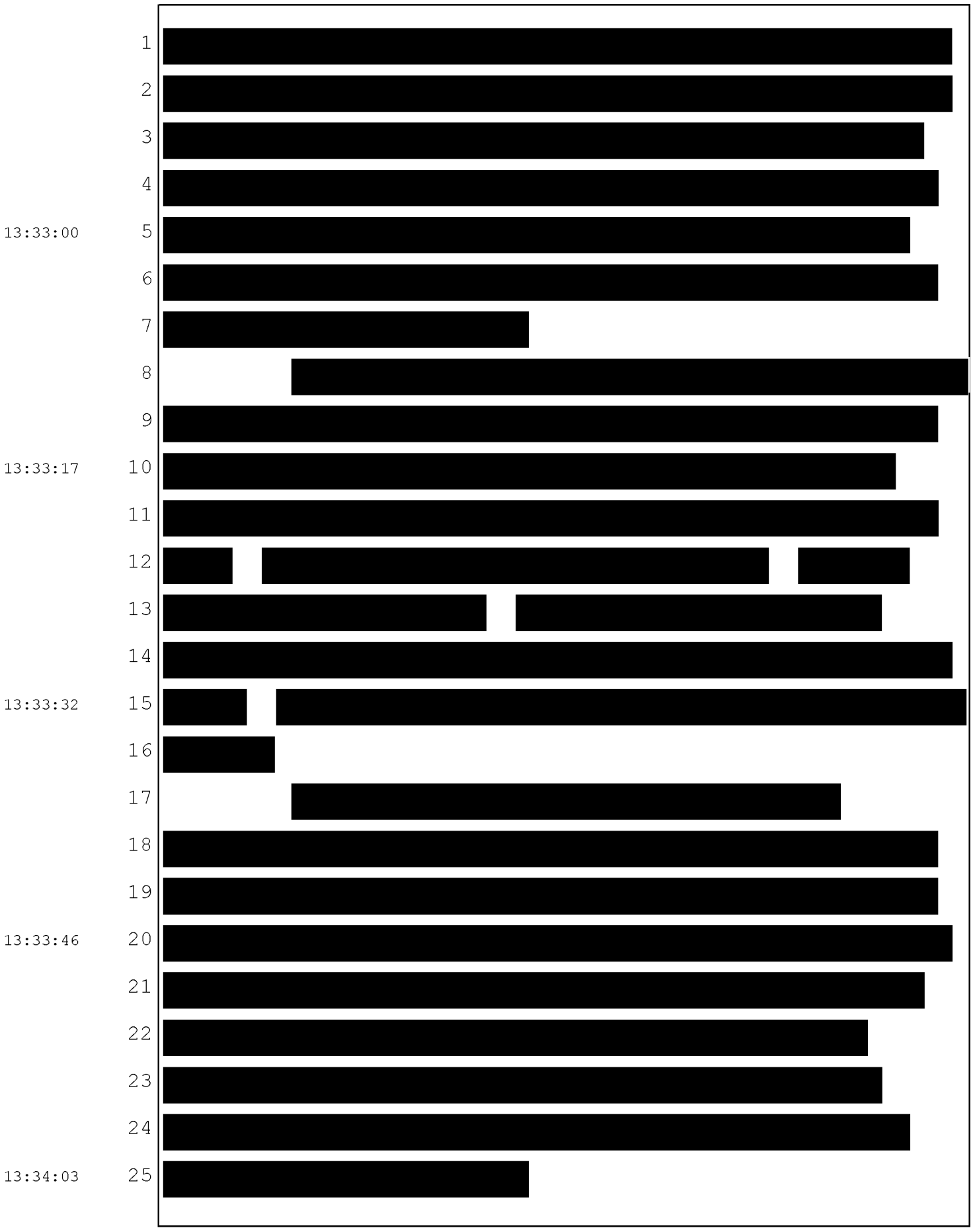
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(Jurors enter courtroom.)

THE COURT: Good afternoon.

Good afternoon, Ladies and Gentlemen, and welcome back. Good afternoon, Dr. Neugut. Dr. Neugut remains under oath.

And, Mr. Wisner, when you're ready, you may proceed.

MR. WISNER: Thank you, your Honor.

DIRECT EXAMINATION (Continued)

BY MR. WISNER:

Q. Dr. Neugut, just before we ended off, we were talking about the AHS study specifically related to issues of exposure misclassification and imputation. And the first thing I'd like to do is I'd like to just ask you a question about -- one second. I'm discombobulated here.

13:37:20

All right. Doctor, in your binder, if you could please turn to Exhibit 684.

13:37:45

A. Okay.

Q. This is a journal article specifically about the agricultural health study that you've reviewed.

A. Yes.

13:38:05

MR. WISNER: Permission to publish, your Honor?

THE COURT: Objection?

MR. LOMBARDI: No objection.

THE COURT: Very well.

Q. BY MR. WISNER: All right. This is the document I just showed you, Doctor. It's on the screen. It's titled, "Impact of Pesticide Exposure Misclassification on Estimates of Relative Risks in the Agricultural Health Study." What is this article about?

13:38:11

A. This is looking at what we had talked about earlier which is when they measured the -- how the

13:38:29

exposure was measured by the people who were filling out the questionnaires when they were recruited into the AHS study. They're looking at how accurate was the amount of exposure that they measured on the questionnaires.

13:38:53 Q. And this is published in July of 2011; is that right?

A. Uh-huh.

Q. And the lead author is Aaron Blair.

A. Uh-huh.

13:39:00 Q. Do you see that?

A. Uh-huh, yes.

Q. And then it's a bunch of other scientists mostly from the Division of Cancer Epidemiology and Genetics at the National Cancer Institute?

13:39:11 A. Correct. And these mostly are the authors from the AHS study, or many of them are.

Q. In fact, many of the authors of this document were also authors in the Andreotti paper or, as Monsanto likes to call it, the JNCI paper; is that right?

13:39:29 A. Yes.

Q. That's the one that has the most recent data about NHS and glyphosate?

A. Correct.

Q. Okay. So here they're talking about the

13:39:37 potential impact of exposing this classification, one of

the issues that we were just discussing a minute ago or before lunch; is that right?

A. Correct.

Q. Okay. I want to go to the conclusion section here. Starting at the word "second."

13:39:48

Do you see that, Doctor?

A. Yes.

Q. "Second, except in situations where exposure estimation is quite accurate, i.e., correlations of .70 or greater with true exposure and true relative risks are 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."

13:40:10

13:40:29

Did I read that right?

A. Yes.

Q. What does that mean?

A. So it's saying that if -- two things: If the exposure estimate is only 70 percent accurate in the first place, then you're going to have a random misclassification error that's going to lead to an error that's going to cause the relative risk estimate to be grossly inaccurate in the first place. But even more importantly, for our purposes, as I had said before, here it's saying that since we're talking in the context with

13:40:42

13:40:58

a relative risk estimate is putatively 1.5.

So they're saying if the true relative risk is 3 -- unless the true relative risk is 3 or more, pesticide -- the misclassification error is going to basically eliminate the observed risk estimate to the degree that basically you're going to miss a risk estimate entirely by the degree of error, that just the way people filled out the questionnaire is going to do it.

13:41:21

13:41:36

So basically in the AHS study, the exposure misclassification is basically going to make it impossible to see a relative risk of 1.5 in the first place.

Q. And, in fact, with the AHS article in 2017, we actually have a bit of both; right?

13:41:54

A. Yeah.

Q. We have poor imputation issues, and we have misclassification; is that right?

A. Well, I didn't get a chance to talk about the imputation error, but just the first -- we have misclassification error twice. We have the misclassification on the baseline interview which was measured at 10 percent or at least 10 percent, which is probably enough to obviate the risk to underestimate or eliminate the risk of 1.5 in the first place. Then

13:42:04

13:42:21

you're interviewing them a second time and getting a second misclassification error, then the point of the imputation, which is another error that we haven't talked about yet, but that's adding a third error.

13:42:38 So between all the errors, which are all going to be conservative, as I said, they're all going to reduce the observed risk ratio to 1 or below 1, so you're not going to see anything. That's why I think that the AHS study is really, to a large degree, uninterpretable

13:43:01 and really doesn't give us any information with regard to the association between glyphosate and NHL.

Q. Now, Doctor, AHS didn't just look at glyphosate; right?

A. No.

13:43:14 Q. And it didn't just look at NHL?

A. No. It looked at the basically multiple, multiple herbicides and fungicides and other things, and it also looked at the basically multiple, multiple, cancers, among them NHL.

13:43:30 Q. Just to be clear, would it ever be appropriate to call the AHS study, either the 2005 or the 2017 version of it, a "non-exploratory" study?

A. I don't know the term in this context. I mean, it's whatever it is. It's a study.

13:43:52 Q. I guess the question is: If someone were to say

all the case control studies they're exploratory, but the AHS, that's specifically glyphosate, would that be accurate?

A. Well, I suppose the last study is specific to glyphosate, because it only analyzes glyphosate as the exposure.

Q. But the AHS itself isn't about glyphosate?

A. The AHS study itself is not specific to glyphosate.

Q. So in all those case control studies that the authors had just published just the glyphosate results, then it would itself be a glyphosate-specific study; right?

A. Yes.

Q. All right. Now, because there was other pesticides tested in the AHS, wouldn't it be possible to see how the AHS did with other pesticides that we know cause cancer?

A. Absolutely.

Q. And I believe you prepared a demonstrative for that; is that right?

A. Yes.

MR. WISNER: Permission to publish, your Honor, Demonstrative 1034?

THE COURT: Any objection?

MR. LOMBARDI: No objection, your Honor.

THE COURT: Very well. You may proceed.

Q. BY MR. WISNER: All right. Doctor, we're looking at Exhibit 1034.

13:45:06 Do you see this, Doctor?

A. Yes.

Q. And this is from one of your reports that you prepared in this case; right?

A. Yes.

13:45:12 Q. Walk us through what we're seeing here.

A. Pardon me?

Q. Tell us what we see.

A. Oh, I'm sorry.

Q. What does this show us?

13:45:18 A. This is a table which looks at the -- basically, the results from the AHS study, and it's listing five pesticides or herbicides that were evaluated in the AHS study. And you can see the list in the first left-hand column, DDT, et cetera, et cetera, with glyphosate itself 13:45:42 on the bottom in bold. And you can see in the second column how they were each classified in the IARC classification, and you can see each of these is either a Class 1 or Class 2A carcinogen according to IARC and all of them being positively associated with NHL. So 13:46:06 basically they're all putatively like glyphosate.

And now if we look in the last column how the AHS study evaluated them or whether -- they were all evaluated by the AHS study. And while the AHS study did find an association between DDT and NHL and between lindane and NHL, it did not find an association with glyphosate as we know and as we're now saying, but it also missed diazinon and malathion, which are two other known carcinogens, 2A carcinogens, for NHL.

13:46:29

So basically, what we can say is that the AHS study -- I'll use the word "screwed up," not just once, but screwed up for several known 2A carcinogens. So it's not singular. It's not the only thing it missed. So we can say that the AHS study is, you know, insensitive or has problems and doesn't always -- it's not a perfect study in terms of being able to pick up 2A carcinogens that were identified previously. So the fact that it missed glyphosate is not remarkable. It goes along with its failures in other instances.

13:46:50

13:47:17

Q. All right. Doctor, we got ten minutes left. So let's end with Sir Bradford Hill. Who is Sir Bradford Hill, quickly?

13:47:37

A. Sir Bradford Hill was a statistician in the 1960s in Great Britain, basically an early epidemiologist, an early cancer epidemiologist involved in tobacco and lung cancer. These are the days of when

13:47:55

people were trying to prove that tobacco and lung cancer were associated. And as I said before, it's not easy to prove causal association. So the question is, as I've said, all the studies we've been talking about in terms
13:48:09 of case control and Cohort Studies really are to show statistical association, so now we have to go on to the next step. How do you show a causal association, which is really what's at issue, and the answer is what's universally used in epidemiology is what are called the
13:48:26 Bradford Hill criteria named after Sir Bradford Hill, who elucidated them or described them in his paper in 1965 in the context of tobacco and lung cancer.

Actually, I need a slide or poster or whatever. I don't know what you've got.

13:48:40 MR. WISNER: Permission to publish 1033, your Honor?

THE COURT: Any objection?

MR. LOMBARDI: No objection.

THE COURT: Very well.

13:48:45 Q. BY MR. WISNER: So let me ask the questions and then -- I don't want to get draw an objection. So we have a chart here. We have the first one that says "Temporality."

Do you see that?

13:48:55 A. Yes.

Q. These are the various factors for Bradford Hill?
A. Yes.
Q. Okay. Great. And then you have these pluses next to them and minuses.
A. Right.
Q. Do you see that?
A. Right.
Q. That's not a minus, that's a range; right?
A. Yes.
13:49:06 Q. So this is between two and three for --
A. Two to three.
Q. -- dose response?
A. Yeah.
Q. Okay. So before you go through this -- and I
13:49:15 want you to go through this -- but in case we run out of time -- before we get there, to a reasonable degree of scientific certainty, does glyphosate formulation exposure cause non-Hodgkin's lymphoma?
A. Yes.
13:49:27 Q. So let's go through this. Walk us through each one, temporality.
A. These are the criteria that were established by Bradford Hill for establishing or judging whether -- given a statistical -- given an association whether
13:49:41 there's, in fact, a causal association as opposed to some

other who knows what. It's the same criteria, by the way, that we used in the IARC Monograph and that are used in the IARC Monographs, and they are used across the board by epidemiologists.

13:49:56 These are the criteria and they're basically judgments. And these are my -- these pluses, like for a movie, these are my judgments in terms of how powerful each of these criteria are.

So the first is what's called temporality.

13:50:11 Temporality means that a cause has to come before an outcome, the exposure has to come. Sometimes when you do studies, you can't tell which came first: The chicken or the egg or the egg or the chicken. So -- so do we know that in this instance the glyphosate exposure came before

13:50:28 the lymphoma? And the answer is, in this instance, I don't think there's any doubt about it. So I gave it a high score, the temporality applies. We can be confident that the glyphosate exposure precedes the lymphoma outcome.

13:50:45 Q. And to be clear, you're talking about in the data as it relates to glyphosate; right?

A. From the studies and from everything we know about it, yes.

Q. We do know, for example, that before glyphosate

13:50:54 hit the market, NHL was on the rise?

A. Yes. But that's -- that may or may not have anything to do with the glyphosate, but I'm talking about in the studies and in general.

And consistency is something I alluded to earlier, which is basically from the Forest plot, which is across the board in multiple studies, no matter how -- the studies that were done in different context, different populations, different countries under different circumstances, some of the studies were what are called a population-based context. Some of them were done with registries. Some of them were done among farmers.

But across all the studies, they were consistently positive -- or I say positive results. That's consistency. None of them, as I showed, were across -- were on the other side of the -- of one, so the results are consistent. That's a very important -- that's a very important criterion in causal associations. And so again, I gave it a fair high score, not quite four plus.

Dose response, you like to see a dose response. The more you're exposed, the higher your risk. Not all the studies assess this, but two or three of the six studies that were on that board did look at it, and they showed dose response relationships that those who were

exposed more had a higher risk of getting lymphoma. So I gave it a 2 to 3-plus which, again, is moderate or more than moderate but not super high 5, but I think there is certainly grounds for dose response associations here in relationships.

13:52:37

Biological plausibility, so, again, is there a biological reason or basis for assessing that glyphosate causes non-Hodgkin's lymphoma? So you've heard testimony from Dr. Portier -- and I'll leave it at that -- and the IARC Monograph discusses it at great length and gives it a high value, so I gave it a high score, and I won't discuss that at length. But certainly the biological plausibility that there are mechanisms by which this agent can cause malignancy, so that's biological plausibility.

13:52:52

13:53:11

Strength of association, strength of association is how strong is the relationship between the two. So here I would say it's modest, we're talking about a 1.5, not a 10 like in tobacco and lung cancer. But that's modest, so I didn't give it a very high score. But it is what it is.

13:53:23

Finally, there's a criterion called specificity. Specificity doesn't always come up in causal associations. We often ignore it, but here specificity is a very interesting one which applies in glyphosate and

13:53:38

non-Hodgkin's lymphoma, which is that as in the AHS study and in other studies, they looked at the relationship between glyphosate and multiple cancers.

13:53:57 There are multiple studies of glyphosate and every other cancer on earth: Prostate cancer, breast cancer, colon cancer, whatever you like. All the other studies are negative. I mean null, clearly null. And if you would do Forest plots for them, they would show up, you know, nicely distributed across 1 the way they should 13:54:17 randomly associate across 1. The only one that comes up with a Forest plot that looks like the Forest plot we showed is NHL -- glyphosate and NHL. Very specific, it's NHL. All the time, it's glyphosate and NHL. That's specificity.

13:54:34 So it comes up as a powerful marker that whatever you do, it's NHL. So specificity in this particular instance applies, and I think that adds validity to our consideration that causality truly applies in this particular association, and that it's -- 13:54:56 that there's truly a causal association and that's my ending conclusion and -- with regard to all of this is that there is indeed a causal association between glyphosate and NHL.

MR. WISNER: Thank you, sir.

13:55:09 No further questions, your Honor.

THE COURT: Thank you.

MR. LOMBARDI: Your Honor, may I move the podium?

THE COURT: Yes.

13:55:38 MR. LOMBARDI: Your Honor, I'm not sure how much I'll need the binders, but I figured it would be more efficient to pass some up now, if that's okay?

THE COURT: Oh, yes. That's fine.

CROSS-EXAMINATION

BY MR. LOMBARDI:

Q. Doctor, we haven't met. My name's George Lombardi, and I'm going to be asking you questions on behalf of Monsanto. How are you today?

13:56:30 A. I'm good.

Q. Good. Doctor, you were retained by plaintiff's counsel in this matter; is that right?

A. Yes.

Q. And you've been retained by plaintiff's counsel

13:56:41 before; isn't that right?

A. Yes.

Q. In fact, you -- this is not the first time that you've been retained by the particular lawyers that are involved in this case; is that right?

13:56:55 A. I've been retained in one other case by them.

Q. One other case, but involved several trials; isn't that right?

A. Yes.

Q. So when you say one other case, you mean one other big matter that involved several trials that you actually testified at?

A. Correct.

Q. And the plaintiff's firm that hired you in those cases is Mr. Dickens' firm; isn't that right?

A. Yes.

Q. Now, you're compensated, is that right, for your time on this matter?

A. Yes. By the way, I would say that they requested that I testify in several other matters, which I refused to, just for balance.

Q. That's fine. That's fine, Doctor.

Now, at the time they called you in this case, you had never reviewed the epidemiological literature on glyphosate; isn't that right?

A. Yes.

Q. Because glyphosate has really never been one of your interests?

A. Not at all.

Q. So what they did was you got a phone call from them; right? You got a phone call from them?

A. I imagine, yes.

Q. And they said, "Will you participate in this case"?

A. Yes.

13:58:01 Q. And they provided you with the IARC Monograph; isn't that right?

A. They didn't provide me with it. I said earlier in my direct testimony that when they called me, I went and looked up the literature on the subject, including

13:58:16 looking up the IARC Monograph and perusing it, as well as some related literature.

Q. So when you started this case -- or before, right before you started this case, you didn't have any opinion on whether glyphosate caused non-Hodgkin's

13:58:33 lymphoma or any other kind of cancer; is that right?

A. That's correct. I was a totally unbiased person with regard to the subject.

Q. A totally unbiased person retained by Mr. Dickens' firm; correct?

13:58:46 A. Not at the time.

Q. So when you -- you told us earlier that as an epidemiologist -- by the way, let's step back a second.

Epidemiology, one of the really great things about epidemiology is that it deals with the real world;

13:59:05 right?

A. I guess that's a good thing about it.

Q. Well, you agree that it deals with the real world?

A. As opposed to?

13:59:12 Q. Well, let me ask you this: Have you heard epidemiology referred to as an observational science?

A. It's observational and interventional, but if -- is that the distinction you're making?

Q. You observe people and exposures that occur in

13:59:29 the real world; isn't that right?

A. Yes.

Q. And so when we're talking about the epidemiology of glyphosate and Roundup, what we're talking about is the actual product as it's used in the real world;

13:59:45 correct?

A. I guess so.

Q. Well, you're the epidemiologist, Doctor. I'm just asking the questions. But isn't it true that epidemiologists study the exposure of human beings in the

14:00:04 real world to various substances?

A. I guess I'm having difficulty understanding what the unreal world is.

Q. Real world is giving you trouble?

A. Yes.

14:00:15 Q. Okay. Not in the laboratory, how about?

A. Uh-huh. I mean, I think in terms of making causal associations, one has to take into account laboratory work as well, but, you're right, epidemiologists as a rule don't deal with the laboratory, and I don't particularly partake in the laboratory --

14:00:35

Q. You don't like the laboratory, you told us.

A. I don't like being in the laboratory. I like the laboratory.

Q. All right. You like others to be in the laboratory.

14:00:46

A. Uh-huh.

Q. So, Doctor, all this stuff about the real world, all I'm trying to say is that when we have a study like AHS, say, what we're looking at is Roundup or whatever products as they exist and are used by people in their ordinary lives.

14:00:56

A. Okay.

Q. You agree with that?

A. Yes, I do.

Q. Okay. And so there's not a question that with epidemiology studies you're just looking at glyphosate, you're looking at whatever makes up the whole Roundup formulation; right?

14:01:08

A. True.

Q. Including if there's surfactants in there, it

14:01:25

would be studying a formulation that has surfactants in it; right?

A. Yes.

Q. It would have glyphosate in it and it would have whatever else is in the Roundup formulation or whatever glyphosate-based products there are; right?

14:01:36

A. So that's true. If people are exposed to Roundup and there are other chemicals in the product, then that's certainly true.

Q. And you are studying the exposure of human beings like, say, pesticide applicators to products like Roundup?

14:01:48

A. Yes.

Q. Now, Doctor, you said -- if I understood you right and please tell me if I've got this wrong -- but I think I understood you to say that it is very important for an epidemiologist to review all the literature before making a decision?

14:02:06

A. Well, I mean, it's hard to deny that, yes.

Q. That's self-evident, isn't it?

14:02:27

A. It's logical.

Q. But in this case, Doctor, you arrived at an opinion before you had read all of the epidemiological literature; isn't that right?

A. I didn't do a totally complete review of every

14:02:40

single paper in the literature, that is correct.

Q. Well, you did a lot less than that, didn't you, sir?

A. Yes.

14:02:49 Q. What you did was you reached the opinion in this litigation that glyphosate caused cancer before you had read any of the glyphosate epidemiological studies, didn't you?

MR. WISNER: Your Honor --

14:03:01 THE WITNESS: No.

MR. WISNER: Your Honor, I don't know if this is intentional, but he's standing about four and a half feet away from my witness and shouting at him. I think --

MR. LOMBARDI: I do not mean to raise my voice. 14:03:12 But if my voice is too loud, your Honor, I'll do everything I can --

MR. WISNER: I just want to make sure it doesn't turn into --

THE WITNESS: You can yell at me.

14:03:23 Q. BY MR. LOMBARDI: Doctor, I have no intention to yell at you.

A. And it's not true. I mean, when I read -- I said I read the IARC Monograph. The IARC Monograph contains all the papers that were relevant with summaries 14:03:34 of them and I went back and looked at some of them in the

original.

Q. Okay. So what you did was you read the IARC Monograph which summarized papers?

A. Along with going back and looking at some of them. I'll confess I did not read every single one in depth, as I did later.

Q. You read a couple of them; right?

A. A few of them.

Q. Before you came to your conclusion; right?

A. That is correct.

Q. So if IARC was wrong in the way they summarized the papers, then your opinion could have been wrong because you relied on IARC; right?

A. And if I did, then I would have withdrawn from being a witness, because, yes, I do have integrity and I wouldn't have sat up there and lied after swearing.

Q. And so --

A. But, you're correct, I did not read every paper in depth at that point in time.

Q. And so, Doctor, let me just ask you a few points about glyphosate now that you have -- I mean, you've studied -- over the course of this case, you've studied glyphosate and the epidemiology certainly more than you did before this case; right?

A. Yes.

Q. Because you didn't study it before this case?

A. No.

Q. But the conclusion that you've come to -- well, non-Hodgkin's lymphoma is the only cancer you're aware of, based on your study, that even arguably has any link to glyphosate; is that right?

14:04:50

A. Yes.

Q. Non-Hodgkin's lymphoma has -- I'm going to be approximate, Doctor, and if you know exactly, please correct me -- but about 60 different subtypes?

14:05:06

A. I would bet it has even more than that, depending on how you want to split or lump it, but every cancer has 60 or more subtypes, I would bet.

Q. Okay. Well, I'm just asking about non-Hodgkin's lymphoma, because that's what the jury is here to talk about.

14:05:26

A. Sure.

Q. Okay. Is that a sure, I know, or --

A. I'm sure it does.

Q. Now, because non-Hodgkin's lymphoma has different subtypes, you would agree that there are different causes associated with the different subtypes.

14:05:33

Do you understand the question?

A. Yes.

Q. Okay. And can you answer?

14:05:45

A. I wouldn't know.

Q. Well, wouldn't you say that every disease has a set of causes so that you would say almost perforce one would have to say that every subclass of disease has its
14:06:02 set of causes?

A. That's a complex question. And my answer is that by the definition that you're using for subtypes, that doesn't necessarily apply, because a subtype -- every disease splits into an absolute panoply of
14:06:25 multiple, multiple subtypes. There are more than 60 types of breast cancer. There are more than 60 types of colon cancer. And if you would split and lump into 60 types every disease, you would know absolutely nothing about any disease if you're going to argue that each one
14:06:44 has its own spectrum of causes or outcomes. To some degree, it is true that each one has a unique risk factor or a unique prognosis or a unique treatment, and to some degree one can make universal statements or integrated statements across the -- across the integrated group.

14:07:12 We talked about non-Hodgkin's lymphoma as a group. We treat them as a group. They all respond to the same -- for the most part, most of them respond to the same treatment, despite the fact that there are, as you say, 60 subtypes. By your definition, there should
14:07:30 be 60 different treatments for non-Hodgkin's lymphoma and

there are not. So I would say that the statement may or may not be true for any given subtype.

Q. Did I ask -- not me, but have you been asked that question under oath and given a different answer, Doctor?

14:07:49

A. I haven't got a clue.

Q. Well, let me remind you. Doctor, you can look on in your book or I'll put it up on the screen, this is your deposition from June of this year, page 55.

14:08:00

MR. WISNER: Please don't play it on the screen until I have a chance to look at it.

THE COURT: What tab number is this, Counsel?

MR. LOMBARDI: This would be -- it's in the -- I need to hand it up to you, your Honor.

14:08:19

MR. WISNER: There's five in here.

MR. LOMBARDI: It's the one from June 18th.

May I approach the witness, your Honor?

THE COURT: Yes.

And what is the date?

14:08:32

THE WITNESS: It's not in this book?

MR. LOMBARDI: It's in that one I just passed you. Your depositions are June 18th -- or June of 2018, I'm sorry.

MR. WISNER: Page and line?

14:08:45

MR. LOMBARDI: Page and line. Page 55, lines 5

through 14.

Your Honor, may I ask to put that up on the screen.

THE COURT: Just one second.

14:08:55 THE WITNESS: I'm sorry. Where am I looking?

MR. LOMBARDI: 55, lines 5 to 14. Page 55.

MR. WISNER: I object. Improper impeachment.

THE COURT: Overruled. You may put it up.

MR. LOMBARDI: Let's put that up on the screen.

14:09:21 It's Slide 41, please.

Q. Doctor, were you asked this -- by the way, at a deposition, Doctor -- Doctor, are you with me -- you raised your hand to take the same oath you took before testifying today; right?

14:09:35 A. Yes.

Q. And your intention is certainly to tell the truth at the deposition; isn't that right?

A. And I believe I intend that then as I do today. Thank you for reminding me of that.

14:09:47 Q. I'm sure you do. Let me show you what question you were asked at your deposition.

"In your opinion, Dr. Neugut, are there different causes for different subtypes of non-Hodgkin's lymphoma?"

14:09:57 Your answer: "Every disease has its set of

causes, so I would say that almost perforce one would have to say that every subclass of disease has its set of causes."

"And when you are referring to subclass of disease there, you are including subtypes of non-Hodgkin's lymphoma; correct?"

Answer: "Yes."

Did you give those answers to those questions under oath at your deposition?

14:10:21 MR. WISNER: Again, your Honor, object --

THE WITNESS: May I see the parts before and after I said that? Can I see it in here?

MR. LOMBARDI: You've got it in front of you.

MR. WISNER: I have an objection.

14:10:32 THE WITNESS: I don't even see it in where you showed in the pages where you presented it to me. Here it says 55 and I don't see the --

THE COURT: Do you wish to repeat the page and line?

THE WITNESS: Can you show me --

Q. BY MR. LOMBARDI: It's page 55. You've got four pages on each sheet of paper, so you'll look for the page number on one of the four pages.

A. Oh, I see. I was looking at the bottom page 55.

14:11:04 Q. That's happened before.

A. I'm sorry.

MR. WISNER: Objection. Improper impeachment. Counsel did not ask that question.

THE COURT: Okay. Overruled.

14:11:13 Q. BY MR. LOMBARDI: Do you have it, Doctor?

A. Uh-huh. May I answer or are you just going to get to ask the questions?

Q. Well, the way it works is I would love to answer your questions, Doctor, but I have to ask you. So we're

14:11:25 going to keep by that format. My only question is, were you asked that question and did you give that answer under oath at your deposition?

A. And as I say --

Q. Was it a "yes" or "no"?

14:11:34 A. When I say that there are different subtypes of cancer that have different causes, as I said before, that may well be that all the different subtypes have the same causes, as I said earlier, so that the different classes of non-Hodgkin's lymphoma may all share the same causes

14:11:52 just as they share the same treatments.

Q. Okay. Did you finish your answer, Doctor?

A. Hmm?

Q. Did you finish your answer?

A. Yes.

14:12:02 Q. Thank you. Now, Doctor, it is the case that

glyphosate in your opinion does not cause all non-Hodgkin's lymphoma; correct?

A. Of course not.

Q. And it's your opinion that not everybody exposed to Roundup gets non-Hodgkin's lymphoma?

14:12:19

A. Correct.

Q. And, Doctor, you're a medical doctor in addition to being an epidemiologist. I think you told us that; correct?

A. Yes. Thank you.

14:12:34

Q. And, Doctor, you see no difference in the symptoms of somebody with non-Hodgkin's lymphoma that was exposed to glyphosate as exposed to somebody who wasn't exposed to glyphosate; is that correct?

A. I wouldn't be able to answer that question. I don't particularly in my practice treat lymphomas. So you'll have to wait for the expert on lymphoma, whom I gather is come in a day or two.

14:12:52

Q. Okay. That's fine. You don't know, just to have it clear for the record; is that right?

14:13:08

A. Correct.

Q. And, Doctor, you're not aware of any individual case reports published in the literature of glyphosate-induced non-Hodgkin's lymphoma; is that correct?

14:13:21

A. I don't read case reports.

Q. So you're not aware; is that correct?

A. No, I'm not.

Q. Doctor, you don't have any opinions about what the minimum threshold dose is that is required for any person exposed to glyphosate to develop non-Hodgkin's lymphoma; isn't that correct?

A. Are you talking about rats?

Q. No. I'm talking about dose for humans, for a person. Do you want me to redo the question again? I'm happy to if you'd like me to.

A. Yes, I would.

Q. I'll just ask you this way. Do you have any opinions about what the minimum threshold dose that is that is required for any person exposed to glyphosate to develop non-Hodgkin's lymphoma?

A. I would have to say that it would depend on how much exposure was included in the patients or the people who were included in the studies. If they're included in the studies and the group as a whole has an elevated risk, then I can't distinguish them from the people who are in the study.

Q. Doctor, did you give a different answer to that question under oath at your deposition?

A. Again, I don't have a recollection of it, but

I'm sure I'm going to find out.

Q. Well, Doctor, it's the same deposition. It's the June of 2018 deposition that I think you have open in front of you. I assume -- if you don't want to follow along, that's fine.

14:14:54

A. No, no. But you're going to have to tell me the page.

Q. I'm going to. Page 56, lines 3 to 7.

A. 56 where?

14:15:03

Q. Lines 3 to 7.

Do you have that?

A. Yes.

MR. WISNER: Objection. Improper impeachment. And actually now this is beyond the scope. I don't think the word "dose" was even used on direct.

14:15:11

THE COURT: Just a moment.

THE WITNESS: Okay.

THE COURT: Overruled.

MR. LOMBARDI: May I put --

14:15:32

MR. WISNER: Both objections, including the beyond the scope objection?

THE COURT: Yes.

MR. LOMBARDI: Your Honor, may I put that up on the screen?

14:15:45

THE COURT: Yes.

MR. LOMBARDI: Thank you, Your Honor.

Slide 42, please.

Q. BY MR. LOMBARDI: Doctor, this is the question I just asked you. This is the answer you gave under oath about a month ago in a deposition.

14:15:54

"Do you have any opinions about what the maximum threshold dose is that is required for any person exposed to glyphosate to develop non-Hodgkin's lymphoma?"

Answer: "No."

14:16:05

MR. WISNER: Objection. The quote is minimum threshold dose from the deposition. I don't know what that slide is saying.

MR. LOMBARDI: Okay. Error on the slide. I'll accept your correction.

14:16:17

Q. Doctor, I'm going to read it, but I'm going to make the correction that Counsel has said.

"Do you have any opinions about what the minimum threshold dose is that is required for any person exposed to glyphosate to develop non-Hodgkin's lymphoma?"

14:16:30

Answer: "No."

Did you give that answer to that question?

A. Yes.

Q. I'm sorry?

A. Yes.

14:16:35

Q. Thank you, Doctor.

So, Doctor, non-Hodgkin's lymphoma is not something that you typically work on, as I understand it; is that right?

A. That's correct.

14:16:44 Q. But in your work in this case, you've gotten to learn some things about non-Hodgkin's lymphoma; right?

A. I suppose.

Q. Yes?

A. I suppose I have.

14:17:00 Q. Okay. Well, here's something that you know now about non-Hodgkin's lymphoma, right, is that rates of non-Hodgkin's lymphoma seem to be higher with farmers than with others; isn't that right?

A. I knew that before.

14:17:18 Q. You knew that before being involved in this case?

A. Yes.

Q. Okay. And actually that's something that's been known for a long period of time; isn't that right?

14:17:29 A. Yes.

Q. And actually it's been observed even before glyphosate was on the market, that farmers had a higher risk level for non-Hodgkin's lymphoma than others; isn't that right?

14:17:40 A. Yes.

Q. So the conclusion we can draw from that is that something is causing non-Hodgkin's lymphoma in farmers that is not glyphosate; isn't that true?

A. I imagine, yes.

14:17:58 Q. And I take it, as you sit there right now, you don't know what it is other than glyphosate that's causing non-Hodgkin's lymphoma to be greater in farmers than in others?

A. I don't think anyone knows.

14:18:12 Q. It could be farm practices; correct? That's one example.

A. It could be other herbicides.

Q. It could be other herbicides. It could be animals, exposure to farm animals, couldn't it?

14:18:31 A. Yes.

Q. These are things that -- I'm not just making -- these are things that epidemiologists are actively considering; isn't that true?

A. Yes.

14:18:40 Q. And you mentioned that there are other herbicides out there that could be causing farmers to get non-Hodgkin's lymphoma before glyphosate even went on the market; right?

A. Yes.

14:18:53 Q. And so one of the things that's really important

about these studies is you have to separate out the effect of those other pesticides from glyphosate if you're going to have a true picture in the epidemiology; isn't that right?

14:19:08 A. I think it's important to take that into consideration, yes.

Q. And that's what we call adjusting for other pesticides; right?

A. Yes.

14:19:17 Q. And adjustment for other pesticides means that you've got -- say you've got, I don't know, I'm just going to make something up, Doctor, just for an example. You've got five pesticides that a farmer is exposed to and then you have glyphosate, and you're trying to

14:19:34 separate out, tease out, what is actually responsible for the non-Hodgkin's lymphoma; right?

A. Yes.

Q. Adjustment for other pesticides is something that you look for when you look at the studies; isn't

14:19:48 that right?

A. Yes.

Q. It would be extremely desirable to adjust for other pesticides in studies; right?

A. Yes.

14:19:59 Q. All right. Doctor, let me ask you a little bit

about IARC, because you spent some time on IARC this morning. Do you remember doing that?

A. Was that a question?

Q. I'm just trying to orient you. I just asked you if you remembered talking about IARC this morning. I assume the answer is yes.

14:20:19

A. Yes.

Q. Okay. Thank you, Doctor.

And you yourself have never been on an IARC Working Group; is that right?

14:20:29

A. No.

Q. And you recognize that you talked a lot about what IARC does; right? And how you consider it -- I can't remember your exact word, but the premier determiner of carcinogenicity or something like that; right?

14:20:45

A. Yes.

Q. So you, Doctor, when you look at IARC, it's really important to understand exactly what role IARC is playing; right?

14:20:59

A. What role IARC is playing in what?

Q. In the determination of carcinogenicity.

A. Yes.

Q. Because you want to know exactly what they mean when they see probable carcinogen; right?

14:21:15

A. Yes.

Q. You don't want to just say, oh, it says probable carcinogen, and I, Dr. Neugut, am going to apply my meaning of probable carcinogen in this case, you want to use IARC's meaning; right?

14:21:29

A. Okay.

Q. Well, do you agree?

A. Yes.

Q. Okay. Well, because you know from your experience reading IARC stuff that what IARC does is very different than, for instance, what regulators do; isn't that right?

14:21:37

A. Yes.

Q. And what IARC does is something called a hazard assessment; right?

14:21:52

A. Yes.

Q. So I would like to put up -- and I think this is already in evidence. I want to put up IARC preamble, which is in your binder, DTX 2635.

MR. WISNER: I don't believe that is in evidence. I mean, our exhibit is in evidence.

14:22:09

MR. LOMBARDI: It's the same thing. I'll let you look at it to confirm. 2635, and I'm going to go to page 4.

Q. Doctor, it's Exhibit 2635 and I'm going to turn

14:22:23

you to page 4.

MR. WISNER: No objection.

MR. LOMBARDI: Thank you.

Q. And, Doctor, if it's easier for you, I'm going to put something up on the screen with the Court's permission that might be easier for you to look at.

A. That's all right.

What page?

Q. 2635. And then these are the numbers at the bottom, have 004 at the end of it.

Do you have that, Doctor?

A. I have 004, yes.

Q. And maybe, Armando, can you just go back to the first page just so we show the jury exactly what we're looking at here.

This is the preamble for IARC Monographs; is that right?

A. Yes.

Q. And what it does is it sets forth terms that IARC uses; correct?

A. Yes.

Q. And this gets appended to all the Monographs that come out; isn't that right?

A. Yes.

Q. We'll go back to page 4, if we could, Armando.

And let's take a look right here. And, Doctor, do you see what I've blown up on the screen there?

A. Yes.

Q. And this is where IARC defines what it means by hazard versus risk; correct?

14:23:57

A. Yes.

Q. And let's just highlight that first sentence, Armando.

It says: "A cancer hazard is an agent that is capable of causing cancer under some circumstances, while a cancer risk is an estimate of the carcinogenic effects expected from exposure to a cancer hazard."

14:24:09

Do you see that?

A. Yes.

Q. So what IARC's goal here is what they're doing when they arrive at their categorization of an agent is they're just trying to see if that agent is capable of causing cancer under some circumstances; right?

14:24:21

A. Yes.

Q. And they go on -- if we could go to line 21, Armando, and highlight from "The distinction."

14:24:38

"The distinction between hazard and risk is important and the Monographs identify cancer hazards even when risks are very low at current exposure levels."

Do you see that?

14:24:59

A. Yes.

Q. And you understand that's what IARC is doing; right?

A. Yes.

14:25:06 Q. That is part of the way they go about their Monographs and, in particular, the Monograph on glyphosate; is that right?

A. Their role is to identify whether something can cause cancer or it does cause cancer. They don't give an

14:25:26 estimate of how -- or they don't purposely or they don't as a primary part of their assessment make an assessment of how strong the risk assessment or how strong the relative risk is.

Q. Okay. And so it actually -- what it literally

14:25:42 says is a hazard is an agent capable of causing cancer under some circumstances; right? Right?

A. Well, again, some circumstances meaning, as you said earlier, I'll say real world circumstances.

Q. You're going to real world. All right.

14:26:02 So, Doctor, then it goes on -- but what's important here is IARC will find something to be a cancer hazard and categorize it as such even when the risks are very low; correct?

A. Even when the risks can be low, yes.

14:26:22 Q. Okay. And that's what IARC was doing with

respect to the work of Working Group 112 on glyphosate, they were doing this kind of hazard assessment; isn't that right?

A. That's what they're always doing, yes.

14:26:37 Q. Okay. And IARC reached no conclusion about a dose of glyphosate that could cause cancer in humans; right?

A. I don't think they typically do that.

Q. Right. So, Doctor, let's go to the next page, 14:26:55 if we could, page 5, and the first full paragraph on page 5, and this talks a little bit about what IARC expects or understands is done with its Monographs; right?

A. I guess.

Q. And the Monographs are used by national and 14:27:17 international authorities to make risk assessments.

Now, that's different than a hazard assessment, as IARC said; right?

A. Yes.

Q. And we're talking about national and 14:27:28 international authorities, we're talking about things like the EPA; right?

A. Yes.

Q. And what IARC does is it helps them make risk assessments, formulate decisions concerning preventative 14:27:38 measures, provide effective cancer control programs, and

decide among alternative options for public health decisions.

Do you see that?

A. Yes.

14:27:47 Q. If we could just skip one sentence where it says "These evaluations."

"These evaluations" -- that means the IARC evaluation; right, Doctor?

A. Yes.

14:28:10 Q. The IARC evaluations.

"These evaluations represent only one part of the body of information on which public health decisions may be based."

Do you see that?

14:28:22 A. Yes.

Q. And then the last sentence in this paragraph says: "Therefore, no recommendation is given with regard to regulation or legislation which are the responsibility of individual governments or other international

14:28:37 organizations."

A. Absolutely. I mean, IARC tells you that something can cause cancer and what you want to do with that information is totally up to you. I don't have any opinions as to whether glyphosate should be taken off the

14:28:52 market or whether it should have a warning label or not.

I couldn't care less. It's simply a matter of glyphosate -- the knowledge that glyphosate can cause cancer.

Q. Under some circumstances; right?

14:29:05 A. Under some circumstances, true.

Q. And IARC -- IARC, the fact that they have a Monograph that classifies glyphosate doesn't mean that IARC is recommending a warning; is that right?

A. I don't know what IARC thinks about it, but 14:29:26 you're right. I assume that they're saying that that's a public policy decision that's up to public policy or governmental organizations to do.

I mean, you know, everything in life has a potential downside, and we don't say it should be banned. 14:29:45 We have cars and they cause death and we don't say we shouldn't be driving cars. The same way, you know, glyphosate causes cancer, okay. That's okay with me.

Q. Okay, Doctor. And I want to go to another section now. You've testified here as an epidemiologist, 14:30:00 so I want to focus on the epidemiology analysis that was done by IARC. Do you understand -- I'm trying to be transparent about where I'm going, Doctor.

Do you understand that?

A. Yes.

14:30:10 Q. Okay. Let's go to the same exhibit, page 21 to

22.

A. We're now in the preamble still?

Q. Still in the preamble, same exhibit. Just go back to 21 to 22.

14:30:32 I'll leave it the way it is for right now. Wait until you find your place, Doctor. Tell me when you're ready.

A. I have it.

Q. Okay. You've got it.

14:30:41 And this is where it talks about the categorization of carcinogenicity in humans; right?

A. Yes.

Q. And this is talking about the epidemiology studies; right?

14:31:02 A. Yes.

Q. And so the top category says "Sufficient evidence of carcinogenicity" and it says the Working -- that happens when the Working Group considers that a causal relationship has been established between exposure

14:31:17 to the agent and human cancer; right?

A. Yes.

Q. And that is not what Working Group 112 concluded about glyphosate; correct?

A. That is correct.

14:31:30 Q. What they concluded about glyphosate was that it

was limited evidence of carcinogenicity; correct?

A. Yes.

Q. Let's look at that. That says: "A positive association has been observed between exposure to the agent and cancer for which a causal interpretation is considered by the Working Group to be credible, but chance, bias, or confounding could not be ruled out with reasonable confidence."

Is that right?

14:31:42

14:31:58

A. Yes.

Q. And chance, bias, and confounding, those are terms that have meaning for any epidemiologist; is that right?

A. Yes.

14:32:07

Q. Chance has to do with -- you made reference I think this morning -- statistical significance, size of the study, things like that?

A. Well -- okay. Yes.

Q. Okay. And bias, you made some reference to bias, but different kinds of studies are prone to different kinds of bias and you have to look at the specific study, but that's something that any epidemiologist is looking into; right?

14:32:25

A. Yes.

Q. There are biases that are associated with case

14:32:35

control studies, for instance; right?

A. Yes.

Q. Might have something called recall bias; right?

A. Yes.

14:32:47 Q. You might have -- well, I think sometimes people call it misclassification bias; is that right? Or --

A. Misclassification isn't necessarily bias, but -- unless it occurs with bias.

Q. Okay. And then "or confounding" --

14:33:02 A. Yes.

Q. -- is the third one. And that relates to we were talking about -- what we were talking about earlier, where you can do adjustments to take care of confounding; is that right?

14:33:16 A. Yes.

Q. So IARC with respect to glyphosate, you know concluded that chance, bias, and confounding is a problem with many of the studies; isn't that right?

A. Yes.

14:33:27 Q. Now, the IARC Working Group on glyphosate, Doctor, 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 lymphoma?

14:33:47 A. That's correct.

Q. And, Doctor, actually, you agree with them that the epidemiology alone is not sufficient to show a causal relationship between glyphosate and non-Hodgkin's lymphoma; correct?

14:34:02 A. Yes.

Q. Thank you, Doctor.

So let me talk a little bit, Doctor, about the epidemiology of glyphosate more specifically, not just what it said in IARC.

14:34:30 You understand where I'm going now?

A. Not yet.

Q. All right. Fair enough. That's fair enough.

Let's talk for a minute about a couple of just concepts from epidemiology so the jury understand what

14:34:45 we're talking about. One concept is statistical significance. You obviously are aware of that term; right?

A. Yes.

Q. And statistical significance really in the

14:34:56 studies we're looking at, the way you check on statistical significance is to look at what are called confidence intervals; right?

A. Yes.

Q. And if your counsel will allow me, I'll hold up

14:35:10 one of your demonstratives.

MR. WISNER: Sure.

Q. BY MR. LOMBARDI: So the confidence intervals, Doctor, are the bars; right?

A. Yes.

14:35:20 Q. I'm going to call them bars. Sometimes epidemiologists call them whiskers; right?

A. I've never heard that.

Q. All right. I'm talking to the wrong epidemiologist, I guess.

14:35:29 So it's got bars and the end points of the bars represent the confidence interval; right?

A. Correct.

Q. And what you're doing with the confidence interval is you're giving an estimate -- you're giving an

14:35:46 estimate of the precision of your point estimate; right?

A. I don't know if I like the word "precision," but again -- actually "confidence" isn't a bad word.

Q. Go ahead. I didn't mean to interrupt you.

A. Confidence is a pretty good word. I mean,

14:36:11 basically it says that 95 percent of the time if you did the study again and again and again, you would get an answer within the bars.

Q. Right.

A. Within the risk estimate, the relative risk

14:36:26 would come out somewhere between the end of the bars.

Q. Okay. So it means 95 percent of the time the true answer would be between the ends of the bars; right?

A. Correct. Uh-huh.

Q. And confidence intervals are something that every epidemiologist, including yourself, takes into account when you're looking at the results from a study; right?

14:36:43

A. Yes.

Q. No epidemiologist would say that that little -- the box -- those boxes are precise risks; right? You have to look at the confidence interval.

14:36:55

A. So, again, I don't know what the word "precise" in this context means, or how you're using it. No one would say that -- again, if you're using the word "precise" to mean that that's an absolute correct number, then I don't know if that's true or not. But that's -- that the answer is somewhere -- that the mean answer is somewhere near that bar -- near the box.

14:37:24

Q. Well, the better answer is that 95 percent of the time the answer is somewhere between the ends of the confidence interval; right, Doctor?

14:37:44

A. Correct.

Q. Now, so in all the epidemiology studies you've looked at about glyphosate, there is always an indication of the confidence interval; right?

14:38:03

A. The confidence interval is a standard part of how you assess the risk estimate and it's always given together or it should be always given together with the risk estimate so that someone can assess the confidence with which they can look at that estimate.

14:38:17

Q. Okay. And when you're dealing with confidence intervals, you say that a result is not statistically significant if the bar overlaps 1.0; correct?

A. Yes.

14:38:33

Q. So, Doctor, in the Forest plot that you put up here, every single bar crosses 1.0; correct?

A. Yes.

Q. They are not statistically significant results; correct?

14:38:48

A. Yes.

Q. And, Doctor, from your point of view, you, you, Dr. Neugut, 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?

14:39:06

A. Why do you say I, I, I, Dr. Neugut?

Q. Because I'm asking you the question.

A. Oh. Again, if we're talking about one single study and only one study had ever been done on glyphosate and non-Hodgkin's lymphoma, then you would probably be

14:39:27

correct. But if we're looking at a multiplicity of studies, as we are here, and they are all positive and some of them are pretty close to one, then I would say that that statement is not necessarily accurate.

14:39:49 And I would also say that, at least in more recent epidemiologic methodology, that the concept of statistical significance is becoming more flexible and not relying on P -- in .05 as a rigid tool for assessing statistical significance.

14:40:14 Q. Okay. Doctor, let me -- I'm going to ask you the question very precisely here.

A. Uh-huh.

Q. You would not label an exposure as being associated with an outcome unless there is a finding of

14:40:26 an increased risk that is statistically significant, correct?

MR. WISNER: Objection. Asked and answered. Improper hypothetical.

THE COURT: Overruled. You may answer.

14:40:37 THE WITNESS: It would depend on the circumstances.

Q. BY MR. LOMBARDI: Okay. Did you get asked that question under oath and give a different answer?

A. Again, I would have to say I don't recall.

14:40:50 Q. Okay. Let's look this time at a deposition from

August of 2017.

A. Am I supposed to be looking this up?

Q. Yes, if you would, please. It's back in that same binder where --

14:41:15 A. This one?

Q. Yes, it should be there. It's August 7th of 2017, so almost a year ago now.

A. And the page?

Q. Page 45. Let me know when you're there and I'll

14:41:31 give you the lines.

A. Uh-huh.

Q. Are you there, Doctor?

A. Yes.

Q. Okay. So look at lines 14 to 18.

14:41:48 And, your Honor, I'd ask to put this on the screen so the jury can see it.

MR. WISNER: Sorry. Lines?

MR. LOMBARDI: 14 to 18. Page 45.

MR. WISNER: I actually don't think it's

14:42:10 appropriate. I think you have to read the question beforehand. It's the same subject matter.

THE COURT: Overruled.

You can put it on the screen.

Q. BY MR. LOMBARDI: Let's put it up on the screen,

14:42:21 Doctor, so the jury can see.

You were asked this question and gave this answer under oath at your deposition; correct, Doctor?

A. Yes.

Q. "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?"

Your answer was: "That's correct."

MR. WISNER: Again, objection. This isn't a -- hold on, Doctor.

THE WITNESS: And if that's the question, then my answer is twofold. One is, first of all, you have the metaanalysis, which is statistically significant. And, secondly, as I said before, if we're talking about a single study, that's accurate, but over the course of multiple studies, I would not say that that is -- that that would be my feeling. And if you're talking about it in the context of these studies, there are statistically significant findings in these studies as well aside from the overall findings.

Q. BY MR. LOMBARDI: Okay. Is that the answer you gave under oath, Doctor?

A. That is the answer I gave under oath.

Q. Thank you, Doctor.

Another area that epidemiologists consider when

they look at studies is called power; right? The power of the study?

A. Yes.

Q. And the power of the study, you want to have a study that's as powerful as possible. Power is a good thing, I guess is what I'm saying; is that true?

A. Yes.

Q. And power has to do with the size of the study; is that right?

A. Yes.

Q. And when we say the size of the study, we just don't mean the number of people total that are in the study, do we?

A. Not at all.

Q. What we mean is -- what we're talking about is the -- and we'll explain this, but in epidemiological terms, the exposed cases; is that right?

A. Well, I would say it's actually dependent on a number of things, but I would say mostly it's -- in most instances it's based on the number of end points.

Q. Okay. Doctor, the key number for power is the number of individuals who are both exposed and had the outcome of interest; correct?

A. That's probably the most important single number, yes.

Q. Okay. Thank you, Doctor.

And insufficient power in a study limits your ability to get a correct answer from the study; isn't that right?

14:45:27 A. Limits your ability to get a statistically significant answer from the study.

Q. Does it also limit your ability -- limit the ability of the study to be able to give you a correct answer?

14:45:40 A. Not necessarily.

Q. Let me ask you precisely, Doctor, so there's no confusion. Do you believe if a study has insufficient power, that this is a significant limitation in your ability to use that study to reach a causation opinion?

14:46:00 A. Again, to get a statistically significant result, if you don't have enough power, you're going to have difficulty getting a statistically significant outcome if you don't have enough power.

Q. Will you have difficulty getting a correct

14:46:17 answer, Doctor?

A. Maybe yes, maybe no. Again, what does correct mean?

Q. Does it limit your ability to get a correct answer, Doctor?

14:46:25 A. So if you're talking about the precision of the

relative risk estimate, not necessarily.

Q. Okay. Doctor, would you -- in the same deposition -- you were asked that question under oath in a deposition before, weren't you, Doctor?

14:46:39 A. I have no recollection.

Q. Let's go to the August 7th deposition at page 203. Tell me when you have it, Doctor.

A. Uh-huh. I have it.

Q. And I'm looking at lines 15 to 23.

A. Uh-huh.

Q. Do you have that?

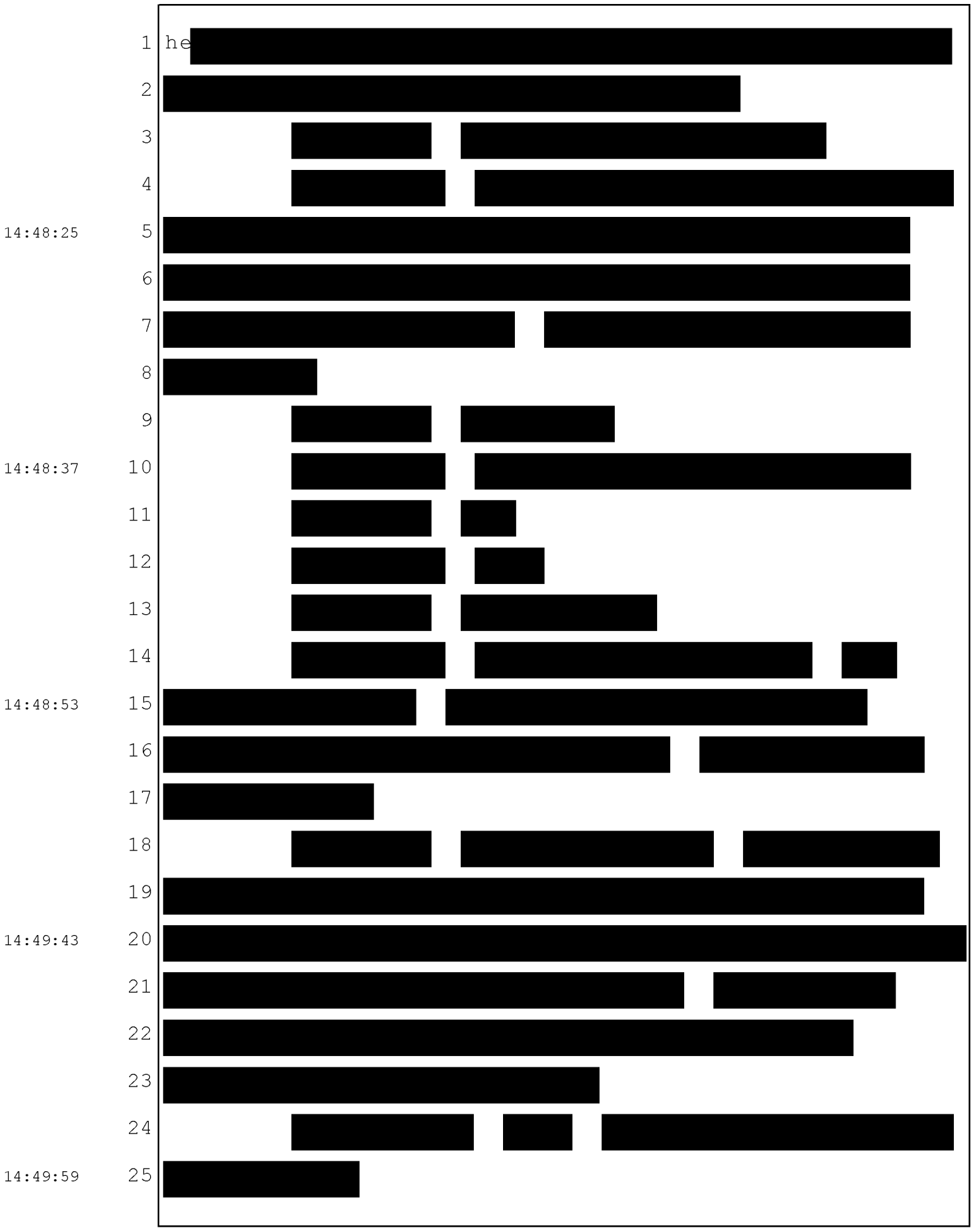
A. Yes.

MR. WISNER: Your Honor, sidebar. Please.

THE COURT: Yes. Please approach.

14:47:37 (Sidebar.)

[redacted]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(End sidebar.)

14:50:14 THE COURT: All right, Ladies and Gentlemen, we're going to take the afternoon recess now. So we'll be in recess for 15 minutes and resume again at five after 3:00. All right? You may step down. Thank you.

(Recess.)

15:05:51 (Jurors enter the courtroom)

THE COURT: Welcome back, Ladies and Gentlemen. Dr. Neugut. Dr. Neugut remains under oath. And, Mr. Lombardi, you may continue.

MR. LOMBARDI: Thank you, your Honor.

15:07:59 Q. Dr. Neugut, I want to turn to the Forest plot that you had. It's this chart. And I'm going to put it up on the video screen if I can.

You had said that you had taken the Forest plot from the article; right, Doctor?

15:08:34 A. Yes.

Q. And this looks like the Forest plot that you had; is that right?

A. Yes.

Q. And so I don't want the take a huge amount of

15:08:46 time with this, but you're the epidemiologist; right?

A. Yes.

Q. And you didn't show the jury any of these studies; correct?

A. I figured we'd do them with you.

15:09:04 Q. And so, Doctor, you just kind of generally referred to, oh, studies have problems; right?

A. I don't know that I said that. Did I?

Q. Well, again, I'm not allowed to answer questions, Doctor, but your testimony was essentially

15:09:29 that all of these studies have their problems.

A. Every epidemiologic study and every experiment that's done in humans is -- so every study perforce has issues with it. My point was that its consistency that really is what carries the day, because each of the

15:09:53 studies is done under different circumstances -- Scandinavia, Canada, the US. Some of them have controls for -- as you said earlier and as we said earlier, herbicide, other herbicides. Some have not. Some have done dust response relationships. Some have not.

15:10:12 But across the board, as I said, to a greater or lesser degree, they all are positive by being to the right of one and thus I considered them on a whole positive with showing risk ratios greater than one. And the metaanalysis shows a cumulative risk ratio that's

15:10:35 greater than one as well.

Q. So let me ask you about just a couple of specifics just so that we get a feel for things.

A. Sure.

Q. The top study here is De Roos 2003. You made reference to that one specifically.

Do you remember that?

A. No.

Q. During your direct? You don't remember?

A. It was a long time ago.

15:10:56 Q. Okay. All right. Doctor -- Doctor?

A. Yes.

Q. De Roos 2003 is a pooled study; isn't it?

A. Yes.

Q. It pools how many other studies?

15:11:09 A. Three.

Q. And you pool studies together in order to help create greater power; is that right?

A. You pool studies for -- well, first of all, its metaanalysis is pooled studies, so you pool a study to 15:11:28 your right for -- primarily for achieving increased numbers so you can get statistical power, as you say. And, in addition, by pooling studies you also achieve what's called generalized ability because you also have pooled together different populations. So one might 15:11:57 criticize a study by saying that it only alludes to one

population, one state or whatever, but by pooling together three studies, you now have -- De Roos now represents different populations together so it actually -- and you still get a statistically significant risk ratio and a positive result, but it's across several populations now so you can have more confidence that the result really represents a more dramatic population than would be the case with any of the single studies.

15:12:14

Q. For the De Roos 2003 study, actually what you put up on the board has a confidence interval that crosses one, doesn't it?

15:12:32

A. I alluded to that in the thing and said the actual risk ratio, if you look, is 2.1.

Q. Well, you chose to put 1.6 up, Doctor; right? That's what you put on the board?

15:12:53

A. Right. But that's the --

Q. Because you wanted to be conservative; right?

A. Yes.

Q. And that's what good epidemiologists do; right?

15:13:03

A. But I think the --

Q. Is that right, Doctor?

A. Yes. That is right.

Q. And, Dr. De Roos, tell the jury, isn't it relevant to consider when the data is gathered for an epidemiological study?

15:13:19

MR. WISNER: Objection. This is Dr. Neugut. Not Dr. De Roos.

Q. BY MR. LOMBARDI: I'm sorry. I didn't mean to call you Dr. De Roos. My apologies.

15:13:30 A. I'm sure Dr. De Roos would be thrilled that you called me that. Or maybe not.

Q. I apologize.

It's important to know, the three pooled studies in De Roos, you actually -- you know when those

15:13:43 studies -- when the cases for those studies were diagnosed; right?

A. Not off the top of my head, but I could look it up.

Q. Well, I don't want to take all that time, but

15:13:54 you know, does it sound right to you that the case control studies, the cases in the De Roos study were gathered in the late '70s or early '80s? Do you recall that?

A. Not offhand, but if you show me the De Roos

15:14:08 paper, I'm willing to take a look and see.

Q. I've got limited time, Doctor, so if you don't know, just tell me and we'll move on.

A. Then let's move on.

Q. Okay. But, Doctor, it is important to an

15:14:21 epidemiologist's analysis to know how close in time those

diagnosed cases were to the time glyphosate first went on the market; right?

A. Yes.

Q. Because you want to make sure there's enough time and enough prevalence of glyphosate for there to be non-Hodgkin's lymphoma actually caused, don't you?

15:14:39

A. Yes.

Q. And you can't correct that problem with the underlying three pooled studies by pooling them together; correct?

15:14:55

A. Yes.

Q. Now, I want to go back to that PowerPoint we were talking about. Not a slide. I want to go back to the point about statistical power we were talking about right before the break.

15:15:09

Do you remember that?

A. Yes.

Q. Now, just to give the jury a feel here, that pooled study with De Roos, how many exposed cases were there in that study?

15:15:19

A. Again, without looking at the paper, I don't know.

Q. Well, let me ask, and this is just my representation, but does 36 sound about right?

15:15:29

A. I don't know. But you can actually get a feel

for the power of the study by looking at the box. The jury can get a feel for the power of the study or for the size of the study by looking at the box.

Q. Well, I want to put down the number of exposed cases, if that's okay with you, Doctor. Is that all right?

A. Sure.

Q. Let's skip De Roos 2005, because that's a cohort study; right?

MR. WISNER: Objection.

Q. MR. LOMBARDI: I'm going to come back to it, Doctor.

A. Yes.

Q. Okay?

MR. WISNER: Objection. The 36 on there hasn't been confirmed. He needs to look at the study.

MR. LOMBARDI: I said that's my representation, Judge? If I'm wrong, then he can --

Q. Do you know that that's wrong?

A. No.

Q. I mean, does that sound ballpark to you, Doctor?

A. Again, off the top of my head, I don't know the answer.

Q. Okay. Doctor, do you know how many exposed cases there are in the Eriksson study?

A. No.

Q. You don't know?

A. No.

Q. So if I go down here to Hardell, you don't know what the exposed cases are for that?

15:17:41

A. No, I don't have the numbers.

Q. McDuffie, you don't know?

A. Not off the top of my head. I'd have to look in the papers.

Q. Orsi, you don't know?

15:17:49

A. I don't have the papers in front of me.

Q. All right. I'm just going to ask you. You tell me if that refreshes your recollection. Does Eriksson have 29 exposed cases?

A. Again, I have no way of knowing without --

15:18:01

Q. Hardell, we've heard a lot about Hardell. I don't think the jury has heard. Isn't Hardell eight exposed cases?

A. I would not know.

Q. Eight would be really small, though, wouldn't it?

15:18:11

A. The size is really not that important after you've done the study and gotten the results. Statistical power is important before you do the study, not so much after.

15:18:28

Q. Eight is small?

A. Eight is a small number.

Q. Yep. And McDuffie was 51, does that sound about right?

15:18:36 A. Again, I have no way of knowing.

Q. Orsi, 12, does that sound about right?

A. I don't know.

Q. Now --

MR. WISNER: Your Honor, I actually have his

15:18:46 notes. Maybe we should just give it to him.

MR. LOMBARDI: I'm ready to move on.

THE COURT: All right. You may proceed.

Q. BY MR. LOMBARDI: So, Doctor, now, De Roos is a pooled study. You know that De Roos actually got pooled

15:19:01 into another larger study; right?

A. I don't know what you're referring to.

Q. Well, you've heard of the North American Pooled Project; right?

A. Yes.

15:19:09 Q. And the North American pooled product pools De Roos and the three studies that are part of De Roos with McDuffie, doesn't it?

A. I did not consider the NAPP study in my review.

Q. Understood. And I'm not going to ask you

15:19:27 substantive questions about it. I just want to know, do

you know that NAPP includes De Roos and McDuffie in the pool?

A. How would I know if I didn't look at it?

Q. You don't know?

15:19:38 A. No.

Q. But you chose not to look at the NAPP study?

A. When you say -- use the word "choose," you're making it sound like I made some kind of arbitrary, idiotic decision to exclude some important study and, you

15:20:02 know, tried to make some judgement that was dumb. But the reality is I chose not to look at it for good reasons.

Q. Well, that's actually all I asked you. I didn't ask you all that other stuff. I just asked you --

15:20:16 A. No. But when you said choose, it sounded like I chose not to include it. I decided not to include it.

Q. You decided not to include it?

A. Yes.

Q. That's better than chose? Because I'll ask you

15:20:30 the question again. I want to get it right.

You decided not to include the NAPP study?

A. Because it's not a peer-reviewed study. It's never been included -- it's never had the same number of cases in it. It's never been published.

15:20:46 Q. And you also decided not to include the Journal

of the National Cancer Institute article from 2018. You decided not to use that one as well; correct?

A. I explained that in my direct testimony this morning, so -- because I think that it's not up to the standards of being included.

Q. And we'll talk about that study in just a minute, Doctor. But as you look at this Forest plot and as you consider what you've seen in your review of the epidemiological literature related to glyphosate, it's true, isn't it, that there is no odds ratio anywhere in the epidemiological literature that reports for glyphosate and non-Hodgkin's lymphoma and adjusted odds ratio positive association that is statistically significant? That's true; isn't it?

A. First of all, I did not make up this metaanalysis. This is from a published study. So --

Q. I'm actually just asking about your knowledge. We can take this off the screen so it won't be a distraction. I'm asking your knowledge based on the epidemiology you've looked at.

A. De Roos.

Q. Okay. Let me ask you the question again just so we've got it clear.

Doctor, there is no odds ratio anywhere in the epidemiological literature that reports for glyphosate

and non-Hodgkin's lymphoma an adjusted odds ratio positive association that is statistically significant; correct?

A. That's not true.

15:22:32 Q. Okay. Could you refer to -- you were asked that question under oath, weren't you? Let's go to your deposition, your August 7th deposition at page 150.

MR. WISNER: Objection, your Honor. Sidebar.

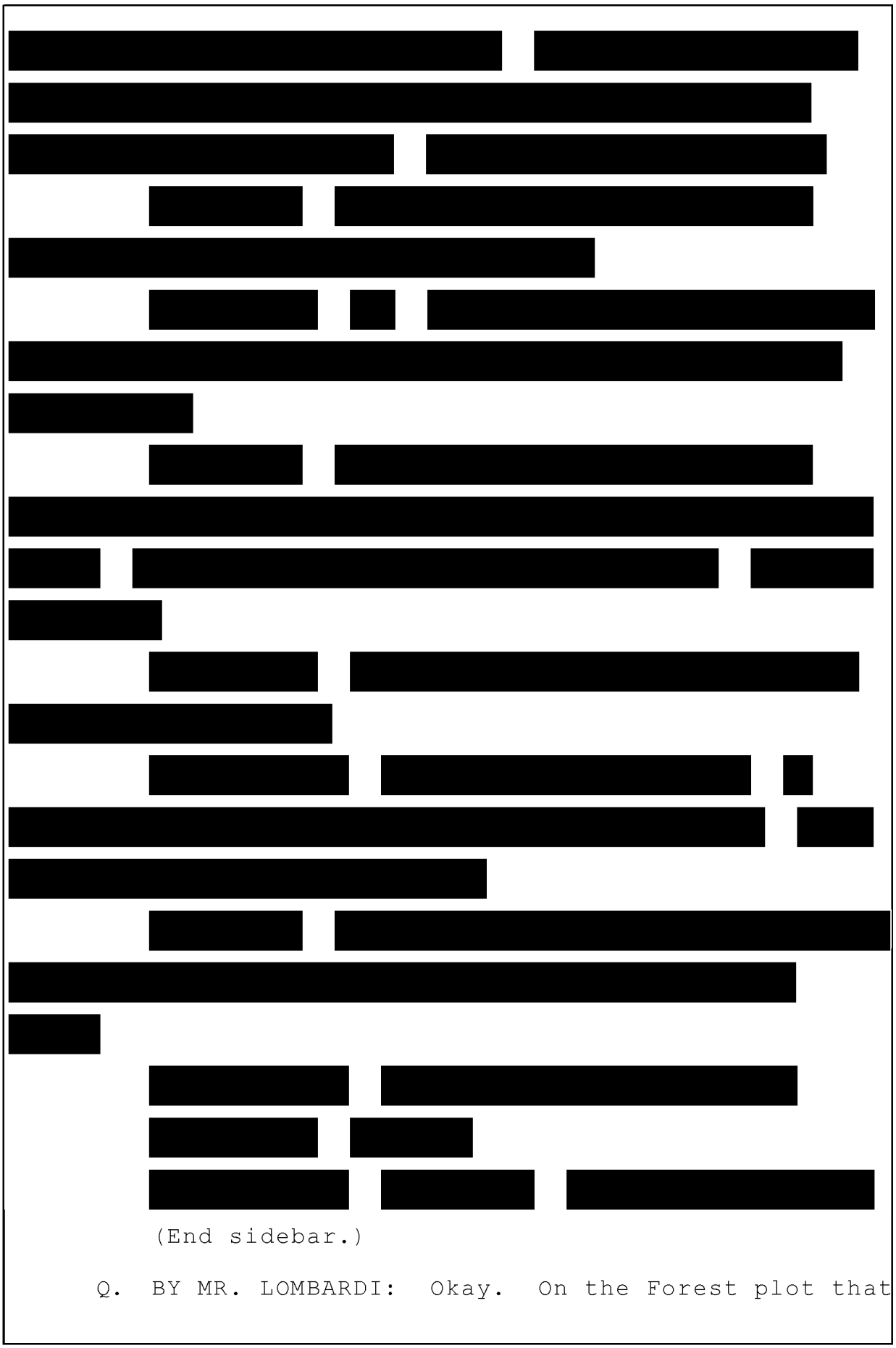
(Sidebar.)

15:23:00 [redacted]

15:23:22 [redacted]

15:23:38 [redacted]

15:23:51 [redacted]



(End sidebar.)

15:24:10 15:24:22 15:24:35 15:24:49 15:25:05

Q. BY MR. LOMBARDI: Okay. On the Forest plot that

you presented to the jury, there was no statistically significant result?

A. Correct.

Q. Thank you.

15:25:27 Let me ask you -- we'll change the subject here, Doctor, to JNCI. And by that I mean the Journal of the National Cancer Institute 2018 article which you talked about this morning; right?

A. Yes.

15:25:45 Q. You didn't actually show that to the jury; right? You gave your critique of it; is that correct?

A. Yes.

Q. And so let me -- I'd like to publish 2052. It's in evidence.

15:26:02 THE COURT: Any objection?

MR. WISNER: No objection, your Honor. It's actually not in evidence.

MR. LOMBARDI: My mistake, but I think we have agreement we can publish.

15:26:09 THE COURT: That's fine.

MR. LOMBARDI: Let's put it up on the screen. I think this will be a clearer way for the jury to see it.

Q. And so you see this is right there, Journal of the National Cancer Institute; is that right?

15:26:34 A. Yes.

Q. That's a well regarded journal?

A. Yes.

Q. And you've been published in it yourself; is that right?

15:26:40 A. I have 20 papers in it.

Q. Let's go down to -- it says, "Glyphosate Use and Cancer Incidence in the Agricultural Health Study." I think you made reference to this before. It specifically is a study about glyphosate; right?

15:26:54 A. Yes.

Q. Okay. And then it lists the authors. And there are a number of them.

Do you see that there?

A. Yes.

15:27:00 Q. And these authors are either associated with the government or with universities; is that right?

A. If they're associated with the government, then I suppose we're going to have to be a bit suspicious, but aside from that, yes.

15:27:19 Q. Okay. You don't mean to impugn the integrity of Gabriella Andreotti, do you, Doctor?

A. No.

Q. Okay. Thank you.

And so Andreotti -- you look here it says the

15:27:33 affiliations of the authors. If you look at that, you

see that they are with the National -- I'm not going to read all of the language. Doctor? Are you with me, Doctor?

A. Yes.

15:27:43 Q. They're with the National Cancer Institute.

Do you see that?

A. Yes.

Q. Of the National Institutes of Health?

A. Yes.

15:27:51 Q. They are with the National Institute of Environmental Health Sciences of the National Institute of Health.

Do you see that?

A. Yes.

15:28:09 Q. They are with -- right below that, the Department of Epidemiology at the University of Iowa?

A. Yes.

Q. They are with Drexel University right below that.

15:28:21 Do you see that?

A. Yes.

Q. They are not with Monsanto; correct?

A. Yes.

Q. They are not with any industry entity; is that

15:28:33 right?

A. Yes.

Q. And you understand that the agricultural health study was a study that was created and put together by government entities; correct?

15:28:44 A. Yes.

Q. Funded by those entities; right?

A. Yes.

Q. All right. Now, this is a cohort study -- you talked about cohort studies this morning; is that right?

15:28:56 A. Yes.

Q. All right. Let's go to the next page and let's look under "Study Design."

Do you see that section, Doctor?

A. Yes.

15:29:14 Q. Okay. And under "Study Design," it says that -- right there -- tells us how many people were enrolled in the study initially; right?

A. Yes.

Q. 57,000 some-odd; correct?

15:29:29 A. Yes.

Q. And we're going to come back to the followup in just a few minutes, but it starts with 57,000. Let's go to the statistical -- excuse me. Let's go to the next page under "Results" and they actually -- these

15:29:48 scientists did a number of different analyses, didn't

they?

A. Sure.

Q. And they tried to look at this data in a number of different ways to see if they could see any effect of
15:30:00 glyphosate on the risk level for non-Hodgkin's lymphoma; correct?

A. Yes.

Q. And so what you're seeing here is -- and here, if you could just go a little bit above that, Armando --
15:30:21 yeah. "Risk ratios for unlagged intensity-weighted lifetime days."

Do you see that? That's one of the analyses they did; right?

A. Yes.

15:30:29 Q. And then if you go further down to right about here, here's another analysis they did, the rate ratio in the top exposure quartile.

Do you see that?

A. Yes.

15:30:43 Q. They had quartiles that they kind of ranked people by the extent of their exposure; is that right?

A. Yes.

Q. And then if you go down a little bit further, you can go -- if you can scroll up a little bit, Armando,
15:30:59 that would be great. Right there. They did results

based on lifetime days of glyphosate use and cancer risk.

Do you see that?

A. Yes.

Q. They evaluated the impact of lagging exposure.

15:31:21 Do you see that?

A. Yes.

Q. And they conducted several sensitivity analyses.

Do you remember that?

A. Yes.

15:31:32 Q. And a sensitivity analysis is something that is designed to basically check the results you got?

A. Yes.

Q. By performing tests to make sure that the tests -- the result you got is accurate?

15:31:48 A. Yes.

Q. Okay. And they did -- do you remember how many sensitivity analyses they did?

A. No. But I'm sure they did a lot.

Q. And did they do -- were there any sensitivity

15:31:59 analyses in the case control studies that you referred to?

A. I'm sure there were.

Q. Okay. Let's go to page 5 and let's just read what they say in conclusion.

15:32:16 "In this updated evaluation of glyphosate use

and cancer risk in a large prospective study of pesticide applicators, we observed no associations between glyphosate use and overall cancer risk or with total lymphohematopoietic cancers."

15:32:40 Do you see that?

A. Yes.

Q. And that's the results that they came to; right?

A. Yes.

Q. And if we just go to page 7 down here under

15:32:53 "Funding," just to confirm, Doctor, this work was supported by the Intramural Research Program of the National Institutes of Health, National Cancer Institute, Division of Cancer Epidemiology and Genetics; right?

A. Yes.

15:33:09 Q. The National Institute of Environmental Health Science.

Do you see that?

A. Yes.

Q. The Iowa Cancer Registry; right?

15:33:18 A. Okay.

Q. Iowa's Holden Comprehensive Cancer Center; correct?

A. Yes.

Q. And as well as the NIEHS-funded Environmental Health Sciences Research Center.

Do you know what NIEHS is?

A. Yes.

Q. What is it?

A. National Institute of Environmental Health Sciences.

Q. Another government entity?

A. Well, referred to earlier. But that's part of the NIH.

Q. Okay. And actually in this, one of the things you think was well done in this study is they had access to good cancer registries to track the disease in the cohort; is that right?

A. Like I said before, cancer outcomes are usually well measured.

Q. And you agreed that in this particular case the cancer outcome was well measured?

A. Yes.

Q. Now, one thing that you talked about as being problematic, in your view, with the JNCI study was imputation; right?

A. No.

Q. Well, you talked about their use of imputation.

A. Imputation was appropriate. You use imputation when you've got a screwed-up study with poor followup. And since they had poor followup, they had to use

imputation. And so the use of imputation was totally appropriate and they did it correctly and appropriately. Turned out it didn't work well, so -- as we're saying here, you know, I have no problem with the investigators here. I think they're all, as you say, noble government employees and excellent scientists, and they did a noble job of trying to work with the study where there were many problems. And unfortunately this is a case of measuring shit with a gold scale where it turns out the results just didn't turn out to be what they should be because there were so many problems, as I pointed out in my direct testimony this morning.

So you got those misclassification in the exposure, poor followup, and then the imputation didn't work -- it didn't work. I didn't say the imputation was inappropriate. I said the imputation didn't work well. And in particular it didn't work well or it didn't work as it could have because the risk ratio that we're looking for is small so that the errors that are here or the problems that are here with a risk ratio -- a putative risk ratio of 1.5 just obviates and attenuates a risk ratio that's that small. If the risk ratio was 3 or 4, everything would be fine and good. But with a risk ratio of 1.5, they're not going to catch it. And they didn't.

Q. Did you finish your answer, sir?

A. Yes, I did.

Q. You know, I think we're probably going to bleep you in the transcript.

15:36:36 A. I'm going to be very offended by that.

Q. Doctor, the fact is that you have used imputation yourself in studies?

A. Yes. As I say, I have no problem with imputation. It's a good statistical tool and should be

15:36:52 used.

Q. Let's take a look in your binder at Exhibit 3153.

A. 31 --

Q. 53. 3153.

15:37:16 And let me know when you have it, Doctor.

A. I'm honored.

Q. That is -- for the record, that is an article that you were a coauthor on; is that right?

A. Yes.

15:37:30 Q. And it was an article that was published just last year in the Journal of the National Cancer Institute, I believe; is that right?

A. Yes.

MR. LOMBARDI: And I'd ask permission to publish

15:37:45 it.

THE COURT: Any objection?

MR. WISNER: No objection. It just has nothing to do with glyphosate or NHL. But I assume it has some relevance. So no objection at this time, your Honor.

MR. LOMBARDI: So let's put it up on the screen so the jury can see it.

Q. Doctor, it says, "Post-Diagnosis Changes in Cigarette Smoking and Survival Following Breast Cancer."

That was the title; is that right?

15:38:05 A. Yes.

Q. And there you are, Dr. Neugut --

A. Yes.

Q. -- as one of the authors.

And what happened with this study was you were

15:38:16 tracking a group of people; is that right?

A. Breast cancer patients.

Q. Right. So let's go to page 4 of the study.

A. Uh-huh.

Q. And let's look down here and more specifically

15:38:44 right there, and here you note the sample that you had; right?

After excluding an additional seven women for various reasons, the analytic sample consisted of 1332 women; is that right?

15:39:00 A. Yes.

Q. And then you lost some to followup; right?

A. 28 percent.

Q. In a similar way -- I mean, that's what you talked about, lost to followup with the JNCI 2018 study we've been looking at; right?

15:39:12

A. Yes.

Q. And so you lost 28 percent of followup. And the way you solved that problem was to do imputation; is that right?

A. That's correct.

15:39:23

Q. So if we just go down a little bit. Right there. Missing values were imputed using -- and I assume that these are complicated computer software type of things?

A. It's the typical software.

15:39:39

Q. Okay. Great. And you talk about Markov Chain Monte Carlo procedure. We don't need to know about that, sir, but that is part of the imputation process; isn't that right?

A. Yes.

15:39:54

Q. All right. And what you concluded in the end was that imputation was a good thing; right?

A. Yes.

Q. And let's go to page 7. And I think it's right about there. This is where -- and, Doctor, if you need

15:40:15

me to go back up, but this is where you're talking about some of the limitations of your study?

A. Yes.

Q. All right. So here it says: "Last, while our prospective study design allowed us to assess changes in smoking status several years after breast cancer, a proportion of women were lost to followup and thus did not complete the followup assessment. However, we addressed the missing data using multiple imputation" -- and then here's what you say about that -- "resulting in valid statistical inferences that properly reflect the uncertainty due to missing values."

Do you see that?

A. Yes. But there are vast differences between this study and the AHS study, which I can address, which are, number one, that, first of all, we had a strong positive association as opposed to a null finding. And when you have a strong positive association, as I said this morning, you can put a lot more reliance on the findings than when you have a null finding. Because when you have a null finding, you don't know if it's due to the errors, their results, or not.

Secondarily, the smoking assessment is assessed with a great deal of validity. While it's certainly unclear if the exposure misclassification that results

from the glyphosate study, that can eliminate a risk ratio of 1.5 in and of itself. So that's a point.

Thirdly, we actually put the problem here, which is to say in a paper you're supposed to put down the problems with the paper, which is the fact that we had lost the followup and used imputation to correct the loss to followup. If you go back to the AHS study, the authors in the discussion section don't mention that they had loss to followup and used imputation. It's not in the discussion section for the peer reviewer to address.

Q. Wait. Are you suggesting that it's not clear from the AHS -- from the JNCI study 2018 that imputation was done?

A. No. Of course it's clear that imputation was done, but it's a standard part of the discussion section to put the strengths and limitations into the discussion section so the peer reviewer can properly do peer review.

Q. One other way that JNCI 2018 is different from your study is they did three sensitivity analyses to check their imputation, didn't they, Doctor?

A. And they were off by 17 percent. So that error alone would be enough to obviate a 1.5 risk ratio, and therefore the absence of a risk ratio of 1.5 in your findings can be totally due to the use of the imputation. They themselves found an error of 17 percent in their own

thing and that's without even looking at the bias.

Q. Sir, do you remember my question?

A. What's -- no, I don't.

Q. So my question, Doctor, was, they did three sensitivity analyses to check their imputation, didn't they?

15:43:45

A. I don't recall offhand, but possibly. And?

Q. Okay. So let's go to back to Andreotti, 2052, and let's go to page 3. And it's that paragraph towards the top that says, "In addition." And here's what they said, these folks that I guess were not properly disclosing imputation, they said, "In addition, we conducted sensitivity analyses to evaluate the impact of" --

15:44:11

15:44:29

A. I did not say they did not disclose imputation. Don't misquote me.

Q. Doctor, can you just answer my question? It says --

A. Just properly quote me.

15:44:39

Q. Doctor, I'll do the best I can, but can you just answer my question?

A. Uh-huh.

Q. "In addition, we conducted sensitivity analyses to evaluate the impact of including additional exposure information."

15:44:49

Do you see that?

A. Yes.

Q. That refers to the imputation; right?

A. I don't know.

15:45:01 Q. Well, if you need to, Doctor, you can go back to the prior page. If you need to. Do you need to?

A. Oh, no. They go on to say that. Okay. Uh-huh.

Q. Do you agree with me now that they're specifically talking about imputation in here, Doctor?

15:45:25 A. Give me a moment to read through the paragraph.

Q. Sure.

A. Okay.

Q. All right. And do you see they talk about three different sensitivity analyses they did; right?

15:45:48 A. Yes.

Q. The first one was they calculated risk estimates including cancer incidence data for the complete followup period with only exposure information collected at enrollment. That was one method they used; right?

15:46:03 A. Yes.

Q. The second method they used was we examined associations excluding imputed exposure data, thereby limiting analyses to participants who completed both the enrollment and the followup questionnaires; right?

15:46:20 A. Correct.

Q. And the last one was because the last exposure information was collected between 1999 and 2005, we truncated followup at 2005 to coincide with this exposure period; right? Correct?

15:46:35 A. Do I get to answer now?

Q. Yes. Did they do that?

A. Yes, they did that. And --

Q. Okay. Now let's look at the results. Let's go to page 4. And it's down here. "We conducted" -- right

15:46:58 there. "We conducted several sensitivity analyses evaluating the impact of including exposure data obtained at the two time points." And then continuing: "When restricted to exposure reported at enrollment, the patterns of risk were the same as analyses that

15:47:18 considered glyphosate use reported at enrollment and followup."

Do you see that?

A. Yes.

Q. That was one of the sensitivity tests that came

15:47:26 out with the same result; is that right?

A. Yes.

Q. Let's look at the last one. It says: "Finally" -- down there -- "when we truncated the followup period to 2005 to be concurrent with the latest

15:47:41 exposure information, we had even fewer total cancer

cases."

Do you see that?

A. Yes.

Q. For NHL -- I'm going -- I'm trying to find an easy way to read this, Doctor -- the reasonable risk quartile four was, again, no effect; is that right?

15:47:52

A. Yes.

Q. And that was the third sensitivity test that they did that showed that they got -- that their imputated results were accurate. That's why they did it; right? They got the same result in the sensitivity analysis.

15:48:08

A. That doesn't mean they were accurate. That means they were the same.

Q. Okay. Good.

15:48:22

Now, the other imputation method that they did or sensitivity analysis they did was -- just so it's clear to everybody, there's something like 54,000 people that filled out the first questionnaire; right?

A. Yes.

15:48:35

Q. And then you had a follow-up period; right?

A. Yes.

Q. And you followed up with people. And your point is that they didn't get everybody to follow up, people hung up, people refused, whatever it was; right?

15:48:45

A. Yes.

Q. And with that you ended up with -- I think you said 36 or 37, something in that ballpark of people did not do the followup; is that right?

15:49:01 A. Yes.

Q. And those people -- so that leaves you with a total of, what is it, 34,000 or so that did do the followup and the initial questionnaire; right?

A. Yes.

15:49:12 Q. And what happened when you did the -- this particular sensitivity analysis was -- this sensitivity analysis said let's just not impute at all and see what result we get with the 34,000 who did do both? That's what this particular sensitivity analysis said.

15:49:35 A. Yes.

Q. Okay. And then let's see what the result was. Right there. "To evaluate the impact of using imputed exposure data for participants who did not complete the followup questionnaire, we limited the analysis to 34,000 some-odd participants" --

15:50:01 I've got that right so far, Doctor?

A. Yes.

Q. -- "who completed both questionnaires, reducing the total number of cancer cases to 4,699."

15:50:13 And, again, when they don't even impute, they

again find that glyphosate use was not associated with NHL; right?

A. So that's introducing almost as big a bias as is possible to introduce because you're now excluding 40 percent of your sample, and who are the 40 percent you're excluding? The losers who are not answering the phone or for whatever reason. So you've introduced a huge bias in your sample. There are studies conducted by these same investigators that show that there's a big difference between the 60 percent who did answer -- who did answer the questionnaire and the 40 percent who did not, but you've excluded the 40 percent. And for all you know, the 60 percent is totally different than the other 40 percent and it's difficult to make any conclusions then. And indeed the risk ratio that they mention here goes up when they do their sensitivity analysis. So, again, maybe if you included the 40 percent who were not interviewed, you would have had an EPA higher risk ratio. Again, to get rid of the 1.5 risk ratio, you don't need much bias, you don't need much non-response, you don't need much error altogether.

Q. Sir, this was a sensitivity analysis run as a check on the imputation that they did.

A. I'm not criticizing them for doing a sensitivity analysis and I'm not blaming them for having lost the

followup, and in no way did I ever say they shouldn't have done imputation. I think imputation was absolutely the correct method to use. Imputation is precisely what you should use when you have lost a followup. So it's
15:52:09 unfortunate when they did their own check on the amputation, which you didn't allude to, but when they checked the 20,000 against the 10,000, when they did a validity bias, the imputation showed a 17 percent discrepancy, which also would have caused an elevated
15:52:26 risk ratio to disappear.

So there are many errors in this study and -- or potential errors, and I think a risk ratio or finding a null risk ratio is no surprise whatsoever and is really uninterpretable in the context of this study. And I'm
15:52:45 not criticizing the AHS study overall, but for the particular analysis of glyphosate versus NHL, I think there's a lot of problems in being able to rely on it in any meaningful way. And if you're going -- I mean, I just think it's not appropriate.

15:53:04 MR. LOMBARDI: Your Honor, I don't think we ever answered the question.

THE COURT: All right. Dr. Neugut, if you could please just listen carefully to Mr. Lombardi's question, answer the question only, and then he'll ask you another
15:53:15 question.

THE WITNESS: I believe I am answering his questions, your Honor.

THE COURT: Mr. Lombardi, do you wish to repeat your last question or do you have another question?

15:53:24 MR. LOMBARDI: Well, I'll try.

Q. So, Doctor, you're okay with the fact that they did sensitivity analysis?

A. Of course.

Q. That's a good thing to do for an analysis; 15:53:34 right?

A. Absolutely.

Q. And what they found out was when they did imputation, they got a relative risk that was very similar to when they didn't do imputations. That's what 15:53:45 they found, Doctor.

A. Yes.

Q. Thank you.

Now, Doctor, you've talked about the problem with imputation was misclassification bias in part; right?

A. I don't understand the question.

Q. Well, part of the problem, you said, this is what I understood you to say, was that when imputation was done here, there was an issue with potential 15:54:17 misclassification bias; correct?

A. Misclassification bias is a different -- misclassification error is a different problem than the problems that arose from the imputation.

Q. Okay. Am I right that you raised misclassification bias as a problem with the imputation?

15:54:35

A. Misclassification, yes, uh-huh.

Q. Now, with respect to the 34,000 participants who did both the initial questionnaire and the second questionnaire, isn't it true that there is no concern about misclassification bias with that group?

15:55:03

A. There's a concern with misclassification error, random misclassification error, that they're not filling -- that they have the initial misclassification error from when they originally filled out the questionnaire in 1993 to 1997, and then when they filled it out again the second time, they're going to have the same error a second time. So that's going to introduce two misclassification errors right off the bat. And again in the context of a low relative risk, that's a problem to start with.

15:55:21

15:55:40

Q. Sir, you agree that you don't have any concerns of exposure misclassification with that 63 percent of the cohort; correct?

A. I don't have any concerns with?

Q. Exposure misclassification with respect to that

15:56:00

63 percent of the cohort; correct?

A. No, I don't agree.

Q. Okay. Let's look at your deposition from January of 2018, pages 86 to 87.

15:56:18 A. I'm sorry. Give me the --

Q. It will be January of 2018.

A. What page?

Q. Page 87, line 4.

Do you see that?

15:57:01 A. Yes.

MR. LOMBARDI: Your Honor, I ask to publish it.

THE COURT: All right. You can publish.

Q. BY MR. LOMBARDI: And I'll just put it over here.

15:57:22 These are the answers you gave under oath, Dr. Neugut, at your deposition; is that correct?

A. Yes.

Q. Starting at line 4, "You agree that you don't have any concerns of exposure misclassification with

15:57:36 respect to that 63 percent of the Cohort; correct?"

Your answer, under oath, was "correct"; isn't that right, Doctor?

A. So --

Q. Did you give that answer to that question?

15:57:48 A. Yes. I gave that answer, but --

Q. Thank you, Doctor.

MR. WISNER: Objection, your Honor. He should be allowed to respond. This is improper impeachment.

THE COURT: Mr. Lombardi, do you have any further questions?

15:57:59

MR. LOMBARDI: I think I do.

THE COURT: All right. Well, you can address it on redirect, Mr. Wisner.

Q. BY MR. LOMBARDI: Doctor, you put up this chart at the very end of your testimony, and for the record it's Plaintiff's Exhibit 1034. Do you remember seeing that?

15:58:14

A. Yes.

Q. And you put together a chart that showed things that were classified under IARC as 2A?

15:58:35

A. Yes.

Q. And then things from the AHS study -- and this is actually -- 2014 was actually -- not the 2018 publication, but there was a 2014. I think it was just a draft, wasn't it, Doctor?

15:58:52

A. I'll confess, I'm not sure.

Q. I'm not trying to --

A. No, no. I'm just --

Q. There was at least a draft in 2014; right?

15:59:06

A. Uh-huh, yes.

Q. Okay. And what this shows is it shows that IARC was doing something different, doesn't it?

A. That IARC was doing something different?

Q. Right.

15:59:22 A. In what context or sense?

Q. Well, we know that IARC is only considering a hazard assessment, right, not a risk assessment?

A. Yes.

Q. And AHS is actually doing a study to determine

15:59:39 what happens, I'm going to say, in the real world, Doctor, see if you're with me on that?

A. I'm sorry, you'll have to repeat that one. That went over my head.

Q. That's fine. That's fine. IARC is doing a

15:59:53 hazard assessment; right?

A. Determining whether it's a carcinogen.

Q. Right. And what we see from your chart is that there is not necessarily a correlation between an IARC hazard assessment and what the epidemiology actually

16:00:10 finds; right?

A. So that the AHS study did not necessarily find an association between an IARC defined carcinogen and NHL.

Q. Actually, IARC defined probable carcinogens one

16:00:33 as a carcinogen; right?

A. You can differ on what we can call a carcinogen, but yes.

Q. Thank you, Doctor.

MR. LOMBARDI: May I have one second just to make sure --

16:00:40

THE COURT: Yes.

MR. LOMBARDI: But I think I'm finished, Doctor. No further questions, your Honor.

Thank you very much for your time, Doctor.

16:00:54

THE WITNESS: Thank you.

THE COURT: All right. Mr. Wisner, you may proceed.

MR. WISNER: Thank you, your Honor. permission to publish Plaintiff's Exhibit 669, the

16:01:28

Andreotti study.

THE COURT: No objection?

MR. LOMBARDI: I'm sorry?

MR. WISNER: Andreotti.

MR. LOMBARDI: No problem, yes. No objection, I

16:01:37

mean, your Honor.

REDIRECT EXAMINATION

BY MR. WISNER:

Q. All right. Doctor, we're looking at the

16:01:40

Andreotti study, the one that Mr. Lombardi asked you

quite a few questions about towards the end of your cross-examination.

I actually just want to ask you a straightforward question. Do you think it's important to be honest in your publications?

A. Do I think it's important to be what?

Q. Honest in your publications?

A. Yeah.

Q. Okay. Let's look at the abstract here. In the conclusion it states -- and Doctor, I'm not asking if you agree with this conclusion. I'm just asking what it actually states in this paper, okay?

It says, "In this large prospective Cohort study no association was apparent between glyphosate and any solid tumors or lymphoid malignancies overall including NHL and its subtypes." Do you see that?

A. Yes.

Q. Is that a true statement? I understand you don't agree with it or not. Is that a true statement based on what the study showed itself?

A. Depends on how you read the paper, but not fully, no.

Q. Was there a statistical significance association between glyphosate exposure and an NHL subtype?

A. So again, I wouldn't want to count the AHS study

towards our discussion today because as I said I think it has so many problems with it that I don't want to integrate it or include it with the case control studies, but it did find a significant association with one type
16:03:16 of non-Hodgkin's lymphoma.

Q. And what was that?

A. T-cell lymphomas.

Q. And are you aware whether or not mycosis fungoides is a type of T-cell lymphoma?

16:03:31 A. One thing it did find statistically a significant association with was mycosis T-cell lymphomas.

Q. Thank you, your Honor -- thank you, Doctor.

Now, you raised the criticism about the
16:03:43 sensitivity -- sorry, about the imputation limitations not being disclosed in the article. Do you recall that?

A. Yes.

Q. And you took issue with the way Mr. Lombardi was characterizing your opinion, do you remember?

16:03:59 A. Well, again, I did not criticize in any way that that they used imputation. Imputation is used when you have lost a follow-up and it's the proper methodology to use as I used -- or as we used in our study in breast cancer. It's a methodology that's used when there's a
16:04:22 loss to follow up and you have to use it. In their

particular study it didn't -- it didn't work well, which is not anyone's fault. They did everything right. They did everything correctly, and it just didn't pan out properly, which happens. There is a paper by
16:04:40 Heltsche, et al., which shows that when they used imputation, it introduced -- and they studied it that it introduced a 17-percent error rate -- a potential 17-percent error rate and thus a 15-percent error rate on top of the exposed misclassification in the first place
16:05:02 is certainly a big error in the context of a risk ratio of 1.5 and was taken away or attenuated a 1.5 error rate and thus the fact that we find a null finding for non-Hodgkin's lymphoma as a whole is no surprise at all.

MR. WISNER: Permission to publish demonstrative
16:05:33 1032.

THE COURT: No objection?

MR. LOMBARDI: No objection, your Honor.

Q. BY MR. WISNER: All right. Doctor, this is that graph about glyphosate or Roundup use.

16:05:40 Do you see that, Doctor?

A. Yes.

Q. And my understanding is the second follow-up on the AHS for exposure assessment, that was completed by 2005; right?

16:05:54 A. Yes.

Q. So after 2005, I mean we almost have an additional doubling of the use of Roundup, don't we?

A. Yes.

Q. Was there any accounting for that?

16:06:05 A. No.

Q. So if there was any issues with the follow-up between '93 and '97 and then 2001, 2005, we'd have a similar problem in 2005 to the present, wouldn't we?

A. I suppose we would, yes.

16:06:21 Q. And the cancers that are being counted as part of the AHS study, they're counting cancers in registries; right?

A. So I think the cancer follow-up went through -- I don't know the exact year. I'd have to see again in 16:06:39 the Andreotti paper, but I think it went through 2015 or 2016. So I guess if you were exposed between 2005 and 2013, 14, '15, they would have missed that. If your exposure changed over that time interval, it would have it would be missed.

16:07:00 Q. So people could have started using it in 2005 and had been using it for one, two, three, four, five, six, seven, eight, nine -- ten years and gotten NHL and they would have been considered -- by the Andreotti paper's own standards, they would have been considered 16:07:19 unexposed in having cancer?

A. If they started in 2005 for sure, yes.

Q. And that's assuming they filled it out, it was arranged between 2001 and 2005 so those people who started using it in 2002 but completed their follow-up in 16:07:38 2001, that could be even 13 years; right?

A. Yes.

Q. Now, you've done Cohort studies before; right?

A. Yes.

Q. And you agree with me that an important aspect 16:07:48 of the Cohort study is repeated follow-up to make sure your exposure is correct; right?

A. It's a difficult thing to keep following up 50,000 people. The problem is most exposures don't change so dramatically over time. As I said if you're a 16:08:06 smoker, you tend to stay a smoker and you don't change so dramatically over time. This is an unusual circumstance where the exposure over time is really dramatically changing, so it does become more important to have an ongoing follow-up to try to reassess it but, of course, 16:08:30 it's difficult to go back and do another 50,000 questionnaire. Who's going to pay for it? Now you're going to have to find -- you've already lost 20,000 out of the 50,000 in the first follow-up, then you go back to the 30,000 that you got the second time around and God 16:08:46 knows how many of them are going to answer the phone the

second time you call. So you're going to have one loss to follow up on top of the second loss to follow up, and I'll be sitting up here telling about, you know, another 30 percent loss to follow up and one screw up on top of another. Again, it's not a screw up. It's just that's the nature of the beast and that's the way life goes.

16:09:05

MR. WISNER: Permission to publish Exhibit 1034.

THE COURT: No objection?

MR. LOMBARDI: No objection.

16:09:17

THE COURT: Very well.

Q. BY MR. WISNER: This is one where the AHS and IARC agree; right? DDT, 2A seen in the AHS?

A. DDT and what was the other one you said.

Q. Well, DDT that was seen in IARC and the AHS; right?

A. Yes.

Q. Now, DDT didn't have an explosion of use during the time of the AHS, did it?

A. DDT was banned in the early '70s, I believe.

16:09:45

Q. So essentially it's static starting from the 1970s on. So there's no change of use after that point?

A. No.

MR. WISNER: Mr. Lombardi, permission to publish the block?

16:10:01

THE COURT: Any objection?

MR. LOMBARDI: No objection.

Q. BY MR. WISNER: Mr. Lombardi raised an issue about how this De Roos study in 2003 was looking at studies in the 1980s. Do you remember that issue?

16:10:12 A. Yes.

Q. The 1980s, that doesn't have the problem change of Roundup use, does it?

A. No.

Q. So by actually focusing on earlier exposures

16:10:23 where it's more constant, you're actually able to parse out a difference?

A. It's easier.

Q. And that De Roos 2003 study, the one that has a 2.1, if this was the proper 2.1 this would be

16:10:41 statistically significant; right?

A. Yes.

Q. And that adjusted for like 69 pesticides, didn't it?

A. Yes.

16:10:46 Q. So even after adjusting for pesticides, studying a population that have consistent exposure, what did the results show?

A. Significant increase in glyphosate association with NHL.

16:10:58 Q. Now, Doctor, no one has said, not Dr. Portier

nor you, that the epi in this case is sufficient to show causation; correct?

A. That's correct.

Q. Would it be even remotely scientifically correct to just look at the policy?

16:11:16

A. No. I mean, not to make a causal link based solely on the epidemiology.

Q. You have to look at the totality of the evidence; right?

16:11:27

A. That's what I showed in the Bradford-Hill criteria at the end of my direct testimony, that you have to incorporate the dose-response relationship, the biological evidence like the toxicology that Dr. Portier spoke about. You have to think about it, you have to look at things, like I said, the specificity and the other factors, consistency the strength of association, et cetera.

16:11:49

Q. Now, you recall Mr. Lombardi raised some issues that IARC isn't doing a risk assessment; it's doing a hazard assessment. Do you recall that?

16:12:07

A. Yes.

Q. Now, a hazard assessment that's trying to answer the question that something causes cancer; right?

A. Yes. Sure.

Q. And after you decide that yes, sure, that can

16:12:16

cause cancer, the next step is sort of see how much of it do you need to cause cancer; right?

A. How much of it and how much risk does it really confer on you or on the population, how seriously do you want to take it, what do you want to do about it, how high is the risk, are you going to put a label on it, are you going to ban it, are you going to -- but that's a public policy decision. That's, you know, for an agency or for a governmental agency.

16:12:32

16:12:49

Q. And you'd agree that when we talk about exposure, it's a lot different if someone sprays it in their yard twice or three times in their life and they're doing it everyday for their job and getting drenched in it? Those are different types of exposures; right?

16:13:03

A. Of course. That's where the dose response issue comes into play.

Q. Before once you establish, okay, it can cause cancer, then you have to look at a specific person and their experiences and exposure before you can say whether it causes that person's cancer; right?

16:13:17

A. Of course.

Q. And IARC nor yourself are offering any opinions about a specific person here; right?

A. I'm not.

16:13:26

Q. We have someone else for that; right?

A. Yes. I hope so, yes.

Q. And so, Doctor, on the question that really is before you, the question that kind of goes to the first thing that we have to figure out here in this courtroom: Does Roundup exposure, as we see it in the world and as we see it in the data, does it actually cause non-Hodgkin's lymphoma?

A. That's my expert opinion, yes.

MR. WISNER: Thank you. No further questions.

THE COURT: Mr. Lombardi.

MR. LOMBARDI: Just a couple, your Honor.

RECROSS-EXAMINATION

BY MR. LOMBARDI:

Q. Doctor, you talked a couple times about the Heltsche article.

Do you recall that?

A. Yes.

Q. And the Heltsche article is the one you say shows that there's a 17-percent error in the Journal of the National Cancer Institute 2018 article; is that right?

A. Seventeen-percent error with the imputation, yes.

Q. And, sir, I just want to show you here, let's

look quickly at the --

MR. WISNER: Do we have a copy?

MR. LOMBARDI: My apologies.

Q. -- Defendant's Exhibit 2598.

16:14:36 MR. LOMBARDI: My apologies, your Honor.

Q. I'm not going to run you through the whole article, Doctor. I think you'll be okay with just what I'm going to show you. Why don't we give that a shot.

MR. LOMBARDI: Am I okay to publish?

16:14:47 MR. WISNER: Yes.

MR. LOMBARDI: Thank you.

Q. And so, Doctor, you're not suggesting that the folks that did the JNCI 2018 article weren't aware of the Heltsche article, are you?

16:15:05 A. No.

Q. Because actually the people who did the Heltsche article, a lot of them were involved in the JNCI article, weren't they?

A. That's correct, but they didn't mention it in

16:15:16 their JNCI paper.

Q. Well, they cited it, didn't they?

A. They didn't put the figure into the JNCI. That's why I think the JNCI is a rather sloppy, poorly written, misleading in some ways, paper but...

16:15:30 Q. Heltsche is good?

A. Heltsche is good --

Q. A good paper?

A. I didn't -- I'm not --

Q. You're citing it, Doctor.

16:15:42 A. Okay. Then it's a good paper.

Q. Heltsche good. JNCI's bad, sloppy, dishonest, I think you said; right?

MR. WISNER: Objection. Let him answer the question.

16:15:53 THE WITNESS: I didn't use the word "dishonest." "Misleading" is the word I used.

Q. BY MR. LOMBARDI: Misleading. JNCI is misleading?

A. Yes, and sloppily written.

16:16:01 Q. So Heltsche -- when she wrote the Heltsche paper, that's a good paper. Let's just go through. You know that Heltsche was on the JNCI paper; right?

A. Yes.

Q. Lubin was on the JNCI paper; right?

16:16:18 A. Yes.

Q. Andreotti was on the JNCI paper; right?

A. Yes.

Q. Sandler was on the JNCI paper; right?

A. Yes.

16:16:27 Q. Freeman was on the JNCI paper; right? Isn't

that right?

A. These are all the same authors, yes, same investigators.

Q. And isn't it possible, sir, that the person who has it wrong here is not those authors, but you?

A. Possible, yes.

Q. Now, Doctor, one other thing and I -- I may have misheard you, so I apologize if I did. Did you just say that there was a statistically significant result for T-cell lymphoma in mycosis fungoides in the JNCI study? Is that what you said?

A. I'm not saying we should count it at all, but yes.

Q. You say it's a statistically significant result?

A. Yes.

Q. Okay. Let's look at what JNCI actually says. Defendant's Exhibit 2052, permission to publish?

THE COURT: No objection? Very well.

Q. BY MR. LOMBARDI: Let's look at page 5 at the bottom.

MR. WISNER: Objection. Completeness. He has to show the page after it as well.

MR. LOMBARDI: I think I'm entitled to examine the witness, your Honor.

THE COURT: He may ask the question. This is

the Andreotti article?

MR. LOMBARDI: Yes.

THE COURT: You may proceed.

Q. BY MR. LOMBARDI: This is the NHL T-cell results; right, sir?

A. Which table is that?

Q. This is Table 2. Do you see it says T-cell?

A. Yes. And did I misspeak? Can I see the paper?

Q. You've got it. It's 2052. But, sir, can we make the point here while we're here?

MR. WISNER: Objection. He needs to see the paper. He's hiding Table 3.

THE COURT: Counsel --

THE WITNESS: I don't recall if it's Table 2 or Table 3, but, again, I'm just asking for the paper.

Q. BY MR. LOMBARDI: You've got it there. 2052.

A. Which folder? I think it's that one, the three ring binder that you've got.

Q. Do you have it, Doctor?

A. You're right. It's not statistically significant.

Q. And that's because it's .73 to 24.6. That's a huge confidence interval; right?

A. Yes. It's also a very large risk ratio. It's a very large risk ratio. But I misspoke.

Q. Okay. And so, sir, in fairness to you, I'm going to show you Table 3, okay?

A. Uh-huh.

Q. You've said you misspoke but let's go to table 3 non-Hodgkin's lymphoma T-cell down towards the bottom, I believe, and let's look at that. And this is an even smaller group right, sir? It's 12 in M1 and 6 in M2, that's very small; right?

A. Right.

Q. That again is a non statistically significant result; right?

A. Right.

Q. Over here it's nine, even smaller?

A. Uh-huh.

Q. For that one it's 2.97 and the confidence interval is above 1; right?

A. Yes.

Q. Okay. Let's go up and see what that's referring to, sir. You know that this is a 20-year lag study; right?

A. Yes.

Q. So that's saying that the only time that they saw any effect at all with those nine people was after 20 years had passed; right.

A. Uh-huh.

Q. Right?

A. Yes.

Q. That means it took 20 years for them to get the disease, to have the symptoms and the disease show up; right?

16:21:07

A. Yes.

Q. Thank you. And let me just to finish this off.

Doctor, let's just go to page 7 in our study. This is what the authors actually conclude just the very top. "In our study we observed no associations between glyphosate use and NHL overall or any of its subtypes"; correct?

16:21:20

A. Yes.

Q. That includes T-cell; right?

A. Yes.

16:21:33

MR. LOMBARDI: Thank you, Doctor. No further questions.

MR. WISNER: Redirect, your Honor?

THE COURT: Redirect on the recross?

MR. WISNER: Just that, yeah.

16:21:41

THE COURT: Very well.

RE-REDIRECT EXAMINATION

BY MR. WISNER:

Q. Doctor, we looked at Table 3 and there was statistically significant result for the lag 20 year

16:21:49

analysis. That doesn't mean it took 20 years to develop the T-cell. That means it took 20 years to see it in this the study; right?

A. To tell the truth, I'm not sure what it means in the context of this. But again, I'm not arguing we should be taking this result and making anything out of it. I've been arguing we shouldn't be using the AHS study at all. I'm just saying, I guess as a throw away, if you use the AHS study, here's the potential T-cell mind. But I think the AHS study is not -- it has so many potential flaws in it, that it shouldn't be utilized for consideration in the epidemiologic thing, and that goes for B-cells or T-cells.

Q. Fair enough. Doctor, would it be fair to say, though, that every one of those T-cell lymphoma in the Andreotti paper, every single one of them is elevated above one; right?

A. That's true.

MR. WISNER: No further questions.

THE COURT: All right. Anything further?

All right. Thank you, Dr. Neugut. You may be excused.

THE WITNESS: Thank you, your Honor.

THE COURT: All right. Ladies and Gentlemen --

You can leave your exhibits there. Thank you.

(Dr. Neugut leaves courtroom.)

THE COURT: All right. Ladies and Gentlemen, we're going to adjourn now for today. We will not in session tomorrow. We will not be meeting tomorrow. Please do not do any research about the case or discuss the case or any interesting issues. We will resume again on Friday at 9:30.

And, Counsel, can you please remain? I'll be right back.

(Jury leaves courtroom.)

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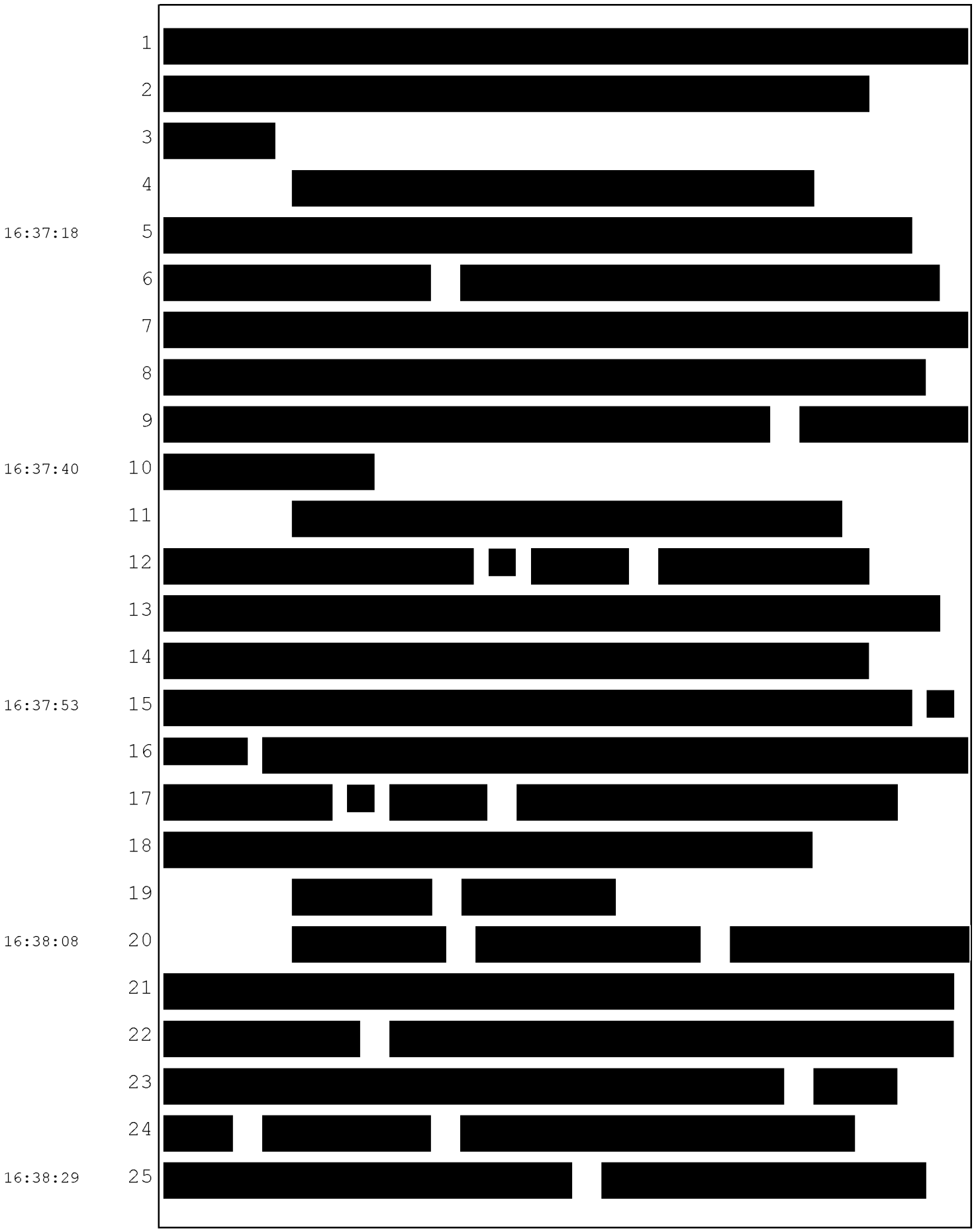
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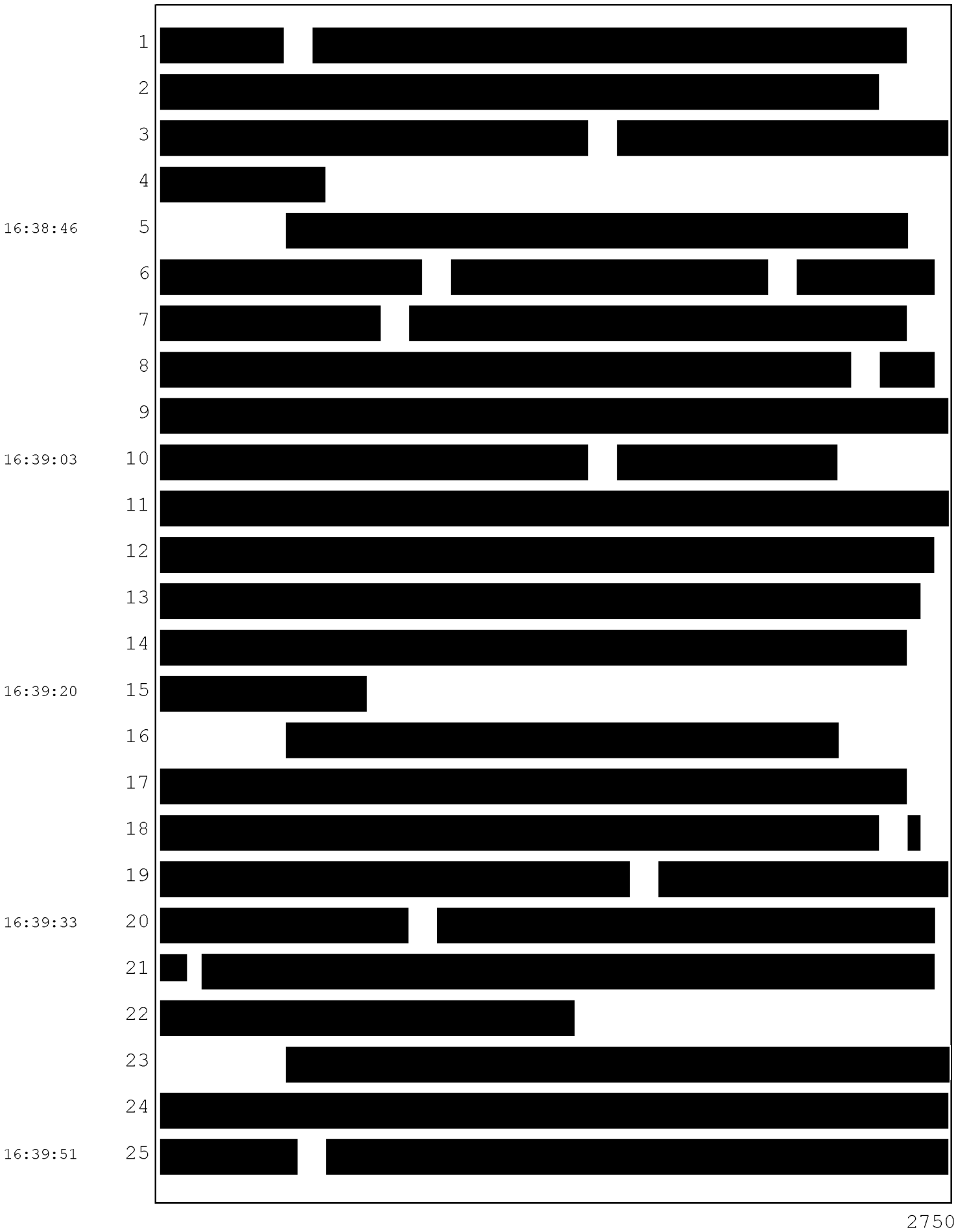
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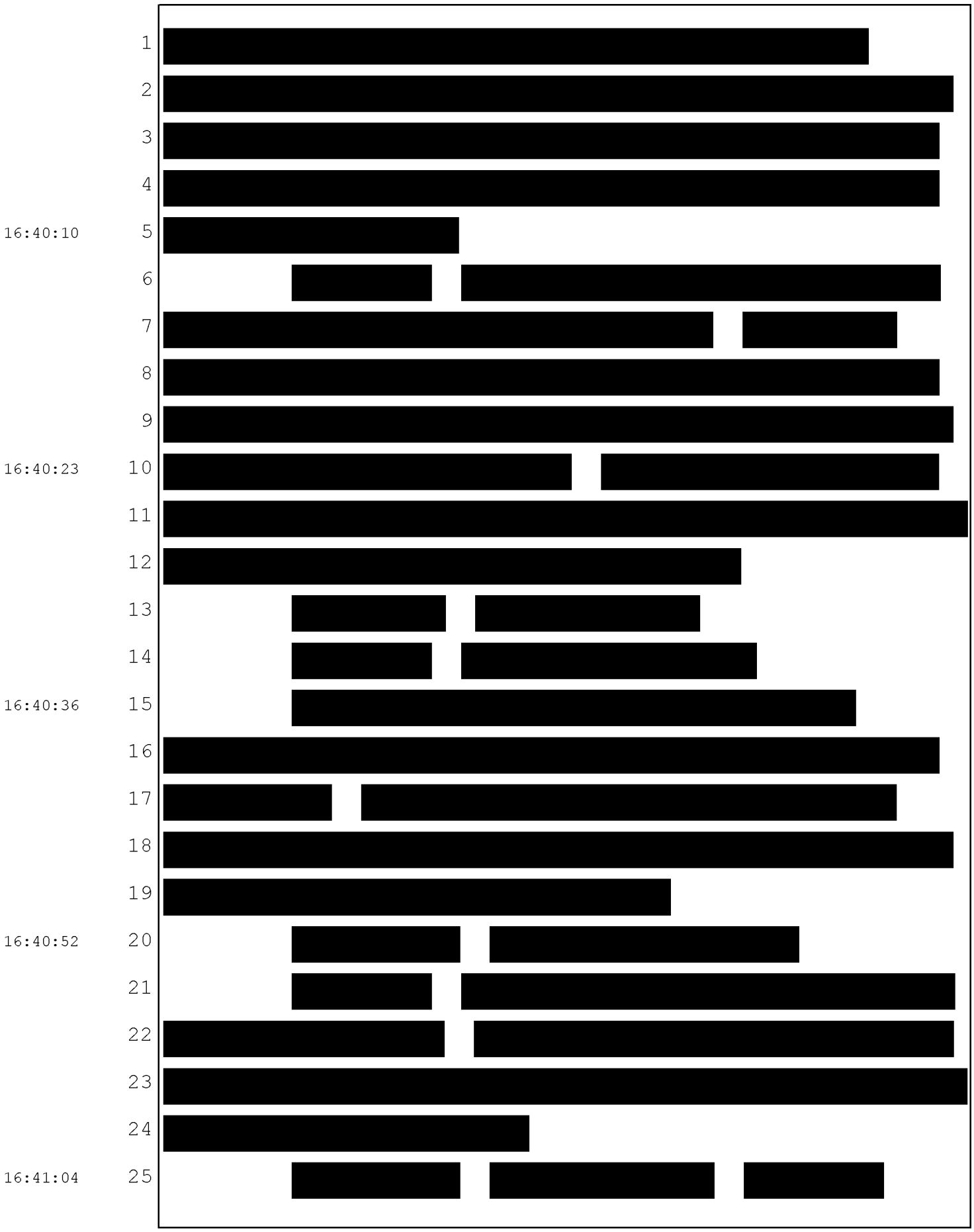
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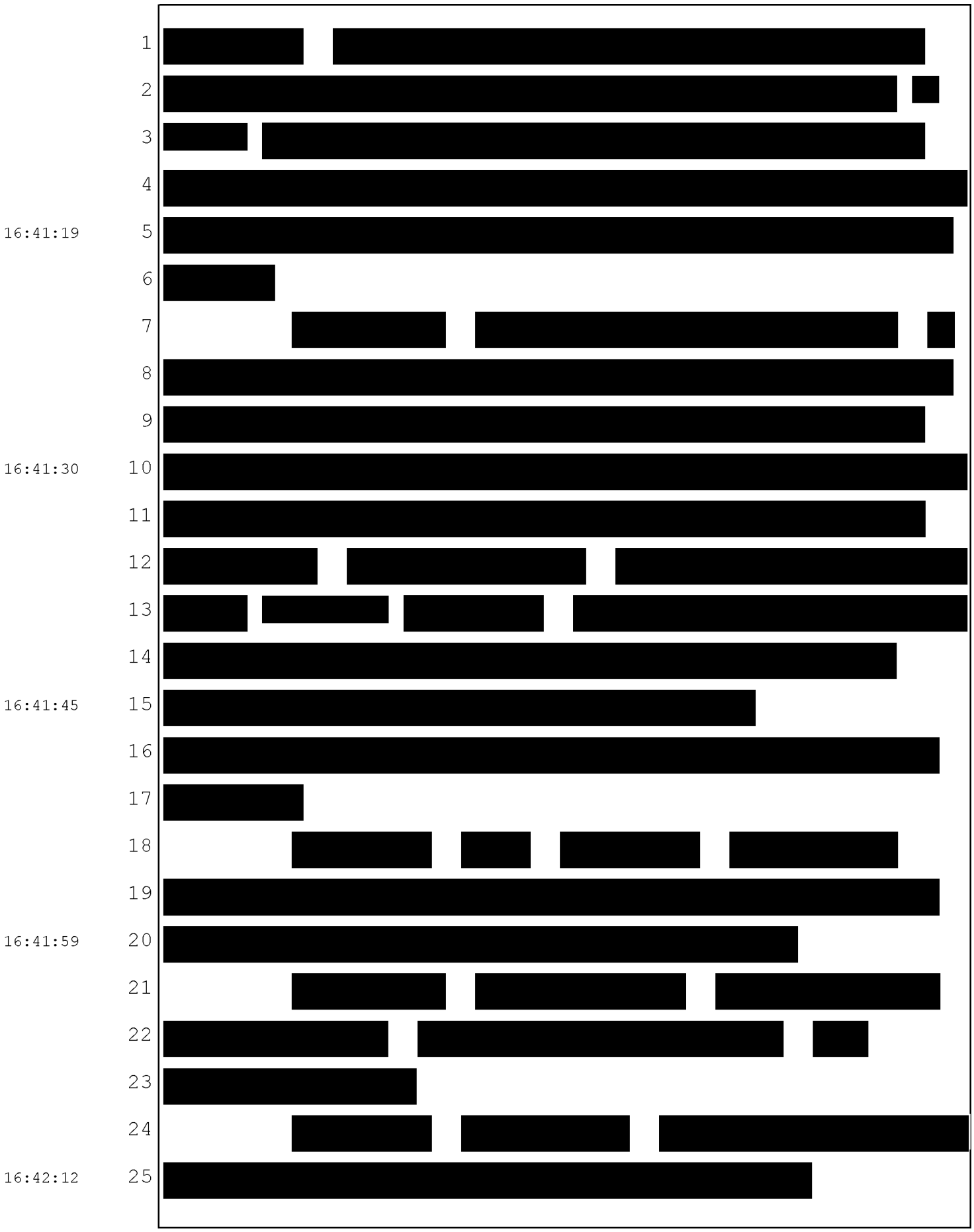
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(Time Noted: 4:42 p.m.)

REPORTER'S CERTIFICATE

I certify that the proceedings in the within-titled cause were taken at the time and place herein named; that the proceedings were reported by me, a duly Certified Shorthand Reporter of the State of California authorized to administer oaths and affirmations, and said proceedings were thereafter transcribed into typewriting.

I further certify that I am not of counsel or Attorney for either or any of the parties to said Proceedings, not in any way interested in the outcome of the cause named in said proceedings.

IN WITNESS WHEREOF, I have hereunto set my hand: July 18th, 2018.

<%signature%>
Leslie Rockwood Rosas
Certified Shorthand Reporter
State of California
Certificate No. 3462