

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA

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| IN RE: ROUNDUP PRODUCTS LIABILITY LITIGATION | MDL No. 2741 Case No. 16-md-02741-VC |
| <p>This document relates to:</p> <p><i>Canning et al. v. Monsanto Co.</i>, Case No. 19-cv-04230-VC</p> <p><i>Cotter et al. v. Monsanto Co.</i>, Case No. 20-cv-03108-VC</p> <p><i>Nelson et al. v. Monsanto Co.</i>, Case No. 19-cv-04576-VC</p> | <p>PRETRIAL ORDER NO. 290: ORDER DENYING MOTIONS TO EXCLUDE EXPERTS HERRICK AND BOYD</p> <p>Re: Dkt. Nos. 17601, 17612, 17614, 17617</p> |

Monsanto's motions to exclude the testimony of Dr. Robert F. Herrick and Dr. D. Barry Boyd in the *Canning*, *Cotter*, and *Nelson* cases are denied. This order assumes a familiarity with the Court's prior orders on general and specific causation and the Ninth Circuit's opinion in *Hardeman*. See generally *In re Roundup Products Liability Litigation*, 390 F. Supp. 3d 1102 (N.D. Cal. 2018) (Pretrial Order No. 45, Dkt. No. 1596); *In re Roundup Products Liability Litigation*, 358 F. Supp. 3d 956 (N.D. Cal. 2019) (Pretrial Order No. 85, Dkt. No. 2799); *Hardeman v. Monsanto Company*, 997 F.3d 941 (9th Cir. 2021). It also assumes a familiarity with the record related to Herrick and Boyd.

I

Dr. Robert F. Herrick holds an Sc.D. from the Harvard School of Public Health, where he worked as Lecturer and Senior Lecturer on Industrial Hygiene between 1994 and his retirement

in 2018. *See* Herrick CV (Dkt. No. 17732-1) at 2.¹ Herrick’s primary contribution to these cases is his calculation of figures that measure the duration of a given plaintiff’s exposure to Roundup. Herrick, using information provided in the plaintiff fact sheets and the plaintiffs’ depositions, tabulates two types of exposure metrics. The first, “eight-hour, time-weighted exposure days,” is calculated by determining the total amount of hours that a plaintiff used Roundup and dividing that number by eight, which yields a total lifetime figure of eight-hour exposure days. The second, “non time-weighted exposure days,” simply counts the cumulative number of days in the plaintiff’s life that he used Roundup for any amount of time. *See* Herrick Report (*Canning*) (Dkt. No. 17732-7) at 6–8. This order will refer to these figures collectively as “exposure days.”

Monsanto’s attack on Herrick is primarily an attack on the limitations of the exposure days metric. As Monsanto points out, exposure days are not a very precise way to measure the amount of glyphosate that entered a plaintiff’s body over the course of their life. In other words, exposure days are not equivalent to “dose,” meaning the biological level of glyphosate that might be measured through contemporaneous urine or blood testing. Nor does Herrick’s calculation of exposure days account for various factors that might affect a given plaintiff’s biological level of glyphosate, such as the type of protective equipment used when applying Roundup (if any), the method of Roundup application, and whether the Roundup product used was premixed or unmixed. Herrick does discuss most of these issues in his expert reports, which—in addition to their exposure days calculations—also offer descriptions of each plaintiff’s use of Roundup, the protective equipment they used, the manner in which they applied it, their recollections about whether they got Roundup on their skin, and so forth. *See, e.g.,* Herrick Report (*Canning*) at 3–5. But the “exposure days” number does not itself take these matters into account.

Herrick acknowledges that the metric has these limitations. His justification for using it is, in essence, that this is the way that many of the relevant epidemiological studies quantified the exposure levels of the people they studied, either using time-weighted or non-time-weighted

¹ Throughout this order, citations are to the original document page numbers, not the ECF page numbers.

exposure days. *See* Herrick Report (*Canning*) at 6–7.² There may be more sophisticated ways of measuring dose or exposure than by calculating exposure days, and Monsanto suggests at least one that has been used by the EPA in other contexts. *See* Reply ISO Mot. to Exclude Herrick (Dkt. No. 17794) at 6. But the fact that more sophisticated methods may exist does not mean that Herrick’s “exposure days” are an inherently unreliable metric. There is no indication that he chose the metric because it obscured unfavorable information. And to his credit, he is frank about the limitations of what the exposure days number can capture—he doesn’t pretend that the figure is more sophisticated than it really is.

Although Herrick doesn’t quite say this, using the same metrics that are used in the key epidemiological studies is useful to the plaintiffs because it allows their specific causation experts to compare the plaintiff’s exposure levels with data points from the literature. Monsanto has serious, longstanding objections to the specific causation experts’ differential diagnoses, which have tended to involve comparing the duration of a plaintiffs’ exposure to certain data points from epidemiological studies in a way that Monsanto says is unreliable. Those objections are, in turn, rooted in Monsanto’s serious, longstanding objections to the plaintiffs’ general causation opinions, which provide the basis for using the McDuffie and Eriksson studies to argue for a “dose-response” relationship between Roundup usage and NHL risk. Of course, the boundaries of admissible opinion on these matters have already been drawn. *See* Pretrial Order No. 85 at 6 (holding that the plaintiff’s specific causation expert offered admissible opinions that Roundup caused Hardeman’s NHL where the experts “relied heavily on the plaintiffs’ exposure levels in drawing their conclusions” and opined that “both the McDuffie (2001) and Eriksson (2008) studies showed a dose-response relationship between glyphosate and NHL”); *Hardeman*, 997 F.3d at 966 (rejecting Monsanto’s argument that Hardeman’s specific causation experts had “rel[ied] on ‘two flawed studies’—McDuffie and Eriksson—linking glyphosate and NHL,” and

² Monsanto also argues that Herrick is unqualified to “interpret” the studies to which he refers. But all Herrick does with the studies is note what kinds of exposure metrics they used. He is certainly qualified to do that, which can hardly even be called interpretation.

holding that the experts had properly been allowed to “rely on McDuffie and Eriksson to show a dose-response relationship between glyphosate and NHL”). The Court offers some further discussion of this issue below, in connection with Monsanto’s motion to exclude the plaintiffs’ specific causation expert.

For present purposes, the problem is that Monsanto’s attack on Herrick is really an attack on the causation evidence. Monsanto doesn’t have much, if anything, to say about the reliability of *Herrick’s* methods. It doesn’t argue that Herrick has improperly calculated the number of exposure days, that exposure days are not actually measured in the epidemiological studies, or that Herrick has otherwise used unreliable methods to review and synthesize the information about each plaintiff’s exposure. To the contrary, Monsanto’s view is that Herrick’s calculations are so simple that anyone could do them. *See* Mot. to Exclude Herrick (Dkt. No. 17617) at 14. Really, what Monsanto is saying is that Herrick’s exposure days cannot be reliably used to determine whether a given plaintiff has been exposed to enough Roundup that their NHL could have been caused by it (assuming that glyphosate is capable of causing NHL at some level of exposure). But that isn’t a criticism of Herrick. Everyone agrees that Herrick himself offers no opinions about how many Roundup exposure days are necessary to cause NHL, or what caused a given plaintiff’s NHL. Instead, it’s an attack on the plaintiffs’ specific causation expert and his *use* of Herrick’s figures. The same is true of Monsanto’s various arguments about the indispensability of measuring “dose” in a toxic tort case. Even if it were true that the Ninth Circuit recognized such a requirement, the *Daubert* problem would lie with the causation analysis, not with the other expert who tabulated a non-“dose” metric without drawing any conclusions from it.

Obviously, a specific causation expert making use of the exposure days figure would have to be cognizant of its limitations. The metric could certainly be used unreliably. To take Monsanto’s own example, it is true (as Herrick acknowledged) that the “exposure days” figure is not sensitive to the type of protective equipment used. So if a plaintiff wore an impermeable hazmat suit the entire time he was applying Roundup, his number of exposure days would be the

same as someone who wore shorts and a t-shirt. But it is up to the specific causation expert to look at the totality of the information about the duration and nature of a plaintiff's exposure and to draw conclusions about the cause of the NHL. Here, the specific causation experts have plenty of information—from both the plaintiffs themselves and from Herrick's report—about the type of protective equipment a given plaintiff used. They can know whether a plaintiff was actually wearing an impermeable hazmat suit. (None was.) They can also know whether a plaintiff remembers inhaling Roundup or getting it on his skin, and so forth. "Exposure days" must be considered along with other information about a plaintiff's exposure, but it is not an inherently unreliable metric. Nor has Herrick calculated it or presented it unreliably. The metric's limitations can be brought out on cross examination and made clear to the factfinder.

Monsanto's last attack on Herrick is that his calculations involve only basic arithmetic, so they will not be helpful to the jury. But while Herrick's contribution isn't rocket science, it will be helpful for him to point to the metrics used in the epidemiological studies, explain how to calculate them, and synthesize the information from the plaintiffs' evidence into the appropriate figures. That will save the jury time and effort, and it will be useful to the plaintiffs' specific causation experts. Herrick is admissible. *Cf.* Pretrial Order No. 201 (admitting testimony of Dr. Sawyer, who did not offer any admissible causation opinions, but who testified to "a particular plaintiff's level of exposure or rate of absorption").

II

Dr. D. Barry Boyd is an experienced oncologist and an Assistant Professor of Clinical Medicine at the Yale School of Medicine. His clinical practice and academic research focus on lymphoma. Like other specific causation experts, Boyd performs a "differential diagnosis" (he uses the more precise term "differential etiology") to determine the likely cause of each plaintiff's NHL. Like other plaintiffs' specific causation experts, Boyd concludes that Roundup was a substantial cause of each plaintiff's NHL. Monsanto moves to exclude Boyd in each of the cases addressed in this order. But, in each case, Boyd's testimony is admissible.

First, Monsanto says that Boyd fails to reliably "rule in" glyphosate as a possible cause of

each plaintiff's NHL. The argument is that Boyd has impermissibly cherry-picked certain epidemiological studies—McDuffie, Eriksson, and Pahwa—that he says showed a dose-response relationship between glyphosate exposure and NHL risk. Then, Monsanto says, Boyd compares the plaintiffs' levels of exposure to those reported for the subjects in those studies with the highest reported risk ratio, and then concludes that the plaintiffs' NHL could have been caused by Roundup because the plaintiff's exposure level exceeded that threshold. Monsanto says this is impermissible, at least in part because it claims that this court has previously rejected the so-called "exposure days methodology."

To start, Monsanto mischaracterizes this argument by calling it an attack on Boyd's "ruling in" process. At the ruling-in stage, the question is merely "which of the competing causes are generally capable of causing the" disease. PTO No. 85 at 2. Boyd, like other specific causation experts before him, can rule in glyphosate by incorporating the admissible general causation opinions. *See id.* The Court has already rejected the argument "that the specific causation experts improperly ruled in glyphosate exposure by cherry-picking favorable epidemiological studies." *Id.* The point is not that cherry-picking is acceptable; the point is just that a specific causation expert's "ruling in" process does not require a full, independent general causation analysis. *See id.* at 3 ("Thus, it does not matter that the specific causation experts mentioned only a subset of the epidemiological studies in their reports; at trial, their basis for ruling in glyphosate will be the general causation opinions.")³

A specific causation expert's judgment that the plaintiff was exposed to enough Roundup that it probably caused their NHL is part of the decision *not to rule out* Roundup—not part of the decision to rule it in. So Monsanto's argument is really about Boyd's failure to rule out Roundup as a possible cause. This part of the inquiry bleeds into the key question of how "to differentiate

³ Monsanto cites to Pretrial Order No. 288, where the Court excluded Dr. Charles and Dr. Schneider. There, the Court criticized Charles on the grounds that he "cherry-picked the findings of the epidemiology studies, reporting only certain odds ratios—those most favorable to his ultimate opinion." Pretrial Order No. 288 (Dkt. No. 17504) at 3. But there, the Court was discussing Charles' *general causation* opinion. Boyd is only a specific causation expert.

Roundup users who developed NHL because they used the product from Roundup users who would have developed NHL regardless.” PTO No. 85 at 4. In other words, how has the expert decided that the plaintiff’s NHL was not one of the majority of NHL cases that is idiopathic—or perhaps one of the cases caused by random, endogenous genetic mutations?

Understood this way, Monsanto’s arguments are not novel ones, and they can largely be answered by looking to prior decisions on expert evidence.⁴ The basic parameters that govern an expert’s decision not to “rule out” Roundup in favor of idiopathy are as follows. At the specific causation stage, “[i]t is sufficient for a qualified expert, in reliance on his clinical experience, review of a plaintiffs’ medical records, and evaluation of the general causation evidence, to conclude that an ‘obvious and known risk factor[]’ is the cause of that plaintiff’s disease.” Pretrial Order No. 85 at 5 (quoting *Wendell v. GlaxoSmithKline LLC*, 858 F.3d 1227, 1235 (9th Cir. 2017)); *see also Hardeman*, 997 F.3d at 966 (“Monsanto acknowledge[d] that an expert can rule out idiopathy by reliably concluding that the known factor (here, glyphosate) is a ‘substantial cause,’ which can be shown when a strong association exists between the diseases and a known risk factor.”) (citing *Wendell*, 858 F.3d at 1235, 1237). Admissible specific causation experts have identified glyphosate as causal in part by relying on the admissible general causation opinions, which purport to find a dose-response relationship in certain studies and otherwise read the epidemiological evidence to support a strong association between Roundup usage and NHL. Specific causation experts have also “relied heavily on the plaintiffs’ exposure levels in drawing their conclusions,” noting “the plaintiffs’ extensive Roundup usage”

⁴ In its *Daubert* briefing, Monsanto increasingly ignores *Hardeman* and large swaths of the prior *Daubert* orders in this case. Instead, its briefing is replete with citations to out-of-circuit authority, without any effort to show that the Ninth Circuit would or should agree with those cases. More frustratingly, there is little effort to distinguish this court’s prior rulings or the Ninth Circuit’s opinion in *Hardeman*, even where Monsanto is making arguments that the Court has previously dealt with in one form or another. At most, there is selective quotation from prior *Daubert* orders and total silence on *Hardeman*. Since in most instances these authorities are directly relevant to the *Daubert* issues in this MDL, the Court expects that Monsanto will at least try to distinguish them (or argue why the Court should depart from them) in future briefing. It is one thing to argue that past decisions should be revisited, or that previous decisions didn’t take sufficient account of certain issues. It is another to rehash old arguments without acknowledging how they have been dealt with previously.

and explaining that “both the McDuffie (2001) and Eriksson (2008) studies showed a dose-response relationship between glyphosate and NHL.” Pretrial Order No. 85 at 6. The Ninth Circuit affirmed the admissibility of this basic approach. *See Hardeman*, 997 F.3d at 966 (rejecting Monsanto’s argument that Hardeman’s specific causation experts had “rel[ied] on ‘two flawed studies’—McDuffie and Eriksson—linking glyphosate and NHL,” and holding that the experts had properly been allowed to “rely on McDuffie and Eriksson to show a dose-response relationship between glyphosate and NHL.”).

Monsanto correctly notes that the Court has deemed certain uses of McDuffie and Eriksson—which, in relevant part, are both based on data unadjusted for the use of other pesticides—to be junk science. But Monsanto overstates the degree to which experts are precluded from using these studies as part of their differential etiology. What Pretrial Order No. 85 says is that experts may not claim “that the McDuffie and Eriksson studies stand for the proposition that if someone uses Roundup more than two days per year or more than ten days in their lifetime, their risk of developing NHL doubles,” nor may they “testify that glyphosate is a substantial causative factor for anyone who exceeds two days per year or ten lifetime days of Roundup use, because that conclusion is again based on unadjusted data.” Pretrial Order No. 85 at 7–8. In other words, it was impermissible for experts to pretend to a level of quantitative precision that the studies could not support. One could not “quantify that risk and assign it to a particular plaintiff using the unadjusted numbers from McDuffie and Eriksson.” *Id.* It follows from these limitations that a specific causation expert cannot point to Roundup as causal *solely* because the plaintiff had more exposure days than the high-exposure groups in McDuffie and Eriksson.

But using this fact as part of a differential diagnosis is not unacceptable, particularly where the plaintiff’s exposure dramatically exceeds the highest figures recorded in those studies. Specific causation experts, using the general causation opinions, can “testify that the risk of NHL increases as exposure increases” based on McDuffie and Eriksson. *Id.* at 8. And they can note that the plaintiff had a very high level of exposure relative to the studies that showed a supposed

dose-response relationship. *See id.* at 7 (“In other words, returning to the previously mentioned scenario of 100 NHL patients with glyphosate exposure but no other risk factors, how, precisely, would [the specific causation experts] draw the line between those whose NHL was caused by glyphosate and those whose NHL is idiopathic? The primary response of the plaintiffs’ experts—which, as discussed above, falls within the range of admissible expert testimony—was that, however they draw the line, the exposure for these three plaintiffs was so significant that their NHL should not be considered idiopathic.”). Again, that conclusion can’t follow *solely* from the unadjusted case-control studies; it has to at least take the other available information into account:

Had the experts relied only on McDuffie and Eriksson to show glyphosate is a substantial cause of NHL, their specific causation opinions may have been unreliable. However, Hardeman’s experts relied not only on McDuffie and Eriksson but also other epidemiological evidence (like De Roos) supporting a strong association, as well as their clinical experience and review of plaintiff’s medical records. Thus, as a whole, the evidence provided a sufficient basis for reliably ruling out idiopathy by concluding glyphosate was a substantial cause of Hardeman’s NHL.

Hardeman, 997 F.3d at 966–67. Of course, the line between an admissible general causation opinion and impermissibly mechanistic specific causation opinion—one in the form of “exposure days greater than 10, therefore Roundup”—will not always be crystalline. A certain amount of fuzziness follows from the Ninth Circuit’s *Daubert* case law on differential diagnosis, under which “doctors enjoy wide latitude in how they practice their art when offering causation opinions.” Pretrial Order No. 85 at 5 (citing *Wendell*, 858 F.3d at 1237); *see also Messick v. Novartis Pharms. Corp.*, 747 F.3d 1193, 1198–99 (9th Cir. 2014) (“A doctor using a differential diagnosis grounded in significant clinical experience and examination of medical records and literature can certainly aid the trier of fact and cannot be considered to be offering ‘junk science.’”).

Here, though, Boyd has not said anything impermissible. Like all previous specific causation experts, one of the primary factors he looks to is the extent of the plaintiffs’ exposure relative to the case-control studies. But he also discusses other aspects of the literature, the

specific ways in which they used Roundup, and his clinical experience. *See, e.g.*, Boyd Dep. (*Canning*) (Dkt. No. 17729-2) at 41:6–44:23; 78:24–85:23. As part of this analysis, his reliance on Herrick’s exposure days calculations is not problematic.

Part of Monsanto’s argument in both the Herrick and Boyd motions is that the specific causation analysis in this litigation is inherently unreliable because the plaintiffs’ experts do not calculate “dose,” meaning the precise amount of Roundup that entered a plaintiff’s body. But Monsanto has only out-of-circuit case law to support this argument. The indispensability of “dose” is not supported by Ninth Circuit precedent—at least none that Monsanto has produced. The authority seems to be to the contrary. *See Clausen v. M/V New Carissa*, 339 F.3d 1049, 1060 (9th Cir. 2003), *as amended on denial of reh’g* (Sep. 25, 2003) (“[W]hile ‘precise information concerning exposure necessary to cause specific harm [is] beneficial, such evidence is not always available, or necessary, to demonstrate that a substance is toxic . . . and need not invariably provide the basis for an expert’s opinion on causation[.]’”). No precise “dose” evidence was presented in the *Hardeman* trial, and instead, the experts compared the exposure levels to the numbers used in the same epidemiological studies referred to by Herrick and Boyd. *See, e.g.*, Pretrial Order No. 159 (Dkt. No. 4565) at 1–2 (denying Monsanto’s motion for JMOL and holding that “Mr. Hardeman presented sufficient admissible evidence of causation. . . . Mr. Hardeman’s exposure levels still far exceeded the threshold used in most of the epidemiological literature, and specifically the McDuffie and Eriksson studies.”).

Finally, Boyd’s decisions to rule out possible alternative causes for the plaintiffs’ NHL were within the bounds of admissible testimony. The distinction between admissible “ruling-out” and inadmissible “ruling-out” is probably best illustrated by the distinction between two past specific causation experts and their handling of obesity. First consider Dr. Shustov, a specific causation expert in the *Hardeman* trial. He ruled out obesity as a risk factor on the grounds that (1) he “did not find compelling evidence linked to it,” (2) “obesity is a reflection of most likely other factors that come with it that can cause heart disease and other disease . . . [s]o not having a very defined mechanistic explanation [of] how obesity can cause lymphomas, it is a wrong factor

to interrogate in the first place,” and (3) he analyzed a relevant study and other literature on the relationship between obesity and NHL. Pretrial Order No. 288 (Dkt. No. 17504) at 10–11. Shustov also devoted a paragraph of his expert report to stating and explaining his conclusion about obesity’s lack of impact on Hardeman’s risk of developing NHL. *See id.*

Next consider Dr. Schneider. Schneider’s expert report “made no mention of a conclusion that obesity was not a serious risk factor nor of any literature that he might have relied on to reach such a conclusion.” *Id.* at 11. He stated that the plaintiff “was ‘negative’ for obesity despite indications to the contrary in the plaintiff’s medical records.” *Id.* He also took an inconsistent position on the issue, and he didn’t rely on any particular studies or research to form his opinion on the matter. *See id.*

Boyd’s handling of alternative risk factors places him on the admissible side of the line. With respect to other pesticides or possible environmental carcinogens, Boyd’s general approach is to argue that the extent of the plaintiff’s exposure was much less than their exposure to Roundup, both in terms of the duration of exposure and the circumstances of the exposure. In the *Canning* case, for example, Boyd distinguished the plaintiff’s possible exposure to non-Roundup pesticides from his exposure to Roundup by the different ways in which the two pesticides were applied. With the method of applying non-Roundup pesticides—which involved feeding the pesticides into an irrigation system from a sealed container—Boyd opined that there was minimal opportunity for exposure. But with Roundup—where Canning manually applied the pesticide with a backpack sprayer—Boyd said there was ample opportunity for exposure. Boyd Report (*Canning*) at 19, 34.

With respect to obesity, Boyd approaches the issue in much the same way as Shustov. He acknowledges that Canning’s BMI of 31 qualifies him as “mildly obese,” but Boyd discusses the literature on obesity and NHL and concludes that, at that level, the literature does not support the conclusion that obesity had a significant effect on his development of NHL. *See Boyd Dep. (Canning)* at 75:17–77:12; Boyd Report (*Canning*) at 31–32. Boyd also notes that Canning’s medical records showed that he was a regular exerciser and routinely performed physical labor,

which further supported his conclusion that his borderline BMI was not likely a cause of his NHL. *See* Boyd Dep. (*Canning*) at 76:4–77:12.

In the *Canning* and *Cotter* cases, Boyd ruled out family histories of cancer by pointing to medical literature showing that the forms of cancer these plaintiffs’ family members had—prostate cancer, skin cancer, thyroid cancer, and colon cancer—were not associated with increased risk of NHL. Boyd Report (*Canning*) at 32; Boyd Dep. (*Canning*) at 95:25–96:17; Boyd Report (*Cotter*) at 22. But this reasoning isn’t applicable to the *Nelson* case, which probably contains Boyd’s shakiest testimony on non-Roundup risk factors. Nelson’s father died of B-cell lymphoma, and his mother and grandmother “had undefined blood disorders,” the nature of which is ambiguous—Monsanto suggests that they were probably blood cancers. *See* Boyd Report (*Nelson*) at 27. Boyd nevertheless ruled out this history. In essence, his view was that Nelson’s father’s NHL shouldn’t be considered a serious risk factor because the father was likely diagnosed very late in life, and “family history represents a higher risk when the onset of the disease occurs at a younger age” and “the predictor of risk of a familial gene causing a cancer is younger age at onset.” Boyd Dep. (*Nelson*) at 60:15–25. Boyd seems to have given little weight to the mother and grandmother’s disorders because these were not defined with specificity in the medical records. While it is a close call, Boyd is offering a principled, scientifically grounded reason for ruling out Nelson’s father’s lymphoma as a cause. Monsanto’s criticisms of this aspect of the differential etiology can be raised on cross-examination.


Lastly, Boyd adequately grappled with Dr. Cristian Tomasetti’s work on random mutations and cancer. *See* Pretrial Order No. 289 (Dkt. No. 17841) (denying a plaintiff’s motion to exclude Dr. Cristian Tomasetti and discussing his research on random mutations and carcinogenesis). Boyd offered a sufficiently cogent, scientifically grounded explanation of why, in his view, random mutations should not be considered as an isolated alternative mechanism for the development of NHL in any of the plaintiffs. He argued that random mutations likely work in tandem with environmental carcinogens in most or all cases. *See, e.g.*, Boyd Dep. (*Canning*) at 85:3–23 (“Q: So you agree that you can’t fully rule out random mutations as causing his NHL? .

. . A: And, again, I want to make the point that random mutations never act alone. There's no such thing as a body without an environment. And in order to have cancer just around a mutation, you need to isolate it from all environmental factors. That's the only way you can say that, and that doesn't exist. There is no one who exists without an environment. Micro environment around the tumor, the environment the patient's exposed to, and a global environment.""). As discussed in the order on Tomasetti, it is clear that the implications of his research are the subject of scientific debate among researchers and medical doctors. Boyd's opinion roughly echoes views in this scientific literature that expressed concern about possible interactions between environmental carcinogens and random mutations. *See* Pretrial Order No. 289 at 6–7 (discussing the argument that “random replication errors might mediate the effects of environmental carcinogens, which would undermine Tomasetti's apparent claim to ‘partition the etiological determinants of a disease so that their relative effects add up to 1’”). The lack of certainty about what to make of Tomasetti's research seemed to extend even to Monsanto's own specific causation experts. *See id.* at 14 (discussing Dr. Navarro's testimony that the plaintiff's cancer was caused by an “accumulation of genetic hits” from “environmental carcinogens” like background radiation, barbecued meats, and other “genetic stressors,” as well as “just errors that occur over time”). Boyd's handling of this issue is scientifically reasonable. His opinions are admissible in the *Canning*, *Cotter*, and *Nelson* matters.

In the absence of settlement, suggestions of remand will issue in these cases roughly two weeks from the date this order is filed.

IT IS SO ORDERED.

Dated: May 2, 2024



 VINCE CHHABRIA
 United States District Judge