

**UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION**

In re Flint Water Cases.

Judith E. Levy
United States District Judge

_____ /

This Order Relates To:

Carthan, et al. v. Snyder et al.
Case No. 16-10444

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**OPINION AND ORDER GRANTING IN PART AND DENYING IN
PART DEFENDANTS VEOLIA NORTH AMERICA, LLC, VEOLIA
NORTH AMERICA, INC., AND VEOLIA WATER NORTH
AMERICA OPERATING SERVICES, LLC'S MOTION TO
EXCLUDE THE TESTIMONY AND REPORT OF
DR. HOWARD HU [2461]**

This opinion is close to the final in a series of opinions addressing the admissibility of the testimony and reports of nine experts retained by Plaintiffs¹ in anticipation of the issues class trial, set to begin on

¹ See ECF No. 2454 (VNA's motion to exclude opinions and testimony of Dr. Larry Russell); ECF No. 2455 (VNA's motion to exclude opinions and testimony of Dr. Clifford P. Weisel); ECF No. 2456 (VNA's motion to exclude testimony and reports of Robert A. Michaels); ECF No. 2458 (VNA's motion to exclude opinions and testimony of Dr. David Keiser); ECF No. 2459 (VNA's motion to exclude opinions and testimony of Dr. Daryn Reicherter); ECF No. 2460 (VNA's motion to exclude opinions and testimony of Dr. Paolo Gardoni); ECF No. 2461 (VNA's motion to exclude opinions and testimony of Dr. Howard Hu); ECF No. 2483 (VNA's motion to exclude opinions

February 13, 2024. (ECF No. 2435.) Defendants argue that these experts cannot meet the standards set by Federal Rule of Evidence 702 and *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579 (1993).

Currently before the Court is the motion by Veolia North America, LLC, Veolia North America, Inc., and Veolia Water North America Operating Services, LLC (collectively “VNA”) to exclude all but a small segment of the testimony and report of Dr. Howard Hu. (ECF No. 2461.) For the reasons set forth below, VNA’s motion to exclude is granted in part and denied in part.

I. Background

Dr. Howard Hu is an epidemiologist and expert in preventative medicine; he is currently the Flora L. Thornton Professor of Preventative Medicine at the University of Southern California. (ECF No. 2461-3, PageID.79854.) Dr. Hu has decades of experience conducting “epidemiologic research related to heavy metals [. . .] and their impact on adverse health outcomes,” and has published over 200 peer-reviewed

and testimony of Dr. Panagiotis (Panos) G. Georgopoulos); and ECF No. 2462 (VNA’s motion to exclude opinions and testimony of Dr. Robert A. Simons) (in ECF Nos. 2606 and 2617 the Court inadvertently failed to include the motion related to Dr. Simons’ testimony in this list).

articles about lead exposure. (ECF No. 2461-3, PageID.79856, 79883.)

His qualifications as an expert are not disputed.

Plaintiffs retained Dr. Hu to determine what medical harms—if any—could have resulted from Flint residents’ exposure to lead. In preparation for his report on that topic, Dr. Hu conducted a comprehensive literature review and consulted the reports of several of Plaintiffs’ other experts. (*Id.* at PageID.79858–79859.) Dr. Hu also relied on several studies conducted by his own research group. (*Id.* at PageID.79870–79872.) Finally, Dr. Hu reviewed the *Toxicological Profile for Lead* (“*Toxicological Profile*”), a report published by the Agency for Toxic Substances and Disease Registry and “one of the most thorough and authoritative sources available on the topic of lead-poisoning.” *In re Flint Water Cases*, 2021 WL 5631706, at *1 (E.D. Mich., Dec. 1, 2021) (“*Graziano*”).

Based on this review and his professional experience, Dr. Hu concluded that Flint residents’ lead exposure could have caused clinical hypertension and increased risk of cardiovascular mortality; could have adversely impacted the cognitive development of individuals who were children at the time of the Flint Water Crisis; and could have caused

neurological, renal, immunological, and reproductive harms. (*See* ECF 2461-3.) In addition, Dr. Hu found that lead exposure could have harmed pregnant women through *in utero* effects on their fetus—specifically, through lasting adverse effects on the cognitive development of their child. (*Id.* at PageID.79861.)

On May 19, 2023, VNA filed this motion to exclude all but two of Dr. Hu’s opinions.² (ECF No. 2461.)

II. Legal Standard

Federal Rule of Evidence 702 governs the admissibility of expert testimony and requires that: (1) the witness must be qualified, (2) the testimony must be relevant, and (3) the testimony must be reliable. Fed. R. Evid. 702; *In re Scrap Metal Antitrust Litig.*, 527 F.3d 517, 528–29 (6th Cir. 2008). As the Supreme Court explained in *Daubert*, Rule 702 imposes a “gatekeeping” obligation on the courts to ensure that scientific

² Plaintiffs originally alleged immunological harm, a theory on which VNA moved for summary judgment; however, Plaintiffs withdrew this theory of harm. (*See* ECF No. 2508, PageID.83050 fn.36.) Accordingly, the parties agree that Dr. Hu will not present testimony regarding immunological harm. Thus, VNA’s challenge to the admissibility of Dr. Hu’s opinions on that topic is moot.

testimony “is not only relevant, but reliable.” *Daubert*, 509 U.S. at 589; *See also Kumho Tire Co., Ltd. v. Carmichael*, 526 U.S. 137, 147 (1999).

In *Daubert*, the Supreme Court provided a non-exclusive list of factors courts may consider when evaluating reliability: (1) whether the theory or technique at the basis of the opinion is testable or has been tested, (2) whether it has been published and subjected to peer review, (3) what the known error rates are, and (4) whether the theory or technique is generally accepted. *Daubert*, 509 U.S. at 593; *see also In re Scrap Metal*, 527 F.3d at 529 (listing same factors). Not every factor needs to be present in every instance, and courts may adapt them as appropriate for the facts of an individual case. *Kumho*, 526 U.S. at 150.

“Rejection of expert testimony is the exception, rather than the rule.” *United States v. LaVictor*, 848 F.3d 428, 442 (6th Cir. 2017) (quoting *In re Scrap Metal*, 527 F.3d at 529–30). But the burden is on Plaintiffs to show by a “preponderance of proof” that the proffered expert meets the standards of Rule 702 as interpreted by *Daubert*. *Pride v. BIC Corp.*, 218 F.3d 566, 578 (6th Cir. 2000) (quoting *Daubert*, 509 U.S. at 592).

III. Analysis

The parties agree that Dr. Hu is qualified to provide expert testimony, so only the relevance and reliability of Dr. Hu's analysis are at issue. Fed. R. Evid. 702. VNA also does not contest the admissibility of Dr. Hu's opinions about the renal and cognitive effects of lead-poisoning. (See ECF No. 2461.) Rather, it argues that the remainder of Dr. Hu's opinions are inadmissible on three grounds. VNA argues, first, that Dr. Hu's opinions about the cardiovascular and reproductive effects of lead-poisoning are irrelevant and unreliable; second, that, his opinions about the *in utero* harms of lead-poisoning are irrelevant; and third, that his opinions about exposure in Flint are unreliable.

A. Cardiovascular Harms

VNA first challenges Dr. Hu's opinions about the cardiovascular consequences of lead exposure. Regarding the cardiovascular harms associated with exposure to lead, Dr. Hu concluded that "the scientific literature supports the view that relatively modest elevations in blood lead levels [. . .] are a cause of clinically-significant elevations in blood pressure." (ECF No. 2461-3, PageID.79867.) According to Dr. Hu, those elevations can in turn cause more serious problems, such as heart attacks or strokes. (*Id.* at PageID.79868.) Dr. Hu supports both steps of that

argument—lead-exposure causes elevated blood pressure, and elevated blood pressure can cause heart attacks or strokes—with references to several peer-reviewed studies.

For instance, a “systematic review” of the evidence in 2007—published in a leading specialist journal—concluded that “the evidence is sufficient to infer a causal relationship of lead exposure with hypertension.” See Ana Navas-Acien et al., *Lead Exposure and Cardiovascular Disease: A Systematic Review*, 115 *Env’t Health. Persp.* 472 (2007) (“Navas-Acien (2007)”); (ECF No. 2461-3, PageID.79869 (discussing this literature).) Follow-up studies around the world confirmed that result, including at blood-lead levels of lower than 5 micrograms per liter of blood. See, e.g., Simisola Teye et al., *Association Between Blood Lead Levels and Blood Pressure in American Adults*, 27 *Env’t Sc. & Pollution Rsch.* 45836 (2020) (concluding that higher blood lead levels were associated with higher systolic and diastolic blood pressure); (ECF No. 2461-3, PageID.79870 (reviewing this and other articles).)

Similarly, Dr. Hu reviewed and analyzed the findings of several reputable, peer-reviewed articles concluding that elevated blood pressure

can cause “vascular mortality”—meaning mortality caused by heart attacks, strokes, or “other adverse cardiovascular events.” (ECF No. 2461-3, PageID.79868); *see also* Sarah Lewington et al., *Age-specific Relevance of Blood Pressure to Vascular Mortality*, 360 *The Lancet* 1903 (2002) (“throughout middle and old age, usual blood pressure is strongly and directly related to vascular (and overall) mortality, without any evidence of a threshold down to at least 115/75 mm Hg”).

In sum, Dr. Hu supports each of his conclusions about the cardiovascular effects of lead with ample citations to the scientific literature, and a review of the sources used confirms Dr. Hu’s descriptions of them. Thus, Dr. Hu used reliable methods to reach these conclusions. “Submission to peer-review generally suffices under *Daubert*.” *United States v. Gissantaner*, 990 F.3d 457, 468 (6th Cir. 2021); *Little Hocking Water Ass’n, Inc. v. E.I. du Pont de Nemours and Co.*, 90 F. Supp.3d 746, 766–767 (S. D. Ohio 2015) (approving of literature review as scientifically reliable under *Daubert*).

VNA objects that Dr. Hu “admit[ted] that there is insufficient evidence” to posit a relationship between cardiovascular risks and lead-exposure. (ECF No. 2461, PageID.79828.) But that is plainly wrong. Dr.

Hu says there is insufficient evidence that elevated blood-lead can cause cardiovascular mortality “*independent of [lead’s] impact on blood pressure or hypertension.*” (ECF No. 2461, PageID.79861 (emphasis in original).) That opinion is consistent with the view, discussed above, that blood-lead indirectly causes cardiovascular mortality due to its effect on blood pressure. Thus, Dr. Hu’s opinions about the relationship between lead-exposure and cardiovascular health are admissible.

B. Reproductive Harms

Dr. Hu’s report also indicates that modest elevations in blood-lead levels can cause “adverse effects on [. . .] reproductive functions.” (ECF No. 2461-3, PageID.79871.) VNA correctly points out that his report features only a passing reference to this issue, followed by a reference to the *Toxicological Profile*. (*Id.*) Plaintiffs offer some analysis of the *Toxicological Profile*’s stance on lead and reproductive harms in their briefing, but Dr. Hu does not do so in his report. (ECF No. 2508, PageID.83053.) VNA argues that Dr. Hu’s testimony, therefore, does not satisfy the Plaintiffs’ disclosure obligations. (ECF No. 2461, PageID.79832.)

As support for this proposition, VNA points out that in a deposition prior to his Rebuttal Report, Dr. Hu acknowledges that he did not specifically review whether there were “studies since 1999 that identify an adult reproductive health risk associated with blood lead levels at five micrograms per deciliter or lower.” (ECF No. 2461-6, PageID.80060.) Dr. Hu did, however, clearly review the *Toxicological Profile*, which he cites in his report and for which he was a peer reviewer. (ECF No. 2461-3, PageID.79857, 79861.) The *Toxicological Profile* addresses reproductive harms, which both Plaintiffs and VNA acknowledge, and the Court has already noted its reliability and comprehensiveness in this Opinion. (ECF No. 2461, PageID.79833; ECF No. 2508, PageID.83053–83054.)

Not only that, but Dr. Hu, in his Rebuttal Report, provides more evidence and explanation for these claims, including references to specific studies connecting lead exposure to “impaired male reproductive function,” (ECF No. 2461-4, PageID.80017.), “increased risk of spontaneous abortion,” (*Id.* at PageID.79978–79979.), and “risk of preterm birth.” (*Id.* at PageID.79980.) He introduces these claims to respond to VNA experts who question whether the lead exposure in the Flint Water Crisis was sufficient to cause reproductive harms and

question whether he overstates the conclusions of the literature regarding “reproductive impacts.” (*Id.* at PageID.79973, 80018.) All of this further undermines VNA’s suggestion that the foundation of Dr. Hu’s testimony was not properly disclosed. (ECF No. 2461, PageID.79832.)

VNA next objects that Dr. Hu’s opinions are unreliable, because they view the *Toxicological Profile* as equivocal on the causal relationship between lead exposure and reproductive effects. (*Id.*) They argue not all the relevant studies find an association between lead and female reproductive effects and such effects are more consistent for males at higher levels. (*Id.* at PageID.79832–79833.) Plaintiffs disagree with this reading. (ECF No. 2508, PageID.83053–83054.) The Parties’ differing interpretations do not relate to whether Dr. Hu’s opinion is reliable; that determination depends on his “principles and methodology.” *Daubert*, 509 U.S. at 595. He can permissibly rely on both the *Toxicological Profile* and his review of the studies discussed in his Rebuttal Report. VNA does not provide a reason to think Dr. Hu employed an unreliable methodology here or offered an unreasonable interpretation of his sources, but they

can certainly cross-examine him to challenge the weight and credibility of his opinions.

Finally, VNA argues that Dr. Hu fails to identify specific impairments related to reproductive function caused by lead, which renders his opinions on this matter irrelevant. (ECF No. 2461, PageID.79833.) Lack of specificity, they suggest, means that this testimony will not assist the trier of fact in determining the questions at issue, because Michigan law requires establishing general causation with respect to a specific injury. Fed. R. Evid. 702; *Powell-Murphy v. Revitalizing Auto Cmtys. Env't Response Tr.*, 333 Mich. App. 234 (2020). On the contrary, as previously discussed, Dr. Hu refers to spontaneous abortion and preterm birth, as well as impaired male reproductive function. Moreover, the caselaw does not indicate experts must discuss injuries at a level of specificity beyond the level provided here. VNA's argument here fails.

Accordingly, Dr. Hu's opinions regarding reproductive harms are admissible.

C. In Utero Effects of Lead-Poisoning

VNA also challenges the relevance of testimony presented by Dr. Hu about the impact of *in utero* exposure to lead. Fed. R. Evid. 401. Evidence is relevant if it has “any tendency to make a fact more or less probable than it would be without the evidence,” so long as the fact is “of consequence in determining the action.” *United States v. Hazelwood*, 979 F.3d 398, 408 (6th Cir. 2020). This relevancy challenge hinges on whether Michigan law allows for damages when a child is negligently exposed to lead *in utero*, causing the parent mental anguish and emotional distress due to the potential intellectual impairment to the child over the course of their life.

The class issues trial includes only adults who were 18 years of age or older “as of the date of the class notice”—August 17, 2022. (ECF No. 1957, PageID.68057.) Children who were *in utero* during the Flint Water Crisis would have been under 18 at the time of class notice, so they are not part of this class. Thus, any opinion about *in utero* effects of lead could be relevant in this class case only to the extent those effects could cause—or themselves constitute—cognizable harms to the adult parents.

VNA argues that “Michigan law does not recognize a claim for mental anguish or emotional distress attributable solely to injuries

suffered by third parties.” (ECF No. 2528, PageID.83848.) Under Michigan law, “[r]ecovery for mental disturbance caused by defendant’s negligence, but without accompanying physical injury or physical consequences or any independent basis for tort liability, has been generally denied.” *Daley v. LaCroix*, 384 Mich. 4, 8 (1970). If damages cannot be awarded for Plaintiffs’ claims related to *in utero* harms, then testimony on this issue is not relevant to determining any issue in the case and must be excluded. Fed. R. Evid. 401.

Plaintiffs respond that “ingestion of lead in Flint water would impair the woman’s healthy transfer of nutrients through the placenta and umbilical cord, and thus impair her body’s ability to engage in healthy gestation.” (ECF No. 2640, PageID.86284.) They suggest that claims based on resulting mental anguish and emotional distress are cognizable under Michigan law, rejecting VNA’s contention that damages are only available when emotional harms flow from a plaintiff’s own physical injuries. (*Id.* at PageID.86284–86285.) Plaintiffs offer three arguments in support of this conclusion.

First, Plaintiffs suggest that lead impacts a mother’s ability to engage in healthy gestation, an impairment that counts as a physical

injury from which emotional and mental harms flow. (ECF No. 2640, PageID.86285.) If the contaminated water caused a physical harm to mothers, which resulted in mental and emotional harm to them, then VNA's objections fail.

Plaintiffs point to a Michigan Court of Appeals case where a negligence claim related to a woman's miscarriage was held to constitute a physical impact sufficient to support a claim for mental or emotional damages. *McClain v. Univ. of Michigan Bd. of Regents*, 256 Mich. App. 492 (2003). They suggest that impairment of the ability to "support healthy gestation during pregnancy" is a comparable physical impact to a miscarriage and therefore supports claims for mental and emotional damages. (ECF No. 2640, PageID.86285–86286.) Plaintiffs describe the impairment here as the prevention of the woman's healthy transfer of nutrients through the placenta and umbilical cord. (ECF No. 2640, PageID.86284.) Such an impairment is a present physical injury to a pregnant woman, they argue, insofar as it involves diminished physical capacity.

VNA suggests that Plaintiffs' claim is that lead is being transferred to the fetus, causing a harm to the fetus and not a physical injury to the

pregnant woman. They argue that Dr. Hu does not testify that pregnant women are injured (as opposed to their offspring). (ECF No. 2652, PageID.86556–86557.) On VNA’s view, Dr. Hu is saying that the fetus is exposed to lead rather than, as Plaintiffs argue, that the lead is directly impeding mothers’ reproductive capacities.

In the opinions Dr. Hu offers, his focus is indeed on the water’s impact on the “offspring” of pregnant women, not the women themselves. (ECF No. 2461-3, PageID.79875.) In the operative complaint, Plaintiffs do cite research suggesting that “[l]ead can also cross the placental barrier exposing the fetus to lead. This can result in serious effects *to the mother* and her developing fetus, including: reduced growth of the fetus [and] premature birth.” (ECF No. 1175-3, PageID.28694 (emphasis added).) Dr. Hu discusses such impacts on reproductive health, including premature birth and spontaneous abortion. (ECF No. 2461-4, PageID.79977–79980.) That is a different sort of claim than the one suggested in Plaintiffs’ briefing, which relates to the healthy transfer of nutrients across the placenta and its impact on a fetus’s future cognitive capacity. Moreover, insofar as Dr. Hu posits a causal mechanism for the cognitive impacts on children, Dr. Hu does not mention nutrition or

limitations on women’s reproductive capacities, instead referencing DNA methylation, a genetic issue. (ECF No. 2461-3, PageID.79875.) He makes this point briefly and describes it as an ongoing “area of investigation.” (*Id.*)

The theory of physical injury to pregnant women referenced in Plaintiffs’ briefing—that mothers’ physical capacities are harmed—is not set forth in Dr. Hu’s opinions. Instead, he focuses on physical injuries to the fetus and issues with pregnancies that are unrelated to cognitive capacity (such as premature birth and spontaneous abortion). While it is possible that diminished capacity to transfer nutrients to a fetus constitutes physical injury to a pregnant woman, Dr. Hu’s testimony does not lay out such claims. They relate to injury to *in utero* offspring via exposure to lead. (*See, e.g.*, ECF No. 2640-2, PageID.86296–86297.) As a result, Plaintiffs’ first argument does not succeed.

Second, Plaintiffs argue that even if lead ingestion does not constitute a physical injury to a mother’s capacity to “support healthy gestation,” damages for emotional and mental harms are still available. (ECF No. 2640, PageID.86286.) They point to *Daley v. LaCroix*, which holds that damages may be available when there is “definite and

objective physical injury [. . .] produced as a result of emotional distress proximately caused by defendant's negligent conduct [. . .] notwithstanding the absence of any physical impact upon plaintiff at the time of the mental shock." 384 Mich. at 12–13. Plaintiffs offer this point to demonstrate that VNA is incorrect that damages are available only if they result from a plaintiff's own physical injury. (ECF No. 2640, PageID.86286.)

The holding in *Daley* is not enough to show that Dr. Hu's testimony is relevant. Dr. Hu's opinions here relate to *in utero* exposure to lead that impacts cognitive development in the fetus. The Plaintiffs who might make a prospective claim about such impacts in this case are mothers who experience emotional distress or mental anguish in the wake of such injuries to their children. (ECF No. 2640, PageID.86282.) Here, an injury to one party causes emotional distress and mental anguish to another. That is different from a plaintiff's emotional distress leading to a physical injury, which is the possibility discussed in *Daley*. There, negligent property damage led to "traumatic neurosis, emotional disturbance and nervous upset," which in turn caused the "physical consequences" of "sudden loss of weight, [. . .] inability to perform ordinary household

duties, [and] extreme nervousness and irritability.” *Daley*, 384 Mich. at 7, 15. While *Daley* undermines strong claims about the necessity of a physical injury preceding or occurring at the same time as the mental and emotional harms, it does not settle this dispute. This second argument fails, because Plaintiffs do not allege injuries that are analogous to those in *Daley*; they do not claim physical injuries to the mothers resulting from mental or emotional harms.

Finally, Plaintiffs point to a Michigan statute, which they argue shows that pregnant women are class members with an independent claim against VNA for injuries to fetuses. That statute states: “A person who commits a wrongful or negligent act against a pregnant individual is liable for damages if the act results in a miscarriage or stillbirth by that individual, or physical injury to or the death of the embryo or fetus.” Mich. Comp. Laws § 600.2922a(1). Puzzlingly, the Plaintiffs claim that, given the existence of this statute, they “possess an independent negligence claim against VNA for the injuries to the fetus.” (ECF No. 2640, PageID.86288.) As VNA correctly points out, this statute does not appear in Plaintiffs’ complaint. (ECF No. 2652, PageID.86561.) At this point, Plaintiffs cannot introduce this novel claim into the litigation,

having failed to provide “fair notice” of it in their complaint by alleging a claim under § 600.2922a. *Kensu v. Corizon, Inc.*, 5 F.4th 646, 650 (6th Cir. 2021) (cleaned up).

Plaintiffs may simply be offering this Michigan statute to show that it is possible for a plaintiff to bring a claim for the physical injury of another. They emphasize that pregnant women are class members and that this statute does not exclude emotional and mental damages. (ECF No. 2640, PageID.86288.) However, even if such damages may be available under § 600.2922a, Plaintiffs do not explain why they are available here, where that claim was never pled.

Because Dr. Hu did not testify to the theory of physical injury Plaintiffs offer here, and because Plaintiffs did not sue under § 600.2922a, they cannot appeal to these arguments now to claim damages for mental anguish and emotional distress due to the potential intellectual impairment to children from *in utero* lead exposure. *Daley* also does not provide support for their claims. As a result, Dr. Hu’s testimony about *in utero* exposure to lead must be excluded under Rule 401. Fed. R. Evid. 401.

D. Flint Specific Opinions

Dr. Hu also reviewed data specific to Flint, including the expert report of Dr. Georgopoulos and scientific studies of water- and blood-lead levels in Flint during the Flint Water Crisis. Based on that evidence, Dr. Hu concluded that the above-discussed harms could have been caused by exposure to the lead-contaminated water in Flint specifically—as opposed to lead exposure in general. VNA seeks to exclude these opinions for three reasons: (1) they are based on Dr. Georgopoulos’s analysis, which VNA says is itself unreliable, (2) they misrepresent the findings of peer-reviewed studies, and (3) they rely on an impermissible theory of exposure.

The first argument challenges the methods used by Dr. Georgopoulos, not those used by Dr. Hu. The Court has already denied VNA’s motion to exclude Dr. Georgopoulos’ testimony. (ECF No. 2630.) Accordingly, Dr. Hu may rely on his colleague’s opinions.

VNA’s argument that (contrary to Dr. Hu’s assessment) epidemiological data demonstrates “that significant elevations in water and blood lead levels did *not* occur” in Flint is meritless. (ECF No. 2461, PageID.79840.) VNA’s lone reference in support of that argument in fact concluded that “water lead results contradicted official claims that there

was no problem” because the 90th percentile in the study “was 26.8 [micrograms per liter], which was almost double the Lead and Copper Rule action level.” Kelsey J. Pieper et al., *Evaluating Water Lead Levels During the Flint Water Crisis*, 52 *Env’t Sci. & Tech.* 8124 (2018) (“Pieper (2018)”). Other results reported in the same study indicated an even higher degree of lead contamination. *Id.* Dr. Hu is entitled to rely on—and testify about—this study. *Gissantaner*, 990 F.3d at 468.

Besides, VNA’s disagreement with Dr. Hu’s review of the literature does not show that Dr. Hu used unscientific methods. As the Supreme Court has made clear, such disagreements should be resolved through “vigorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof.” *Daubert*, 509 U.S. at 596. VNA is free to argue at trial that the Flint Water Crisis did not involve lead contamination.

VNA’s final challenge to Dr. Hu’s opinions revisits an argument this Court has rejected twice before: that an expert may not rely on a “no-threshold” theory of exposure. *See Graziano*, 2021 WL 5631706, at *3 (“there is no general rule prohibiting an expert from opining that a toxin can cause harms at any level of exposure”); *In re Flint Water Cases*, 2021

WL 5847102, at *7 (E.D. Mich., Dec. 9, 2021) (“Dr. Bithoney may [. . .] testify that there is no known toxicity threshold for lead.”) To be clear: experts may testify that there is no known toxicity threshold for a poisonous substance when the evidence supports that view, and they may not when it does not. As the *Toxicological Profile*, among other sources, shows, lead is toxic at virtually any level, and despite decades of study no toxicity ‘threshold’ has yet been discovered. See *Graziano*, 2021 WL 561706, at *3–6. Dr. Hu may testify to this because it is “unquestionably based on scientifically reliable research.” *Id.* at *5.

As VNA points out, the toxicity threshold for lead may differ depending on the particular health effect. For instance, it might take more exposure to lead to cause hypertension than it does to cause cognitive harms. But Dr. Hu himself acknowledges those differences. He concludes, for example, that very low blood-lead levels can cause an elevation in blood pressure, but that kidney damage does not occur until “modest elevations” in blood-lead levels of between 5-10 micrograms/liter. (ECF NO. 2461-3, PageID.79872–79873.) Those distinctions mean that not every Flint resident who drank lead-contaminated water will suffer the same health outcomes. Dr. Hu acknowledges those distinctions in his

report, so they do not render his opinions about Flint residents unreliable.

Accordingly, Dr. Hu's Flint-specific opinions are admissible.

IV. Conclusion

For the reasons set forth above, VNA's motion to exclude Dr. Hu's opinions and testimony is granted as to opinions related to the *in utero* effects of lead exposure but is denied as to all other opinions.

IT IS SO ORDERED.

Dated: October 20, 2023
Ann Arbor, Michigan

s/Judith E. Levy
JUDITH E. LEVY
United States District Judge

CERTIFICATE OF SERVICE

The undersigned certifies that the foregoing document was served upon counsel of record and any unrepresented parties via the Court's ECF System to their respective email or first-class U.S. mail addresses disclosed on the Notice of Electronic Filing on October 20, 2023.

s/William Barkholz
WILLIAM BARKHOLZ
Case Manager