

**IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF ILLINOIS
EASTERN DIVISION**

IN RE: HAIR RELAXER
MARKETING, SALES PRACTICES,
AND PRODUCTS LIABILITY

Case No. 1:23-cv-00818

Judge Mary M. Rowland

MEMORANDUM OPINION AND ORDER

I. Legal Standard

Federal Rule of Evidence 702 requires judges to act as gatekeepers to ensure expert testimony proceeds from scientific or other specialized “knowledge.” *Johnson v. Ridge Tool Mfg. Co.*, 186 F.4th 478, 484 (7th Cir. 2026) (citing *Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 151 (1999); *Daubert v. Merrell Dow Pharms., Inc.*, 509 U.S. 579, 589 (1993)). In performing that role, courts evaluate “(1) the proffered expert’s qualifications; (2) the reliability of the expert’s methodology; and (3) the relevance of the expert’s testimony.” *Gopalratnam v. Hewlett-Packard Co.*, 877 F.3d 771, 779 (7th Cir. 2017). The proponent bears the burden of establishing that the requirements of Rule 702 are satisfied by a preponderance of the evidence. Fed. R. Evid. 702 advisory committee notes to 2023 amendment; *Johnson*, 186 F.4th at 484. District courts have “significant discretion under the flexible *Daubert* inquiry.” *Lapsley v. Xtek, Inc.*, 689 F.3d 802, 818 (7th Cir. 2012).

Defendants levy numerous objections to Plaintiffs’ ten general causation experts. Most critique the reliability of Plaintiffs’ experts’ methodologies. Reliability

is determined case by case. *See id.* It is well established that “the key to the gate is not the ultimate correctness of the expert’s conclusions. Instead, it is the soundness and care with which the expert arrived at her opinion.” *Schultz v. Akzo Nobel Paints, LLC*, 721 F.3d 426, 431 (7th Cir. 2013).

The 2023 amendment to Rule 702 clarified the scope of courts’ role in determining an expert’s reliability. While examining whether an expert employs reliable principles and methods, a court must also determine that their testimony rests on “sufficient facts or data” and that “the expert’s opinion reflects a reliable application of the principles and methods to the facts of the case.” Fed. R. Evid. 702(b), (d). Accordingly, questions concerning “the sufficiency of an expert’s basis” and “the application of the expert’s methodology” can determine admissibility. Fed. R. Evid. 702 advisory committee notes to 2023 amendment; *see Gilbert v. Lands’ End, Inc.*, 158 F.4th 839, 848 n.3 (7th Cir. 2025), *cert. denied sub nom. Andrews v. Lands’ End, Inc.*, No. 26-3, 2026 WL 2976181 (U.S. Oct. 5, 2026). As the Seventh Circuit recently emphasized, an “expert opinion must stay within the bounds of what can be concluded from a reliable application of the expert’s basis and methodology.” *Johnson*, 186 F.4th at 484 (citing Fed. R. Evid. 702 advisory committee notes to 2023 amendment); *see also Bielskis v. Louisville Ladder, Inc.*, 663 F.3d 887, 894 (7th Cir.2011) (the expert’s opinion “must be reasoned and founded on data [and] must also utilize the methods of the relevant discipline.”).

At the same time, courts must be careful to “not subsume the jury’s ‘essential role as the arbiter of the weight and credibility of expert testimony.’” *Johnson*, 186

F.4th at 484 (citing *Stollings v. Ryobi Techs., Inc.*, 725 F.3d 753, 765 (7th Cir. 2013)). The Seventh Circuit has cautioned against “unduly scrutinizing the quality of the expert’s data and conclusions rather than the reliability of the methodology the expert employed.” *Manpower, Inc. v. Insurance Co. of Pennsylvania*, 732 F.3d 796, 806 (7th Cir. 2013). As this Court recently explained, “[t]he soundness of the factual underpinnings of the expert’s analysis and the correctness of the expert’s conclusions based on that analysis are factual matters to be determined by the trier of fact[;]” they are not themselves matters for the court to decide in its gatekeeping role. *Guster-Hines v. McDonald’s USA, LLC*, No. 20-cv-00117, 2026 WL 754963, at *22 (N.D. Ill. Mar. 17, 2026) (quoting *Smith v. Ford Motor Co.*, 215 F.3d 713, 718 (7th Cir. 2000)). Attacks on underlying data, disputes between experts, and disagreement over the conclusions properly drawn from those data are matters for cross-examination and the factfinder.

Most of Defendants’ challenges to the reliability of Plaintiffs’ experts’ opinions involve the court’s duty to police the “analytical gap” between an experts’ data and their conclusions. *See General Electric Co. v. Joiner*, 522 U.S. 136, 146 (1997). That is, Defendants argue that Plaintiffs’ experts do not provide sufficient “connection between the data employed and the opinion offered” to make their opinion reliable. *See Manpower*, 732 F.3d at 806 (quoting *Joiner*, 522 U.S. at 146). Where “there is simply too great an analytical gap between the data and the opinion proffered,” the opinion is unreliable. *Joiner*, 522 U.S. at 146; *see also C.W. ex rel. Wood v. Textron, Inc.*, 807 F.3d 827, 835 (7th Cir. 2015).

Policing the analytical gap requires a court to examine challenged inferences made by each expert. That is, when the evidence on which an expert relies supports a particular proposition, and the expert moves from that proposition to another, the court must examine whether the expert provided a reliable scientific basis for their inferential step. An expert may bridge an analytical gap through, *inter alia*, a recognized methodology, even if it integrates multiple bodies of evidence, *see Milward v. Acuity Specialty Prods. Grp, Inc.*, 639 F.3d 11, 17-19 (1st Cir. 2011); additional scientific evidence supporting the inference, *see In re Testosterone Replacement Therapy Prods. Liab. Litig.*, No. 14 C 1748, 2023 WL 7183216, at *3-4 (N.D. Ill. Nov. 1, 2023); a scientifically justified extrapolation from available evidence, *see Fuesting v. Zimmer, Inc.*, 421 F.3d 528, 536 (7th Cir. 2005), *opinion vacated in part on other grounds on reh'g*, 448 F.3d 936 (7th Cir. 2006); acceptance of the proposition in the scientific community, *see id.*; or a showing that the inferential step reflects the ordinary intellectual rigor of experts practicing in the relevant field. *See Kumho Tire*, 526 U.S. at 152; *see also Schultz* 721 F.3d at 431 (citing *Daubert*, 509 U.S. at 593-94) (factors relevant to reliability include “(1) whether the scientific theory or technique can be (and has been) tested; (2) whether the theory or technique has been subjected to peer review and publication; (3) whether a particular technique has a known potential rate of error; and (4) whether the theory or technique is generally accepted in the relevant scientific community.”) These considerations are “neither exhaustive nor mandatory.” *C.W.*, 807 F.3d 835. In other words, Rule 702 requires experts to

supply a reliable scientific bridge between the data relied on and the opinion offered. *See C.W.*, 807 F.3d at 837; *Joiner*, 522 U.S. at 146.¹

II. Legal and Factual Background

At the defendants' urging, the Court bifurcated expert discovery and briefing concerning general and specific causation. CMO 15, Dkt. [1120]. This opinion concerns only Defendants' challenges to Plaintiffs' general causation experts, addressing Defendants' collective challenges to Plaintiffs' experts writ large, as well as their specific challenges to two of Plaintiffs' experts. The inquiry at general causation asks whether the product or substance at issue "had the capacity to cause the harm alleged," while specific causation asks whether it "did, in fact, cause the harm alleged" in an individual plaintiff. *C.W.*, 807 F.3d at 831. At this stage, then, Plaintiffs' experts' opinions need only be relevant to the question of whether chemical hair relaxers ("CHRs") are capable of causing uterine or ovarian cancer.

CHRs are products that chemically alter bonds within the hair shaft to produce a straighter or less tightly curled texture. Defs.' Mem. at 3; Pls.' Opp at 25-26. Defendants emphasize that hair relaxers are a heterogenous product with ingredients and formulations varying across manufacturers and through time. Defs.' Mem. at 3-4. In response, Plaintiffs emphasize common features across products. Pls.' Opp. at 25-26. While parties contest the significance of variation among product formulations, both agree that chemical hair relaxers are prevalently and disproportionately used by Black women. *See, e.g.*, Defs.' Mem. at 4; Atwood Rep. at

¹ A court may exclude discrete portions of an expert's testimony that fail to meet the requirements of Rule 702 without excluding otherwise reliable and relevant opinions. *See Smith*, 215 F.3d at 721 n.3.

5. Illustrating this use-pattern is the Black Women’s Health Study (“BWHS”). The authors using data from the BWHS used a combined “never/light” group as the study’s reference group because “only 5%” of the black women in the study reported no past use of hair relaxers. Bertrand et al., *Hair Relaxer Use and Risk of Uterine Cancer in the Black Women’s Health Study*, 239 *Env’t Rsch.* 117228 (2023) (“*Bertrand*”).

Much of the literature connecting CHRs to the cancers at issue was relatively new at the time of the Complaint’s filing. Three principal publications arise from two large prospective cohorts. *White* and *Chang* analyzed data from the Sister Study. *White* et al., *Use of Hair Products in Relation to Ovarian Cancer Risk*, 42 *Carcinogenesis* 1189 (2021) (“*White*”); *Chang* et al., *Use of Straighteners and Other Hair Products and Incident Uterine Cancer*, 114 *J. Nat’l Cancer Inst.* 1636 (2022) (“*Chang*”). *White* examined the association between the use of products to straighten, relax, or press hair and ovarian cancer, while *Chang* examined the association between these products and uterine cancer. *Bertrand* used BWHS data to analyze the association between CHR use among Black women and uterine cancer. All three publications reported that CHR use was associated with elevated risk estimates, although with statistical significance that varied between subpopulations. The parties sharply dispute what these results establish, the limitations of the underlying exposure data, and the extent to which Plaintiffs’ experts reliably extrapolate from these three studies.

Plaintiffs repeatedly emphasize that their theory of general causation operates at the level of the finished product. Rather than opining that specific chemicals in CHRs are capable of causing ovarian or uterine cancers in isolation, Plaintiffs' experts opine that CHRs cause these cancers at the mixture or product level—that they contain chemicals that have additive or synergistic effects, operate on “cumulative carcinogenic mechanisms” or “interact or degrade synergistically.” *See* Pls.' Opp. at 24, 28, 38, 53, 82, 93. In Plaintiffs' own words:

“This case is not about whether a chemical in isolation can cause cancer but instead about whether the mixture and milieu of chemicals in the finished hair relaxer products, i.e., the kit or system of chemical relaxer materials that Defendants manufactured, marketed, and sold to be used together in the chemical process of relaxing hair, can cause cancer.” *Id.* at 24.

“It is not that Plaintiffs' experts ignored the chemicals; it is that they more properly considered them as classes of chemicals, acting in an additive and synergistic manner, when considering their relationship to the injuries alleged (i.e., estrogenic cancers).” *Id.* at 28.

In bringing a mixture-level theory of general causation, Plaintiffs disclaim the need to show general causation as to particular chemical constituents or even particular sets of those constituents. Instead, Plaintiffs claim that their experts reliably show general causation at the mixture-level via evidence of association at the mixture-level in addition to evidence concerning the biological properties and interactions of CHRs' alleged constituents.

Plaintiffs proffer ten general causation experts. Plaintiffs do not present each expert as independently establishing the entire chain of general causation. Rather, they describe certain opinions as a constituent, not constitutive, of their chain of general causation. *See, e.g.*, Pls.' Opp. at 81-82 (referring to Mr. Atwood's opinion as

a “building block”). This is permissible. *See Adams v. Ameritech Servs., Inc.*, 231 F.3d 414, 425 (7th Cir. 2000) (citing Fed. R. Evid. 401; *United States v. Porter*, 881 F.2d 878, 887 (10th Cir.1989)). Each expert’s particular contribution, however, must independently satisfy Rule 702.

Defendants challenge the reliability or methodology of each of Plaintiffs’ experts, and the qualifications of some. This order addresses the generalized challenges Defendants levy against Plaintiffs’ experts writ large, as well as Defendants’ specific challenges to Mr. Atwood and Dr. Cote. The Court will issue a subsequent order addressing Defendants’ challenges to Plaintiffs’ other experts.

III. Generalized Challenges to Plaintiffs’ Experts

Much of Defendants’ motion levies generalized challenges to be applied against the set or some subset of Plaintiffs experts. *See* Defs. Mem. at 20-54. Plaintiffs argue that these generalized challenges are, in some instances, poorly signposted in their application to particular experts. *See* Pls.’ Opp. at 12 n.6. The Court agrees. Defendants frequently group Plaintiffs’ experts together even where they may employ different methodologies, consider different evidence, assign different weight to that evidence, or account differently for that evidence’s limitations. In some cases, Defendants also do not clearly identify which experts a generalized objection is meant to reach. The Court need not construct unstated expert-by-expert application of generalized challenges on Defendants’ behalf. *See United States v. Dunkel*, 927 F.2d 955, 956 (7th Cir. 1991) (“Judges are not like pigs, hunting for truffles buried in briefs.”); *see also In re Johnson & Johnson Talcum Powder Prods. Mktg.*, No. 3:16-

MD-2738 (MAS) (RLS), 2026 WL 161184, *4 (D.N.J. Jan. 20, 2026) (“By presenting their challenges collectively, Defendants effectively place upon ... the Court the burden of disentangling a voluminous record...”).

Still, in most cases, Defendants are clear enough, either because they signpost or because an expert obviously performs an inference they challenge. Thus, this opinion first addresses challenges that obviously apply to multiple experts. These include assertions that Plaintiffs’ experts:

- (a) are necessarily unreliable to the extent that they employ a mixture theory that does not specify specific chemicals or identify any fixed chemical “recipes”;
- (b) unreliably consider dose, including unreliable analysis of dose-response and dose-thresholds, as well as inappropriate use of “any dose” logic to show exposure; and
- (c) necessarily overextend the findings of the three central epidemiological studies, *Chang*, *White*, and *Bertrand*.

A. Challenges to Plaintiffs’ Mixture Theory

Defendants levy various challenges to Plaintiffs’ decision to frame their general-causation theory at the level of the finished product and its constituent mixtures. First, Defendants argue that “having chosen to ground their causation opinions in particular constituents—endocrine disrupting chemicals (‘EDCs’), formaldehyde, heavy metals, and others—Plaintiffs must offer reliable evidence connecting those constituents, as present in Defendants’ products and at real-world

exposure levels, to uterine or ovarian cancer.” Defs.’ Reply at 3. Second, Defendants argue that Plaintiffs cannot reason from chemical classes because chemicals within that broad class may materially differ. *See* Defs.’ Mem. at 22 (citing *McClain v. Metabolife Int’l, Inc.*, 401 F.3d 1233, 1246 (11th Cir. 2005)). Third, Defendants insist that Plaintiffs must identify either specific causal chemicals or provide a sufficiently defined “recipe” of chemicals responsible for the alleged effect, rather than rely on an undefined “toxic soup.”² Defs.’ Reply at 46. Otherwise, Defendants contend, Plaintiffs have not supplied reliable scientific evidence that the constituents they identify act through complementary mechanisms to produce uterine or ovarian cancer, much less the combination necessary to produce such an effect. *Id.*

The Court finds that none of these generalized challenges pose categorical bars to Plaintiffs’ experts’ reliability. Plaintiffs may use a mixture as the relevant causal exposure, may reason from defined causal classes of chemicals, and do not have to provide specific recipes. At the same time, none of these generalized holdings relieve Plaintiffs’ experts from their obligation under Rule 702 to employ a reliable methodology as to each inferential step. That is, Plaintiffs’ experts must provide sufficient and reliable scientific justification for their opinions as to a mixture level theory of general causation, just as they must bridge any other analytical gap.

1) Plaintiffs Experts May Opine to Mixture or Finished Product Level General Causation Theories, So Long as They Are Reliable.

² Neither Plaintiffs nor their expert use the phrase “toxic soup” to refer to the chemical mixtures.

First, Defendants contend that Plaintiffs chose to ground their causation opinions in particular constituents. Defs.' Reply at 3. Therefore, Defendants argue, Plaintiffs' experts are unreliable to the extent that they do not reliably substantiate general causation theories as to each identified constituent. *Id.*

In arguing that this kind of reasoning should disqualify the slate of Plaintiffs' experts, Defendants reach too far. It is clear from the case law that Plaintiffs' experts should not be excluded merely for employing a mixture-level theory of general causation. *See e.g., Talcum Powder*, 2026 WL 161184, at *120-21, *142; *Burst v. Shell*, 50 F. App'x 170, 172; *Moore v. P & G-Clairol, Inc.*, 781 F. Supp. 2d 694, 702-03 (N.D. Ill. 2011); *Henricksen v. ConocoPhillips Co.*, 605 F. Supp. 2d 1142, 1156 (E.D. Wash. 2009). In particular, the Court in *Talcum Powder* affirmatively admitted both plaintiffs' and defendants' experts' opinions as to a finished product-level theory. *See Talcum Powder*, 2026 WL 161184, at *120-21, *142.³ Where mixture-level theories were disallowed, it was because experts' mixture- or product-level opinions had fatal analytical gaps. It was not merely because they opined as to a mixture theory or failed to opine to that theory in conjunction with an admissible individual component theory.

Although mixture-level theories can be admissible, parties' cases illustrate that they can also be imprecise. Where this imprecision tips into unreliability, opinions regarding mixture effects should be excluded. For instance, the courts in

³ The Court also found elucidating *In re JUUL Labs, Inc. Mktg., Sales Pracs. & Prods. Liability Litig.*, No. 19-md-02913-WHO, 2022 WL 1814440, at *9 (N.D. Cal. June 2, 2022) (declining to exclude mixture-effect opinions where experts identified the chemicals involved and explained their combination increased the risk of harm.).

Burst and *Henricksen* recognized that evidence concerning one constituent cannot simply be treated as proof that exposure to a mixture containing that constituent can cause the disease at issue. *Burst*, 650 F. App'x 170, 172; *Henricksen*, 605 F. Supp. 2d at 1156 (“If it is possible to extrapolate from studies of benzene or other benzene-containing products conclusions regarding gasoline, then it will be incumbent upon [plaintiff] to explain and demonstrate why the extrapolation is scientifically proper.”). Rather, an expert must provide scientific justification for extrapolating from the constituent to the chemically distinct mixture. Similarly, in *Moore*, the expert reasoned from safety data sheets concerning individual chemicals in hair dye to the dangerousness of the finished product without analyzing the concentrations or formulation of those chemicals in the product. 781 F. Supp. 2d at 702-03. The fatal problem in *Moore* was not that product-level theories are inherently flawed, but that the expert’s flawed methodology could not, without more, bridge the analytical gap between the chemicals or mixtures analyzed and the finished product. *See id.* at 703 (noting that this “fundamental flaw” inheres in methodology relying entirely on extrapolation from data safety sheets) (citing *Lemmermann v. Blue Cross Blue Shield of Wisc.*, 713 F.Supp.2d 791, 801-02 (E.D. Wis. 2010)).

Zurbriggen and *Baby Food* likewise stand for the proposition that experts must provide a reliable bridge between evidence concerning an alleged toxic agent, mixture, or finished product and the product exposure at issue. *Zurbriggen v. Twin Hill Acquisition Co.*, No. 17 C 5648, 2025 WL 1092973, at *12, *15 (N.D. Ill. Apr. 11, 2025), *aff'd*, No. 25-1963 (7th Cir. June 16, 2026); *In re Baby Food Prods. Liab. Litig.*,

No. 24-md-03101-JSC, 2026 WL 559857, at *16 (N.D. Cal. Feb. 27, 2026); *see also id.* at 3 (“[I]t is not enough to say the baby food can cause generalized neurological injury; rather, it must be the specific neurological injury alleged here.”). *Zurbruggen* excluded general causation experts because of the manifold failures of their analyses, including never “develop[ing] a theory for how the [product] caused the plaintiffs’ reactions.” 2025 WL 1092973 at *12-*22 (detailing the many analytical gaps plaintiffs’ experts did not even attempt to bridge). And while Defendants cite *Baby Food* in part for the proposition that experts’ mixture-level opinions must specify an allegedly harmful ingredient, *see* Defs.’ Mem. at 20, the court there in fact reasoned in the other direction. The *Baby Food* court excluded plaintiffs’ epidemiology and toxicology general causation experts in part because they had not reliably connected their *individual component theories* of general causation to exposures *at the product level*. 2026 WL 559857, at *16.⁴

In sum, parties’ cases demonstrate that analytical gaps must be bridged; none establishes a rule against mixture-level theories of general causation.

2) Plaintiffs’ Experts May Reason from Causal Classes if They Do So Reliably.

Defendants argue that Plaintiffs’ experts’ mixture-level opinions are unreliable because they do not provide full general causation opinions as to specific chemicals or recipes. *See* Defs.’ Mem. at 22; Defs.’ Reply at 46. Defendants’ argument operates on two levels: conceptual and practical. On the conceptual level, Defendants argue

⁴ Both Plaintiffs and Defendants cite *Baby Food* at a pincite, *29. That pincite does not exist. *See* Defs.’ Reply at 39; Pls.’ Opp. at 25. While that is concerning, *Baby Food* does support the propositions the parties cite it for.

that Plaintiffs’ experts, in failing to identify specific constituents or recipes, have failed to define the mixtures they analyze with sufficient specificity to reliably opine to their causal effects. *See* Defs.’ Mem. at 20-23. On the practical level, Defendants argue that, without defining specific chemicals or mixtures, Plaintiffs’ experts cannot reliably tie the mixtures they opine on to the specific formulations of products to which each Plaintiff was exposed. *See id.* After all, as Defendants aver, CHRs are diverse products with diverse chemical formulations. *Id.* at 3.

Given Plaintiffs’ approach to general causation, both objections are misplaced. Plaintiffs’ general causation experts do largely opine as to mixtures that contain chemicals falling into classes, such as parabens, phthalates, or EDCs generally, as well as to specific carcinogens like formaldehyde. However, Plaintiffs’ experts also provide scientific justification for treating certain chemicals as a class, such as defining them through their mechanistic, additive, or synergistic effects.⁵ For instance, Plaintiffs’ experts opine that the class of endocrine disrupting chemicals can cause ovarian and uterine cancer through mechanisms they share—chiefly endocrine disruption. *See* Atwood Rep. at 49-68; Cote Rep. at 12-14. Additionally, Plaintiffs’ experts do, in some cases, analyze specific chemicals falling in those classes. *See, e.g.,*

⁵ For this reason, Defendants’ cases are distinguishable. *See McClain*, 401 F.3d at 1246 (rejecting analogy between PPA and ephedrine where expert provided no reasoning for analogy and admitted that lumping together chemicals in the class “is both foolish and misleading”); *Ruffin v. BP Exploration & Prod., Inc.*, 176 F.4th 855 (5th Cir. 2026) (excluding expert who extrapolated properties of a class solely from evidence specific to a single member of that class); *Rider v. Sandoz Pharma. Corp.*, 295 F.3d 1194, 1201 (11th Cir. 2002) (affirming exclusion where “plaintiffs failed to come forward with even a theory as to why the mechanism that causes some ergot alkaloids to act as vasoconstrictors would more probably than not be the same mechanism by which bromocriptine acts to cause vasoconstriction.”). Small differences in chemical structure can alter a chemical’s effect. But Plaintiffs’ experts must provide scientific justification for their grouping that makes it applicable to the specific causal chain on which they opine, such as grouping chemicals by their function or effect.

Atwood Rep. at 34-49.⁶ As such, Defendants' conceptual objection amounts to a requirement that Plaintiffs' experts who reason from chemical classes may only do so if they supply a reliable basis for concluding that the classes' members share sufficiently relevant features.

While Defendants' practical objection has more force, it is more appropriate for specific causation. The parties' specific-causation briefs will undoubtedly argue whether the products used by an individual plaintiff produced an exposure falling within the classes defined by Plaintiffs' general causation experts. At general causation, the Court need only examine whether Plaintiffs' experts have reliably opined that certain classes of chemicals are capable of causing ovarian and uterine cancer.⁷

3) Plaintiffs' Experts Need Not Opine as to Specific Chemicals or Specific "Recipes" to be Reliable So Long as They Bridge the Analytic Gaps Between the Chemicals Analyzed and the Mixture or Finished Products.

Defendants argue that even if Plaintiffs' mixture level theory is permissible, their experts must tie it to an independently reliable general causation theory regarding a specific chemical or recipes. However, Plaintiffs' experts provide other scientifically justified bridges over this analytical gap. Defendants' cases do not require Plaintiffs' experts to provide a recipe for their mixtures so long as doing so is

⁶ Plaintiffs' experts also generally *do* bridge the gap between the chemicals or chemical classes they analyze and Defendants' products. *See, e.g.*, Atwood Rep. at 26-29 (citing studies of the chemicals in CHRs); Pls.' Opp. at 26 ("Plaintiffs' experts offered opinions that chemical hair relaxers are comprised of a common set of ingredient categories across the class.").

⁷ Defendants' practical objection also relates to their objections regarding inferring exposure from dose. *See infra*, Section III.B.

scientifically unnecessary. As such, the Court declines to impose Defendants' categorical requirement.

To begin, the case law shows that constituent-specific and product-level causal opinions can be analytically distinct. *See Talcum Powder*, 2026 WL 161184, at *126 n.107, *143 n.120 (excluding opinions that heavy metals and fragrance chemicals independently caused ovarian cancer yet permitting experts to offer separate product-level opinions including these chemicals).⁸ Plaintiffs' experts offer the latter, adducing two main strands of evidence: epidemiological evidence concerning the association of CHRs with ovarian and uterine cancer, as well as evidence connecting CHR products' constituents with toxicological and mechanistic evidence, mixture science, and other evidence that Plaintiffs claim supports the biological mechanisms through which CHRs could produce the cancers at issue. Take one of Plaintiffs' biological plausibility theories: that the EDCs may interfere with hormone signaling in hormone-responsive tissues relevant to uterine and ovarian cancers. *See* Pls.' Opp. at 37-38. This theory relies in part on mixture effects. *See id.* Plaintiffs contend, among other things, that EDCs can act upon the same hormonal pathways, resulting in additive effects, and that CHR constituents may act synergistically with other chemicals in their classes or across classes, including that endocrine-disrupting and carcinogenic mechanisms may operate through complementary pathways. *See* Pls.'

⁸ Although the *Talcum Powder* court found an independently reliable causation opinion as to a specific chemical, asbestos, it did not rest its conclusion about the admissibility of final product level testimony on that finding. *See id.* As here, in *Talcum Powder*, the epidemiological literature underlying the *Talcum Powder* opinion studied talc use without necessarily parsing each constituent. *Id.* at 37-38 (discussing *In re Johnson & Johnson Talcum Powder Prods. Mktg., Sales Pracs. & Prods. Litig.*, 509 F. Supp. 3d 116, 168-70 (D.N.J. 2020)).

Opp. at 26-27, 37-39; *see, e.g.*, Atwood Rep. at 19-24. Under these circumstances, where Plaintiffs' experts purport, at least in part, to define the relevant mixture functionally rather than by invariant formulas, anchoring that analysis to specific chemicals or chemical recipes is unnecessary.

Defendants do not cite case authority that shows that, under these circumstances, under this kind of general causation theory, mixture theories are unreliable without a recipe. Nor does their argument that Plaintiffs' logic is circular map onto the details of Plaintiffs' theory. Defs.' Reply at 7-8 ("Plaintiffs rely on a self-reinforcing loop: the products allegedly contain a carcinogenic 'soup' because epidemiological studies report an association, and the association is allegedly causal because the products allegedly contain a carcinogenic 'soup.'"). Plaintiffs posit a carcinogenic mixture in part because the epidemiology reports a product-level association. But they also opine that CHR's product-level mixtures contain carcinogens that can act additively or synergistically to cause the cancers at issue. And, while Plaintiffs infer that the association is causal in part because the products contain a carcinogenic mixture, the association only forms one basis of their experts' methodologies—whether Bradford Hill or weight-of-the-evidence. It is well established that these methodologies, when reliably applied, combine epidemiological evidence showing product-level associations with toxicological or mechanistic evidence concerning biological plausibility. *See, e.g., Milward*, 639 F.3d 11, 17-20. As such,

Defendants' argument does not show that Plaintiffs' experts' reasoning necessarily lies outside the realm of these methodologies' reliable application.⁹

While neither party cites a case employing Plaintiffs' exact method of proof, a few are close. In *Talcum Powder*, the court permitted experts to testify to a talc-as-a-product theory where product-level epidemiology was combined with mechanistic evidence. 509 F. Supp. 3d 116, 168-70. In *In re Abbott Lab's, Preterm Infant Nutrition Prods. Liab. Litig.*, the court admitted experts where one examined human evidence of product-level exposure while the other examined which components of the product could explain the association between ingestion of cow's milk and NEC. No. 22 C 71, 2025 WL 1283927 (N.D. Ill. May 2, 2025). In *Baby Food*, the Court excluded testimony relying on particular components, emphasizing that there were no epidemiological studies examining whether baby-food consumption was associated with ADHD or ASD. See 2026 WL 559857 at *16.

In sum, the Court will not exclude experts who otherwise reliably opine as to Plaintiffs' theory of general causation just because they do not provide exact recipes. Nor is an opinion that a particular chemical may be neither necessary nor sufficient to cause the disease at issue necessarily unreliable.¹⁰

⁹ At the same time, Plaintiffs' mixture theory does not permit associations at the level of "the product as a whole" alone to substitute for sufficiently rigorous application of these methodologies. See *Zurbriggen*, 178 F.4th at 1088-1091 ("[T]hat the plaintiffs here experienced various reactions simply does not signal the existence of a defect or an error without more evidence.").

¹⁰ Plaintiffs also argue that Rule 702 should not impose a burden more demanding than the substantive law governing their claims. Pls.' Opp. at 23 (citing *In re Testosterone Replacement Therapy Products Liability Litigation*, 2017 U.S. Dist. LEXIS 69399, at *996 (N.D. Ill. May 8, 2017)). If state law permits causation to be established by showing that exposure was a substantial contributing factor in producing an injury, the general-causation inquiry should not require proof that the exposure is

B. Generalized Challenges to Plaintiffs’ Expert Opinions Regarding Dose and Exposure

Defendants next argue that Plaintiffs’ experts fail to account adequately for dose and exposure.¹¹ First, Defendants emphasize the familiar toxicological principle that “the dose makes the poison,” and contend that Plaintiffs’ experts neither quantify the chemical doses delivered by hair-relaxer use nor identify a threshold dose at which any constituent, class of constituents, or mixture is capable of causing uterine or ovarian cancer. Defs.’ Mem. at 25-29. Additionally, Defendants contend that Plaintiffs’ experts cannot avoid dose-related deficiencies in their opinions by asserting that there is “no safe dose,” that endocrine-disrupting chemicals exhibit non-monotonic or low-dose dose responses, or that cumulative exposure matters. *Id.* In Defendants’ view, those propositions reduce Plaintiffs’ opinions to the “any exposure” theory rejected in *Krik v. Exxon Mobil Corp.*, 870 F.3d 669 (7th Cir. 2017).

General causation experts perform reliable dose analysis so long as they “proffer a reliable opinion that the chemical at issue can cause the disease at exposure

independently sufficient to cause the disease. *See* Pls.’ Opp. at 23 (citing *Tweedy v. Wright Ford Sales, Inc.*, 64 Ill. 2d 570 (1976)). But references to state law cannot lower Rule 702’s reliability requirement.

¹¹ Parties at times conflate arguments concerning the relationship between dose and exposure with arguments concerning dose-response as evidence supporting the inference from association to causation. *See, e.g.*, Defs.’ Mem. at 60 (applying *Krik*, a dose-exposure case, to dose-response). The Court views these questions as analytically distinct. The former concerns whether the causal evidence considered by an expert can be reliably extrapolated to exposures humans realistically may experience. *See Roundup*, 390 F. Supp. 3d at 1113-15. The latter concerns whether the relationship between the dose and the disease risk supports causation and is not an indispensable Bradford-Hill consideration. *See Hardeman*, 997 F.3d at 966-67 (considering evidence that disease risk changes with increased exposure as supporting a causal inference); *Preterm Infant Formula*, 2025 WL 1283927, at *11-12 (admitting expert who could not identify a triggering threshold but could reliably discuss the qualitative dose-response reflected in the studies); *Testosterone Replacement Therapy*, 2018 WL 4030585, at *5.

levels that a human could realistically have experienced.” *Ruffin*, 176 F.4th at 861-62; *see also C.W.*, 807 F.3d at 836-38; *In re Roundup Prods. Liab. Litig.*, 390 F. Supp. 3d 1102, 1113-15 (N.D. Cal. 2018). This does not translate to a universal requirement that a general-causation expert identify a numerical threshold below which an exposure cannot cause disease. *Preterm Infant Nutrition Prods.*, 2025 WL 1283927 (rejecting argument that expert must identify a “specific triggering threshold dose”) (distinguishing *Krik*, 870 F.3d 669); *see also Thompson v. Orkin, LLC*, No. 1:20-CV-13085-TGB-PTM, 2025 WL 18639, at *14 (E.D. Mich. Jan. 2, 2025) (“[E]vidence of the precise level of chemical exposure is not necessary when other evidence supports the claim.”) (citing *Hardyman v. Norfolk & W. Ry. Co.*, 243 F.3d 255, 265-66 (6th Cir. 2001)). Rather, the connection between dose and human-relevant exposure at the general causation stage can be shown in various ways. For example, in *In re Testosterone Replacement Therapy Prods. Liab. Litig. Coordinated Pretrial Proc.*, the Court declined to exclude an expert who could not identify a minimum dose but instead discussed studies suggesting that greater doses were associated with greater cardiovascular risk. No. 14 C 1748, 2018 WL 4030585, at *5 (N.D. Ill. Aug. 23, 2018); *see also Ruffin*, 176 F.4th 855, 861-62 (5th Cir. 2026) (rejecting idea that “exactitude in minimum dangerous dosage” is required)

The Seventh Circuit authority that Defendants cite does not show otherwise. *Contra* Defs.’ Mem. at 27-28. In *Krik*, the Seventh Circuit affirmed the lower court’s ruling that “any dose” or “cumulative exposure” theories could not substitute for evidence connecting the plaintiff’s exposure to a causally meaningful dose. 870 F.3d

at 675-77. Illustrating the illogic of that gap, the *Krik* expert's causal conclusion was not tied to the quantum of exposure attributable to any defendant; instead he opined that every exposure above zero necessarily was a substantial contributing factor. *Id.* at 677; *see also C.W.*, 807 F.3d at 837-38 (excluding expert who failed to “connect the dots” between the studies and the plaintiffs’ alleged exposures and illnesses but stating that “nothing in the case law” required an expert to locate a study at the precise dose and duration experienced by the plaintiffs); *Johnson v. Edward Orton, Jr. Ceramic Foundation*, No. 19-cv-6937, 2021 WL 5493231, at *2-3 (N.D. Ill. Nov. 23, 2021), *rev'd on other grounds*, 71 F.4th 601 (7th Cir. 2023) (applying *Krik*, 870 F.3d 669).¹²

But “any dose” logic is only unreliable where it is used to paste over the requirement that experts tie the causal evidence they consider to human-relevant exposures. *Roundup*, 390 F. Supp. 3d 1102, is illustrative. There, the court also bifurcated general and specific causation, ruling at general causation that plaintiffs

¹² Defendants’ other cases either stand for the same proposition (that there must be a scientifically supported connection between the general theory of exposure and the asserted harm), or instead concern an expert’s failure to establish exposure on specific causation. *See McClain*, 401 F.3d at 1241-42 (excluding opinion where expert agreed product’s effects were dose-dependent and expert opined essentially that any amount was excessive); *In re Denture Cream Prods. Liab. Litig.*, 795 F. Supp. 2d 1345, 1352-53 (S.D. Fla. 2011) (excluding experts who could not say how much Fixodent had to be used, or for how long, to produce the intermediate biological condition on which their causal chain depended); *Hostetler v. Johnson Controls, Inc.*, No. 3:15-cv-226, 2020 WL 5543081, at *5-6 (N.D. Ind. Sept. 16, 2020) (excluding expert whose report “offers no reliable basis ... for extrapolating TCE’s ability to cause those effects under *some* circumstances, to its ability to cause those effects to *these* Plaintiffs under *their* circumstances”); *Henricksen v. ConocoPhillips Co.*, 605 F. Supp. 2d 1142, 1163-66 (E.D. Wash. 2009) (finding specific causation opinion unreliable); *Wintz by & Through Wintz v. Northrop Corp.*, 110 F.3d 508, 514 (7th Cir. 1997) (same); *Mahler v. Vitamin Shoppe Indus., Inc.*, 2023 WL 6141369, at *7 (N.D. Ill. September 20, 2023) (same). Defendants miscite *Cunningham v. Masterwear, Inc.*, another inapposite specific causation case. *See* No. 1:04CV1616-JDT-WTL, 2007 WL 1164832, at *8 (S.D. Ind. Apr. 19, 2007).

needed only present reliable evidence that glyphosate could cause non-Hodgkin's lymphoma "at exposure levels humans might have experienced." *Id.* at 1113. The court recognized that the precise range of actual exposure would remain "vague" during general causation because the question of individual plaintiffs' exposures belonged to the later specific-causation inquiry. *Id.* at 1115. But these "vague" general causation opinions were reliable so long as they provided a bridge between their analysis and real-world exposure or use. *See id.* ("Picture, for instance, a professional gardener who has applied Roundup without using protective equipment several times per week, many hours per day, for decades."); *Hardeman v. Monsanto Co.*, 997 F.3d 941, 963 (9th Cir. 2021) (adopting the same formulation), *abrogated on other grounds by Monsanto Co. v. Durnell*, 609 U.S. 371 (2026); *but see Baby Food*, 2026 WL 559857, at *17-18 (finding plaintiffs' experts had not bridged this gap because the scientific literature concerned lead and arsenic exposure generally rather than exposure produced by defendants' baby foods).

Plaintiffs argue that this gap is bridged at general causation in part because the *Chang*, *White*, and *Bertrand* studies connect actual human CHR use with uterine or ovarian cancer. *See* Pls.' Opp. at 32-33. The Court agrees. Because these studies show disease outcomes among humans using the relevant products under real-world conditions, it is reliable for Plaintiffs' experts at general causation to lean on them to show dose at realistic human use rates.¹³

¹³ Plaintiffs' experts also cite additional direct evidence on exposure. Mr. Atwood, for example, cites human biomonitoring studies reporting greater urinary concentrations of various EDC biomarkers among women reporting use of CHRs. *See* Atwood Rep. at 31-32.

Relatedly, the Court disagrees with Defendants that any expert testimony regarding non-monotonic or low-dose dose responses necessarily employs the prohibited “any dose” logic. *Contra* Defs.’ Mem. at 27-28, 52. First, non-monotonic dose response is a recognized phenomenon in endocrine-disruption science. *See* Nat’l Acads. Of Scis., Eng’g, & Med. & Fed. Jud. Ctr., Reference Manual on Scientific Evidence, at 980 (4th ed. 2025) (“Reference Manual”) (“Evidence for non-monotonic dose response has been presented for chemicals that affect hormones (termed endocrine disruptors).”); Atwood Rep. at 12-14, 50 (explaining evidence for non-monotonicity; discussing the idea’s adoption by the EDC society). Second, Plaintiffs’ experts largely use this concept to bolster their opinions regarding dose-response, not to show human-relevant exposures. While the latter would be prohibited by *Krik*, Plaintiffs experts use non-monotonicity to help explain why an apparent failure to identify a conventional linear association between exposure and disease is not fatal to their opinion. *See, e.g.*, Cote Rep. at 13, 25.¹⁴ Thus, offering an opinion on non-monotonicity cannot make an expert unreliable merely because it departs from aphoristic, “the dose makes the poison,” toxicological models. *See Austin v. Monsanto Co.*, No. 2:23-cv-272, 2025 WL 3443493, *7 (D. Vt. Dec. 1, 2025) (declining to exclude PCB-causation testimony merely because experts did not identify a precise dose-response threshold in part because an expert opined that chemical’s effects were non-

¹⁴ Because some experts do opine that there may be “no safe dose” of CHRs, the Court examines below whether those experts use logic other than “any dose” to reliably bridge the gap between their analysis and human-relevant exposures.

monotonic). Especially given the concept's adoption in some scientific circles. Atwood Rep. at 12-14, 49-51 (discussing non-monotonicity of EDCs).

C. Generalized Challenges to the Epidemiological Foundation of Plaintiffs' Experts Opinions

Defendants next lodge a series of generalized challenges against Plaintiffs' experts' reliance on the three epidemiological publications at the center of this litigation: *Chang*, *White*, and *Bertrand*. To the extent Defendants' challenges attack the underlying data, these are factual questions for the ultimate factfinder. *See Manpower*, 732 F.3d 796, 806. But, contrary to Plaintiffs' position, Pls.' Opp. at 12, Defendants' generally overbroad attack also encompasses a challenge appropriate for a Rule 702 inquiry: that the studies' limitations are so fundamental that any expert who relies on them to support their general causation opinion necessarily overextends the underlying data.¹⁵

Defendants' objections concern genuine limitations of these studies, including whether the reported associations supply sufficient predicate to perform a Bradford Hill analysis; the substantial number of non-statistically significant results for various subpopulations; the potential inclusion of non-CHR "straighteners, relaxers, or pressing products" in the Sister Study exposure category; the Sister Study's measurement of product use during only the 12 months preceding enrollment; and indicia of novelty, including the studies authors' characterization of their findings as novel and *White's* status as the only study addressing ovarian cancer. Defs.' Mem. at 33-43.

¹⁵ The Court will consider this objection as applied to specific experts below. *See Infra*, Section IV.

In general, limitations of this sort in underlying data do not render an expert's reliance on them inherently unreliable. Especially where those limitations did not prevent the challenged study from passing peer-review and publication. *Daubert v. Merrell Dow Pharms., Inc.* (“*Daubert II*”), 43 F.3d 1311, 1318 (9th Cir. 1995) (“That the research is accepted for publication in a reputable scientific journal after being subjected to the usual rigors of peer review is a significant indication that it is taken seriously by other scientists, i.e., that it meets at least the minimal criteria of good science.”). *Chang*, *White*, and *Bertrand* are no different. Each is a peer-reviewed publication analyzing data from large prospective cohorts using conventional epidemiological methods. The limitations of these studies do not render Plaintiffs’ experts who extrapolate from them inherently unreliable, but Plaintiffs’ experts must reliably account for those limitations. *See Rutledge v. Walgreen Co.*, 182 F.4th 168, 201 (2d Cir. 2026).

1) The Studies’ Findings¹⁶

Chang examined uterine cancer using data from the Sister Study. For use of “straighteners, relaxers, or pressing products” during the preceding 12 months, the study reported statistically significant hazard ratios of 1.80 (95% CI 1.12–2.88) for “ever” use compared with never use, 2.55 (95% CI 1.46–4.45) for frequent use (more than four times per year), 2.52 (95% CI 1.39–4.55) for frequent post-menopausal use, and 2.78 for confirmed medical cases (95% CI 1.39–5.55). Infrequent use yielded a non-statistically significant hazard ratio of 1.20 (95% CI 0.63–2.29). *Chang* controlled

¹⁶ The Court here reiterates only results that parties, or their experts, emphasize.

for race but also reported results for Black women that were elevated but not statistically significant: 1.66 (95% CI 0.67–4.09) for “ever” use and 2.12 (95% CI 0.83–5.39) for frequent use.

White, the sole epidemiological publication addressing ovarian cancer, also used Sister Study data. “Ever” use of “straighteners, relaxers, or pressing products” yielded a non-statistically significant hazard ratio of 1.29 (95% CI 0.70–2.38). Frequent use yielded a statistically significant hazard ratio of 2.19 (95% CI 1.12–4.27). Among Black women, as with *Chang*, hazard ratios were elevated but not statistically significant: 1.28 (95% CI 0.46–3.52) for “ever” use and 1.82 (95% CI 0.64–5.18) for frequent use. As in *Chang*, *White*’s authors controlled for race. They also characterized its race-specific analysis as exploratory and noted limited power and overlapping confidence intervals. *See White* at 1191.

Bertrand studied CHRs specifically using data from the BWHS. Relative to the study’s never/light reference group, moderate use yielded a hazard ratio of 1.23 (95% CI 0.86–1.76) and heavy use an HR of 1.18 (95% CI 0.81–1.71), both non-statistically significant results. The study reported statistically significant associations for postmenopausal women: hazard ratios of 1.60 (95% CI 1.01–2.53) for moderate use, 1.64 (95% CI 1.01–2.64) for heavy use, and 1.71 (95% CI 1.08–2.72) for at least 20 years of use. Because *Bertrand*’s authors combined never users with very light users to form the study’s reference category, several of Plaintiffs’ experts contend that a reference population containing women exposed to CHRs explains the study’s non-statistically significant results. *See, e.g., Cote Rep.* at 19.

2) The Studies' Limitations Are Factors Each of Plaintiffs' Experts Must Reliably Consider, Not Categorical Reasons for Exclusion.

a. Statistical Significance.

Defendants first contend that these studies do not form sufficient predicate association from which Plaintiffs' experts can reliably perform a Bradford Hill analysis. Defs.' Mem. at 33. Defendants are correct that association is a prerequisite. *See Gilbert*, 158 F.4th at 850. But they are incorrect that the studies do not sufficiently form said predicate. Even if experts could only reliably consider statistically significant results, each study reported at least one.

Further, while statistical significance is an important means of distinguishing true association from random variation, it is not a blanket requirement for an expert's causal analysis. *See In re Zolof (Sertraline Hydrochloride) Prods. Liab. Litig.*, 858 F.3d 787, 793 (3d Cir. 2017) (statistical significance is not a "magic criterion"). This is especially true in cases involving epidemiological evidence. *See In re Lipitor (Atorvastatin Calcium) Mktng., Sales Pracs. & Prods. Liab. Litig.*, 892 F.3d 624, 642 (4th Cir. 2018) (declining to impose statistical significance as a categorical threshold for admissibility); *Milward*, 639 F.3d at 24-25 (finding expert reliable who factored in non-statistically significant epidemiological results into weight-of-the-evidence analysis); *Talcum Powder*, 509 F. Supp. 3d at 170-71 (D.N.J. 2020) ("[A]ccording to the experts, in the epidemiology context, inconsistent statistical significance from one study to the next does not, in of itself, show inconsistency under Bradford Hill."); *see also Matrixx Initiatives, Inc. v. Siracusano*, 563 U.S. 27, 40-41 (2011) (rejecting

premise that medical experts have no reliable basis to draw inferences absent statistically significant evidence). In fact, the *Reference Manual on Scientific Evidence* describes a movement in epidemiology away from basing epidemiological conclusions solely on dichotomous significance testing. Reference Manual at 936-38. The Court therefore agrees with Plaintiffs that non-statistically significant results may reliably be considered as part of an epidemiological methodology. See Pls.' Opp. at 17-18. However, although Defendants' categorical objection regarding statistical significance misses the mark, they are correct that experts who materially rely on such results must provide a scientifically justified reason for doing so.

Moreover, experts must apply their approach to non-statistically significant evidence consistently. For example, an expert cannot treat lack of statistical significance as a reason for caution in one part of their analysis but disregard it in another without explanation. See *In re Paraquat Prods. Liab. Litig.*, 730 F. Supp. 3d 698, 842-50 (S.D. Ill. 2024). Defendants repeatedly characterize Plaintiffs' purported reliance on the statistically significant results in *Chang*, *White*, and *Bertrand* as doing exactly that. Defs.' Mem. at 2, 39 (characterizing this behavior as cherry-picking). But selecting among studies or assigning them different weights is not cherry-picking if an expert provides scientific justification for doing so. See *Rutledge*, 182 F.4th at 191-93; *Zenith Electronics Corp. v. WH-TV Broadcasting Corp.*, 395 F.3d 416, 419 (7th Cir. 2005) (Experts are required to "follow scientific approaches normal to their disciplines."). Whether each expert in fact cherry-picked depends on what that expert actually did, especially where experts considered evidence other than just

these three studies. As such, the Court analyzes Defendants' objections regarding statistical significance as applied to individual experts, where appropriately raised.¹⁷

b. Transdiagnostic Analysis

Defendants also object to analyses by Plaintiffs' experts that lump the three epidemiological studies together. Defs.' Mem. at 49 (citing *In re Acetaminophen - ASD-ADHD Prods. Liab. Litig.*, 707 F. Supp. 3d 309, 339, 342 (S.D.N.Y. 2023), *vacated and remanded sub nom. Rutledge v. Walgreen Co.*, 182 F.4th 168 (2d Cir. 2026))). In particular, Defendants note that only the *White* study examined the association between CHR use and ovarian cancer, and it only reported one statistically significant result. As such, Defendants argue, Plaintiffs' experts who analyze or group *White* together with *Bertrand* and *Chang* necessarily perform an unreliable "transdiagnostic" analysis. *Id.* However, Defendants' only authority was recently overturned on exactly this argument. *See Rutledge*, 182 F.4th at 185-188. As the Second Circuit explained, transdiagnostic analysis can be reliable where an expert provides a scientifically justified reason for engaging in it. *See id.* In other words, this limitation is not a categorical bar but rather requires a specific inquiry

¹⁷ Defendants likewise criticize the association identified in the three studies as "inherently suspect" because they report hazard ratios between 1.0 and 2.0, thus precluding reliable extrapolation from them. *See, e.g.*, Defs.' Mem. at 45-46. But there is no categorical requirement for an association to demonstrate double the risk of the diseases at issue. *See Hardeman v. Monsanto Co.*, 997 F.3d 941, 966 (9th Cir. 2021); *Talcum Powder*, 2026 WL 161184, at *31 (declining to impose a "magical number" for relative risk). Defendants' cases concern what magnitude of hazard ratio, taken alone, may allow an inference of causation as applied to a particular plaintiff. *See, e.g.*, *Daubert II*, 43 F.3d at 1321 ("A statistical study showing a relative risk of less than two could be combined with other evidence to show it is more likely than not that the accused cause is responsible for a particular plaintiff's injury."). Still, Plaintiffs' experts must consider hazard ratios reliably.

into whether each of Plaintiffs' experts who perform transdiagnostic analysis provide sufficient scientific justification for it.

c. *Chang* and *White*'s Overinclusive Exposure Categories

Defendants next emphasize that *Chang* and *White* are flawed because the Sister Study questionnaire asked participants about "straighteners, relaxers, or pressing products," an exposure category that is overinclusive. Respondents to the questionnaire, Defendants point out, may have interpreted that question to include non-CHR straighteners, relaxers, or pressing products such as "flat irons and hot combs to 'smoothing' methods known as Brazilian or Japanese straightening." Defs.' Mem. at 4. Defendants contend that this imprecision in the data means that Plaintiffs' experts who rely on the association in these studies must necessarily overextend the studies' findings. *See id.* at 34-36.

The Court disagrees. In particular, the underlying studies themselves did not overlook this limitation. For instance, *White* expressly discusses the distinction between chemical straightening and heat-based pressing and explains why the authors believed the resulting misclassification could underestimate association. *See Chang* at 1642; *White* at 1193; *see also* Cote Rep. at 21.¹⁸ Here too, then, the proper recourse is for the Court to examine whether Plaintiffs' experts treat this limitation reliably in their analyses.

¹⁸ To the extent that Defendants' experts may disagree, *see, e.g.*, Defs.' Mem. at 50 n.36 (citing Report of Dr. Adams-Campbell), this is a fact question for the jury. *See Manpower*, 732 F.3d at 806-09; *see also Rutledge*, 182 F.4th at 191-93 (overturning exclusion of expert who supplied a coherent scientific explanation for why an identified source of bias would tend to attenuate not create the observed association).

d. *Chang* and *White*'s 12-month Use Windows

Defendants similarly criticize Plaintiffs' experts' reliance on *Chang* and *White* because the Sister Study's questionnaire only asked whether respondents used CHRs during the 12 months preceding enrollment. *See* Defs.' Mem. at 51. Defendants contend that this one-year snapshot cannot account for ovarian and uterine cancer's latency periods and may misclassify former users as unexposed. *Id.* Again, neither the studies nor Plaintiffs' experts overlooked this limitation. For instance, Dr. Cote notes that the authors of *Chang* explained that the baseline measure was intended as a proxy for more usual use and reported that excluding cancers occurring during the first year of follow-up produced materially similar estimates. Cote Rep. at 21 (reasoning that the limited window may tend to underestimate longer-term use) (citing Chang et al., *Response to Etminan*, 115 J. Nat'l Cancer Inst. 233 (2023)). Pls.' Opp. at 20 & nn. 11-12 (arguing that the shorter window also reduces "recall bias"). To the extent Defendants argue that particular experts fail to examine this limitation unreliably, the Court considers those individualized objections.¹⁹

e. Novelty

Defendants finally argue that Plaintiffs' experts unreliably extrapolate from the epidemiological studies' conclusions, either because these studies only showed association, not causation, or because the studies' authors describe their findings as

¹⁹ Again, that Defendants' experts may identify a direction of error different from some of Plaintiffs' experts poses a factual question appropriate for a battle of the experts at trial. *See Baugh v. Cuprum S.A. de C.V.*, 845 F.3d 838, 850 (7th Cir. 2017) (cleaned up). It does not render Plaintiffs' experts categorically unreliable, especially where Plaintiffs' experts may have a scientifically justified reason for concluding differently. *See, e.g.*, Cote Tr. at 168-170 (explaining that data on lifetime use suggests the margin of error tilts in the direction of under- not over-estimation).

novel, use couching language, or call for additional research. The Court does not find Defendants' arguments persuasive. Extrapolation of causation from association is common in toxic tort cases and must only be performed through a reliable methodology, such as Bradford Hill or weight-of-the-evidence. *Gilbert* 158 F.4th at 850; *Milward*, 639 F.3d at 24-25. Further, couching language is common in studies assessing causal relationships. *See* Reference Manual at 973. Especially where science may be novel. *See Wendell v. GlaxoSmithKline LLC*, 858 F.3d 1227, 1237 (9th Cir. 2017) ("Perhaps in some cases there will be a plethora of peer reviewed evidence that specifically shows causation. However, such literature is not required in each and every case.") (citing *Clausen v. M/V New Carissa*, 339 F.3d 1049, 1060 (9th Cir. 2003)). Novelty does not equal unreliability. *See id.* at 1235-37; *Daubert*, 509 U.S. at 593.

IV. Challenges to Individual Experts

As mentioned above, Plaintiffs' experts' opinions play different roles in supporting Plaintiffs' overarching theory of general causation. The Court here addresses Defendants' challenges to Mr. Atwood, who offers an opinion on biological plausibility, and Dr. Cote, an epidemiologist offering a general causation opinion using Bradford Hill analysis.

A. Mr. Atwood's Biological Plausibility Opinion

Mr. Atwood is a toxicologist who spent more than twenty years conducting weight-of-evidence carcinogen evaluations for the National Toxicology Program ("NTP"). Pls.' Opp. at 82. Defendants do not challenge his qualifications. While

Defendants challenge Mr. Atwood’s “untimely” causation opinion, Defs.’ Mem. at 83, Plaintiffs clarify in their opposition that they proffer Mr. Atwood solely for his opinion on biological plausibility. Pls.’ Opp. at 81-86 (expressly disclaiming that Mr. Atwood offers any stand-alone general-causation opinion).²⁰

For his part, Mr. Atwood states his mandate was “to render an opinion regarding the biological plausibility that use of chemical hair relaxers could cause endocrine-related cancers—specifically ovarian and uterine cancer.” Atwood Rep. at 3. To answer that question, he reviewed more than five hundred papers and other sources, including human epidemiology, agency assessments, human and animal toxicology, in-vitro and in-silico studies, product-composition studies, biomonitoring studies, and mechanistic literature. *Id.* at 4-7, 20-29. Mr. Atwood’s report divides the evidence into “direct” evidence—such as epidemiology of hair-relaxer users, product testing, and biomarkers following product use—and “indirect” evidence concerning chemicals reported in hair relaxers and biological processes relevant to endocrine disruption and carcinogenesis. *Id.* at 5-6.

Biological plausibility is, as Plaintiffs describe it, a “building block” of their general causation theory. *See* Pls.’ Opp. at 81. Biological plausibility is neither

²⁰ This means Mr. Atwood may explain the role of his biological plausibility opinion within the Bradford Hill framework but may not offer it as its own independent general-causation analysis. This moots Defendants’ correct observation that Mr. Atwood mischaracterizes three studies in his abbreviated Bradford Hill analysis—*Wise*, *Kithikii*, and *Ogunsina*—as “uterine cancer” studies even though his earlier discussion accurately identifies those three studies as addressing uterine fibroids or leiomyomata. *Compare* Atwood Rep. 30, 38-39 (discussing these as fibroid studies), *with id.* 69-70 (citing them as finding association between hair relaxer use and uterine cancers). Moreover, Mr. Atwood’s reasoning from these three studies in support of his opinion on biological plausibility accurately characterizes them. Nor do they form a necessary foundation for his biological plausibility opinions. Thus, this mischaracterization does not warrant his exclusion.

necessary nor sufficient for a general causation theory. *See Talcum Powder*, 2026 WL 161184, at *50-51, *55, *58. Further, biological plausibility opinions need not definitively prove every step in a causal mechanism. *See id.* Rather, such opinions must only provide reliable scientific support demonstrating that their proposed mechanism is plausible. *Id.*; *see also Talcum Powder*, 509 F. Supp. 3d 116, 175; *In re Abilify (Aripiprazole) Prods. Liab. Litig.*, 299 F. Supp. 3d 1291, 1308 (N.D. Fla. 2018) (collecting cases). Particularly where ethical or practical constraints preclude direct experimentation, biological plausibility may be supported through converging lines of different bodies of scientific evidence. *Talcum Powder*, 2026 WL 161184, at *58. Plaintiffs bear the burden to show that it is more likely than not that Mr. Atwood's biological plausibility opinion rests on sufficient facts or data and reflect a reliable application of reliable principles and methods.

As elaborated below, Defendants' motion to exclude as to Mr. Atwood is granted in part and denied in part.

1) Mr. Atwood Reliably Opines as to Only Some Chemical Classes.

In a generalized objection, Defendants argue that Plaintiffs' experts, especially toxicologists like Mr. Atwood, cannot reliably analyze chemicals in class groups. Defs.' Mem. at 75 (calling this a failure "to perform the foundational toxicological analyses necessary to assess causation."). As discussed above, this generalized objection only holds to the extent Mr. Atwood provides inadequate scientific justification for grouping the chemicals he examines.

Atwood supplies a reliable basis for concluding that the members of some chemical classes share causally-relevant properties. For instance, using the key characteristics of chemicals framework, Atwood separately evaluates cyclosiloxanes, parabens, phthalates, and benzophenones, rates the strength of the evidence for various endocrine-disrupting mechanisms, and accounts for the strengths and weaknesses of the evidence. *See* Atwood Rep. at 49-68 (especially §§ 7.4.3–7.4.4 & Tables 7-10–7-13). Plaintiffs state that Mr. Atwood’s methodology, “reflect(s) accepted toxicological principles.” Pls.’ Opp. at 82. Defendants do not challenge any specifics of Mr. Atwood’s methodology or application specific to the key characteristics of chemicals framework. Instead, Defendants reiterate their generalized challenges or point out analytical gaps in Atwood’s extrapolation from his applying that framework to his ultimate biological plausibility opinion on uterine and ovarian cancer, further discussed below. *See* Defs.’ Mem. at 75-78.

The Court agrees with Plaintiffs. Mr. Atwood’s groupings of these EDC categories is more likely than not reliable. He evaluates the strengths and weaknesses of the evidence, accounts for heterogeneity, and, most importantly, does not merely extrapolate from the proposition that one member of a broad category happens to be an EDC. *See* Atwood Rep. at 49-68. Instead, Mr. Atwood identifies common biological functions, mechanisms, or effects relevant to his inference. *See id.* For instance, he describes the common pathways these chemicals share and describes the effect of heterogeneity within each class. *See, e.g.,* Atwood Rep. at 62 (noting that different parabens are category 1 or category 2 endocrine disruptors; “activity of

parabens increases with alkyl side chain/branched chain length”); *id.* at 64-65 (similar for phthalates).

On the other hand, Atwood’s report does not provide sufficient scientific justification for analysis predicated on broader use-based categories, such as fragrances or UV filters. Mr. Atwood appears to group these chemicals merely because each identified “chemical class” “included one or more chemicals that have endocrine disrupting properties.” *See* Atwood Rep. 28-29. This is a scientifically unjustified extrapolation. *See Burst*, 650 F. App’x at 172; *Henricksen*, 605 F. Supp. 2d at 1156.

Accordingly, Mr. Atwood’s opinion may reliably analyze by class those chemicals for which he supplies a common biological basis. He may not reason from use-based classes, such as fragrances or UV filters.

2) Mr. Atwood Ties the EDCs He Examines to the CHRs at Issue.

Defendants also challenge Mr. Atwood’s opinion as insufficiently tied to the products at issue. They emphasize that *Helm et al.*, on which Mr. Atwood partially relies, tested only three relaxers, that CHR formulations differ, that Mr. Atwood did not review Defendants’ product-specific ingredient lists, and that he acknowledged the absence of any particular constituent would not necessarily alter his overall plausibility opinion. Defs.’ Mem. at 76-79 (citing *Helm et al.*, *Measurement of Endocrine Disrupting and Asthma-associated Chemicals in Hair Products Used by Black women*, 165 Environ. Res. 448 (2018)). Plaintiffs respond that “Mr. Atwood can

rely on the published materials reflecting the classes of chemical ingredients in chemical hair relaxers.” Pls.’ Opp. at 83.

But *Helm* is not Mr. Atwood’s sole evidence concerning product composition. For instance, Mr. Atwood relies on a California EPA assessment reviewing ingredients in 185 hair-straightening products, as well as published product-testing literature concerning EDCs and other substances in hair products. Pls.’ Opp. at 83; Atwood Rep. at 26-29. Experts at the general causation stage must only reliably tie their chemical analysis to the products at issue. *See supra*, Section III.A. Mr. Atwood’s reliance on publications that connect the EDC chemicals and mechanisms analyzed to CHRs as a product class makes it more likely than not that he has done so.

3) Mr. Atwood Reliably Opines to Biological Plausibility Regarding EDC Mixtures.

Defendants’ central argument that Mr. Atwood’s opinion is unreliable is that, despite being a toxicologist, he cannot identify an individual constituent that independently causes uterine or ovarian cancer, cannot prove precisely which constituent generated the associations observed in the epidemiology, and cannot identify an invariant chemical recipe for the mixture he analyzes. Defs.’ Mem. at 75-79 (arguing this is essential for any toxicological analysis). In response, Plaintiffs point to Mr. Atwood’s report, stating that he reviewed a large literature, employed the typical methods he used in his practice at the NTP, and adequately supported mixture/endocrine mechanisms. Pls.’ Opp. at 82. As discussed above, Rule 702 does not impose the requirements Defendants propose. *See supra*, Section III.A. Instead,

Mr. Atwood must provide reliable scientific support for the mixture mechanism and chemical groupings that he actually advances.

Mr. Atwood does so as to EDC mixtures. For instance, Mr. Atwood reviewed experimental literature concerning such mixtures and explains that those studies show EDCs have additive and synergistic effects. Atwood Rep. at 16-19, 66-68. He also analyzed literature concerning common biological mechanisms or effects using the key characteristics of carcinogens framework. *See id.* at 53-62.

Defendants further argue that Mr. Atwood never bridges the analytical gap from endocrine disruption to uterine or ovarian cancer. Defs.' Mem. at 75, 77-78. Defendants rely heavily on portions of his deposition in which he acknowledged that there are no studies reporting "a causal association" between various chemicals and uterine or ovarian cancer. *See id.* They also argue that endocrine disruption does not invariably produce adverse health effects and that the fact that a chemical causes one cancer does not establish that it causes another. *Id.* Plaintiffs respond that Mr. Atwood's opinion is not causal but regards "whether chemical hair relaxers can contribute to uterine and ovarian cancer through biologically plausible mechanisms," Pls.' Opp. at 81; that "simplistic linear dose-response relationships are inadequate to capture the effects of endocrine disruptors because such compounds exert low-dose effects and non-monotonic biological response," *id.* at 83-84; and that Defendants' authority on transdiagnostic analysis was overturned, *see* Pls.' Notice of Supp. Authority, Dkt. [1980]; *supra*, Section III.C.

First, Mr. Atwood's use of transdiagnostic reasoning is reliable because he explains why such reasoning is scientifically appropriate. *See supra*, Section III.C. Citing *Rachon et al.*, Mr. Atwood explains that breast, uterine, and ovarian cancers are hormone-responsive malignancies whose growth may be estrogen-dependent and that EDCs exhibiting estrogenic effects may therefore have relevance across those diseases. Atwood Rep. at 30 (citing Rachon et al., *Endocrine Disrupting Chemicals (EDCs) and Female Cancer: Informing the Patients*, 16(4) Rev. Endocr. Metab. Disord. 359 (2015)). Further, for many of the types of EDCs he analyzes, Mr. Atwood also separately cites uterine- and ovarian-specific mechanistic evidence, including studies involving human ovarian cancer cells and effects in uterine and ovarian tissues. *See id.* at 44-49, 61-68, 78-79.

Additionally, Defendants' citations of Mr. Atwood's testimony regarding his failure to identify *causal association* with ovarian and uterine cancers does not render unreliable his opinion on *biological plausibility*. Again, Plaintiffs disclaim that Mr. Atwood opines to causation. Illustrating the difference, Mr. Atwood described his method on biological plausibility in his deposition as one that looked at whether endocrine disruption "has been identified as a key event or a molecular initiating event... for both ovarian and uterine carcinogenesis." Atwood Tr. at 128-29. He supports this opinion, discussing receptor-mediated effects, altered hormone production, epigenetic modifications, oxidative stress, and other key characteristics of endocrine disruptors and carcinogens. *See* Atwood Rep. at 49-66; *see also id.* at 43 ("Because most of the [chemicals of concern] have endocrine disrupting properties via

binding to an endocrine or other hormone receptor, receptor-mediated effects (KCC8) were common to all.”); *see id.* at 44 (tying cyclosiloxanes to breast cancer and acknowledging studies’ limitations); *id.* at 45 (“Parabens are known to bind to estrogen, androgen, progesterone, and glucocorticoid receptors, and PPARs and promote cell proliferation at levels relevant to human exposure.”); *id.* at 46 (Table 7-6) (tying parabens to breast cancer); *id.* (tying phthalates to “breast and other endocrine-related cancers”); *id.* at 47 (Benzophenones “induce disrupting effects toward estrogen receptor, androgen receptor, progesterone receptor, and thyroid hormone receptor.”). More likely than not, these scientific justifications for his opinion on biological plausibility render Mr. Atwood’s opinion reliable.

Furthermore, Defendants argue that Mr. Atwood did not test for the exact EDC mixtures present in any particular CHR and acknowledged that he did not possess data establishing synergy among any precise mixture in a CHR. Defs.’ Mem. at 79 (citing Atwood Tr. at 344-49). To the extent this is a rehashing of their “no recipe” argument, the Court addressed it above. To the extent this is an independent argument regarding Mr. Atwood’s reliability, he explained that his opinion is based on evidence regarding additive and synergistic effects of EDC mixtures and low-dose effects. Atwood Tr. at 348; Atwood Rep. at 11-14, 54-67; *see also* Pls.’ Opp. at 83-84. Moreover, biological plausibility simply does not require experimental analysis where an expert supports his reasoning with scientific evidence. *See JUUL*, 2022 WL 1814440, at *9-10 (permitting mixture opinions where experts identified additive or synergistic mechanisms and cited literature).

For these reasons, the Court finds that Mr. Atwood more likely than not reliably applied the methodology underlying his EDC mixture opinion, including reliably addressing any analytical gaps.

4) Mr. Atwood Does Not Reliably Connect Other Carcinogenic Constituents to His Mixture Theory of Biological Plausibility.

In addition to EDCs, Mr. Atwood's opinion discusses other carcinogenic constituents, such as formaldehyde and other substances. His opinions as to biological plausibility for these non-EDC constituents are unreliable. As explained above, evidence that several substances possess harmful characteristics independently does not itself establish a scientifically plausible mixture effect. *See supra*, Section III.A. But this is how Mr. Atwood's report treats these other chemical constituents. Mr. Atwood never connects these other carcinogenic chemicals to his mixture analysis. Nor does his report explain that formaldehyde or other non-EDC carcinogenic constituents act additively or synergistically together or with EDCs. *See* Atwood Rep. at 19-24, 66-68, 75-79.

Further, unlike with Mr. Atwood's EDC-related opinions, the Court agrees with Defendants that Mr. Atwood does not connect non-EDC chemical constituents to ovarian and uterine cancers. Plaintiffs for their part do not challenge Defendants' characterization as to Mr. Atwood's consideration of non-EDC carcinogenic constituents. *Compare* Defs.' Mem. at 77-78 (discussing EDC and non-EDC constituents) *with* Pls.' Opp at 81-83 (citing the record only for EDCs). Although Mr. Atwood's report may reliably show that these chemicals bear the hallmarks of general

carcinogenicity, as discussed above, Plaintiffs' experts at general causation must connect the chemicals they discuss to the cancers at issue.

Mr. Atwood's strongest opinion on a non-EDC constituent regards formaldehyde, which he states can act as a tumor promoter or co-carcinogen with other substances. Atwood Rep. at 34-49. But his report does not identify a study or other scientific source for that proposition, identify the relevant co-exposures, or explain how formaldehyde may act as a promoter or co-carcinogen. *See id.* Nor does Mr. Atwood tie formaldehyde's individual or alleged mixture effects specifically to uterine or ovarian cancers. *See id.*

As such, Defendants' motion to exclude Mr. Atwood's opinion is granted as to his biological plausibility opinions regarding the mixture effects of non-EDC chemical constituents and their connections to uterine and ovarian cancer.

5) Mr. Atwood Provided Sufficient Specificity on Dose for his Biological Plausibility Analysis.

Defendants next argue that Mr. Atwood performed no dose-response analysis, identified no threshold dose, and therefore cannot reliably opine on biological plausibility. Defs.' Mem. at 79-80. Defendants' response largely hinges on the toxicological maxim that "the dose makes the poison." Defs.' Reply at 40. As explained above, exact dose thresholds are not required for a reliable expert opinion, especially for substances recognized as exhibiting non-conventional dose responses. The relevant inquiry is then whether Mr. Atwood's report reliably connects the mechanistic evidence to exposures humans realistically experience.

Mr. Atwood's methodology does. First, he scientifically justifies his description of EDC's low dose or non-monotonic dose response. As already explained, contrary to Defendants' characterization, Defs.' Mem. at 79, non-monotonic dose response is a recognized feature in endocrine-disruption science. Mr. Atwood explains this recognition to Defendants in his deposition just in-between the pincites that Defendants cite. *See* Defs.' Mem. at 79 (citing Atwood Tr. at 312-313, 315, 318-19); Atwood Tr. at 317 (stating that the Endocrine Society published a statement on the non-monotonicity of EDCs). Further, Mr. Atwood reliably explains the phenomenon of non-monotonicity, cites the literature supporting it, and explains how it informs his interpretation of low-dose effects for EDCs. *See* Atwood Rep. at 11-14; *see also* Reference Manual at 980 (giving EDCs as an example where nonmonotonic effects have been shown).

The Court is also not persuaded by Defendants' argument that "Mr. Atwood concedes he never analyzed chemical hair relaxers or their constituent chemicals to determine whether [non-monotonic] effects actually occur from use of chemical hair relaxer products." *See* Defs.' Mem. at 79. As explained above, Mr. Atwood need only explain a biologically plausible mechanism to be reliable. Testing is often not required for such opinions, especially where, as Plaintiffs point out, such testing would likely be unethical. *See* Pls.' Opp. at 32 n.19 (citing *Talcum Powder*, 2026 WL 161184 at *58) ("As courts have recognized, biological plausibility may be established through multiple lines of evidence, ... particularly where ethical and practical constraints preclude direct human experimentation.").

Moreover, Mr. Atwood's report connects EDCs to dose through other mechanisms. For instance, he cites biomonitoring evidence, discusses studies detecting EDCs in human blood and tissues, and expressly gives "greater weight" to human studies and human-cell studies using concentrations comparable to actual human exposures than to studies involving less pertinent test systems. Atwood Rep. at 8, 32-33. His conclusions likewise identify in-vivo and in-vitro effects reported "at concentrations below or near the concentrations found in human blood and tissues." *Id.* at 79.

The Court therefore finds Mr. Atwood reliably considers dose.

6) Mr. Atwood Reliably Follows His Stated Methodology

Defendants also contend that, because Mr. Atwood acknowledged that he did not conduct a formal "ADME" analysis, he failed to follow his own methodology. Defs.' Mem. at 82. This argument attributes to Mr. Atwood a methodology he did not claim to perform. *See id.* (arguing Mr. Atwood failed to reliably apply the NTP Report on Carcinogens Handbook). Mr. Atwood's report states only that the methodology he used "is consistent with methods used to identify and evaluate mechanistic studies for carcinogens while working as a Senior Toxicologist supporting the NTP's Report of Carcinogens for more than 20 years." Atwood Rep. at 21. He also states that his "general methods are described in the NTP's Report on Carcinogens' Handbook, and the IARC preamble." *Id.* (cleaned up). Defendants do not argue that Mr. Atwood did not perform the methodology he describes, that its application was inconsistent with his practice as a Senior Toxicologist, or explain how the differences between his

chosen method and a formal ADME analysis render him unreliable. Further, the Court’s “cursory comparison of Mr. Atwood’s report to the Handbook,” *see* Defs.’ Mem. at 82, revealed that Mr. Atwood did in fact analyze evidence related to “evaluation of the mechanistic and other data relevant to the potential carcinogenicity, including evidence of absorption, distribution, metabolism, and excretion.” *See generally* Atwood Rep.; *see also* Atwood Tr. at 293-95 (explaining he considered data addressing the questions relevant to his task).²¹

7) Atwood Reliably Supports a Dermal Exposure Pathway, but Not an Inhalation Pathway

Finally, Defendants contend that Mr. Atwood conducts unreliable absorption or exposure-pathway analysis. They are correct as to Mr. Atwood’s inhalation/vaporization analysis, but not as to his dermal-exposure analysis.

Mr. Atwood devotes sections of his report to exposure. He explains that chemicals applied to the scalp may be absorbed dermally, citing evidence indicating that scalp absorption can exceed absorption through other skin sites and that disruption of the skin barrier can increase dermal penetration. Atwood Rep. at 8-9, 32-33. He also cites literature connecting that general toxicological pathway to biomonitoring studies reporting higher urinary and tissue concentrations of several EDC biomarkers among users of relevant hair products. *Id.* He also cites studies showing that EDCs in personal care products have been shown to circulate

²¹ Defendants also argue that Mr. Atwood’s analysis is unreliable because he cited the 2015 version of the NTP Handbook even though the NTP issued an updated Handbook in 2025. Defs.’ Mem. at 82 n.55. The problem is that Defendants identify no material methodological difference between the 2015 and 2025 Handbooks that should bear on the reliability of Mr. Atwood’s analysis.

systemically in the human body. *Id.* That is sufficient to reliably support the dermal exposure component of his limited biological-plausibility opinion.²²

Mr. Atwood's inhalation/vaporization analysis is different. Mr. Atwood only states in his report that "volatile" substances such as formaldehyde and cyclosiloxanes can be released during application and that heat can increase release to the air. Atwood Rep. at 8-9, 32-33. He cites no studies for that proposition, and he acknowledged in his deposition that he had not specifically investigated it. Atwood Tr. at 142-45. As such, Mr. Atwood's opinion regarding this pathway of absorption or exposure is unreliable.

The Court therefore grants Defendants' motion to exclude Mr. Atwood as to his testimony regarding the inhalation or vaporization pathway of exposure or absorption, but not as to the dermal pathway.

8) Conclusion as to Mr. Atwood.

Accordingly, Defendants' motion to exclude Mr. Atwood is granted in part and denied in part. Atwood may offer his EDC-centered biological-plausibility opinion, including his opinions related to dermal pathways of exposure, EDC-mixtures, non-monotonic and low-dose dose-response, and transdiagnostic evidence. He may not offer an ultimate general-causation opinion; rely on inhalation or vaporization as an independently established exposure pathway; use the general carcinogenicity of

²² Defendants also criticize Mr. Atwood's discussion of scalp burns on the ground that not every use of every relaxer causes a burn. This point does not undermine the chain of biological plausibility from dermal exposure that Mr. Atwood describes. His report treats intact-scalp dermal absorption as an exposure pathway and burns as a circumstance that may increase absorption. *See* Atwood Rep. at 8-9, 33.

formaldehyde or other carcinogenic constituents as part of his opinion on the relevant mixture mechanisms of biological plausibility; or opine as to as to chemical use-classes like fragrances and UV filters.

B. Dr. Cote's General Causation Opinion

Using a Bradford Hill analysis, Dr. Cote opines that chemical hair relaxers “as a whole,” are capable of causing uterine and ovarian cancer. *See* Cote Tr. at 375; Cote Rep. at 1, 5-6. Defendants lodge both generalized and specific objections to Dr. Cote's reliability. *See* Defs.' Mem. at 20-54 (generalized); *id.* at 57-61 (specific). The Court finds that Dr. Cote reliably employed a reliable methodology to support her conclusions and therefore declines to exclude her opinion on general causation.

1) Bradford Hill Analysis

Bradford Hill analysis is generally accepted as a reliable methodology for assessing causation. *See Gilbert*, 158 F.4th at 850; *see also Zoloft*, 858 F.3d at 796-97 (finding the framework “generally reliable”); *Wendell*, 858 F.3d at 1235 n.4 (similar). Experts using a Bradford Hill methodology evaluate available evidence to opine whether an observed association is causal rather than attributable to chance. *See Gilbert*, 158 F.4th at 850-51. The framework was first published in 1965 by Sir Austin Bradford Hill,²³ and has since been adapted as scientific methods and knowledge have evolved. *See* Pls.' Opp. at 44 (citing Kristen Fedak et al., *Applying the Bradford Hill Criteria in the 21st Century: How Data Integration Has Changed Causal Inference in*

²³ Sir Austin Bradford Hill, *The Environment and Disease: Association or Causation?*, 58 Proceedings of the Royal Soc'y of Med. 295 (1965).

Molecular Epidemiology, 12 Emerg. Themes Epidemiol. 14 at 3 (2015)); Reference Manual at 973-75.

The original *Bradford Hill* article enumerated nine considerations, not a rigid “formula or algorithm [that must] ...be used to assess whether a causal inference is appropriate.” Reference Manual at 975.²⁴ For instance, an expert need not analyze all nine factors. *See id.* Instead, the only necessary aspects of a Bradford Hill analysis are a predicate finding of an association, *see Gilbert*, 2026 WL 2976181, at *850, and the factor of temporality. *Paraquat*, 730 F.Supp.3d at 811 n.17. The others may be absent even when a true causal relationship exists. Reference Manual at 975; *Rutledge*, 182 F.4th at 199-200.

Bradford Hill analysis requires an expert to exercise “judgment and searching analysis, based on biology, of why a factor or factors may be absent despite a causal relationship, and vice versa.” *See* Reference Manual at 975. As such, “the Bradford Hill methodology poses some challenges for a reviewing court, as the sweep of an expert’s opinion is likely to be quite broad, the inquiry involves the exercise of subjective judgment, and an expert may opine on matters outside of her core area of expertise.” *Roundup*, 390 F.Supp.3d at 1130.²⁵ A court assessing an expert’s Bradford

²⁴ The nine factors are: “1. Temporal relationship 2. Strength of the association 3. Dose-response relationship 4. Replication of the findings 5. Biological plausibility 6. Consideration of alternative explanations 7. Cessation of exposure 8. Specificity of the association 9. Consistency with other relevant knowledge.” Reference Manual at 974-75; *Roundup*, 390 F. Supp. 3d at 1116 (similar).

²⁵ *See also id.* at 1134 (“It bears repeating that applying the Bradford Hill criteria involves a certain amount of subjectivity, and experts often will disagree when doing so. The job of the district court is merely to ensure that the expert’s methods are not so far outside the realm of reasonable scientific practice that his testimony would be unhelpful or misleading to a jury.”); *see also* Reference Manual at 975 (“Although the drawing of causal inferences is informed by scientific expertise, it is not a determination that is made by using an objective or algorithmic methodology”).

Hill analysis must be careful not to substitute its own disputed interpretation of epidemiological evidence for an expert's scientifically supportable interpretation. *Rutledge*, 182 F.4th at 185-96; *but see id.* at 199-200 (affirming exclusion of expert who failed to explain the relationship among the Bradford Hill factors or how he weighed and synthesized them"); *Paraquat*, 730 F.Supp.3d at 841 ("An expert who relies on a weight of the evidence review based on Bradford Hill framework must, at a minimum, explain how conclusions are drawn for each Bradford Hill criterion and how the criteria are weighed relative to one another. A district court, for its part, should avoid treating each subsidiary conclusion that the expert draws atomistically.") (cleaned up).

2) Defendants' Generalized Challenges as Applied to Dr. Cote Do Not Render Her Unreliable.

Defendants first argue that Dr. Cote cannot offer a reliable causation opinion without identifying the particular chemical—or chemical recipe—responsible for the alleged carcinogenic effects. Defs.' Mem. at 23-24, 29. As the Court has explained, nothing in Rule 702 establishes such a categorical prerequisite. *See supra*, Section III.A. Further, Dr. Cote scientifically justifies analysis at the product-as-a-whole level. She considers epidemiological evidence relating CHR use at the product level to the diseases at issue, literature identifying potentially endocrine-disrupting constituents in CHRs, and scientific work describing how EDCs can act through hormone receptors and produce additive or synergistic biological effects. Cote Rep. at 12-14, 23-26; Cote Tr. at 363.

Second, although Defendants critique Dr. Cote for analyzing certain chemicals as a class, Dr. Cote identifies scientific characteristics shared by EDCs that justify class treatment:

“I would say that endocrine-disrupting chemicals as a class could be associated. And actually, I think evidence nicely suggests and supports the idea that these endocrine-disrupting chemicals interfere with your hormone system, with your endocrine system, through their ability to mimic estrogen and disrupt all sorts of bodily processes ultimately leading to carcinogenesis, especially in estrogen-sensitive tissues.” Cote Tr. at 362; *see also* Cote Rep. at 12-14.

Unrebutted by Defendants, this is sufficient scientific justification for Dr. Cote’s class-based consideration of EDCs to be reliable.

Third, Defendants next emphasize Dr. Cote’s testimony that she does not know which particular chemical appeared in which particular hair relaxer at any given point in time. *See, e.g.*, Defs.’ Mem. at 23 (citing Cote Tr. at 357, 364-65). However, as the Court stated previously, general causation experts must only bridge the analytical gap between the chemicals they analyze and the products at issue. *Supra*, Section III.A. Dr. Cote provides a sufficient bridge. For instance, she cites literature in her report that connects her product-as-a-whole analysis, especially as to EDC mixtures, to CHRs, including by describing studies reporting greater urinary concentrations of EDC biomarkers among women using CHRs. Cote Rep. at 12.²⁶

Fourth, Defendants’ generalized objections regarding dose are inapposite to Dr. Cote’s analysis. As discussed above, *supra*, Section III.A., at the general causation

²⁶ Dr. Cote also testified that she knows CHRs contain EDCs. *See* Cote Tr. at 365-66. The Court finds this statement reliable given Dr. Cote’s references to the scientific literature. *See* Cote Rep. at 12, at references 65-66; *see also id.* at Additional Materials Considered (citing Helm et al., *Measurement of Endocrine Disrupting and Asthma-associated Chemicals Hair Products Used by Black Women*, 165 Env. Rsch. 448 (2018)).

stage, an expert must only provide a reliable scientific basis for their opinion that the products are capable of causing the alleged disease under relevant exposure conditions. Dr. Cote's analysis involves epidemiological studies of actual CHR product use, including the reported relationships between frequency or duration of use and cancer risk, evidence that hair-product use is associated with EDC biomarkers, and mechanistic literature concerning EDCs and hormone-responsive carcinogenesis. Cote Rep. at 12-14, 15-25. Furthermore, her evaluation of biological gradient, discussed further below, also shows that her opinion is tied to exposure through realistic human use. *See Testosterone Replacement Therapy*, 2018 WL 4030585, at *5. Finally, Dr. Cote's discussion of low-dose effects is a far cry from using impermissible "any dose" logic to show exposure. *See Reference Manual* at 981 n.244 ("Evidence of a dose-response relationship as bearing on whether an inference of general causation is justified is analytically distinct from determining whether evidence of the dose to which a plaintiff was exposed is required in order to establish specific causation.").

3) Dr. Cote Does Not Unreliably Overextend the Underlying Epidemiological Evidence

Defendants raise specific challenges to Dr. Cote's reliance on the underlying epidemiological evidence and, in their generalized challenges to Plaintiffs' experts, primarily focus on Dr. Cote. *See Defs.' Mem.* at 35-42. The Court rejected Defendants' categorical challenges above, and rejects those here again as applied to Dr. Cote's opinion. The Court finds that Dr. Cote evenhandedly considered *Chang*, *White*, and *Bertrand*, acknowledging their limitations and scientifically justifying why they nonetheless support her opinion. *See Cote Rep.* at 17, 21 (discussing the Sister Study's

combined category of straighteners, relaxers, and pressing products); *id.* at 17-18, 21, 24 (discussing the Sister Study's twelve-month exposure window); *id.* at 15-24 (discussing statistically significant and non-statistically significant findings). Defendants either do not contend with Dr. Cote's actual reasoning regarding these aspects of the studies or merely contest its persuasiveness. In the latter instance, the proper recourse for Defendants is cross-examination or presentation of competing expert opinions. *See Schultz*, 721 F.3d at 431.

One exception warrants closer examination: Defendants' contention that Dr. Cote cherry picks statistically significant results (thereby inadequately or inconsistently considering non-statistically significant results), especially in the Black-women subgroups of the Sister Studies and the results in *Bertrand* for moderate- and heavy-use subgroups. *See* Defs.' Mem. at 36-40. However, Defendants largely mischaracterize Dr. Cote's treatment of non-statistically significant results. Although Defendants criticize Dr. Cote's emphasis or deemphasis of certain results as standardless, *see* Defs.' Mem. at 49, the Court finds that Dr. Cote provides significant scientific justifications. Centrally, she holistically considers both types of results in the context of each epidemiological study's quality, evaluating their measures of effect, confidence intervals, cross-checks against medically confirmed cases, sensitivity analyses, exposure categorizations, numbers of participants and cases, recruitment periods, follow-up, and potential confounders. Cote Rep. at 15-23. After considering each studies' strengths and weakness, Dr. Cote concludes that each

is a “well-designed prospective cohort study with excellent longitudinal follow up and case ascertainment.” *Id.* at 17, 19-20.

Particularly informative as to Dr. Cote’s discussion of statistically significant results is her identification of several reasons why the epidemiological study’s limitations may bias their results towards the null. *Id.* at 17-19, 21, 23-24. For instance, Dr. Cote explains that *Bertrand’s* never/light reference category would produce estimates closer to the null because it included users of CHRs. *Id.* at 19, 23-24. She likewise considers the Sister Study’s potential misclassification of former users as never users because its questionnaire captured only the preceding twelve months. *Id.* at 17-18, 21, 24 (citing research concerning patterns of relaxer use); see also *id.* at 17, 21 (reasoning that inclusion of non-CHR straightening methods in questionnaire could underestimate association). While Defendants contest the expected direction and magnitude of Dr. Cote’s direction-of-bias assessments, the Court finds Dr. Cote has provided sufficient scientific justification to be reliable. *See Rutledge*, 182 F.4th at 185-96 (cautioning that a court should not “substitute[e] its own understanding of various epidemiological criteria for that of the expert scientists”). Defendants may contest those assessments on cross-examination, or via their own experts.

Moreover, Dr. Cote’s approach to statistical significance is consistent with her field’s. For instance, her report criticizes a study’s reliance on a lack of statistical significance to rule out an association, notwithstanding the increased risk for postmenopausal women. Cote Rep. at 22 (discussing Hernandez et al., *Systematic*

Review of the Epidemiology of Hair Relaxer Use and Hormone-Sensitive Reproductive Outcomes Among Black Adult Women in the United States, J. Applied Toxicology (2025)). This criticism accords with modern epidemiology's caution against an exclusively dichotomous approach to statistical significance. *See supra*, Section III.C.; Reference Manual at 936-39.²⁷

As such, Dr. Cote's opinion has little in common with the experts in Defendants' cases. In *Caraker v. Sandoz Pharmaceuticals Corp.*, the Court found unreliable experts who had repudiated the reliability of the very studies on which they selectively relied. 188 F. Supp. 2d 1026, 1033-34 (S.D. Ill. 2001). Likewise, in *Paraquat*, the excluded expert not only failed to follow his own specified methodology but also failed to engage with a lack of statistical significance that was "prevalent throughout the epidemiological literature." 730 F. Supp. 3d at 846-848. Here, Dr. Cote reviewed the three central epidemiological publications, reported non-statistically significant results alongside statistically significant ones, identified limitations bearing on their interpretation, and explained why she nevertheless credits the evidence. *See Cote Rep.* at 15-23.

²⁷ Defendants' citations to Dr. Cote's scientific writing do not establish that she adopted contradictory standards on statistical significance for litigation. *Contra* Defs.' Mem. at 37, 57 n.42. Some of the language Defendants quote is the typical qualified language of scientific publications. *See* Reference Manual at 973. The others are consistent with Dr. Cote's treatment of statistical significance as relevant, but not dispositive in a Bradford Hill analysis. Nor does her Bradford Hill analysis rest entirely on the epidemiological studies; rather she articulates what that evidence, taken with the rest, supports. *See Rutledge*, 182 F.4th at 193-94 ("Bradford Hill analysis ... is a methodology for synthesizing many scientific results where no single one definitively establishes or negates a causal relationship. A study that does not itself prove causation, because of its own limitations, can nonetheless serve as a reliable link in a chain supporting a particular Bradford Hill factor.").

Ultimately, the Court finds Dr. Cote's analysis to be closer to the last case Defendants cite, *In re Testosterone Replacement Therapy Prods. Liab. Litig. Coordinated Pretrial Proc.*, where the court admitted experts who examined the competing epidemiological evidence and justified their causal interpretations despite scientific disagreement. *See* Defs.' Mem. at 38 (citing 2017 WL 1833173, at *3, *11 (N.D. Ill. May 8, 2017); *see also Roundup*, 390 F.Supp.3d at 1151-52 (declining to exclude experts who surveyed the epidemiological literature, "identified at least a few statistically significant results," and "identified what they deemed to be pattern of odds ratios above 1.0 from case-control studies, even if not all were statistically significant"). While Defendants may disagree with Dr. Cote's approach to statistical significance, the Court does not find that her treatment of it renders her methodology unreliable or uncharacteristic of her field.²⁸

4) Dr. Cote, For the Most Part, Does Not Offer an Inadmissible Public Health Opinion

While Defendants are correct that Dr. Cote's deposition testimony may veer into approximations of public health or policy judgments, they hyperbolize the extent to which this may render her opinions unreliable. *See* Defs.' Mem. at 47, 60. Defendants argue that Dr. Cote's personal, or policy-based "assert[ion]" that these

²⁸ Defendants emphasize null results in the epidemiological studies among Black women subpopulations. Regarding the Sister Study, Plaintiffs respond that although the results for Black women in the Sister Study were not statistically significant, the study is still relevant to that population as its cohort included a significant number of Black women and the study's authors controlled for race. Dr. Cote considered these factors and, in considering *Bertrand*, accounted for that study's tendency to the null. *See* Cote Rep. at 17-19. As such, Dr. Cote's consideration of these results is not unreliable. Moreover, Defendants argue from the premise *Bertrand's* results were uniformly null. *See, e.g.,* Defs.' Mem. at 40. However, as Dr. Cote reports, *Bertrand* reported statistically significant results for at least three subpopulations. *See* Cote Rep. at 19. Any scientific uncertainty resulting from *Bertrand's* mixed results is thus a proper subject for cross-examination, not exclusion.

hazard ratios are “unacceptable” amounts to a nonscientific judgment. *See id.* at 47. However, Defendants fail to cite where Dr. Cote makes this assertion.²⁹

Elsewhere in their brief, Defendants argue that Dr. Cote substituted policy judgments because she believes that CHRs “have ‘no medicinal value,’ are ‘for cosmetic use only,’ and provide ‘no direct benefit’ to users.” *See* Defs.’ Mem. at 60 (citing Cote Tr. at 347; 386-87). Reading her deposition reveals that Dr. Cote was responding to a question regarding “whether hair relaxer products should be pulled from shelves.” Cote Tr. at 387. In her response, she said that this is both “outside [her] realm of thinking” and “not part of [her] report.” The Court agrees with Defendants that Dr. Cote is not qualified to offer public health opinions, such as CHRs’ “overall benefit to society,” but her opinion as to “the potential risks” of CHRs is well within the scope of her report.

Dr. Cote’s is not permitted to offer opinions not contained in her report. But that did not happen here. Instead, here, Dr. Cote answered a question she was asked about whether CHRs should continue to be marketed. That is not a basis to exclude her opinions.

5) Dr. Cote Reliably Applies Bradford Hill.

Defendants challenge every aspect of Dr. Cote’s Bradford Hill analysis, even the factors on which Defendants, Plaintiffs, and Dr. Cote apparently agree. For the reasons below, the Court does not find any of the flaws that Defendants articulate to be fatal to the reliability of Dr. Cote’s analysis.

²⁹ The word, “unacceptable,” did not appear in the Court’s review of Dr. Cote’s report or deposition transcript.

To begin, Defendants’ overarching critiques of Dr. Cote’s analysis are misplaced. Dr. Cote provides significant reasoning for her opinion, including explaining to which factors she gave what weight and why. *See* Cote Rep. at 23-27. Defendants’ critique of Dr. Cote’s weighting as not “objective” is misplaced in a Bradford Hill analysis, which requires only that an expert reliably explain their subjective reasoning. *See Roundup*, 390 F.Supp.3d at 1130; Reference Manual at 975. Given the flexibility of the Bradford Hill methodology, contestations amounting to the idea that different experts accorded different weights to different factors are also unpersuasive.³⁰

i. Strength of Association and Consistency

In addition to the general charges the Court already addressed, including giving weight to hazard ratios under 2.0³¹ and performing a transdiagnostic analysis, *supra* Section III.C., Defendants argue that Dr. Cote inadequately specifies her methodology for how she assigned weight to the strength of association and consistency factors.³² These objections do not warrant exclusion.

³⁰ For instance, Defendants’ argument that Dr. Brown disagrees with Dr. Cote on the strength of association factor would be unsurprising even if it was relevant to the reliability of Dr. Cote’s analysis. *See* Defs.’ Mem. at 42. But it is also irrelevant. Dr. Brown is not an epidemiologist and does not offer a causation opinion, let alone conduct his own Bradford Hill analysis. *See generally*, Brown Rep.

³¹ That Dr. Cote is unaware of any literature that assesses a hazard ratio of less than 2.0 as showing a strong association is unsurprising given her testimony that, in her field, “big publications just examining Bradford Hill criteria are not a large part of the body of scientific literature.” *See* Cote Tr. at 319.

³² Defendants argue that Dr. Cote “stands alone among epidemiologists when she concludes that these ‘novel association[s]’ are ‘established’ with ‘moderate to strong weight.’” Defendants cite no authority that novel findings are unreliable because they are novel. *See Milward*, 639 F.3d at 24-25 (“[T]he district court read too much into the paucity of statistically significant epidemiological studies” since it would be “very difficult to perform an epidemiological study of the causes of [the disease] that would

In particular, Defendants entirely ignore the fact that Dr. Cote combines her consideration of the strength of association and consistency factors, explaining that both go to evaluation of the quality of the underlying epidemiological literature. *See* Cote Rep. at 23 (“Recent adaption of these concepts describes how this should include careful examination of underlying methods, comparison to the weight of evidence in the literature, and consideration of other contextual factors.”). Dr. Cote’s approach finds support in *Roundup*, where the Court found reliable an expert who considered consistency in assessing the strength of an association. 390 F. Supp. 3d at 1133-34. Dr. Cote likewise gives significant weight not merely to the magnitude of the epidemiological studies’ reported associations, but to their quality. She explains that her characterization of the combined evidence as “moderate to strong” reflects not simply the size of the hazard ratios, but her assessment of the studies’ collective evidentiary force. Cote Tr. at 316-19. For instance, she reasons that the studies are well-designed, have excellent longitudinal follow-up and case ascertainment, adjust for numerous potential confounders, and contain findings that remain robust in sensitivity and subgroup analyses. *See* Cote Rep. at 15-24; *see also* Cote Tr. at 315-19 (calling exclusive focus on the magnitude of hazard ratios “a small piece of the moon [that] ignore[s] the rest of the whole moon.”).

Defendants’ critique of Dr. Cote’s transdiagnostic reasoning is similarly unpersuasive. *See* Defs.’ Mem. at 48. As discussed above, transdiagnostic reasoning can be reliable where an expert provides a scientifically justified basis for drawing

yield statistically significant results”). And prospective cohort studies are a well-established methodology in the epidemiological field. *See* Reference Manual at 908-09.

inferences across related diseases. Dr. Cote provides such a basis, describing how endocrine disruption mechanisms can drive both “uterine and ovarian carcinogenesis.” Cote Rep. at 13.³³ To be sure, Defendants are correct that *White* is the only epidemiological study directly examining the association between CHRs and ovarian cancer. But Defendants’ insistence that consistency cannot be established from a single study not only misfires in critiquing Dr. Cote’s transdiagnostic analysis, it also ignores her employed methodology. Her report assesses the strength and consistency factors as part of a combined assessment that draws on epidemiological evidence concerning both cancers rather than the two factors alone. Although this approach is certainly subject to reasonable scientific disagreement, Defendants have not shown that it falls outside the bounds of reliable scientific methodology.

Ultimately, in assessing the combined factors, Dr. Cote considers the number and quality of the studies, the magnitude of the reported associations, adjustments for potential confounders, robustness of the findings, hazard ratios and confidence intervals, sources of bias toward the null, and relevant subgroup analyses. Based on that assessment, she concludes that frequent or heavy users face an increased risk of uterine and ovarian cancers, with reported excess risks ranging from 20% to

³³ Dr. Cote’s reasoning here also resolves Defendants’ criticism of her treatment analogy factor. Defs.’ Reply at 23 n.2. Dr. Cote gives analogy only low weight, discounting the “well-established” relationship “between excess estrogen, obesity, and cancers of the female reproductive tract,” because cancer is “a group of complex diseases.” Cote Rep. at 26. In other words, here too Dr. Cote supplies scientific justification for her transdiagnostic reasoning. Defendants also invoke their expert, Dr. Weed, who opines that no peer-reviewed publication, governmental agency, or scientific organization announces causal conclusions “based on the level of available evidence” in this case. Defs.’ Reply at 23 n.2. Defendants’ expert’s conclusions regarding whether the evidence supports general causation is a disagreement between experts appropriate for the ultimate factfinder, not for resolution in a *Daubert* motion.

approximately 250%. Cote Rep. at 23-24. That conclusion is not an unreasoned scientific leap.

Dr. Cote's characterization of the association as strong may "seem[] like a stretch," given that some findings are not statistically significant and many of the reported hazard ratios are below 2.0. *Cf. Roundup*, 390 F. Supp. 3d at 1133 (expressing skepticism about an expert's characterization of the strength of association). But the question is not whether the Court agrees with Dr. Cote's ultimate assessment of the evidence. As the *Roundup* court explained, "the *Daubert* inquiry does not require (or even allow) a district court to exclude an expert's opinion merely because the court is not persuaded that the expert's read of the evidence is the best one." *Id.* at 1134 (collecting cases). Dr. Cote identifies the considerations informing her weighting and provides scientifically grounded explanations for her assessment. That the evidence might be weighed differently does not establish that Dr. Cote's methodology is unreliable.

ii. Specificity and Experimental Evidence

Defendants note that Dr. Cote's Bradford Hill analysis does not assign the factors of specificity or experimental evidence any weight. Defs.' Mem. at 50; Defs.' Reply at 23. Plaintiffs agree. *See* Pls.' Opp. at 26. Defendants do not argue that the reasoning Dr. Cote offers for not considering these factors is unreliable. It is also well-established that certain factors may not be relevant in Bradford Hill analyses, *see* Reference Manual at 975, which leaves the Court wondering why the Defendants raised these factors at all.

iii. Temporality

Defendants argue that Dr. Cote's discussion of the temporality factor is lacking because she fails to account for the long latency periods of ovarian and uterine cancers. *See* Defs.' Mem. at 50-51. But Dr. Cote in fact did so, explaining that the Sister Studies' authors performed a sensitivity analysis excluding cancers diagnosed during the first year of enrollment. *See* Cote Rep. at 18, 24. She also factored in age-of-use data. *Id.* (citing Gaston et al., *Chemical/Straightening and Other Hair Product Usage During Childhood, Adolescence, and Adulthood Among African-American Women: Potential Implications for Health*, 30(1) J. Expo. Sci. Environ. Epidemiol. 86 (2020)). Using the latter, Dr. Cote concluded that the studies' twelve-month exposure windows may understate historical exposure because women begin using hair relaxers early in life and are more likely to decrease their use with age than to pick it up later in life. Cote Rep. at 18. To the extent Defendants or their experts disagree with Dr. Cote's direction-of-bias assessment, *see* Defs.' Reply at 22, they may engage in a battle of the experts at trial. *See Baugh*, 845 F.3d at 850.

iv. Biological Gradient

Dr. Cote supports her opinion on the biological gradient factor in two ways. First, she reports that, in the Sister Study, "those who used chemical hair relaxers more than 4 times in the last 12 months had 2.5 times the risk of developing uterine cancer (HR=2.55, 95% CI (1.46 to 4.45)) after adjustment." Cote Rep. at 25. She also notes that the Sister Study reported a statistically significant trend across frequency-of-use categories (P-trend = .002). *Id.* Second, Dr. Cote opines as to low-dose response,

stating that “even low levels of exposure to EDC may negatively impact various mechanisms, ultimately increasing risk of cancer, depending on the timing of the exposure.” Cote Rep. at 25.

Defendants’ objections to Dr. Cote’s opinion on biological gradient mischaracterize her report and testimony. First, Defendants argue that Dr. Cote inappropriately discounts *Bertrand*’s finding of no clear monotonic dose-response relationship while crediting “cruder” frequency measures in *Chang* and *White*. Defs.’ Reply at 20-21. However, Dr. Cote expressly considers *Bertrand*’s results, agreeing that the study does not support a clear dose-response relationship. Cote Rep. at 25.³⁴ In fact, Dr. Cote does not appear to discount *Bertrand* at all on dose-response. *See id.* (opining only that between the three epidemiological studies, there is “some evidence of a dose-response”).

Moreover, the portions of Dr. Cote’s deposition testimony Defendants cite to support their argument that Dr. Cote improperly discounts *Bertrand* largely concern Dr. Cote’s explanation of why *Bertrand*’s findings on age-of-first-use do not disprove the aspect of her opinion regarding EDCs’ low-dose effects. Cote Tr. at 272-77, 347-49. In addition to their mischaracterization of Dr. Cote’s testimony, Defendants also claim that the study Dr. Cote cites to support EDCs’ low-dose effects does not discuss EDCs. Defs.’ Mem. at 59 n.43. But Defendants miscite publication sixty-nine in Dr. Cote’s *curriculum vitae* as if it were the sixty-ninth article referenced in her report.

³⁴ Defendants’ citations to Dr. Cote’s testimony, Defs.’ Mem. at 52 (citing Cote Tr. at 270:17-23, 267:25-268:9), show only that Dr. Cote acknowledged what she stated in her report: that *Bertrand* did not find a clear linear dose-response relationship.

The article that Dr. Cote's *report* references does in fact discuss the effect of EDCs during development. *See* Cote Rep. at 25 (citing Soto and Sonnenschein, *Environmental Causes of Cancer: Endocrine Disruptors as Carcinogens*, 6(7) Nat. Rev. Endocrinol. 363 (2010)).

The Court therefore finds Dr. Cote's reasoning regarding biological gradient reliable.

v. Biological Plausibility

Dr. Cote assigns strong weight to biological plausibility, discussing evidence of endocrine disruption, hormone receptors, estrogen-related carcinogenic pathways, and evidence concerning the effects of mixtures. Cote Rep. at 12-14, 25. Even though her analysis is not as in depth as Mr. Atwood's, an epidemiologist need not independently perform a toxicological analysis in evaluating Bradford Hill's biological plausibility factor. *See Roundup*, 390 F. Supp. 3d at 1130, 1141-42. ("[B]y inquiring about biological plausibility and coherence with other knowledge, the Bradford Hill framework asks experts to survey all the available evidence that might support or disprove causation."). Rather, it is sufficient for Dr. Cote to have reviewed the published evidence on mechanistic evidence to regard this factor as positive in supporting biological plausibility. *See id.*; *Rutledge*, 182 F.4th at 189 ("[T]he Bradford Hill methodology does not require certainty regarding the mechanisms by which exposure causes the condition of interest—indeed, if such proof were available, there would be no need for the multi-factor epidemiological inquiry in the first place."). Dr.

Cote's multidisciplinary scientific review of the mechanistic literature demonstrates that her analysis, while perhaps abbreviated, is not mere ipse dixit.

vi. Coherence

Dr. Cote finds coherence met via the relationship between endocrine disruption, estrogen signaling, and cancers affecting hormone-sensitive tissues. Cote Rep. at 26. Defendants' objection emphasizes Dr. Weed's contrary interpretation of the literature. *See* Defs.' Mem. at 53 n.49. That disagreement is unsurprising, but the mere existence of an opposing expert's assessment does not render Dr. Cote's scientific reasoning unreliable. Further, to the extent that Dr. Cote may not have fully grappled with the one study Defendants cite as contradicting coherence, this is not so fundamental a flaw as to merit exclusion. *See* Fed. R. Evid. 702 advisory committee notes to 2023 amendment ("[T]he fact that the expert has not read every single study that exists will raise a question of weight and not admissibility.").

6) Conclusion as to Dr. Cote

Accordingly, Defendants motion to exclude the opinion of Dr. Cote is denied. Dr. Cote reliably applies each factor of the Bradford Hill analysis; any actual flaws identified by Defendants are minor and go to weight not admissibility. *Schultz*, 721 F.3d at 431. Dr. Cote's opinions are based on facts, a reasonable investigation, and her expertise. She provides reasonable links between the underlying studies, methodology used, and conclusions reached. Her testimony will be subject to "[v]igorous cross-examination, presentation of contrary evidence, and careful

instruction on the burden of proof are the traditional and appropriate means of attack[].” *See id.* (citing *Daubert*, 509 U.S. at 595).

V. Conclusion

For the reasons above, Defendants’ Combined Motion to Exclude Plaintiffs’ General Causation Experts is DENIED as to Dr. Cote and DENIED in part and GRANTED in part as to Mr. Atwood.

E N T E R:

Dated: October 22, 2026

A handwritten signature in cursive script, reading "Mary M. Rowland".

MARY M. ROWLAND
United States District Judge