Daubert's Gatekeeper

Clash of Expert Reliability and Credibility Take Center Stage in Recent *Johnson & Johnson* Ovarian Cancer MDL Decision

By Audrey O. Anyaele

The defense bar will likely feel the ripple effects from a recent product liability decision on the admissibility of expert opinions on causation from the District of New Jersey.

As many attorneys in both the plaintiffs' and defense bars know, the path to establishing, or defending against, scientific causation in a toxic tort matter is neither simple nor uniform. This is especially true when the experts retained to establish scientific causation are faced with defending their opinions and conclusions at a *Daubert* hearing. *Daubert v. Merrell Dow Pharms., Inc.*, 509 U.S. 579 (1993) (ruling that federal courts must act as gatekeepers by ensuring the admissibility of reliable, relevant expert testimony). A recent decision by Chief Judge Freda Wolfson of the United States District Court for the District of New Jersey has provided perhaps one of the most in-depth and thorough analyses of the reliability and admissibility of expert testimony as it pertains to scientific causation. Chief Judge Wolfson, who presided over a *Daubert* hearing in July 2019 in the Johnson and Johnson (J&J) ovarian cancer multidistrict litigation (MDL), issued a decision on April 27, 2020, spanning 141 pages that address several motions by both

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the plaintiffs and defendants to preclude each other's experts. The MDL involves the plaintiffs' allegations that their continuous use of talcum powder products manufactured by J&J caused ovarian cancer. This theory of liability was premised on the plaintiffs' assertions that talcum powder contains traces of asbestos and heavy metals that cause ovarian cancer. Between the parties, there were over thirty-five experts named and numerous motions to preclude the experts filed by the plaintiffs and the defendant. However, the court held a *Daubert* hearing in which the plaintiffs and the defendant selected a total of eight experts to testify on various issues raised regarding expert admissibility.

The court's lengthy decision implicates several issues that could have a lasting effect on toxic exposure matters. In the decision, the court granted in part and denied in part the defendants' motion to preclude testimony from five of the plaintiffs' experts. *In re Johnson & Johnson Talcum Powder Products Marketing, Sales Practices and Products Litigation*, MDL No. 2738, No. 3:16-md-02738-FLW-LHG, at 1 (D. N.J. Apr. 27, 2020) (submitted for publication). Chief Judge Wolfson further wholly denied the plaintiffs' motions to preclude testimony from three of the defendant's experts. This article examines the court's analysis of the plaintiffs' experts and the extent to which the experts would be permitted to testify at trial. This article examines these holdings:

- The plaintiffs' inflammation and oxidative stress expert, Dr. Ghassan Saed, may testify that talc use causes cellu-

lar inflammation and oxidative stress, but the expert cannot testify regarding any causal connection between talc-powder use and ovarian cancer, because his study failed to support such a conclusion.
- Dr. William Longo, the plaintiffs' material sciences expert, may testify regarding his transmission electron microscopy analysis, but he cannot testify regarding his polarized light microscopy analysis, because his testing there was unreliable. Furthermore, he cannot testify that women who used talcum powder products were exposed to asbestos.
- The plaintiffs' general causation experts, Drs. Arch Carson, Anne McTiernan, and Daniel Clarke-Pearson, cannot testify regarding their theory that ovarian cancer may be caused by the inhalation of talcum powder that migrates through the lymphatic system to the ovaries, but they may otherwise testify regarding all other aspects of their reports.

Prior to this decision, J&J consistently maintained that the science relied on by the plaintiffs was "junk science" and unreliable, particularly on the issue of causation. However, the court's decision to permit the plaintiffs' general causation experts to testify, while not validating the conclusions of the experts, at a minimum, determines that the methodology applied and the science and data relied on by plaintiffs' experts are based on "good grounds" and sufficient enough to be placed before a jury as expert opinion.

Furthermore, while the experts' opinions and methodology on both the plaintiff and defense side were examined by the court for admissibility, the court devoted the crux of the 141-page decision to examining and analyzing the plaintiffs' experts, thus making evident that the opinions and methodology applied by the plaintiffs' experts required the court's in-depth analysis and explanation. Regarding the plaintiffs' motions to preclude testimony from defendants' experts Drs. Gregory Diette, Cheryl Saenz, and Benjamin Neel, the court held that all three experts provided "good grounds" for their opinions and/or reliable opinions and methodology that were sufficient under the *Daubert* standard. So, the court denied the plaintiffs' motions in whole.

This article looks into the reasoning in the court's analysis of the admissibility or inadmissibly of certain testimony, opinions, and testing of the plaintiffs' general causation experts, how it may affect the defense of a toxic exposure matter in the future, and the importance of three things in particular: providing alternative methodologies and strategies when challenging the opinion and methodology of an expert; using the history of peer-reviewed studies in anticipation of making a *Daubert* challenge; and establishing a clear distinction between a challenge to the reliability, as opposed to the credibility, of an expert's conclusions.

Background

The history of this MDL is particularly relevant to the analysis of the court's decision. While all the plaintiffs' motions to preclude were denied in whole, the overall ruling is undoubtedly still considered a victory for them. Prior to this decision, J&J consistently maintained that the science relied on by the plaintiffs was "junk science" and unreliable, particularly on the issue of causation. However, the court's decision to permit the plaintiffs' general causation experts to testify, while not validating the conclusions of the experts, at a minimum, determines that the methodology applied and the science and data relied on by plaintiffs' experts are based on "good grounds" and sufficient enough to be placed before a jury as expert opinion.

While the ruling's true effect remains unknown at this time and very well may take years to ascertain fully, one immediate effect is that it will likely alter the way that defendants approach the expert-discovery process in anticipation of challenging the opinions of a plaintiff's experts in *Daubert* jurisdictions. Indeed, even though the court's decision may not be viewed as a "win" for defendants, it certainly provides lessons about how to approach challenging scientific causation in toxic tort actions. If nothing else, *In re Johnson and Johnson* makes clear that this court will not expand its role as a gatekeeper under *Daubert* and conflate its analysis of "reliability" with "credibility." Defense counsel must keep in mind this bar that the court's ruling puts in place and apply it to defense strategy at a very early stage of discovery to attack and preclude an expert's opinion properly.

Expert Analysis

The analysis into the scientific evidence put forth in this matter demonstrates a newfound standard and examination that courts may choose to apply at *Daubert* hearings. At the outset, the court notes that its role as gatekeeper under *Daubert* relegates it to examining the relevance and reliability of an expert's testimony, including whether the methodology applied by the expert is reliable and supported by "good grounds," even if there are some flaws in the method. *In re Johnson & Johnson,* MDL No. 2738, No. 3:16-md-02738-FLW-LHG, at 7 (citing *In re Paoli R.R. Yard PCB Litig.*, 35 F.3d 717, 744 (3d Cir. 1994)). More than anything else, the court focused on whether the methodology applied by the experts and the conclusions reached were scientifically relevant and reliable. The court went to great lengths to refrain from deciding the weight of the testimony or placing greater weight on one

expert's conclusions over another. Rather, it examined each expert's report, supplemented its analysis with the testimony provided during the *Daubert* hearing, and issued a ruling. As mentioned, the result will affect both this MDL and the way future scientific-causation litigation proceeds significantly.

Dr. Ghassan Saed

The decision first addresses the opinion and testimony of the plaintiffs' inflammation and oxidative stress expert, Dr. Saed. Dr. Saed and his laboratory conducted an in vitro experiment examining the role of talc in the carcinogenesis of ovarian cancer. *Id.* at 10–11. He further examined the relationship between inflammation and other pathological conditions in ovarian cells. *Id.* Based on his study, Dr. Saed made the following conclusions: (1) J&J's Baby Powder elicits an inflammatory response in normal ovarian and tubal cells and in ovarian cancer cells that can result in the development and progression of ovarian cancer; (2) this pro-carcinogenic process involves oxidative stress; (3) J&J's Baby Powder exposure results in elevation of CA-125, a cancer antigen and marker of inflammation, and this CA-125 was a clinically relevant biomarker for ovarian cancer in normal and ovarian cancer cells; (4) the molecular effects resulting from use of J&J's Baby Powder exhibit a clear dose-response pattern; (5) based on established molecular mechanisms for the pathogenesis of ovarian cancer and Dr. Saed's in vitro experiment, J&J's Baby Powder exposure could cause ovarian cancer; and (6) based on established molecular mechanisms for the pathogenesis of ovarian cancer and Dr. Saed's in vitro experiment, J&J's Baby Powder exposure worsens the prognosis for patients with ovarian cancer. *Id.* at 14–15.

The defendants challenged the reliability of Dr. Saed's study and conclusions for several reasons, including his failure to follow his own methods, his failure to use a relevant dose of talc, the fact that the results of his study were not replicated, and his lab notebooks contained many errors that undermined his entire study. *Id.* at 15–16. The defendants further argued that the results of his study did not support his ultimate opinions and did not demonstrate causation because his in vitro study was not duplicated in either an in vivo, or animal, study. *Id.* at 16. In addressing the defendants' challenge regarding whether Dr. Saed's study supported his conclusion of a causal relationship between talc and ovarian cancer, the court sided with the defendants and held that Dr. Saed's conclusion that talc causes ovarian cancer was an extrapolation unsupported by his in vitro study. *Id.* at 17. The court noted that Dr. Saed failed to perform several tests that his study stated that he would perform to establish causation, including demonstrating transformation of normal ovarian cells into cancerous cells. *Id.* at 21. Dr. Saed never tested for cell transformation and testified during the *Daubert* hearing that his study was not capable of determining whether cell proliferation was simply an acute response to talc, or whether it was a chronic response that demonstrated causation. *Id.* at 21–22. This, the court stated, was damning to his conclusion that talc use could cause ovarian cancer; Dr. Saed himself conceded that his study could not demonstrate that such a causal relationship may exist. *Id.* at 19. Furthermore, the court placed value on the ultimate rejection for publication by peer reviewers at *Gynecologic Oncology* of Dr. Saed's study—a rejection that specifically noted that Dr. Saed's causation conclusion was not scientifically supported because the data did not show any evidence that the cells transformed into cancerous cells. Though Dr. Saed's study was ultimately published in another peer-reviewed journal, *Reproductive Sciences*, the court held that Dr. Saed's conclusion that talc use causes ovarian cancer was inadmissible because the results of his study did not support such a conclusion.

The court further held that Dr. Saed's causation conclusion was inadmissible because certain aspects of his in vitro study rendered the opinion unreliable. Specifically, the court stated that Dr. Saed's in vitro study could not reliably support the conclusion that talc could cause ovarian cancer in vivo, since the cell lines that he used did not and could not transform into cancerous cells. *Id.* at 17–18. Furthermore, while Dr. Saed noted the difficulties in applying this study in vivo, he nonetheless opined that his in vitro study could establish causation because it would demonstrate that exposure to talc results in neoplastic transformation of normal ovarian surface epithelial cells. To show this causal relationship, Dr. Saed's "Budget Proposal" for the study stated that it would be necessary to conduct a neoplastic transformation assay because the neoplastic transformation was "critical in establishing a cause and effect relationship" between talc and ovarian cancer. *Id.* at 21–22. Despite deeming the neoplastic transformation assay critical, Dr. Saed failed to perform the assay; thus, he could not show cell transformation. *Id.* Without the cell transformation, Dr. Saed did not have a basis for concluding that talc could cause ovarian cancer. Therefore, the court reasoned, his study was unreliable on this issue.

The court also examined the results of Dr. Saed's study as it pertained to CA-125 and his conclusion that CA-125 was a relevant biomarker for demonstrating increased risk of ovarian cancer. Dr. Saed's study revealed that cells treated with talcum powder showed increased levels of CA-125, a cancer antigen marker. However, the defendants argued, and the court agreed, these increased levels of CA-125 did not demonstrate an increased risk of ovarian cancer. *Id.* at 23–24. When questioned during the *Daubert* hearing, Dr. Saed admitted that the measurement of CA-125 levels is not used to diagnose ovarian cancer and that he did not know of any studies that showed an association between elevated levels of CA-125 and increased risk of ovarian cancer. *Id.* Based on this testimony, the court held that Dr. Saed's jump from increased CA-125 levels to increased risk of ovarian cancer was an extrapolation unsupported by his study and unreliable. So, the court precluded Dr. Saed from testifying about any causal relationship between talc and ovarian cancer.

While the court excluded Dr. Saed's opinion regarding the causal relationship between talc and ovarian cancer, it did permit the remaining portions of Dr. Saed's report, including his opinion that talc use causes cellular inflammation and oxidative stress. The defendants challenged the reliability of Dr. Saed's study and argued that his failure to conduct the neoplastic transformation as he said he would demonstrate a failure to adhere to his own methodology, thus rendering his entire study unreliable. *Id.* at 27. However, the court rejected this

argument, noting that while Dr. Saed failed to conduct the neoplastic transformation to demonstrate a causal relationship between talc and ovarian cancer, it did not affect his other conclusions regarding oxidative stress or inflammation to warrant deeming his entire report inadmissible.

Regarding the defendants' argument that that Dr. Saed's testimony should be excluded because he did not attempt to use a relevant dose when exposing the cell lines to talcum powder, the court also rejected this argument, noting that the defendants failed to identify the proper doses that would have been appropriate to use. *Id.* at 30. The court held that this dose information was only relevant in determining the reliability of the expert's methods when an expert has attempted to extrapolate human causation from the results of the in vitro study. *Id.* at 31. However, since the court was prohibiting Dr. Saed from testifying about human causation related to his in vitro study, his failure to use a relevant dosage mimicking actual human use was not relevant and did not render his conclusions on inflammation unreliable.

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The defendants introduced additional challenges to Dr. Saed's testimony, including arguing that the methodology was unreliable because he failed to replicate his experiment, and that Dr. Saed's laboratory notebooks contained computation errors, missing pages, and inconsistencies. The court rejected each of these arguments, noting that Dr. Saed's triplicate method was based on known scientific methods. The court also noted that Dr. Saed's experiment was peer reviewed, and his triplicate methodology was not a concern for the peer reviewers, thus demonstrating that it was, in fact, replicated and reliable under *Daubert*. The court further held that while Dr. Saed's "careless mistakes and shoddy record keeping" could negatively affect the weight given to his opinion by the jury, it did not render his opinion wholly inadmissible. *Id.* at 37.

Thus, the court went to great lengths to examine Dr. Saed's study and methodology fully, concluding that although portions of Dr. Saed's report were unreliable and inadmissible, those portions would not necessarily invalidate all his conclusions. While courts often will leave the issue of scientific causation to the jury, finding the expert's opinion to be minimally qualified to withstand a motion to preclude, this court took great pains to examine the methodology applied by Dr. Saed and whether it properly reflected accepted standards within the relevant scientific community fully. The court's ruling regarding Dr. Saed's causation conclusions demonstrates that in establishing scientific causation, especially as it pertains to human interaction, the conclusion must fit the data collected from study and experiment. As for an experimental study such as the in vitro one designed and conducted by Dr. Saed, it is critical to demonstrate that the results of the in vitro study were applied in an in vivo study with similar results to show causation in humans.

It is notable that while acknowledging that Dr. Saed's study was eventually published in a peer-reviewed publication, the court used the study's initial rejection by *Gynecologic Oncology* as a basis for rejecting Dr. Saed's conclusions that his study demonstrated a causal connection between talcum powder and ovarian cancer. The court specifically referenced critiques from the peer reviewers that assert that the study's data did not result in any cell transformation that demonstrated a causal connection between talcum powder and ovarian cancer. *Id.* at 19. Thus, it can be advantageous to examine the history and timeline of published, peer-reviewed studies relied on by experts when attempting to preclude an expert's report and testimony. The peer-review history of a scientific study can provide yet another avenue of challenging expert conclusions. By the same token, a peer review can also assist to withstand challenges to admissibility. In *In re Johnson & Johnson*, the court also relied on peer reviewers to conclude that Dr. Saed's triplicate methodology was based on good science since it was not challenged by any of the publications that reviewed and critiqued the study.

The court's ruling demonstrates that reliable results and conclusions drawn from an expert's testing can be parsed and separated from other unrelated and unreliable testing, making it partially admissible. This is evidenced by the decision to preclude Dr. Saed's conclusion that a causal relationship exists between talcum powder use and ovarian cancer, while still permitting his conclusions finding a relationship between talc use and inflammation and oxidative stress. The court's analysis of Dr. Saed's inflammation and oxidative stress conclusions demonstrate that merely identifying an aspect of an experiment that is deemed insufficient will not be enough to challenge the admissibility of an expert's conclusions successfully. In this instance, the defendants asserted that Dr. Saed did not use any relevant dosage for his experiment, but as the court noted, the defendants failed to explain what the relevant dosage should have been. Defendants must go further than simply identifying aspects of the expert's report that they deem insufficient or improper, or they run the risk that a court will attribute this challenge as a challenge to the weight of the expert's testimony, which is an issue for the fact finder, not the court as gatekeeper.

Dr. William Longo

The defendants also challenged the admissibility of Dr. William Longo, the plaintiffs'

material sciences expert. The defendants made numerous challenges to Dr. Longo's report and opinions, which the court addressed individually and in significant detail. However, the more notable aspects of the court's admissibility analysis stem from Dr. Longo's testing of talc samples and his conclusions related to talc use and ovarian cancer. Dr. Longo tested seventy-two historical J&J talcum powder products for asbestos using two methods, transmission electron microscopy and polarized light microscopy, and concluded that 69 percent of the J&J talcum products tested contained asbestos. He then concluded that individuals who used J&J's talcum products in the past were more likely than not to have been exposed to significant levels of airborne, regulated amphibole-asbestos and fibrous talc. The court ultimately concluded that although Dr. Longo could testify about the results of his transmission electron microscopy testing, he could not opine on the results of the polarized light microscopy testing. The court further precluded Dr. Longo from testifying that talc users were exposed to asbestos.

In permitting Dr. Longo's transmission electron microscopy testing, the court noted that the defendants did not challenge the methodological reliability of the transmission electron microscopy, which was a generally accepted methodology in the scientific community and recommended by the U.S. Environmental Protection Agency Asbestos Hazard Emergency Response Act (AHERA) regulations. The court held that the defendants' disagreement with Dr. Longo's application of the three-step, transmission electron microscopy method amounted to nothing more than a "battle of the experts" that was an issue best left for a fact finder. *Id.* at 45–46. Specifically, the court once again focused on the fact that while the defendants contended that Dr. Longo's "counting rules" were unreliable, and the AHERA regulations should not have been followed in this instance because it was not known whether asbestos was present in the test subject, the defendants failed to identify any other "counting rules" that should have been applied instead. This, the court stated, was fatal to the defendants' challenge.

Once again, the court highlighted the necessity of providing a method, application, or standard that was more appropriate when challenging the propriety of the method, application, or standard used by an adversary's expert. To the extent that such challenges will be made to preclude an expert, it is necessary that such evidentiary and scientific support are developed throughout the course of discovery and in the relevant expert reports. The court also stressed the importance of peer-reviewed publications, noting that Dr. Longo published numerous peer-reviewed studies applying the AHERA "counting rules" in circumstances where the substances were not previously confirmed to contain talc, thus demonstrating the reliability of his methods. Thus, the court held that Dr. Longo's reliance on the AHERA regulations to designate asbestos minerals was not a basis for rendering his opinions unreliable.

Conversely, the defendants were successful in precluding Dr. Longo's testing results and related opinions coming from his polarized light microscopy testing. Dr. Longo was not required to perform the polarized light microscopy testing, yet he did so to support the results of his transmission electron microscopy testing further. *Id.* at 53. However, in applying the test, Dr. Longo used the ISO 22262-1 method, even though this method stated that when asbestos concentrates fall between 0 percent and 5 percent, as it did in this instance, a different standard, the ISO 22262-2 standard, should be used. *Id.* at 54. Dr. Longo did not provide any basis for using the ISO 22262-1 method rather than the ISO 22262-2 method, nor did he explain it in testimony during the *Daubert* hearing. Furthermore, his decision to use the polarized light microscopy method in general was directly contradictory to the opinion that he held in 2017 and 2018, before this litigation, when he asserted that using polarized light microscopy was inappropriate to test cosmetic talc for asbestos. Due to this, the court found Dr. Longo's polarized light microscopy testing unreliable.

The court also found that Dr. Longo's polarized light microscopy methodology was unreliable because it could not be replicated. The court noted multiple times that replication is an important part of the scientific process. In this instance, Dr. Longo's polarized light microscopy testing had "subjectivity and reproducibility problems" that rendered replication unattainable. For one, Dr. Longo retained a third-party laboratory to replicate his findings, and the laboratory's results were negative for asbestos for each sample tested under the polarized light microscopy method, demonstrating the potential inaccuracy and inconsistency of Dr. Longo's testing using this method as well as the test's reliability "problems."

In permitting Dr. Longo's transmission electron microscopy testing, the court noted that the defendants did not challenge the methodological reliability of the transmission electron microscopy, which was a generally accepted methodology in the scientific community and recommended by the U.S. Environmental Protection Agency Asbestos Hazard Emergency Response Act (AHERA) regulations.

Finally, the defendants successfully argued that Dr. Longo's report should be precluded for purposes of establishing general causation. The court highlighted the importance of conducting an exposure analysis when opining on general causation. This was especially necessary here because the asbestos levels detected in the talcum powder products were "ultra-trace," ranging between .0000033 percent and .0092 percent. Dr. Longo failed to con-

duct any exposure analysis, yet he still concluded that individuals who used J&J talcum powder products in the past were more likely than not to have been exposed to significant levels of airborne, regulated amphibole-asbestos and fibrous talc. During the *Daubert* hearing, Dr. Longo's testified that he did not conduct an exposure analysis; thus, he did not examine whether the ultra-trace levels of asbestos found in the talcum powder could become airborne and enter humans using the product. The court found that Dr. Longo did not have any scientific support for his conclusions that using J&J's talc powder products caused exposure to asbestos, let alone significant exposure to asbestos. The court concluded that there was "simply too great an analytical gap between the data and the opinion proffered" to permit the testimony before a fact finder. *Id.* 59 (citing *Gen. Elec. Co. v. Joiner*, 522 U.S. 136, 146 (1997)).

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The admissibility and preclusion of certain portions of Dr. Longo's report and opinions demonstrate several relevant ways to approach expert discovery. First, the defendants here challenged Dr. Longo's "counting rules" method, but they failed to identify the proper "counting rules" method that should have been used instead to support their assertions that Dr. Longo's method was unreliable. In essence, the defendants challenged Dr. Longo's standard's propriety without providing the correct standard that would have made the results more reliable. This omission rendered the challenge to preclude expert testimony insufficient here. Furthermore, although Dr. Longo only relied on the polarized light microscopy results to support the results and conclusions already reached in his transmission electron microscopy testing, the court made clear that even in a supporting role, testing and data will not be permissible if proper methods are not followed. Thus, even while permitting Dr. Longo to testify that J&J's historical talcum powder products contained asbestos, based on the transmission electron microscopy testing results, the court would not allow Dr. Longo to rely on the polarized light microscopy results to testify to the same conclusion. Permitting an expert to testify to a certain conclusion is not a guarantee that the court will permit all methodology and testing applied to reach that conclusion; the court will still close the gate to unreliable studies and methodology proposed by experts.

Finally, the ruling regarding Dr. Longo reaffirmed that an exposure analysis is critical to an expert's conclusion when opining on a causal relationship between a toxin and exposure. Dr. Longo's failure to conduct an exposure analysis rendered his opinion that talc users were exposed to asbestos impermissible.

The Plaintiffs' General Causation Experts

The court next examined whether the plaintiffs' general causation experts were permitted to testify at trial regarding their reports, opinions, and conclusions on whether using talc products can cause ovarian cancer. Having already precluded Dr. Saed from opining on a causal connection between the use of talc products and ovarian cancer, and Dr. Longo from opining that women who used J&J's talcum powder products were more likely than not to have been exposed to asbestos, the opinions and conclusions of the plaintiffs' general causation experts were critical to establishing a causal connection between talcum powder use and ovarian cancer, and therefore, they were crucial for the survival of the plaintiffs' claims against the defendants.

The plaintiffs produced three experts at the *Daubert* hearing to support their general causation opinion: Dr. Anne McTiernan, an epidemiologist; Dr. Daniel Clarke-Pearson, a gynecologic oncologist; and Dr. Arch Carson, a toxicologist (collectively, the general causation experts). The plaintiffs asserted that each of these experts properly applied the Bradford Hill factors and analysis to establish the conclusion that the use of talcum powder products in the genital perineal area can migrate through the female reproductive tract.

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The plaintiffs' experts further opined that this migration from the genital perineal area through the female reproductive tract, mentioned above, would increase the risk of, or indeed cause, ovarian cancer, specifically epithelial ovarian cancer. The experts also concluded that inhaled talcum powder could also reach the ovaries and cause ovarian cancer.

In assessing the reliability of these experts' general causation opinions, the court examined each expert's application of the Bradford Hill criteria and whether their

analyses were reliable enough to satisfy the *Daubert* standard. The plaintiffs' general causation experts conducted a review of the relevant epidemiologic studies, which consisted of twenty-eight case control studies, three cohort studies, three meta-analysis, and one pooled analysis. The defendants contended that the Bradford Hill analyses performed by the plaintiffs' general causation experts were unreliable and driven by their preconceived conclusions. The plaintiffs countered that their experts' analyses were reliable under *Daubert*, and the defendants' arguments were ultimately challenges to the weight of the experts' testimony. The court ultimately held that the plaintiffs' general causation experts' application of the Bradford Hill factors was reliable under *Daubert* as it pertained to their conclusions that use of talcum powder products in the genital perineal area could cause the talc to migrate up the female reproductive system into the ovaries and cause ovarian cancer. But the court precluded testimony from the plaintiffs' general causation experts on their secondary theory that inhaling talc particles could also lead the talc particles to reach the ovaries and cause ovarian cancer.

The court's focus on its role as gatekeeper and the scientific methodology used by the general causation experts guided its analysis of the application of the Bradford Hill factors by the plaintiffs' experts. The court was adamant that its analysis was limited to the principles and methodology, not the conclusions reached by the experts. *Id.* at 68, 74. For example, in examining the general causation experts' analysis of the strength of association criteria, which is measured in terms of "relative risk," the court rejected arguments from the defendants that the general causation experts placed too much emphasis on this factor in concluding that there was a strong association between talc products and ovarian cancer. *Id.* at 69. The defendants contended that the relative risk as determined by the general causation experts was evidence of a weak association between talc products and ovarian cancer, rather than a strong association. The court held that the general causation experts provided good grounds for their decisions to place significant weight on the strength of association factor, both in their reports and testimony, at the *Daubert* hearing. This was sufficient under *Daubert*, regardless of whether the defendants believed that the relative risk evidenced a strong or weak association. The court reasoned that this challenge by the defendants went to the weight of the experts' testimony as opposed to the reliability.

The court further rejected the defendants' arguments that the general causation experts improperly primarily relied on case-control studies, rather than cohort studies, which the defendants asserted produced more reliable results. The court did not discuss whether cohort studies produced more reliable results than case-control studies, instead focusing on the fact that the general causation experts' reports and testimony provided good grounds for their decisions to rely primarily on case-control studies, including testifying that they examined the cohort studies, but they did not find them useful. The court declined to accept the defendants' position that there is a hierarchy of epidemiologic studies that places cohort studies above case-control studies. Even while acknowledging that some of the experts' reports failed to explain their basis for relying primarily on case-control studies, the court placed strong emphasis on the testimony provided by these experts at the *Daubert* hearing and was satisfied that the reports and *Daubert* testimony, viewed collectively, demonstrated that the general causation experts examined the cohort studies yet determined that the case-control studies were more appropriate. This decision, the court held, was supported by good grounds and sound scientific reasoning, even if the defendants' disagreed with the experts' interpretations of the usefulness of the two study types.

The court applied a similar logic when examining the general causation experts' analysis of the biological plausibility Bradford Hill factor. Biological plausibility assesses whether the purported association (i.e., talc use and ovarian cancer) is biologically plausible and consistent with existing scientific knowledge. *Id.* at 89. The general causation experts opined on two theories of biological plausibility: (1) that talc migrates up the female reproductive tract when applied to the genital area; and (2) that inhaled talc particles could travel through the lymphatic system to the ovaries and fallopian tubes. The general causation experts stated that in either instance, once the talc reached the ovaries, the carcinogens within the talc particles caused inflammation, which could lead to ovarian cancer. *Id.* at 90. As noted above, the court rejected the general causation experts' theory that inhaling talc particles led them to migrate to the ovaries, holding that the experts failed to provide any scientific basis for this theory in their reports or during their testimony at the *Daubert* hearing. *Id.* at 96.

However, the court permitted the experts' conclusion that talc migrated through the female reproductive system when applied to the genital area. Interestingly, the court noted that the studies relied on by the general causation experts did not directly support this theory, but nonetheless, the court concluded that the analysis applied by these experts was permissible because biological plausibility does not require proof or certainty.

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through the female reproductive system when applied to the genital area. Interestingly, the court noted that the studies relied on by the general causation experts did not directly support this theory, but nonetheless, the court concluded that the analysis applied by these experts was permissible because biological plausibility does not require proof or certainty. *Id.* at 93. Rather, it only examines whether the purported causal link is credible, based on what is known in science and medicine about the human body and the alleged toxin. *Id.* (citing *Milward v. Acuity Specialty Prods. Grp., Inc.*, 639 F.3d 11, 25 (1st Cir. 2011)). In this instance, the court was satisfied that the experts, at minimum, provided reliable support, based on various studies and their own scientific experience and knowledge, that their theory was plausible and sufficient. The court did not demand any additional proof from the general causation experts and held that the Bradford Hill analysis was sufficient, even if there was debate in the scientific community about the mechanism that permits talc to migrate up to the ovaries. This, once again, demonstrates the court's emphasis on the reliability of the general causation experts' application of the Bradford Hill factors and the court's refusal to go one step further and examine the weight of the experts' opinions.

The court ultimately concluded that while public health agencies had not reached a consensus that talc use causes ovarian cancer, they also did not reach a consensus that talc use does not cause ovarian cancer. The crucial term here was "biological plausibility," in the court's view, not "biological certainty."

Likewise, when examining the dose–response Bradford Hill factor, the court once again limited its analysis to the reliability of the experts' application, rather than the actual conclusions drawn. This led to the court to accept the plaintiffs' position that the dose–response analysis under Bradford Hill did not require clear and consistent evidence of a dose–response relationship; it merely required examining whether there was *any* evidence that would support a dose–response relationship. The court relied on text from the *Reference Manual on Scientific Evidence*, which gives tools to judges to "manage cases involving complex scientific and technical evidence." *See* Fed. Judicial Ctr., *Reference Manual on Scientific Evidence,* at xv. As the court notes, this manual has been relied on by several other courts in the Third Circuit in assessing the admissibility of an expert's Bradford Hill analysis. *See Rowland v. Novartis Pharms. Corp.*, 9 F. Supp. 3d 553, 562 n.21 (W.D. Pa. 2014); *Magistrini v. One Hour Martinizing Dry Cleaning*, 180 F. Supp. 2d 584, 590 (D. N.J. 2002). The court used this manual to guide its decision that the dose–response factor is not essential to establishing causation between an agent and disease, despite the defendants' assertions otherwise. The court stated that epidemiological principles did not require a strong dose–response relationship for an expert to find that a causal nexus existed between talc use and ovarian cancer. *In re Johnson & Johnson*, MDL No. 2738, No. 3:16-md-02738-FLW-LHG, at 103.

This conclusion is particularly important in the context of toxic exposure because the dose–response relationship has often been viewed by federal courts as a significant factor to consider when assessing scientific causation. *See Williams v. Mosiac Fertilizer, LLC*, 889 F. 3d 1239, 1243–44 (11th Cir. 2018) (affirming the district court's decision that the toxicologist's opinion was unreliable because the toxicologist "neglected the hallmark of science in toxic torts—the dose response relationship"); *Doolin v. Ford Motor Co.,* 2018 WL 4599712 (M.D. Fla. Sept. 25, 2018) (holding that the expert's opinion was precluded due his failure to conduct a dose-response analysis between the plaintiff's asbestos exposure and mesothelioma after acknowledging that mesothelioma was a dose-response disease); *McClain v. Metabolife Intern. Life*, 401 F. 3d 1233, 1243 (11th Cir. 2005) (holding that "[w]hen analyzing an expert's methodology in toxic tort cases, the court should pay careful attention to the expert's testimony about the dose-response relationship… [t]he expert who avoids or neglects this principle of toxic torts without justification casts suspicion on the reliability of his methodology"). Although this court was only examining general causation, the importance of dose-response relationship is particularly relevant when analyzing specific causation, which must also be proved to establish the scientific causation. *See In re Zoloft (Sertralinehydrochloride) Prods. Liab. Litig.*, 176 F. Supp. 3d 483, 391 (E.D. Pa. 2016) (finding that "[c]ausation has two levels, general and specific, and a plaintiff must prove both"). Thus, the court's conclusions that the dose–response factor need not be significant to conclude that a causal nexus exists between the toxin and the disease could have a lasting effect in toxic exposure litigation because it pertains to the ways in which defendants attempt to preclude an expert's opinion based on their dose–response analysis.

In examining how the general causation experts applied the specificity and temporality Bradford Hill factors, the court rejected the defendants' challenges to admissibility, concluding that the defendants were merely challenging the weight of the general causation conclusions and did not establish that the plaintiffs' experts' findings were unreliable. Examining the coherence factor, that is, whether the association conflicted with other known scientific facts, the court permitted the general causation experts' findings that talc use causes inflammation, which leads to ovarian cancer. The court concluded that the experts examined generally known scientific facts about inflammation and cancer and found that these facts were coherent with their conclusions and findings. This was sufficient under the Bradford Hill analysis and *Daubert* standard.

How the court scrutinized the general causation experts' application of the Bradford Hill factors demonstrates that expert opinions will survive a *Daubert* challenge as long as those opinions derive from reliably applied Bradford Hill factors, regardless of some weaknesses in the conclusions reached under each factor. Even just a minimal causal relationship between talc use and ovarian cancer in some of the factors was sufficient in the court's view here. This could potentially raise the standard that the defense counsel must meet to preclude an expert's scientific causation opinion.

After examining how the general causation experts applied the Bradford Hill factors, the court analyzed whether their findings were consistent with views held by relevant public health agencies. Particularly remarkable was the court's conclusion that scientific disagreement in the field on the association between talc use and ovarian cancer did not render an expert opinion unreliable. The defendants argued that various public health agencies declined to state that a causal relationship existed between talc use and ovarian cancer, and the plaintiffs' conclusions otherwise contradicted the findings of multiple public health agencies. The plaintiffs had directed the court to a recent report by Health Canada in 2018 that concluded that a causal relationship existed between perineal exposure to talc and ovarian cancer. *See* Health Canada, *Draft Screening Assessment: Talc,* at iii (Dec. 2018). The court ultimately concluded that while public health agencies had not reached a consensus that talc use causes ovarian cancer, they also did not reach a consensus that talc use does not cause ovarian cancer. The crucial term here was "biological plausibility," in the court's view, not "biological certainty." As such, the general causation experts' findings were not inconsistent with the opinions and conclusions of public health agencies.

Conclusion

The court's ruling represents a rare occasion where a federal judge has thoroughly examined and ruled on the scientific evidence in a talc matter and determined the reliability of the methodology applied and conclusions reached. Furthermore, this decision largely permits the plaintiffs' experts to move forward with their theories and scientific evidence as they relate to the relationship between talcum powder and ovarian cancer. It paves the way for the thousands of pending talc cases against J&J in which plaintiffs rely on expert testimony that seeks to establish a positive correlation between talc use and ovarian cancer, despite J&J's assertions that the scientific evidence states otherwise. It is considered a victory for the plaintiffs on general causation, because the defendants have continuously challenged the reliability of the science relied on by the plaintiffs in this MDL. There is little doubt that this thorough decision will have a lasting effect on not only talc and asbestos litigation, but also on toxic exposure matters in general.

While this MDL decision stems from the U.S. District Court for the District of New Jersey and will likely affect future litigation particularly in New Jersey state and federal cases, its implications extend beyond this jurisdiction. The decision contains perhaps one of the most in-depth reviews and analyses of scientific evidence in quite some time. The court admittedly relied on case law from jurisdictions outside of the Third Circuit in assessing how the experts applied the Bradford Hill factors, noting that district courts in the Third Circuit had not conducted such an in-depth analysis of each factor as this court undertook. Thus, the court's analysis and examination are a culmination of analyses and interpretations in several jurisdictions across the country, over a significant period of time, making the decision potentially influential far beyond the Third Circuit. It is certainly foreseeable that state and federal judges nationwide may cite and rely on the analysis and conclusions reached in Chief Judge Wolfson's decision in future reviews and assessments of the admissibility of expert testimony in toxic exposure matters.

Appellate review could alter many holdings in this matter, but for now, this decision should have significant influence on the litigation of toxic tort exposure cases moving forward.