Circuit Court for Baltimore City
Case No. 24-C-17-003580

UNREPORTED*

IN THE APPELLATE COURT

OF MARYLAND

No. 0568

September Term, 2022

ELIOT DACKMAN, ET AL.

v.

DESHAWN FISHER

Arthur,
Beachley,
Ripken,

JJ.

Opinion by Arthur, J.

Filed: October 30, 2023

* This is an unreported opinion. This opinion may not be cited as precedent within the rule of stare decisis. It may be cited for its persuasive value only if the citation conforms to Rule 1-104(a)(2)(B).

Appellee Deshawn Fisher brought this civil action against the owners and operators of the rental property where he resided during his infancy. He alleged that he had suffered brain damage, neurocognitive impairment, learning disabilities, the loss of I.Q. points, and other damages as a result of his exposure to lead-based paint at the property.

Fisher designated Aaron L. Zuckerberg, M.D., as an expert in childhood lead poisoning. Dr. Zuckerberg testified that Fisher suffered brain damage as a result of his exposure to lead at the rental property. On the basis of Dr. Zuckerberg's testimony and other evidence, a Baltimore City jury awarded Fisher more than $2 million in damages.

The defendants appealed. They ask us to review the circuit court's admission of Dr. Zuckerberg's testimony under Maryland Rule 5-702 and the *Daubert-Rochkind* standard for the admissibility of expert testimony.

For the reasons to follow, we hold that the circuit court did not abuse its discretion in admitting Dr. Zuckerberg's testimony. Accordingly, we affirm the court's judgment.

FACTUAL HISTORY

Deshawn Fisher was born in August of 1993. For the first 21 months of his life, from August of 1993 to May of 1995, Fisher lived at 1723 Montpelier Street in Baltimore City. That property was owned or managed by the defendants, to whom we shall collectively refer as "Dackman."

A 1993 repair proposal and a 1994 Baltimore City Health Department test showed lead-based paint at 1723 Montpelier Street. According to Fisher's aunt, chipped and

flaking paint was visible on the front of the property and in the living room, dining room, kitchen, and bathroom—"really everywhere"—in the household. In 2012, inspection reports prepared by ARC Environmental, Inc., indicated that lead-based paint was still present on the living room window casing, the front exterior windowsill and casing, the basement windowsill and casing, and the rear exterior door jamb and brick wall surface.

In 1994 and 1995, while he was residing at 1723 Montpelier Street, Fisher's blood-lead levels were tested seven times. Each test revealed elevated levels of lead.

Date	**Age**	**Blood-Lead Level**
January 31, 1994	Six months	4 micrograms per deciliter (µg/dL)
July 20, 1994	Eleven months	10 µg/dL
August 3, 1994	Twelve months	11 µg/dL
October 19, 1994	Fourteen months	9 µg/dL
November 29, 1994	Fifteen months	11 µg/dL
March 12, 1995	Nineteen months	11 µg/dL
April 12, 1995	Twenty months	11 µg/dL

Fisher's early childhood was marked by significant and recurring behavioral and academic problems. During elementary school, Fisher was described as hyperactive, inattentive, disruptive, and oppositional. He had to repeat the second, ninth, and tenth grades. In middle school and high school, Fisher had bad grades, failed multiple classes, and was suspended and expelled from school.

Fisher eventually graduated from high school when he was 19 years old. He had a 1.77 grade point average. After graduation, he attended Full Sail University, a career school, but struggled with the curriculum.

In July 1999, and again in June 2000, when he was six and seven years old, respectively, Fisher was evaluated because of concerns about his learning difficulties and his history of hyperactive, aggressive, and disruptive behavior at school. His diagnoses included Attention-Deficit/Hyperactivity Disorder ("ADHD").

Fisher suffered depressive episodes following the murder of his father and the deaths of his mother, grandmother, and friends. At some point in his youth, he experienced auditory hallucinations. He reportedly attempted suicide on multiple occasions and was hospitalized for suicidal ideation in 2010, when he was 17. In October 2013, when he was 20, he was hospitalized again for about a week and was discharged with a diagnosis of "Mood disorder NOS."[1] Medication orders issued on November 4, 2013, said, "Indication: Bipolar disorder."

PROCEDURAL HISTORY

On July 5, 2017, Fisher filed suit against Dackman in the Circuit Court for Baltimore City. Fisher alleged negligence, battery, and violations of the Maryland

[1] The abbreviation "NOS" can mean "not otherwise specified" in medical terminology to refer to a diagnosis "without specific or distinguishing features." *NOS*, Farlex Medical Dictionary (2009) (retrieved from https://medical-dictionary.thefreedictionary.com/NOS) (last visited Oct. 24, 2023), archived at https://perma.cc/LM8C-Z327.

Consumer Protection Act. He claimed that he had suffered brain damage and other injuries as a result of his exposure to lead paint at 1723 Montpelier Street.

On February 12, 2018, Fisher designated his expert witnesses. In his designation, Fisher identified, among others, Aaron L. Zuckerberg, M.D., a board-certified pediatrician, as an expert in childhood lead poisoning. At the time of the trial, Dr. Zuckerberg was the Chief of Pediatric Anesthesiology and the Director of the Children's Diagnostic Center at NAPA/Sinai Hospital in Baltimore. He was also an assistant professor in the Department of Pediatrics at the University of Maryland School of Medicine.

Dr. Zuckerberg's Trial Testimony

The trial began in July 2019. At trial, the court accepted Dr. Zuckerberg as an expert in the areas of "medicine generally, in pediatrics, [and] in lead poisoning, its sources and [the] medical harm it causes." Dackman did not object to Dr. Zuckerberg's qualifications.

Dr. Zuckerberg testified that he has treated children who suffer from lead poisoning since he was an intern and a resident at the Johns Hopkins Hospital in the 1980s. In his practice at Sinai, he continues to see children who have been exposed to lead.

Dr. Zuckerberg is well acquainted with the medical literature pertaining to childhood lead poisoning and the consequences of lead exposure. He has performed more than 100 forensic examinations of lead-poisoned children and adolescents and has

rendered expert opinions concerning the causal connection between lead poisoning and a person's cognitive and developmental conditions. To his knowledge, he has never been found not to be qualified to render those opinions.

During his testimony, Dr. Zuckerberg explained how exposure to lead injures the brain. He described the manifestations of lead poisoning, including problems with attention and memory, problems with behavior and coordination, educational difficulties, executive dysfunction,[2] and impaired intelligence. In addition, he discussed the historical scientific acceptance among state, national, and world health organizations of the general causal relationship between lead exposure and these adverse health effects.

Dr. Zuckerberg identified and explained a 2016 statement published by the American Academy of Pediatrics regarding the effects of lead exposure in children. The statement, he explained, determined that "low level lead exposure, even at blood lead levels below five micrograms per deciliter[,] is a causal risk factor for diminished intellectual and academic abilities, higher rates of neurobehavioral disorders such as hyperactivity, attention deficits and low birth weight in children." According to the statement, "[n]o effective treatments ameliorate the permanent development [e]ffects of

[2] "Executive function" refers to the "cognitive process that encompasses an individual's ability to organize thoughts and activities, prioritize tasks, manage time efficiently, and make decisions." *Executive Function*, American Heritage Medical Dictionary (2007) (retrieved from https://medical-dictionary.thefreedictionary.com/executive+function) (last visited Oct. 24, 2023), archived at https://perma.cc/JG3H-BYZ8.

lead toxicity." Dr. Zuckerberg testified that the statement was consistent with the opinions he was offering in this case.

Dr. Zuckerberg proceeded to describe a summary table from the Environmental Protection Agency's Integrated Science Assessment for Lead (the "EPA-ISA").[3] Dr. Zuckerberg testified that the table was derived from the "evaluation of the enormous amount of literature looking at the effects of lead on children and adults over the course of time." The table, he explained, identifies a causal relationship between lead exposure and "problems with attention, problems with being impulsive, problems with making bad choices, [and] problems with hyperactivity." The table also identifies a likely causal relationship between lead exposure and conditions such as anxiety and depression.

Dr. Zuckerberg outlined the Maryland Department of the Environment's pronouncements on lead and its position on the harms caused by lead. The pronouncements state that children are at the greatest risk for harms caused by lead from birth until the age of six, while their brains and neurological systems are developing. The pronouncements also state that sustained exposure of children to lead "causes long term, long lasting . . . neurological damage or death." The effects of long-term exposure to lead include "learning disabilities, shortened attention span, irritability and lower IQ." According to the Maryland Department of the Environment, a "major source of exposure for children" in Maryland is "lead paint dust from deteriorated lead paint."

[3] The EPA-ISA has been held to establish a sufficient factual basis for an expert's opinion that lead exposure causes attention decrements. *Sugarman v. Liles*, 460 Md. 396, 428-29 (2018).

Dr. Zuckerberg had interviewed Fisher for an hour and had reviewed a voluminous amount of material, including medical records, educational records, neuropsychological, psychiatric, and vocational evaluations, and the deposition testimony of Fisher and his family members. He considered Fisher's developmental history; his medical history, including his elevated blood-lead levels in infancy; his educational history; his cognitive, behavioral, and social profiles; his social history; and his personal history and mental status.

Dr. Zuckerberg observed that Fisher scored in only the eighth percentile on the Seashore Rhythm test, a test of auditory attention, working memory, and visual motor integration. Dr. Zuckerberg explained that Fisher's score revealed a weakness in his ability "to attentively listen to information and incorporate it into [his] learning and [] informational database." Dr. Zuckerberg pointed to numerous studies, dating back to 1979, that identify a "dose-response" relationship between blood-lead levels and Seashore Rhythm scores—meaning that the more lead a person has in their blood, the lower the Seashore Rhythm test scores would be. According to Dr. Zuckerberg, the Seashore Rhythm test is "predictive of educational attainment"—the lower the score, the lower the level of educational attainment. He opined, to a reasonable degree of medical probability, that Fisher's problems with auditory attention were a result of his exposure to lead.

Dr. Zuckerberg noted that Fisher scored in only the thirteenth percentile on a test of working memory, which the doctor described as the ability to store information in

one's short-term memory. Dr. Zuckerberg explained that working memory is "fundamental to our ability to learn," because "when we get a piece of information, we have to incorporate it." Persons who perform poorly on tests of working memory, he said, have difficulty with reading and math.

Dr. Zuckerberg also noted that Fisher scored in just the third percentile in visual-motor integration, a skill that approximates hand-eye coordination. He testified that poor visual-motor integration is used to predict which children will perform poorly on standardized tests and will need academic support. According to Dr. Zuckerberg, it has "been demonstrated since 1979 [that] children [with] elevated blood lead levels have far lower levels of visual-motor integration" than those who do not.

In a report that was disclosed in discovery, Dr. Zuckerberg performed a differential diagnosis to discern whether there was a specific causal connection between Fisher's lead exposure and his neuropsychological impairments, cognitive decrements, and academic underachievement. In his differential diagnosis, Dr. Zuckerberg considered endogenous causes (i.e., those of internal origin, such as lead poisoning), as well as exogenous causes (i.e., those of external origin, such as poverty and poor schools).[4] Both in his report and at trial, Dr. Zuckerberg opined, to a reasonable degree

[4] For example, on the subject of "intellectual reduction"—which was just one of several subjects that he evaluated—Dr. Zuckerberg wrote:

> The differential diagnosis of causes and contributors of intellectual reduction is extensive, including disorders and exposures that affect brain development and functioning. Endogenous considerations can be divided into prenatal, perinatal, syndromic and postnatal causes. *Prenatal*

of medical probability, that Fisher's exposure to lead at 1723 Montpelier Street was a substantial contributing factor to his school insufficiency, academic underachievement, intellectual reduction, and neuropsychological deficiencies.

On cross-examination, Dr. Zuckerberg was questioned extensively about Fisher's diagnoses of ADHD and bipolar disorder. Dr. Zuckerberg testified that he had no specialty training in developmental behavioral disorders or mental health disorders, but that as a pediatrician he has dealt with many psychological and mental health issues. Dr. Zuckerberg agreed that Fisher had been diagnosed with ADHD, a mood disorder, and depression. At first, the doctor was unsure about whether Fisher had been diagnosed with bipolar disorder, but he recalled that Fisher had been prescribed a medication that is used to treat bipolar disorder, among other things. He was "uncertain" about whether Fisher would have had mental health disorders even absent his exposure to lead. At most, the doctor could say that it was "possible."[5]

> categories include congenital infections, in utero exposure to toxins, and congenital hypothyroidism. *Perinatal* categories include maternal age (bimodal), premature birth, low birth weight infants, and perinatal complications: hypoxia, infection, trauma. *Syndromic* etiologies include genetic/chromosomal causes, syndromes: Rett, Fragile X, tuberous sclerosis and metabolic disorders. A familial history of neurodevelopmental disorders is considered in this category. *Postnatal categories* include: Trauma, CNS hemorrhage, hypoxia, environmental toxins **(LEAD)**, CNS infections, seizures, hypothyroidism, malignancy and its treatments, cerebrovascular disease and malnutrition.

[5] According to Dackman, Dr. Zuckerberg conceded that ADHD or bipolar disorder "could cause the same symptoms that [he] ascribed to lead exposure" and that ADHD or bipolar disorder could have caused those symptoms "independent of any lead exposure." Dackman is incorrect. Dr. Zuckerman did not testify that ADHD or bipolar disorder

Defense counsel asked whether science currently acknowledged a causal relationship between lead exposure and either ADHD or bipolar disorder. Dr. Zuckerberg responded that, in his understanding, there was no link between lead exposure and bipolar disorder, but that there was a significant amount of dispute about the causal relationship between lead exposure and ADHD. As of the date of trial, Dr. Zuckerberg was "not ready to say that there's a causal relationship between lead and ADHD."

Dr. Zuckerberg agreed that "individuals with ADHD have concomitant learning issues." He also agreed that some persons with bipolar disorder "perform poorly on academic tests." He added, however, that "there are individuals with bipolar disease who perform exceedingly well." "Some of the most brilliant people," such as "artists" and "architects," he said, "have been bipolar."

On redirect examination, Dr. Zuckerberg reiterated that "[t]he American Academy of Pediatrics was exceedingly clear" in 2016 that lead causes attentional deficiencies, such as those suffered by Fisher.

On the relationship between the symptoms of lead poisoning and the symptoms of bipolar disorder, Dr. Zuckerberg testified:

> I think one doesn't exclude the other. Being lead poisoned doesn't increase your chances of having bipolar disorder, to my knowledge. And having bipolar doesn't exclude the possibility that you were lead poisoned as a child.

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could cause Fisher's symptoms. He testified that being lead poisoned does not increase one's chances of having bipolar disorder and that having bipolar disorder does not exclude the possibility that one suffered lead poisoning as a child.

The Circuit Court's Ruling and the Verdict

At the close of Fisher's case, Dackman moved for judgment as a matter of law. Among other things, Dackman argued that Fisher did not offer sufficient evidence to prove that his injuries were caused by lead exposure. The court denied the motion.

The jury returned a verdict for Fisher in the amount of $2,374,874.00. Dackman moved for judgment notwithstanding the verdict or for remittitur. The circuit court granted a remittitur of $350,000.00 and entered a judgment for Fisher in the amount of $2,212,874.00.

Dackman noted a timely appeal.

Maryland Rule 5-702 Hearing

When this litigation began in 2017, and when this case was tried in 2019, Maryland followed the so-called "*Frye-Reed* standard" for the admissibility of expert testimony. Under that standard, the proponent of the testimony was required to show that the basis of a scientific opinion was "generally accepted as reliable within the expert's particular scientific field" before the opinion would be "received as evidence at trial." *Reed v. State*, 283 Md. 374, 381 (1978).

In August 2020, Maryland's highest court abandoned *Frye-Reed* and adopted the standard for the admissibility of expert testimony set forth in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579 (1993). *Rochkind v. Stevenson*, 471 Md. 1, 5 (2020) ("*Rochkind v. Stevenson II*"). The *Daubert* standard "refocuses the attention away from acceptance of a given methodology—although that is not totally removed from the

calculus—and centers on the reliability of the methodology used to reach a particular result." *Rochkind v. Stevenson II*, 471 Md. at 31.

The Court held that the new standard would apply to any cases that were "'pending on direct appeal when [the] opinion [was] filed, where the relevant question [had been] preserved for appellate review.'" *Rochkind v. Stevenson II*, 471 Md. at 38-39 (quoting *Kazadi v. State*, 467 Md. 1, 47 (2020)). The Court explained that, "[i]n this context, the 'relevant question' is whether a trial court erred in admitting or excluding expert testimony under Maryland Rule 5-702 or *Frye-Reed*." *Rochkind v. Stevenson II,* 471 Md. at 39.

This case was pending on direct appeal when the Court adopted *Daubert* and discarded *Frye-Reed*. Consequently, on October 8, 2020, the parties jointly moved to remand the case for a hearing under the new standard. The parties agreed to rely on the testimony in the existing trial record, the pleadings, and the offer of proof presented after the remand. This Court granted the motion.

The circuit court conducted the hearing on May 16, 2022. At the hearing, Dackman argued that Dr. Zuckerberg's testimony was inadmissible under Maryland Rule 5-702 and *Daubert-Rochkind*. Dackman contended that Dr. Zuckerberg's testimony was unreliable because he did not perform a differential diagnosis to determine whether Fisher's condition was attributable to ADHD or bipolar disorder. Dackman further contended that Dr. Zuckerberg was unable to determine whether Fisher would have the same cognitive struggles absent his lead exposure, because Fisher's symptoms were also

part of the diagnoses for ADHD and bipolar disorder. As the court understood it, Dackman essentially argued that Fisher's diagnoses of ADHD, bipolar disorder, or both precluded a finding of a causal connection between his cognitive symptoms and lead exposure.

In response, Fisher asserted that ADHD and bipolar disorder do not "cause" his symptoms. Instead, he argued, ADHD and bipolar disorder are diagnostic labels that are assigned when a precise constellation of symptoms is present. Fisher also asserted that Dr. Zuckerberg did perform a differential diagnosis, which included a consideration of potential prenatal and postnatal causes for his symptoms, as well as an examination of his familial background, any potential environmental exposures, and other possible health issues. Fisher argued that, based upon Dr. Zuckerberg's review of facts particular to Fisher and his family, as well as supplementation with specific studies, the doctor concluded that other factors could have contributed to Fisher's overall attention and behavioral problems. According to Fisher, however, Dr. Zuckerberg ultimately concluded that lead was a substantial contributing factor to Fisher's cognitive disabilities.

The circuit court held that Dr. Zuckerberg's testimony was admissible under *Daubert-Rochkind*. The court reasoned that Dr. Zuckerberg had reached a scientific conclusion concerning a causal link between lead exposure and the particular symptoms, or "spectrum of injury," that Fisher suffered. The court acknowledged that the "spectrum of injury" included factors that lead to a diagnosis of ADHD or bipolar disorder. Nonetheless, the court rejected Dackman's argument that, under Maryland Rule 5-702

and *Daubert-Rochkind*, a diagnosis of ADHD or bipolar disorder would necessarily preclude the conclusion that lead poisoning was a substantial contributory factor in Fisher's symptoms.

The court concentrated on whether there was a sufficient factual basis for Dr. Zuckerberg's testimony—the third and final clause of Maryland Rule 5-702. Because of the nature of Dackman's contentions, the court focused on whether Dr. Zuckerberg accounted for obvious alternative explanations for Fisher's injuries, which is one of the factors that a court should consider under *Daubert-Rochkind*. *Rochkind v. Stevenson II*, 471 Md. at 36.

The court reasoned that, by stating on the record that there could be other influences and factors at play with Fisher's disabilities, Dr. Zuckerberg was transparent about the narrow aspects of his expert opinion. The court stated that Dr. Zuckerberg accounted for alternative explanations, "just not in the way that the defense would have it—which is to say that if there's an alternative explanation, then that means that it's impossible for there to be a lead[-]caused impairment or injury." The court concluded: "Because we follow a substantial factor causation standard in Maryland, . . . this was a legitimate expert opinion that was presented to the fact finder." "[I]t was up to the fact finder to determine whether the lead causation was a substantial factor in causing Mr. Fisher's injury."

Dackman noted this timely appeal.

QUESTION PRESENTED

Dackman presents one question, which we have rephrased: Did the trial court abuse its discretion by admitting Dr. Zuckerberg's expert testimony on medical causation?[6]

DISCUSSION

Dackman contends that the circuit court abused its discretion by admitting Dr. Zuckerberg's expert opinions under Maryland Rule 5-702 and *Daubert-Rochkind.* In the alternative, Dackman contends that, even if Dr. Zuckerberg's testimony were admissible, Fisher failed to generate evidence sufficient to support a jury verdict.

We conclude that the circuit court did not abuse its discretion in admitting Dr. Zuckerberg's testimony and that the evidence was sufficient to support the verdict.

Admissibility of Expert Testimony

Maryland Rule 5-702 provides that "[e]xpert testimony may be admitted, in the form of an opinion or otherwise, if the court determines that the testimony will assist the trier of fact to understand the evidence or to determine a fact in issue." "'In making that determination, the trial court must determine: (1) whether the witness is qualified as an expert by knowledge, skill, experience, training, or education[;] (2) the appropriateness of the expert testimony on the particular subject[;] and (3) whether a sufficient factual basis

[6] Dackman phrased the question as follows: "Did the Trial Court abuse its discretion under [sic] when it upheld Dr. Zuckerberg's testimony that lead exposure caused all of Appellee's brain injury, cognitive disability, and consequent economic damages even though Dr. Zuckerberg concedes that Appellee's ADHD and Bipolar Disorder could have caused the same symptoms independent of any lead exposure?"

exists to support the expert testimony.'" *Oglesby v. Baltimore Sch. Assocs*., 484 Md. 296, 327 (2023) (quoting Md. Rule 5-702).

"The third factor, the existence of a sufficient factual basis, has been interpreted as encompassing two sub-factors—whether the expert had an adequate supply of data and whether the expert used a methodology that was reliable." *Id.* "Absent either sub-factor, an expert's opinion is inadmissible." *Id.* at 328.

"[T]o satisfy the requirement of a reliable methodology, 'an expert opinion must provide a sound reasoning process for inducing its conclusion from the factual data and must have an adequate theory or rational explanation of how the factual data led to the expert's conclusion.'" *Id.* (quoting *Sugarman v. Liles*, 460 Md. 396, 415 (2018)).

"In addition, in determining whether an expert has a sufficient factual basis to offer an opinion, a court may consider whether there is too great an analytical gap between the data relied upon and the opinion proffered." *Id*. "The data or information upon which an expert relies must provide factual support for the opinions reached." *Id.*

Admissibility of Expert Testimony Under the *Daubert-Rochkind* Standard

In *Rochkind v. Stevenson II*, 471 Md. at 5, the Court abandoned the *Frye-Reed* standard, which had focused on whether an expert's opinion was "generally accepted." In its place, the Court adopted the principles of *Daubert*, which "prizes the reliability of an expert's methodology over its general acceptance." *Katz, Abosch, Windesheim, Gershman & Friedman, P.A. v. Parkway Neuroscience & Spine Inst., LLC*, 485 Md. 335, 342 (2023). The Court held that, in conducting a Rule 5-702 analysis, a trial court should

consider a number of factors in determining whether expert testimony is sufficiently reliable to be submitted to a jury. *Rochkind v. Stevenson II*, 471 Md. at 36.[7]

"[A]ll of the *Daubert* factors are relevant to determining the reliability of expert

[7] The Court restated the five factors delineated by the United States Supreme Court in *Daubert* and added an additional five factors to be considered by Maryland courts when determining the admissibility of expert testimony as follows:

(1) whether a theory or technique can be (and has been) tested;

(2) whether a theory or technique has been subjected to peer review and publication;

(3) whether a particular scientific technique has a known or potential rate of error;

(4) the existence and maintenance of standards and controls;

(5) whether a theory or technique is generally accepted[;]

(6) whether experts are proposing to testify about matters growing naturally and directly out of research they have conducted independently of the litigation, or whether they have developed their opinions expressly for purposes of testifying;

(7) whether the expert has unjustifiably extrapolated from an accepted premise to an unfounded conclusion;

(8) whether the expert has adequately accounted for obvious alternative explanations;

(9) whether the expert is being as careful as he [or she] would be in his [or her] regular professional work outside his [or her] paid litigation consulting; and

(10) whether the field of expertise claimed by the expert is known to reach reliable results for the type of opinion the expert would give.

testimony, yet no single factor is dispositive in the analysis." *Id.* at 37. "A trial court may apply some, all, or none of the factors depending on the particular expert testimony at issue." *Id*.

"Under *Daubert*, judges are charged with gauging only the threshold *reliability*—not the ultimate validity—of a particular methodology or theory." *Id.* at 33 (emphasis in original). Thus, a court must focus "'solely on principles and methodology, not on the conclusions that they generate.'" *Id.* at 36 (quoting *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. at 595).

Still, "'conclusions and methodology are not entirely distinct from one another.'" *Id*. at 36 (quoting *General Electric Co. v. Joiner*, 522 U.S. 136, 146 (1997)). Thus, a trial court "must also consider the relationship between the methodology applied and conclusion reached[.]" *Id*.; *accord Katz, Abosch, Windesheim, Gershman & Friedman, P.A. v. Parkway Neuroscience & Spine Inst., LLC*, 485 Md. at 345 (recognizing that "the choice or calculation of the inputs to a methodology can be a part of the methodology itself," and "reject[ing] an unduly rigid dividing line between 'data' and 'methodology' that binds courts to admit methodologically questionable analyses cloaked as data").

The principles of *Daubert* recognize that "'[t]rained experts commonly extrapolate from existing data.'" *Rochkind v. Stevenson II,* 471 Md. at 36 (quoting *General Electric Co. v. Joiner*, 522 U.S. at 146). "'But'" a trial court need not "'admit opinion evidence

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Rochkind v. Stevenson II, 471 Md. at 35-36.

that is connected to existing data only by the *ipse dixit* of the expert.'" *Id*. (quoting *General Electric Co. v. Joiner*, 522 U.S. at 146). Instead, "'[a] court may conclude that there is simply too great an analytical gap between the data and the opinion proffered.'" *Id.* (quoting *General Electric Co. v. Joiner*, 522 U.S. at 146).

The Court's decision in *Rochkind v. Stevenson II* did "not upend [the] trial court's gatekeeping function." *Id.* at 38. "'Vigorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof are the traditional and appropriate means of attacking shaky but admissible evidence.'" *Id.* at 38 (quoting *Daubert v. Merrell Dow Pharmaceuticals, Inc.,* 509 U.S. at 596).

Standard of Review

Appellate courts review a trial court's decision concerning the admissibility of expert testimony under Maryland Rule 5-702 for an abuse of discretion. *See Rochkind v. Stevenson II*, 471 Md. at 10; *Oglesby v. Baltimore Sch. Assocs*., 484 Md. at 326-27. In cases involving the admission of expert testimony, the precise meaning of "abuse of discretion" appears to be in flux. *See*, *e.g.*, *Abruquah v. State*, 483 Md. 637, 652 n.5 (2023); *Katz, Abosch, Windesheim, Gershman & Friedman, P.A. v. Parkway Neuroscience & Spine Inst., LLC*, 485 Md. at 386-407 (Booth, J., concurring).

In general, an abuse of discretion occurs "'where no reasonable person would take the view adopted by the trial court,'" *Oglesby v. Baltimore Sch. Assocs*., 484 Md. at 327 (quoting *Maryland Bd. of Physicians v. Geier*, 451 Md. 526, 544 (2017)), or "when 'the decision under consideration [is] well removed from any center mark imagined by the

reviewing court and beyond the fringe of what that court deems minimally acceptable.'" *Id.* (quoting *Wilson v. John Crane, Inc.*, 385 Md. 185, 199 (2005)). A court may abuse its discretion if it permits expert testimony that lies beyond "the outer bounds of what" the appellate court determines to be "acceptable expert evidence in [the] area." *Abruquah v. State*, 483 Md. at 652 n.5; *accord Katz, Abosch, Windesheim, Gershman & Friedman, P.A. v. Parkway Neuroscience & Spine Inst., LLC*, 485 Md. at 361.

The Trial Court Did Not Abuse its Discretion Under Rule 5-702

Dr. Zuckerberg opined that Fisher suffered a brain injury as a consequence of his exposure to lead during his early childhood. In Dr. Zuckerberg's opinion, the manifestations of the brain injury include a reduction in intelligence and neuropsychological deficiencies in the area of auditory attention, working memory, and visual motor integration.

Dackman does not dispute that Dr. Zuckerberg is qualified as an expert by knowledge, skill, experience, training, and education. Nor does Dackman dispute the appropriateness of Dr. Zuckerberg's testimony on whether Fisher has suffered personal injury because of his exposure to lead while he was an infant. Therefore, this case does not implicate the first two clauses of Rule 5-702.

Dackman limits his challenge to the circuit court's admission of Dr. Zuckerberg's testimony under the third requirement of Maryland Rule 5-702—"whether a sufficient factual basis exists to support the expert testimony." In brief, Dackman contests the reliability of the methodology that Dr. Zuckerberg employed in opining that Fisher

suffered a brain injury as a consequence of his exposure to lead.

In lead paint litigation, a plaintiff must prove both "general" and "specific" causation. *Oglesby v. Baltimore Sch. Assocs.*, 484 Md. at 334. "'General causation addresses whether a particular substance can cause the kind of injury suffered by the plaintiff[,]' and '[s]pecific causation addresses whether the substance actually caused the plaintiff's injury.'" *Id.* at 334 n.25 (quoting *Sugarman v. Liles*, 460 Md. at 415-16).

Dackman "does not dispute general causation." Nor could he, as epidemiological studies, such as the EPA-ISA, on which Dr. Zuckerberg relied, supply a sufficient factual basis for an expert's opinion that lead exposure causes attention decrements, *Sugarman v. Liles*, 460 Md. at 428-29, such as those that Fisher suffered. Instead, Dackman contends that, in moving from general to specific causation, Dr. Zuckerberg did not employ a reliable methodology, or that he employed the methodology in an unreliable way, or that he "made unsupported logical leaps in his analysis."

Dr. Zuckerberg's methodology involved the use of a differential diagnosis. "'[D]ifferential diagnosis is a methodology by which the cause of a medical problem is identified by considering and then ruling out the potential causes until the most probable cause remains.'" *Blackwell v. Wyeth*, 408 Md. 575, 614-15 (2009); *accord Westberry v. Gislaved Gummi AB*, 178 F.3d 257, 262 (4th Cir. 1999) (stating that "[d]ifferential diagnosis, or differential etiology, is a standard scientific technique of identifying the cause of a medical problem by eliminating the likely causes until the most probable one is isolated"). Numerous courts have held that "a medical opinion on causation based

upon a reliable differential diagnosis is sufficiently valid to satisfy" *Daubert* and Rule 702 of the Federal Rules of Evidence, the federal analog of Rule 5-702. *Westberry v. Gislaved Gummi AB*, 178 F.3d at 263 (collecting authorities).

Dackman contends that Dr. Zuckerberg did not perform any differential diagnosis at all. Dackman characterizes bipolar disorder and ADHD as "independent likely causes" of Fisher's damages. He cites Dr. Zuckerberg's initial failure of recollection that Fisher had a diagnosis of bipolar disorder. He argues that Dr. Zuckerberg could not have ruled out bipolar disorder as a cause of Fisher's cognitive disability if he were unaware of the diagnosis.

Dackman is incorrect in asserting that Dr. Zuckerberg failed to perform a differential diagnosis. Dr. Zuckerberg applied his decades of training and clinical experience and his knowledge of the medical literature concerning the consequences of lead exposure during childhood. He reviewed volumes of data concerning Fisher. He considered exogenous and endogenous factors. *See supra* n.4. And he recognized that some of those factors, such as the adverse events that Fisher experienced during his childhood and his family history of educational attainment, probably contributed to his academic underachievement.

Dr. Zuckerberg "ruled in" lead exposure as a probable cause of Fisher's neurological impairments because of three key pieces of data:

- Fisher's deficit in auditory attention (he tested in only the eighth percentile), a factor that has long been understood to be inversely related to lead exposure (i.e., the greater the exposure, the greater the deficit);

- Fisher's poor performance in a test of visual-motor integration (he scored in only the third percentile), another factor that has been long understood to be related to lead exposure; and

- Fisher's poor performance in a test of working memory (he scored in only the thirteenth percentile), an ability that is well known to be a target of lead exposure.

These data points identify lead exposure as a likely cause of Fisher's impairments. With those data points and the undisputed evidence of elevated blood-lead levels over many months during Fisher's infancy, a "critical" age according to Dr. Zuckerberg, the doctor could reasonably conclude that Fisher's exposure to lead at 1713 Montpelier Street was probably a specific cause of his impairments.

In his report, Dr. Zuckerberg considered, but ruled out an array of exogenous and endogenous factors that might have caused Fisher's injuries. *See supra* n.4. Dackman complains, however, that Dr. Zuckerberg's differential diagnosis was unreliable because it disregarded certain specific "alternative causes"—ADHD and bipolar disorder.

Fisher responds, correctly, that ADHD and bipolar disorder do not "cause" the injuries that he suffered. Rather, ADHD and bipolar disorder are diagnostic labels that are assigned to behavior that satisfy certain criteria. The diagnoses are made pursuant to the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders* (5th ed. 2013) (the "DSM-5"). The diagnostic criteria in the DSM-5 are "intended to facilitate an objective assessment of symptom presentations in a variety of clinical settings . . . as well as in general community epidemiological studies of mental disorders." DSM-5 at xli. The DSM-5 cautions that "a diagnosis does not carry any

necessary implications regarding etiology or causes of the individual's mental disorder." DSM-5 at 25.

In short, a diagnosis of ADHD or bipolar disorder represents a conclusion that a person manifests certain specified symptoms; the diagnosis does not mean that ADHD or bipolar disorder causes those symptoms. ADHD and bipolar disorder, therefore, were not causal factors that Dr. Zuckerberg was required to rule out in his differential diagnosis. As Fisher puts it, Dackman "conflate[s] classification and causation."[8]

Dackman goes on to argue that there was an impermissible "analytical gap" between the data and Dr. Zuckerberg's opinions. In support of this argument, Dackman cites *Rochkind v. Stevenson*, 454 Md. 277 (2017) ("*Rochkind v. Stevenson I*"), a general causation case in which the Court held that an expert had an inadequate supply of data or an insufficient factual basis to opine that that lead exposure causes ADHD. *Id.* at 294; *id.* at 295. Dackman contrasts *Rochkind v. Stevenson I* with *Sugarman v. Liles*, 460 Md. 396 (2018), a specific causation case in which the Court held that an expert had a sufficient

[8] Of course, even if ADHD and bipolar disorder merely describe some of the symptoms that Fisher exhibits and do not actually cause those symptoms, ADHD and bipolar disorder are still caused by something—genetics, perhaps. And some of the symptoms associated with ADHD and bipolar disorder resemble some of the symptoms of brain damage caused by childhood lead exposure. Dackman's real point appears to be that Dr. Zuckerberg did not say that childhood lead exposure was a more likely cause of Fisher's academic underperformance or his difficulty in finding employment than was ADHD or bipolar disorder. As explained below, Dackman's argument misapprehends the rules of causation that apply in lead paint litigation in Maryland. In brief, Fisher need only show that childhood lead exposure was a substantial contributing factor in his damages (*see*, *e.g.*, *Oglesby v. Baltimore Sch. Assocs.*, 484 Md. at 334); he need not show that childhood lead exposure was a more likely cause than any another.

factual basis to testify that exposure to lead caused "attention decrements" or "generalized attention deficits" in a particular plaintiff. *Id.* at 429. The expert's testimony was inadmissible in *Rochkind v. Stevenson I* because the EPA-ISA establishes only an association, and not a causal connection, between lead exposure and ADHD. *Id.* at 291, 294. By contrast, the expert testimony was admissible in *Sugarman v. Liles*, because the EPA-ISA "identifie[s] a causal relationship between attention decrements and exposure to lead." *Sugarman v. Liles*, 460 Md. at 429.

Quoting part of one sentence in *Rochkind v. Stevenson I*, 454 Md. at 287, Dackman asserts that the expert's testimony was inadmissible because "she did not rule out other potential causes for ADHD or otherwise show a reliable methodology for her opinion." On the basis of that sentence fragment, Dackman reads *Rochkind v. Stevenson I* to say that "experts need to account for confounding factors in their diagnosis."

Dackman's reading is incorrect because it is based on a faulty premise. As Fisher points out, Dackman has quoted the Court's account of the defendant's arguments in *Rochkind v. Stevenson I*, not the Court's actual reasoning. In *Rochkind v. Stevenson I*, the Court did not reject the expert's testimony because of her failure to rule out other potential causes of the plaintiff's ADHD; it rejected the expert's testimony because the data did not support her conclusion that lead exposure caused ADHD, *id.* at 291, 294; as opposed to general attention deficits and hyperactivity. *Id.* at 290.[9]

[9] In any event, *Stevenson I* concerns proof of general causation. In this case, however, Dackman does "not dispute general causation."

Dackman misreads *Sugarman* as well. As before, Dackman begins with a quotation from the opinion: "Unlike in [*Rochkind v. Stevenson I*], none of the experts opined that Liles has a diagnosable learning disability or behavioral disorder." *Sugarman v. Liles*, 460 Md. at 429. On the basis of that quotation, Dackman asserts that the *Sugarman* Court upheld the expert testimony because "the facts did not show any unaccounted-for causes like ADHD." "The expert," Dackman says, "had no alternate causes to consider," so she could "logically attribute the plaintiff's injury to lead exposure."

Dackman's argument has no foundation in the *Sugarman* opinion. The *Sugarman* Court held that the expert had an adequate supply of data for her opinion (that lead exposure causes attention decrements) because the EPA-ISA identifies a causal relationship between lead exposure and attention decrements (*id*. at 429); the Court did not hold that the expert had an adequate supply of data for her opinion because she "had no alternate causes to consider." When the *Sugarman* Court distinguished *Rochkind v. Stevenson I* on the ground that "none of the experts opined that Liles has a diagnosable learning disability or behavioral disorder," the Court was saying that, unlike the expert in *Rochkind v. Stevenson I*, the expert in *Sugarman* did not draw an inadequately supported causal connection between lead exposure and ADHD; the *Sugarman* Court was not saying that an expert could draw a causal connection between lead exposure and generalized attention decrements only if the expert ruled out every other potential cause.

Dackman expresses the essence of his position early in his brief when he argues that Fisher must show that "lead exposure *is a more likely cause* of [his] cognitive disability than [his] ADHD or Bipolar Disorder." (Emphasis in original.) Dackman complains that Dr. Zuckerberg had no logical basis to attribute Fisher's damages to one "cause" (lead exposure) rather than another (the behaviors that are described as ADHD or bipolar disorder). Dackman's argument misapprehends how causation works in a lead paint case.

Lead-paint plaintiffs may prove the element of proximate causation by proving that lead exposure was, more likely than not, a substantial factor in bringing about the harm they suffered. *See*, *e.g.*, *Oglesby v. Baltimore Sch. Assocs.*, 484 Md. at 334 (stating that "[c]ausation in lead-based paint cases may be proven by showing that the defendant's negligence was a 'substantial factor' in causing the plaintiff's injury"); *Bartholomee v. Casey*, 103 Md. App. 34, 56-57 (1994).

Substantial factor causation differs from conventional "but-for" causation. But-for causation applies when the injury would not have occurred in the absence of the defendant's wrongful act or omission. *See* Maryland Civil Pattern Jury Instruction 19:10, cmt. B.2(a) (2023) (citing *Peterson v. Underwood*, 258 Md. 9 (1970)). By contrast, substantial factor causation applies when two or more "independent causes concur to bring about an injury, and either cause, standing alone, would have resulted in the identical harm." *Id.* cmt. B.2(b) (citing *Yonce v. SmithKline Beecham Clinical Labs.,*

Inc., 111 Md. App. 124 (1996)). As previously stated, Maryland employs substantial factor causation in cases involving personal injuries resulting from exposure to lead paint.

Section 432 of the Restatement (Second) of Torts (1965) expresses the basic principle of substantial factor causation: "If two forces are actively operating, one because of the actor's negligence, the other not because of any misconduct on his part, and each of itself is sufficient to bring about harm to another, the actor's negligence may be found to be a substantial factor in bringing it about." Comment d to section 432 explains that substantial factor causation applies not only when "the second force . . . is generated by the negligent conduct of a third person, but also when it is generated by an innocent act of a third person or when its origin is unknown."

Under Maryland law, Dackman's negligence could be a substantial cause of Fisher's neuropsychological impairments even if other factors, malign, innocent or unknown, were sufficient, in themselves, to bring about the same harm. Contrary to Dackman's contention, therefore, Fisher was not required to prove that lead exposure was "*a more likely cause* of [his] cognitive disability" than another concurrent cause of the same harm. Accordingly, Dr. Zuckerberg was not required to testify that lead exposure was "*a more likely cause* of [Fisher's] cognitive disability" than another concurrent cause of the same harm.

Fisher was required to prove, and Dr. Zuckerberg was required to testify, only that lead exposure was, more likely than not, a substantial contributing factor in bringing

about his injuries. Dr. Zuckerberg's testimony satisfied that standard. Therefore, the court did not abuse its discretion in permitting him to offer his expert opinions.[10]

Sufficiency of the Evidence

Dackman argues that, even if admissible, Dr. Zuckerberg's testimony was insufficient to support a jury verdict. According to Dackman, Dr. Zuckerberg did not show that Fisher's exposure to lead was, more likely than not, a substantial factor in causing his injury. In support of that contention, Dackman states that Dr. Zuckerberg identified three possible causes of Fisher's injuries (lead exposure, his ADHD diagnosis, and his bipolar diagnosis), but did not eliminate or distinguish Fisher's ADHD or bipolar disorder diagnoses as possible causes of his injuries.

In assessing the sufficiency of the evidence, we conduct a de novo review of the circuit court's ruling. *Univ. of Maryland Med. Sys. Corp. v. Gholston*, 203 Md. App. 321, 329 (2012). "[T]he evidence is legally sufficient to support a finding in support of the prevailing party if, on the facts adduced at trial viewed most favorably to that party, any reasonable fact finder could find the existence of the elements of the cause of action by a preponderance of the evidence." *Id.* "In a jury trial, the quantum of legally sufficient evidence needed to create a jury question is slight." *Id.*

[10] As Fisher observes, "the logical extension" of Dackman's argument "would preclude any opinion of specific causation in a lead exposure case where a treating physician diagnoses—or a defense expert theorizes—that the plaintiff suffered a mental, learning or behavioral disorder characterized by one of the known effects of lead exposure." We agree with Fisher that *Daubert* and *Rochkind v. Stevenson II* do not countenance that result.

Dackman's sufficiency argument suffers from the same flaws as his challenge to the admissibility of Dr. Zuckerberg's opinion.

First, Dackman claims that Dr. Zuckerberg testified that ADHD and bipolar disorder could "cause the same outcomes" as lead poisoning. Dackman's characterization of the doctor's testimony is incorrect. In the exchange in question, Dr. Zuckerberg was asked whether Fisher's symptoms at age six were "consistent with" those of someone who had bipolar disorder. As previously recounted, Dr. Zuckerberg responded:

> I think that one doesn't exclude the other. Being lead poisoned doesn't increase your chances of having Bipolar Disorder, to my knowledge. And having Bipolar Disorder doesn't exclude the possibility you were lead poisoned as a child.

Dr. Zuckerberg did not testify that ADHD and bipolar disorder could "cause the same outcomes" as lead poisoning.

Second, Dackman's argument misapprehends the workings of substantial factor causation. As he did in his unsuccessful challenge to the admissibility of Dr. Zuckerberg's expert opinion, Dackman argues that Fisher was required to show that lead exposure was more likely than ADHD or bipolar disorder to have caused his injuries. Again, Dackman is incorrect. Fisher was required to show only that his exposure to lead was, more likely than not, a substantial factor in causing his injuries. *See*, *e.g.*, *Oglesby v. Baltimore Sch. Assocs.*, 484 Md. at 334. He was not required to show that lead exposure was a more likely cause than another factor that was, itself, sufficient to bring about harm. *See* Restatement (Second) of Torts, *supra*, § 432.

In summary, Dr. Zuckerberg's testimony, if believed, was sufficient to establish that Fisher's exposure to lead paint was a substantial contributing factor in bringing about his injuries. The circuit court did not err in submitting this case to the jury.

JUDGMENT OF THE CIRCUIT COURT FOR BALTIMORE CITY AFFIRMED. COSTS TO BE PAID BY APPELLANTS.