UNREPORTED

IN THE COURT OF SPECIAL APPEALS

OF MARYLAND

No. 2007

September Term, 2013

DEISHAUN THOMAS

v.

KENNEDY KRIEGER INSTITUTE

Meredith,
Kehoe,
Friedman,

JJ.

Opinion by Friedman, J.

Filed: March 25, 2015

As a minor, appellant Deishaun Thomas participated in a lead reduction treatment study facilitated by appellee Kennedy Krieger Institute. Thomas alleges that while enrolled in the study, and as a result of the tortious conduct of Kennedy Krieger Institute, he was exposed to harmful levels of lead that caused irreparable brain injuries. The trial court dismissed several of appellant's claims on motions and the jury rejected those that survived. On appeal from the Circuit Court for Baltimore City, Thomas raises six issues that we have reworded as follows:

1. Whether the trial court erred in concluding that Kennedy Krieger Institute cannot be liable under the Consumer Protection Act because there was no direct commercial transaction between Kennedy Krieger Institute and Thomas.

2. Whether the trial court erred by providing insufficient jury instructions regarding the duty of care owed by a research institution to a research subject.

3. Whether the lower court abused its discretion by excluding Thomas's liability expert when the designation violated the scheduling order but was within the overall discovery timeline.

4. Whether the trial court abused its discretion by excluding evidence probative of Kennedy Krieger Institute's knowledge of the risk of lead exposure in the study participants' homes.

5. Whether the trial court abused its discretion in permitting a Kennedy Krieger Institute expert to testify over Thomas's objections that the expert lacked specific expertise and reliable methodology.

6. Whether the trial court abused its discretion in allowing a KKI expert to testify regarding potential risk factors for cognitive impairment when she was unable to conclude that any one factor was causally related to Thomas's injuries.

For the reasons that follow, we shall affirm the judgments of the circuit court.

INTRODUCTION

This case is one of several similar cases arising out of the same research study conducted by Appellee Kennedy Krieger Institute ("KKI") in Baltimore City in the 1990s. We recently issued an opinion in one such case, *White v. Kennedy Krieger Institute*, No. 1015, Sept. Term 2013, 2015 WL 808544 (Md. Ct. Spec. App. Feb. 26, 2015) (Feb. 26, 2015), that addressed several of the issues now raised by Thomas in this appeal.

FACTUAL AND PROCEDURAL HISTORY

1. The Treatment of Lead Exposed Children Study.

In *White*, we explained the Treatment of Lead-Exposed Children Study undertaken by the Kennedy Krieger Institute:

> This case arises out of a research study conducted by Kennedy Krieger Institute ("KKI") in Baltimore City in the 1990s called the Treatment of Lead-Exposed Children Study, which was known as the "TLC Study." The TLC Study originated as a partnership between the National Institute of Environmental Health Sciences ("NIEHS"), the Office of Research and Minority Health of the National Institutes of Health, and four separate Clinical Centers in separate cities managed by different entities. KKI oversaw and managed the TLC Study at the Baltimore City Clinical Center. The TLC Study was designed to study methods of addressing the high incidence of lead poisoning in inner cities. The TLC Study involved two components: (1) to evaluate the effects of the oral chelating agent, succimer, [1] on moderately lead poisoned

[1] Succimer belongs to a family of drugs called "chelators" that bind to toxic metals such as lead in the bloodstream, and allow the body to expel the resulting compound through the urinary system. Succimer is regularly used to treat children with high blood lead levels. Chelation: Therapy or "Therapy"?, National Capital Poison Center, <http://perma.cc/FK5K-2TXK> (last visited Nov. 21, 2014).

children; and (2) to evaluate benefits of residential lead clean-up and nutritional supplementation for these children. For present purposes, there were two criteria for a child to be eligible to participate in the TLC Study: (1) the child, aged between 12 and 32 months, had to have a moderate existing blood lead level (between 20 and 44 micrograms per deciliter);[2] and (2) the child had to reside in a home that was structurally sound and capable of being cleaned. The children were referred to the study by their pediatricians, or because they were already participating in the KKI Lead Clinic, which operated separately from the TLC Study. Prior to a child's participation in the TLC Study, KKI required parents[3] to give informed consent to participation both during pre-enrollment screening and at the enrollment stage.

Once a child was referred to the TLC Study, a KKI investigator would review the TLC Study pre-enrollment informed consent form ("pre-enrollment consent form") with the parents of the eligible child. The relevant sections of the pre-enrollment consent form are as follows:

> Your child has been exposed to a moderate amount of lead. . . We do not know if giving a child medicine to get rid of some of the lead in her/his body will keep the lead from harming her/him. . . .
>
> * * *
>
> Your child may be eligible for our study . . . We want to see whether a medicine prevents lead in children's bodies from harming them as they grow older. This medicine is called succimer, and it gets rid of some of the lead in children's bodies. It is now used for children who have more lead in their bodies than your child has.

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[2] Blood lead levels are measured in micrograms per deciliter, which are abbreviated as mcg/dL. *See Ross v. Housing Authority of Baltimore City*, 430 Md. 648, 653 n.4 (2013).

[3] For ease of reference, we use the term parents to also include guardians.

> All children in the TLC Study will have their homes repaired and/or cleaned to get rid of lead dust and chipped paint. We will take a careful look at your home to see if it can be repaired and/or cleaned to reduce lead paint and dust hazards. The person that takes a look at your house may collect dust samples from your home to check for lead. All children will get vitamins and minerals, will get regular checkups and blood tests from a doctor, and will get tests of their thinking, learning and development. . . .
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> * * *
>
> Every child will be in [the placebo] group or the [succimer group]. Unless there is a problem, you and the TLC doctor who takes care of your child will never know which group your child is in. There will be another doctor at the hospital who does know your child's group in case of problems.

The pre-enrollment consent also described what the pre-enrollment process entailed:

> **1. Clinic visits and blood tests**: Today we will do a blood test and check up of your child. . . We will measure the amount of lead [to determine eligibility]. . . .

Specifically, the pre-enrollment consent forms explained how KKI would conduct an initial assessment of the child's home at the pre-enrollment stage as part of the environmental component.

> **2. Home visits and Cleanup:** Trained workers will come to your home to look at painted surfaces, including porches, walls, floors, windows and trim; this is to find out whether your house can be cleaned or repaired to reduce lead hazards in paint and dust. . . .

> Some houses will qualify straightaway based on condition. If repairs are needed to qualify your house, the owner or landlord must give his/her permission for the repairs, with our help apply for a state loan and be approved for the loan for special repair funds. If your house does not qualify at all, the person checking your home will explain why and provide further information on "lead safe" housing. . . .
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> * * *
>
> **3. Vitamins and minerals:** We will give you vitamins with minerals tablets[.]

If KKI determined that a child was eligible for the study, the pre-enrollment consent form explained that KKI would arrange for trained workers to return to the child's house and "[v]acuum and wet-wash floors, window sills, window wells and other surfaces . . . to remove as much lead dust and loose chips of paint as possible, [m]ake some repairs, if the owner has special approval for a loan, [and p]rovide you with information on how you can reduce lead exposure in the home." Assessment guidelines were governed by the TLC Protocol. KKI used the same standardized home assessment forms that were used at all Clinical Centers. Depending on the results of the assessment, the home was either professionally cleaned to remove existing lead dust and paint chips, or parents were provided with information on relocating to "lead safe" housing.[4] After the cleaning and repairs, KKI provided parents with cleaning supplies and instructions on how to further reduce lead exposure in the home.

Upon completion of the pre-enrollment screening stage, KKI representatives would then provide parents with the TLC Study enrollment informed consent form ("enrollment consent form") to complete the child's enrollment in the study. For our purposes, the relevant portions are set out below.

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[4] Neither the TLC Study Protocol, nor any of the informed consent documents included a definition of the term "lead safe."

> **2. Blood lead results:** You and the TLC doctor taking care of your child will not know the results of the blood lead tests done during the first six months after your child starts taking capsules, but another doctor will know in case there is a problem. . . You may have the blood lead results after these treatment periods if you want them. . . .
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> * * *
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> **5. Damage at home or moving to a different home:** It is important for you to tell us if you move, or if a plumbing leak or anything else damages the walls or ceilings in your home, because we will need to come out and inspect and clean up as we did at the beginning of the study. If the doctor who sees the results of the blood lead tests finds that the amount of lead in your child's blood has gone up too much, we may want to come and inspect or clean your home again. Very rarely, a child's blood lead level might go up so high during the study that they might receive additional treatment outside of the study.

The enrollment consent form also highlighted the various benefits that KKI expected all children participating in the TLC Study to receive. Specifically, KKI told parents that it would inspect the home for the presence of lead dust and chipped paint, "clean-up the lead dust in your home," provide the child with vitamins and minerals, provide regular medical check-ups for the child, check the child's blood lead levels "regularly and carefully," and test the child's thinking and development.

In the medical treatment component of the study, KKI sought to determine whether succimer, which had previously been used only for children with extremely elevated blood lead levels (in excess of 44 mcg/dL), could also be used to treat children with moderately elevated blood lead levels between 20 and 44 mcg/dL. All study participants received one to three rounds of either succimer or the placebo during the six-month treatment period, and their blood lead levels were measured

two weeks after every round of treatment. The entire study period lasted three years. After completion of the six-month treatment period, participants continued to receive vitamins and mineral supplements, regular medical check-ups, blood testing, and various cognitive tests for the remainder of the study.

The medical treatment component of the TLC Study was "double blind," meaning that neither KKI nor the parents of the children knew whether the child was given the placebo or the succimer until the completion of the treatment period. To maintain the double blind nature of the TLC Study, blood test results were reviewed by a separate physician who did not have any contact with the parents during the treatment period. That physician did not report the results to KKI, but rather to the central TLC Data Coordinating Center run by the Harvard School of Public Health in Boston.

If, after the first round of succimer treatment, a participant child's blood lead level remained above 15 mcg/dL, the Data Coordinating Center was required to advise KKI to conduct a retreatment for both placebo and succimer recipients (to maintain the double blind nature of the study). According to the TLC Study Protocol, there were two circumstances where the Data Coordinating Center was required to notify KKI of an individual child's blood test result. First, if the child's blood lead level was 45 mcg/dL or higher, the Data Coordinating Center was required to direct KKI to retest the child's blood within three days. If the child's blood lead level measured 45 mcg/dL or higher after the retesting, the child's participation in the TLC Study treatment would have paused, and the child would have been treated in accordance with KKI's normal protocol for children with lead levels above 44 mcg/dL, including succimer treatment. Second, if the child's blood lead level measured above 60 mcg/dL, participation in the TLC Study would have ended immediately and the child would have been treated according to KKI's treatment protocols for children with lead levels above 60 mcg/dL.

Ultimately, in 2001 the results of the TLC study were published. The researchers found that:

> Treatment with succimer lowered blood lead levels but did not improve scores on tests of cognition, behavior, or neuropsychological function in children with blood lead levels below 45 mg per deciliter. [Because] succimer is as effective as any lead chelator currently available, chelation therapy is not indicated for children with these blood lead levels.
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> Walter J. Rogan, MD et al., *The Effect of Chelation Therapy with Succimer on Neuropsychological Development in Children Exposed to Lead*, 344 New Eng. J. Med. No. 19, 1421 (2001). The researchers ultimately concluded that because "lead poisoning [is] entirely preventable, our inability to demonstrate effective treatment lends further impetus to efforts to protect children from exposure to lead in the first place." *Id*. at 1426.

White v. Kennedy Krieger Institute, No. 1015, Sept. Term 2013, 2015 WL 808544, at *1-*4.

2. Deishaun Thomas

When Thomas was one-and-a-half years old he was evaluated by a physician at the Johns Hopkins Harriet Lane Clinic in Baltimore City. At that time, his blood tests revealed that he had elevated blood lead level of 31 mcg/dL. His mother, Marcelle Green, was then referred to the TLC study by Hopkins personnel from the Harriet Lane Clinic. Dr. Janet Serwint, a Johns Hopkins pediatrician and co-investigator in the TLC Study, was the Medical Director at the Harriet Lane Clinic and was responsible for recruiting patients from the Harriet Lane Clinic to participate in the TLC Study. On May 23, 1996, Ms. Green met with Tracy Kirkland, a nurse from the Harriet Lane Clinic, who went over the pre-enrollment consent form with Ms. Green. Ms. Green signed the pre-enrollment consent

form that same day. Also that day, Thomas's blood lead level was tested again and measured 33 mcg/dL, which was within the TLC eligibility range.

At this time, Thomas was living at 2109 East Federal Street in Baltimore City. On June 6, 1996, a KKI investigator inspected the Federal Street home, and deemed it structurally sound and cleanable, thus Thomas was fully eligible for the study. On June 25, 1996, Ms. Green signed the TLC enrollment consent form and a physical exam showed Thomas's then current blood lead levels to be 29 mcg/dL. On July 3, 1996, the Federal Street home was cleaned, and several areas were wet scraped and painted. Two days later, KKI conducted a dust wipe sample of the property, but the results of the dust wipe were not provided to Ms. Green. KKI provided Ms. Green with special cleaning materials and instructions on how to maintain low lead dust levels in the home.

Thomas's blood lead level peaked in July of 1996 at 37 mcg/dL, but as he was in the double blind treatment period of the TLC Study, his July blood lead level was not disclosed to KKI, nor to Ms. Green. Beginning October 15, 1996, (by which time Thomas's blood lead level had dropped to 22 mcg/dL) through December 1996, Thomas missed his TLC Study appointments, which caused him to be discharged from the TLC Study on December 8, 1996.

In May of 1997, however, Ms. Green decided to re-enroll Thomas in the TLC Study. At that time, Thomas's blood lead levels measured 27 mcg/dL. KKI again inspected the Federal Street home, and determined that it again needed to be cleaned because of the high presence of dust in the home. According to her affidavit, Ms. Green told KKI staff that she needed to relocate from the Federal Street home because she was being evicted. Ms. Green

testified that two representatives from KKI provided her with a list of lead safe housing options, and drove her to look at different rental properties on the list. Ms. Green decided to move to 417 East Patterson Park Avenue in Baltimore City believing that it was "lead safe." KKI representatives allegedly signed the lease with her and paid the security deposit. The Patterson Park Avenue home was inspected by KKI on May 28, 1997, and determined to be structurally sound and cleanable. Within the next few days, KKI hired professionals to clean the home. After the cleaning, KKI again collected dust wipe samples from the home, but did not share the results with Ms. Green. Ms. Green was again given cleaning supplies and instructed how to clean and maintain reduced lead dust levels in the home.

Five to six months later, and with the assistance of KKI, Ms. Green was able to secure a Section 8 housing voucher that she used to move to a home at 512 North Luzerne Avenue in Baltimore City. Ms. Green understood the house to be lead safe because it was on the Section 8 housing list. The house was deemed eligible for the TLC Study, although KKI did not clean or test the new property. Thomas remained in the Luzerne Avenue home for the remainder of the TLC Study period.

On February 8, 2012, Thomas, now an adult, filed this lawsuit. Thomas alleges that, as a result of his childhood exposure to lead, he suffers from a cognitive disorder, learning disorder, borderline intellectual function, and an IQ loss of between 8 and 11 points. He alleges that his toxic lead exposure and resulting brain injury were caused by KKI's tortious misconduct in the design and implementation of the TLC Study. In particular, Thomas set forth seven claims against KKI: (1) negligence in the design and implementation of the TLC Study; (2) negligence in the failure to maintain the properties in which Thomas

resided in safe condition; (3) negligent misrepresentation of the lead-based paint hazards of the homes in which Thomas resided during the TLC Study; (4) negligent misrepresentation of the risk of harm to Thomas as a result of his participation in the TLC Study; (5) fraudulent misrepresentation of the same; (6) violation of the Maryland Consumer Protection Act; and (7) battery.

KKI moved for summary judgment as to all claims. On October 18, 2013, the trial court granted summary judgment in favor of KKI as to the claim of negligent failure to maintain the properties in safe condition, violation of the Maryland Consumer Protection Act, and battery. The remaining claims proceeded to trial. On October 23, 2013, a Baltimore City jury returned a verdict in favor of KKI on all remaining claims: negligent failure to oversee the TLC study, fraudulent misrepresentation, and negligent misrepresentation. This timely appeal followed.

DISCUSSION

I. The Maryland Consumer Protection Act

Thomas first argues that the trial court committed legal error by granting summary judgment on his claim under the Maryland Consumer Protection Act ("CPA"), Md. Code Ann., Com. Law ("CL") § 13-101 *et seq.* The trial court granted summary judgment in favor of KKI on Thomas's CPA claim, finding that "the Defendant [KKI] is entitled to judgment as a matter [of] law because a contractual relationship arising out of the consent forms was not a consumer transaction to which the Consumer Protection Act applies." In *White,* we rejected a similar theory, holding that:

> [T]he proper inquiry is whether KKI's actions regarding the leased properties was sufficiently integral to "so infect the sale or offer for sale" that a claim of consumer fraud under the CPA can survive a motion for judgment. Whether a party's involvement is sufficiently integral to a sale of consumer goods to bring it within the purview of the CPA is a determination based on the specific factual circumstances of each case.

White, No. 1015 Sept. Term 2013, 2015 WL 808544, at *26 (quoting *Hoffman v. Stamper*, 385 Md. 1, 32 (2005)). We hold, therefore, that the trial court erred in granting summary judgment on this basis.

Nevertheless, we find that the error was harmless. We arrive at this conclusion because the jury—in connection with another claim—determined that Thomas had failed to establish the existence of a *prima facie* element of his CPA claim. We explain.

For a violation of the CPA to have occurred, there must be a deceptive sale practice. The CPA was enacted by the General Assembly for the purpose of providing "strong protective and preventive steps to investigate unlawful consumer practices, to assist the public in obtaining relief from these practices, and to prevent these practices from occurring in Maryland." CL § 13-102(b)(3). The CPA prohibits an individual from engaging in:

> [A]ny unfair or deceptive trade practice, as defined in this subtitle or as further defined by the Division, in:
>
> (1) The sale, lease, rental, loan, or bailment of any consumer goods, consumer realty, or consumer services;
>
> (2) The offer for sale, lease, rental, loan, or bailment of consumer goods, consumer realty, or consumer services.

CL § 13-303. An unfair or deceptive trade practice is defined in relevant part as a "[f]alse . . . or misleading . . . representation of any kind which has the capacity, tendency, or effect of deceiving or misleading consumers," including a representation that "[c]onsumer goods, consumer realty, or consumer services have a characteristic . . . or quantity which they do not have." CL § 13-301(1)-(2)(i). "The gravamen of an 'unfair or deceptive trade practice' under the Consumer Protection Act is whether the false or misleading statements or representations have 'the capacity, tendency, or effect of deceiving or misleading consumers.'" *MRA Prop. Mgmt., Inc. v. Armstrong*, 426 Md. 83, 110-11 (2012) (quoting the CPA) (internal citations omitted).

Thomas asserted that KKI violated the CPA by holding various properties as "lead safe," and in compliance with applicable codes and statutes. Because summary judgment was granted, the jury was not asked whether KKI made false or misleading statements or omissions in the context of the CPA. They were, however, asked an identical question in connection with Thomas's claims of fraudulent and negligent misrepresentation. Thomas claimed that KKI made negligent or fraudulent misrepresentations that:

> (a) [T]hat the premises [were] lead safe, (b) that the premises [were] in habitable condition, (c) that the premises would be maintained in a habitable condition throughout the tenancy . . . (d) that the premises [were[in compliance with all applicable statutes, codes, and regulations pertaining to rental properties at the inception of Plaintiff's tenancy, that the premises would be maintained in compliance with all applicable statutes, codes, and regulations pertaining to rental properties throughout the Plaintiff's tenancy, (f) that the premises [were] safe for the Plaintiff to reside[.]"

Therefore, the fraudulent and negligent misrepresentation claims necessarily encompassed the same factual allegations as the CPA claim. There, the jury made a specific finding that KKI made no misrepresentation to Ms. Green.[5] That finding precluded finding KKI liable under theories of fraudulent and negligent misrepresentation and would also have precluded the jury from finding it liable under the CPA.

Even without the established verdict of the jurors that there was no misrepresentation, our independent review of the trial transcript further confirms that there was no evidence adduced at trial from which a reasonable jury could have could have found that KKI engaged in a deceptive trade practice or made a misrepresentation to Ms. Green. We, therefore, affirm the grant of summary judgment as to Thomas's CPA claim.

II. Jury Instructions

Thomas also argues that the trial court erred in refusing to instruct the jury on the special duty of care owed by a researcher to a research subject under *Grimes v. Kennedy*

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[5] The verdict sheet read:

> Do you find by a preponderance of the evidence that [KKI] made a negligent misrepresentation, which was relied on by [Thomas's] parents and caused injury claimed by [Thomas?] You will respond "yes" or "no."
>
> Do you find by a preponderance of the evidence that [KKI] made a[n] intentional misrepresentation, which was relied on by [Thomas's] parents and caused injury claimed by [Thomas?] You will respond "yes" or "no."

The jury then responded "no" to both claims.

Krieger Inst., Inc. 366 Md. 29 (2001).[6] Thomas requested that the trial judge instruct the jury according to the duty outlined in *Grimes* that "[a] researcher has a responsibility or duty to warn about all the known risks for the research study, all the foreseeable risks, and all of the risks that they may become aware promptly." In rejecting Thomas's requested instructions, the trial court noted the factual differences between the R&M study at issue in *Grimes* and the TLC Study, and found that the requested instruction was inapplicable to the facts of the TLC Study:

> THE COURT: I think that [Thomas's proposed jury instruction] is exactly what the Court says in *Grime*[*s*] when you're putting children at risk of brain damage and the children in *Grimes* were not brain damaged in the [out]set. And then they became brain damaged. In this, in the TLC study, as I understand it, these children are already . . . brain damaged to some extent. . . .
>
> * * *
>
> I do think that that statement about research studies was particular to the R&M study. And so therefore, the court will not give that [instruction].

The trial court instead gave pattern jury instructions on negligence, stating:

> Negligence is doing something that a person using reasonable care would not do, or not doing something that a person using reasonable care would do. Reasonable care means that caution, attention or skill a reasonable person would use under similar circumstances.
>
> A reasonable person changes conduct according to the circumstances and the danger that is known, or would be

[6] In *White*, we explained in detail the factual background of the *Grimes* case, the parameters of the Repair and Maintenance ("R&M") Study at issue in that case, and the ruling of the Court of Appeals. No. 1015 Sept. Term 2013, 2015 WL 808544, at *6.

> appreciated by a reasonable person. Therefore, if the reasonable danger increases, a reasonable person acts more carefully.

The jury found that KKI was not negligent. We agree with the trial court, and hold that the jury instruction requested by Thomas was not compelled by law or the facts of the case, and was otherwise fairly covered by the pattern negligence instructions.

In *White*, we evaluated an identical jury instruction request. 1015 Sept. Term 2013, 2015 WL 808544, at *11 (discussing Requested Jury Instruction 36). We held there that plaintiff's requested jury instruction based on *Grimes* was (1) not a correct statement of the law; (2) not applicable to a therapeutic study like the TLC Study, and (3) fairly covered by the negligence instructions given by the trial court. *Id*. (relying on *Wood v. State*, 436 Md. 276, 293 (2013)). The same analysis applies here. Therefore, we find no abuse of discretion in the trial court's refusal to give Thomas's requested jury instruction.

III. Exclusion of Harriet Washington

The third issue Thomas presents for our review is whether the trial court abused its discretion by excluding the testimony of Harriet Washington as a penalty for Thomas's scheduling order violation. For the reasons we discuss below, we will affirm the exclusion of Washington.

The scheduling order governing this case (as amended) provided four relevant dates:

September 19, 2012	Plaintiff designate all expert witnesses.
June 24, 2013	Defendants designate all expert witnesses.
August 24, 2013	Discovery deadline.

September 8, 2013	All dispositive motions must be filed.

On June 28, 2013, nine months after the plaintiff's expert designation deadline, and four days after the defendant's expert designation deadline, Thomas named Washington as an additional expert who was "expected to testify that the environmental component of the TLC Study, as designed and conducted by KKI, was unethical." Washington was the only expert designated by Thomas who was offered to testify regarding a researcher's ethical duties under *Grimes*.

On August 2, 2013, KKI moved to strike Washington as an expert witness on the grounds that the late designation was prejudicial and fundamentally unfair. In particular, KKI argued that Washington would be available for deposition by KKI only after the conclusion of discovery and the deadline for filing dispositive motions. When KKI declined to depose Washington, Thomas's counsel went ahead and deposed her himself on September 10, 2013, which was over two weeks after the August 24 discovery deadline, and after the deadline for filing dispositive motions.

At a hearing regarding KKI's motion to strike, which was held on October 18, 2013, the trial court sought to determine whether Thomas could show good cause for deviating from the scheduling order. At one point, the trial judge noted:

> THE COURT: So basically what you're saying [is that] based on testimony that was brought out in the *White* case you realized [that] you should have had an ethical expert in the *White* case. And then you sought out to get one. And then you tracked down Washington and it took you some time to get that together.

After hearing arguments from both parties, the trial court then took pause to consider the issues:

> THE COURT: What I'm going to do, I'm going to hold this *sub curia* until after the luncheon recess. And I'm going to read some of these cases and then I'll give you my ruling this afternoon.

After the recess, the trial judge read her ruling from the bench:

> [In *Naughton v. Bankier*, 114 Md. App. 641 (1997), T]he Court [of Special Appeals] notes that they think it's reasonable for Maryland Courts to demand at least substantial compliance or at the barest minimum a good faith and earnest effort toward compliance with the scheduling orders. . . .
>
> And the first thing that the . . . moving party . . . needs to show is some type of good cause and good faith effort in complying with the designation of experts in the scheduling order.
>
> [Counsel for Appellant] told the Court this morning that, you know, it wasn't until after he had finished the trial in . . . *White*, where I believe that was a [d]efense verdict, that he decided that he needed an ethics expert.
>
> The problem the Court has with that is these cases have gone o[n] for some time. The ethics issue in this case has always been there. Many cases have been settled. Some tried. . . . I don't understand why it's at this hour, or the hour of the . . .*White* case that this ethics issue becomes, you know, you get a bright line for that. . .
>
> And because I find that you know these cases, you knew all about whatever ethic[s] issue involved Kennedy Krieger that I understand why at the inception of the case it may not have come to you that you need an ethics expert to testify. And of course you proffered this morning you don't know Harriet Washington, never knew her. So obviously you've never sought an ethics expert before.

> [T]he Circuit Court of Baltimore City [finds] that there was not a showing of good cause by Plaintiff to deviate from the scheduling order.

The trial court then granted KKI's motion to strike Washington.

Scheduling order violations are subject to sanction at the discretion of the trial court, and those sanctions are not laid out in a particular rule. *Dorsey v. Nold*, 362 Md. 241, 256 (2001). A trial court's decision to exclude evidence as a penalty for violation of a scheduling order is reviewed under the highly deferential abuse of discretion standard. *Butler v. S & S P'ship*, 435 Md. 635, 649-50 (2013). The broad discretion of the trial court to exclude such evidence is, however, guided by the following factors: (1) whether the violation was technical or substantial; (2) the timing of the ultimate disclosure; (3) the reason for the violation; (4) the degree of prejudice to the opposing party; and (5) whether any prejudice may be cured by postponement, and the desirability of a continuance. *Butler*, 435 Md. at 650. Additionally, this Court has also considered whether there was substantial compliance, or at the very least, a good faith effort to comply with the scheduling order as a factor in determining the appropriateness of sanctions. *See Naughton*, 114 Md. App. at 653. Finally, the Court of Appeals has explained that "the more draconian sanctions, of . . . precluding the evidence necessary to support a claim, are normally reserved for persistent and deliberate violations that actually cause some prejudice, either to a party or to the court." *Admiral Mortgage, Inc. v. Cooper*, 357 Md. 533, 545 (2000). With these principles in mind, we hold that there was no abuse of discretion in excluding the testimony of Washington. Specifically, we hold that the violation of the scheduling order was substantial, prejudicial, and without good cause.

First, the late designation of Washington was not a mere technical violation of a scheduling order. *See Taliaferro v. State*, 295 Md. 376, 391 (1983) (citing as an example of a technical violation a situation where a defendant submitted a supplemental disclosure that failed to include a witness's address). This was no typo or missing address. Washington was designated *nine months* after the deadline for Thomas's expert designations. Such a late designation is clearly a substantial, rather than technical, violation.

Second, KKI was prejudiced in at least three ways by Thomas's scheduling order violation. First, because Washington was identified on June 28, 2013, four days *after* the June 24, 2013 deadline for KKI's expert designations, KKI was essentially precluded from designating a reply expert to counter Washington's testimony. Second, Washington was deposed by the plaintiff's counsel on September 10, 2013, two days *after* the dispositive motions deadline, which precluded KKI from relying on testimony from Washington's deposition in its motion for summary judgment. Here, the prejudice might be considered minor as Washington's testimony could have been covered in subsequent reply briefs. More egregiously, however, Thomas's delay prejudiced KKI by putting it on the horns of a dilemma: it could either depose Washington and risk the court finding that it was not prejudiced by the late designation or refuse to depose her and risk that she would be allowed

to testify anyway. There can be little doubt that KKI was prejudiced by the late identification of the expert witness.[7]

Third, we agree with the trial court that Thomas failed to demonstrate good cause for violating the scheduling order. Thomas argues that the need to designate an ethics expert only became apparent after Thomas's counsel lost the *White* case in April of 2013. The trial court took particular note of Thomas's counsel's contradictory argument that KKI was not prejudiced because it had already timely designated three experts who would discuss aspects of a researcher's ethical duties. Essentially, Thomas attempts to argue both ways: that KKI was not prejudiced because they had already identified ethical experts, and yet somehow he was not aware that he needed an ethics expert until after the conclusion of the White case. It is also notable that the *Thomas* case is one of many similar cases against KKI regarding the TLC Study, many of which have been litigated by the same counsel. We share the confusion expressed by the trial court: "The ethics issue in this case has always been there. Many cases have been settled. Some tried. . . . I don't understand why it's at this hour . . . that this ethics issue becomes . . . a bright line." We, therefore, agree that Thomas failed to demonstrate good cause for the deviation.

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[7] We reject Thomas's argument that KKI was not prejudiced because it deposed Washington on both a previous and subsequent occasion. Washington's prior deposition, taken on September 9, 2013, however, concerned the ethical implications of the R&M Study, which as discussed above, was an entirely different research study from the TLC Study at issue here, with obviously different ethical concerns. While KKI attended and participated in Washington's subsequent deposition for the present matter, held on September 10, 2013, it did so while noting its objection and citing to its Motion to Strike Washington. As we explained above, the prejudice lay primarily in the creation of Hobson's choice for KKI.

Finally, the trial court's determination to exclude Washington was not a "draconian sanction" against Thomas, in part because Thomas did not provide the trial judge with any alternative. At no time did Thomas seek leave of the court to file a supplemental expert designation, or to request a continuance or postponement of the trial date. With the motions hearing only days before the scheduled trial date, there was no lesser sanction that the trial court could impose without jeopardizing the entire trial schedule. The trial court exercised sound discretion in excluding Washington's testimony, and we affirm.

IV. Exclusion of R&M Study and Pre-TLC Study Documents

Thomas also argues that the trial court abused its discretion by granting KKI's motions *in limine* to exclude two categories of documents: (1) documents pertaining to KKI's involvement in the R&M Study, specifically KKI's resulting knowledge about the effectiveness (or ineffectiveness) of the varying levels of lead abatement done in the R&M Study; and (2) documents pertaining to the design of the TLC Study. Thomas hoped to use this evidence to establish a direct link between the R&M Study, which the Court of Appeals had so roundly condemned in *Grimes*, and the TLC Study at issue in Thomas's case. The trial court ultimately found that the prejudice of admitting both categories of documents outweighed any probative value and, therefore, excluded all documents pursuant to Md. Rule 5-403. For the reasons that follow, we will affirm the trial court's decision.

Under the Maryland Rules of Evidence, relevant evidence may be excluded "if its probative value is substantially outweighed by the danger of unfair prejudice, confusion of the issues, or misleading the jury, or by considerations of undue delay, waste of time, or needless presentation of cumulative evidence." Md. Rule 5-403. "It is well settled that the

admission of evidence, including the determination of its relevance is committed to the considerable and sound discretion of the trial court." *Smallwood v. Bradford,* 352 Md. 8, 27 (1998) (citing *Merzbacher v. State,* 346 Md. 391, 404 (1997)). Generally, a "trial court's ruling on admissibility will not be overturned on appeal absent a clear abuse of discretion." *Mason v. Lynch,* 388 Md. 37, 48 (2005).[8]

A. R&M Study Documents

Because we agree with the trial court that the inclusion of the R&M Study documents would be prejudicial to KKI and confusing to the jury, we will affirm the judgment of the trial court. As the trial court noted, and as we explained at length in *White*, the R&M Study was fundamentally different than the TLC Study:

> THE COURT: . . . I don't think you'll disagree that R&M was basically dealing with abatement. They would do whatever they wanted to do with these houses. . . The people were not in the house and then they would put them back in the house after they had done whatever abatement they wanted to do.
>
> And then the differences in the TLC Study, I don't have any evidence that I've read that that was what was done. My understanding is that, for instance we'll take 417 [Patterson Park Avenue], the house was shown along with some other houses and Ms. Green chose 417 for the reasons that we all know. And the house is in the study because it's cleanable. And it wasn't that she couldn't move in until some level of

[8] Thomas correctly states that a trial court's determination of relevancy as a matter of law under Md. Rule 5-402 is subject to a *de novo* review, however the issue presented in this case is whether the trial court appropriately balanced the probative value of the evidence against its prejudicial effect. *Ruffin Hotel Corp. of Maryland v. Gasper*, 418 Md. 594, 620 (2011) ("[T]he 'de novo' standard of review is applicable to the trial judge's conclusion of law that the evidence at issue is or is not "of consequence to the determination of the action.").

> abatement was done. It was that they sent in a technician . . . and he said well it's cleanable and they proceeded to do that. And then she was moved into the home with, you know, given cleaning supplies and so forth.
>
> I understand [Counsel for Thomas's] argument but I'm very concerned about the jury being totally confused about what [KKI's] duty was under the TLC Study if we're going to start talking about what was done under [the] R&M [Study]. . . .
>
> * * *
>
> [T]he problem is that Deishaun [Thomas] is not part of the R&M Study. He's only part of the TLC Study, and that's the problem I have.
>
> * * *
>
> The main issue is that I have to weigh the necessity for and against probative value versus prejudice [regarding evidence of KKI's involvement in the R&M Study].
>
> As the Court has stated earlier, I don't see that they're [the TLC Study and the R&M Study] on the same playing field, everything being identical. Therefore . . . [t]he Court rules that the prejudice is far outweighed by any probative value.

We agree, as we did in *White*, that the R&M Study differed substantially from the TLC Study. *White*, No. 1015 Sept. Term 2013, 2015 WL 808544, at *6-*9. The TLC Study, for example, provided at least some therapeutic benefits to all of the study participants. That is in stark contrast to the *Grimes* Court's characterization of the R&M Study as nontherapeutic. 366 Md. at 93. The danger of confusion to the jury was clear, and noted by the trial court. Additionally, it would place KKI in the position of having to defend their involvement in the R&M Study that had already been sharply criticized by the Court of Appeals in *Grimes*. The danger of prejudice in this situation was real, and cannot be

overcome by the alleged probative value of the evidence. For these reasons, and those explained at length by the trial court, we see no abuse of discretion in the trial court's exclusion of evidence pertaining to the R&M Study.

B. TLC Study Development Phase Documents

We also agree with the trial court's conclusion that documents pertaining to the development phase of the TLC Study were prejudicial and would tend to confuse the jury. The TLC Study Development Phase documents included communications between KKI and NIEHS and other internal KKI documents regarding technical proposals for the TLC Study, as well as preliminary plans that were submitted to secure funding for the TLC Study. The trial court heard argument from KKI that the TLC Study development documents did not represent the final Protocol that ultimately governed the TLC Study. Thomas countered that the documents were necessary to his claim against KKI for intentional misrepresentation because they included internal discussions surrounding the working definition of "lead safe,"[9] as well as information about KKI's motives regarding the environmental component of the TLC Study. To the latter point, Thomas argued that the TLC Study's environmental component was essentially a revision of the sharply criticized R&M Study:

> [COUNSEL FOR THOMAS]: And this is the Technical Plan Supplements. . . [where] Kennedy Krieger has to put down what the study objective [is]. . . . Number 3, [on the list of study objectives,] 'The variability of house dust lead levels [and] rates of reaccumulation follow[ing] practical remediation

[9] In *White* we discussed the import of the phrase "lead safe" as it pertains to the TLC Study. No. 1015 Sept. Term 2013, 2015 WL 808544, at *22-*23.

> measures.' You know, Kennedy Krieger is two years into the R&M Study, . . . that was [the] only thing they were studying [in the R&M Study]. Did the house dust come back[?] And they're trying to do practical remediations, which were low cost repairs.
>
> * * *
>
> So they were also doing the same R&M Study on the houses of the children in the TLC Study.
>
> * * *
>
> So that's what our case is. . . . We're complaining that they used these children as test subjects in an environmental study. They promised lead safe housing. But it was . . . the R&M Level 1 [abatement][10] that they were experimenting with for two years before they started and it wasn't working there. And they intended to do that from the beginning.
>
> THE COURT: Right, but don't you think it would be confusing to the jury when you start talking about R&M in this case. Because, you know, technically that was a whole different study than this study.

KKI argued that the R&M Study was fundamentally different, and that the Pre-TLC Study documents did not control the final Protocol.

> [COUNSEL FOR KKI]: The R&M Study [was] completely separate. You were right, R&M Study, three levels of remediation . . . TLC Study involved cleaning, that's it. There's no overlap there.
>
> * * *
>
> [These are] documents from 1992, back and forth correspondence about what might happen. . . . It's all before

[10] For more information about the abatement levels in the R&M Study homes *see Grimes*, 366 Md. at 51.

> the protocol. What we should be judged by is the protocol in this study. . . .

After weighing the arguments on both sides, the trial court agreed with KKI and found:

> THE COURT: The Court having listened to the argument, even if the Technical Plans and the Supplemental to [the Technical Plan] is relevant I do find that the prejudice far outweighs any probative value in this case and therefore [KKI's] motion [*in limine*] is granted.

The trial court, having had ample opportunity to consider the TLC Study development phase documents, the parties' motions, and the parties' oral arguments, came to the conclusion that whatever probative value the documents possessed, it could not overcome the prejudice to KKI or risk of confusion to the jury.

It is clear from the record that Thomas's theory was that the environmental component of the TLC Study was essentially another version of the R&M Study, and that he sought to use the TLC Study development documents to link it to the R&M Study. As we explained above, and in *White*, the TLC Study differed fundamentally from the R&M Study, and the trial court's exclusion of the evidence pertaining to the R&M Study was proper. *White*, No. 1015 Sept. Term 2013, 2015 WL 808544, at *12. We agree that TLC Study development documents referencing the R&M Study would have unduly confused the jury. Additionally, the probative value of the documents was undercut by the fact that they did not control the TLC Study; rather, the finalized TLC Study Protocol, which was admitted into evidence, did. Moreover, there is no indication that Thomas's counsel offered an intermediate step of redacting the TLC Study development phase documents to

exclude mention of the R&M Study. There were over 500 pages of development phase documents that Thomas sought to introduce wholesale.

We hold that the trial court carefully considered all of the disputed evidence, and we will not disturb its ruling on appeal. We, therefore, affirm the exclusion of the TLC Study development phase documents.

V. Dr. John Reigart's Expert Testimony

Thomas next challenges the trial court's decision to allow KKI's expert witness, Dr. John Reigart, to testify regarding Thomas's IQ loss in light of Thomas's contentions that Dr. Reigart lacked the proper qualifications under Md. Rule 5-702, and that Dr. Reigart's analysis of the timing of Thomas's injuries was not based on a reliable methodology that is generally accepted in the scientific field. We will address each in turn, and uphold the judgment of the circuit court.

A. Dr. Reigart's Qualifications

Thomas first argues that because Dr. Reigart was not accepted as an expert in toxicology, and because Dr. Reigart did not rely on epidemiology in forming his opinion, Dr. Reigart therefore lacked the specific qualifications to support his opinion that Thomas's IQ loss occurred prior to his participation in the TLC Study. As we will explain below, we disagree with Thomas, and hold that the trial court properly accepted Dr. Reigart's testimony.

Admission of expert testimony is "reviewable on appeal and may be reversed if it is founded on an error of law or some serious mistake, or if the trial court clearly abused its discretion." *Rite Aid Corp. v. Levy-Gray*, 162 Md. App. 673, 708 (2005) (quoting *Radman*

v. Harold, 279 Md. 167, 173 (1977)). Under Md. Rule 5-702, a trial court is required to make three determinations when deciding to admit expert testimony: "(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 exists to support the expert testimony." Md. Rule 5-702. "[T]he admissibility of expert testimony is a matter largely within the discretion of the trial court and its action will seldom constitute a ground for reversal." *Rite Aid Corp. v. Levy-Gray*, 162 Md. App. 673, 708 (2005) (quoting *Radman*, 279 Md. 167, 173 (1977)). The Court of Appeals has noted that a trial court does not abuse its discretion "when the expert, although not a specialist in the field having the most sharply focused relevancy to the issue at hand, nevertheless could assist the jury in light of the witness's 'formal education, professional training, personal observations, and actual experience.'" *Deese v. State*, 367 Md. 293, 303 (2001) (quoting *Massie v. State*, 349 Md. 834, 851 (1998)).

Thomas relies on *Blackwell v. Wyeth*, 408 Md. 575, 623 (2009), to support his argument that Dr. Reigart, because he was not accepted by the trial court as an expert in toxicology nor did he rely on epidemiology to form his opinions, lacked the "specificity of knowledge, skill, experience, training, or education" to support his opinion. Although *Blackwell* does require such expertise, (as does Md. Rule 5-702), it also says:

> [A] witness, … to qualify as an expert, should have such special knowledge of the subject on which he is to testify that he can give the jury assistance in solving a problem for which their equipment of average knowledge is inadequate…. *A witness is qualified to testify as an expert when he exhibits such a degree of knowledge as to make it appear that his opinion is of some value, whether such knowledge has been gained from*

> *observation or experience, standard books, maps of recognized authority, or any other reliable sources.*

Blackwell, 408 Md. at 619 (2009) (quoting *Radman v. Harold*, 279 Md. 167, 171 (1977)) (emphasis in original). Further, with regard to medical experts, the Court of Appeals has clarified:

> In light of the fact that we have never treated expert medical testimony any differently than other types of expert testimony, we perceive no reason why a person who has acquired sufficient knowledge in an area should be disqualified as a medical expert merely because he is not a specialist or merely because he has never personally performed a particular procedure. . . .
>
> It is the scope of the witness'[s] knowledge and not the artificial classification by title that should govern the thresh[]old question of admissibility.

Radman v. Harold, 279 Md. 167, 171-72 (1977) (internal citations omitted). Therefore, the controlling factor is the scope of expert knowledge based on their experience and training, rather than just their title.

In response to Thomas's motion *in limine* to exclude Dr. Reigart, the trial court initially found that:

> THE COURT: The Court will accept Dr. Rei[gart] as an expert in pediatrics. He may testify to the effects of lead exposure upon childhood development and behavior as well as on pediatric research.
>
> He may also testif[y] as to any judgments and interpretations of the various tests, including IQ tests, medical records, or other documentation relating to the plaintiff. Moreover, as a medical doctor, Dr. Rei[gart] may testify as to causation.

During the *voir dire* examination of Dr. Reigart, Thomas objected to receiving Dr. Reigart as an expert in the field of toxicology, to which the trial court apparently assented:

> THE COURT: Okay, the Court will . . . accept Dr. Reigart as an expert in pediatrics and pediatric lead poisoning.

On direct examination, Dr. Reigart further elaborated on his competency:

> [COUNSEL FOR KKI]: Are you familiar with how lead works in the brain and how it affects a child's brain?
>
> [Dr. Reigart]: [I]n all of these toxic events or toxic injuries there have been two lines of investigation that are important. One has been . . . epidemiology[,] . . . [a]nd the other is the basic mechanistic basis. That is what happens at a cellular organ level to the body that results in toxicity. . . .
>
> [COUNSEL FOR KKI]: Are you familiar with both of those with regard to lead?
>
> [Dr. Reigart]: Yes, of course I am.

After Dr. Reigart's testimony, Thomas moved to strike his testimony, apparently on the grounds that he lacked the necessary qualifications. In denying the motion, the trial court reiterated that Dr. Reigart was accepted as an expert in pediatrics and pediatric lead poisoning.

We see no abuse of discretion in the trial court's decision to allow Dr. Reigart to opine about the effects of lead exposure on childhood development and issues pertaining to causation because, although Dr. Reigart was not specifically accepted as a toxicologist, his scope of knowledge rather than the "artificial classification by title" is what governs his competency to testify. *Radman*, 279 Md. at 72. Dr. Reigart was properly accepted as an expert on pediatric lead poisoning, and was sufficiently qualified to opine on causation.

Moreover, we note that despite not being formally accepted in this case as an expert in toxicology, Dr. Reigart has been a member of the American Academy of Clinical Toxicology for over 30 years and may well have been capable of being qualified as a toxicologist too. We perceive no error in the trial court's decision to allow Dr. Reigart to testify regarding issues that were well within his scope of knowledge.

B. Dr. Reigart's Opinion

Thomas also argues that the methodology employed by Dr. Reigart was internally inconsistent, unreliable, and not generally accepted in the scientific community. In Thomas's view, given these deficiencies, the trial court should have excluded Dr. Reigart's testimony. As we explain below, we disagree with Thomas and affirm the judgment of the trial court.

First, Thomas alleges that Dr. Reigart's testimony is internally inconsistent, and therefore unreliable. Thomas points to Dr. Reigart's testimony that the brain develops the majority of necessary connections before age two through a process called synaptogenesis, so any harm resulting from lead exposure is also complete by that time. Despite this conclusion regarding the timing of synaptogenesis, Dr. Reigart denied that Thomas suffered any harm from lead exposure between June 25, 1996, when he became enrolled in the TLC Study, and his second birthday, which occurred in September. In pertinent part, Dr. Reigart testified:

> [COUNSEL FOR THOMAS]: And the process of synaptogenesis goes on until at least age 12, isn't that correct?

> [DR. REIGART]: It goes on, I said this this morning[.] . . . There's a huge burst of it until age two and after that it occurs at a very, very slow rate.
>
> * * *
>
> It's still occurring but at a very low rate and not sufficient to cause the . . . permanent developmental changes we see with lead [poisoning at a young age].

Dr. Reigart essentially discounted Thomas's lead exposure that occurred from July 1996 until September 1996 − while Thomas was enrolled in the TLC Study and before he turned two years old − despite Dr. Reigart's assertion that a child is most vulnerable to lead poisoning up until age two.

Thomas's criticism that Dr. Reigart's testimony was inconsistent does not go to the underlying methodology or analysis used. Rather, it goes to the weight that the jury should afford Dr. Reigart's testimony. *Exxon Mobil Corp. v. Albright*, 433 Md. 303, 423 (2013) ("An expert's opinion is of no greater probative value than the soundness of his reasons given therefor[e] will warrant.") (internal quotation marks omitted). Any inconsistency in Dr. Reigart's testimony was proper grounds for impeachment upon cross-examination, and indeed that is exactly what happened at trial.

Second, Thomas claims that because Dr. Reigart testified that the data upon which he formed his opinion had a 20% margin of error, the analysis of that data was therefore unreliable. The discussion of the 20% margin of error arose when Dr. Reigart explained that the variance between 31 mcg/dL and 33 mcg/dL − Thomas's blood lead levels as indicated on his TLC Participant Referral Sheet just prior to enrollment, and again on the day Thomas was actually enrolled − was insignificant due to the fact that labs are generally

allowed a 20% margin of error when determining blood lead levels. Dr. Reigart then emphasized that this was why it is often necessary for reviewing physicians to consult multiple blood lead level tests of the same individual. Here, Thomas is essentially challenging the results of Thomas's lab tests − upon which his own experts also relied – not the underlying methodology upon which Dr. Reigart formed his opinions. Indeed, according to the Centers for Disease Control and Prevention, federal guidelines allow laboratories that perform blood lead level testing to operate within an allowable range of error of 20% (plus or minus 10%). CDC, *Interpreting and Managing Blood Lead Levels <10 µg/dL in Children and Reducing Childhood Exposures to Lead*, (Nov. 2, 2007) *available at* <http://perma.cc/MJ5H-XSEM>. This is simply not a basis for excluding Dr. Reigart's testimony.

Additionally, a margin of error does not automatically cause a particular scientific methodology or analysis to be unreliable. As the Court of Appeals explained in *Armstead v. State* regarding statistical analysis:

> [A] part of the due process guarantee is that an individual not suffer punitive action as a result of an inaccurate scientific procedure. Scientific test results, however, *need not be infallible to meet the standard for due process*. . . .[T]he due process standard only bars admission of evidence that is so extremely unfair that its admission violates fundamental conceptions of justice. . . . For evidence to violate this standard because of its unreliability, the acts complained of must be of such quality as necessarily prevent a fair trial.

342 Md. 38, 84-5 (1996) (internal citations and quotation marks omitted) (emphasis supplied). Although *Armstead* is a criminal case, the same reasoning is true in the civil context, given that most types of scientific analysis involve some margin of error. Dr.

Reigart acknowledged the margin of error inherent in the lab results on cross-examination by Thomas, and indeed that was the proper place to challenge the analysis – not on a *Frye-Reed* basis.

Lastly, Thomas argues that Dr. Reigart's analysis – regarding the timing of Thomas's injury based on the theory that synaptogenesis is largely complete by age two − is not generally accepted in the scientific community. Under Maryland's *Frye-Reed* standard, "before a scientific opinion will be received as evidence at trial, the basis of that opinion must be shown to be generally accepted as reliable within the expert's particular scientific field." *Reed v. State*, 283 Md. 374, 381 (1978). A *Frye-Reed* challenge is only appropriate when the scientific method at issue is novel, and the proponent of the new scientific method bears the burden of proving the method's general acceptance. *Montgomery Mut. Ins. Co. v. Chesson*, 399 Md. 314, 327 (2007). Appellate review of a trial court's decision regarding admissibility under *Frye-Reed* is *de novo*. *Wilson v. State*, 370 Md. 191, 201 n.5 (2002).

Prior to trial, Thomas moved to exclude Dr. Reigart on the grounds that Dr. Reigart offered novel scientific opinions that did not rest on a generally accepted scientific methodology. In particular, Thomas alleged:

> There is no medical or scientific basis that is generally accepted to produce reliable results upon which an expert could reasonably rely to apportion either IQ loss or neurocognitive and behavior disorders.
>
> * * *
>
> No study published in any peer review epidemiological journal stands for the proposition that a medical or scientific expert can

> calculate the degree of neurological harm attributable to exposures at different levels, at different times in a child's early childhood development, or apportion that harm in any reasonable way.

Where Thomas asserted that no peer reviewed literature or studies existed to support Dr. Reigart's conclusions regarding the timing of Thomas's injury, KKI provided the following:

> (1). R. Canfield, *et al*., *Intellectual Impairments in Children with Blood Lead Concentrations below 10 [mcg/dL]*, 348 (16) New Eng. J. Med. 1517 (April 17, 2003) (Researchers appropriated IQ loss using a nonlinear model whereby they were able to estimate that a child loses 7.4 IQ points the first time their blood lead level reaches 10 mcg/dL, and an additional 2.5 points if the child's blood lead levels increase to 30 mcg/dL).
>
> (2) B. Lanphear, *et al*., *Low-Level Environmental Lead Exposure and Children's Intellectual Function: An International Pooled Analysis*, 113(7) Envir. Health Perspectives 894 (July 2005) (Using data collected from 1,333 children, researchers determined that a child with a blood lead level of 30 mcg/dL would have incurred an IQ loss of around 9 points, 6.2 of which would occur when the child's blood lead levels were between 1 and 10 mcg/dL.)

In addition, Dr. Reigart cited to peer reviewed articles to support his opinion that the process of synaptogenesis can further explain the timing of lead injuries:

> (1). Patricia M. Rodier, *Developing Brain as a Target of Toxicity*, 103(6) Envir. Health Perspectives (Sept. 1995) (Explaining that synaptogenesis is largely complete by age two, and noting that lead interferes with the process of synaptogenesis).
>
> (2). April Neal, *Lead Exposure During Synaptogenesis Alters Vesicular Proteins and Impairs Vesicular Release: Potential Role of NMDA Receptor-Dependent BDNF Signaling*, 116(1) Toxicological Sciences 249 (2010) (Explaining how lead exposure negatively affects synaptogenesis by hindering various neuron connections).
>
> (3). April Neal, *Lead Exposure During Synaptogenesis Alters NMDA Receptor Targeting via NMDA Receptor Inhibition*, 32(2) Neurotoxicology

281 (Mar. 2011) (Explaining how lead exposure during synaptogenesis reduces the levels of certain critical receptors).

The trial court determined that the methodology used by Dr. Reigart was not novel, and therefore was not an appropriate subject for a *Frye-Reed* hearing. Our independent review of the literature leads us to the same conclusion as the trial court: that Dr. Reigart's expert testimony was neither novel nor lacked general acceptance, and that he was qualified as an expert to opine regarding the timing of Thomas's injuries.

On appeal, Thomas seeks to further bolster his *Frye-Reed* challenge of Dr. Reigart on the grounds that Thomas's own expert witnesses disagreed with Dr. Reigart about the timing of Thomas's injuries. Thomas points to conflicting expert testimony introduced by Thomas at trial that demonstrated children remain vulnerable to lead poisoning up to age seven. In light of our conclusion that Dr. Reigart's analysis did not rely on novel or unaccepted scientific methods, any conflicting expert testimony introduced at trial properly went to weight rather than admissibility. Simply put, this was a battle of the experts in a case where causation of injury is highly contested. Thomas's challenge under *Frye-Reed* thus fails on appeal as it did at trial.

VI. Admission of Dr. Gretchen Meyer's Expert Testimony

Thomas's final argument is that the trial court erred by refusing to strike the testimony of KKI's expert witness, Dr. Gretchen Meyer, on the grounds that her testimony was contradictory and irrelevant. Thomas's principle objection to Dr. Meyer's testimony was that, although she listed a number of risk factors that *may* have negatively affected Thomas's cognitive development, she was unable to identify in particular what risk factor

actually impaired his development. Thomas also asserts that Dr. Meyer's testimony is irrelevant because, despite acknowledging the various risk factors, Dr. Meyer ultimately reached the allegedly contradictory conclusion that Thomas was not cognitively impaired or disabled.

We review a trial court's determination that evidence is relevant *de novo*. *State v. Simms*, 420 Md. 705, 725 (2011). Thomas urges us, and KKI does not contest, to apply a *de novo* standard of review to the trial court's apparent ruling[11] that Dr. Meyer's testimony was relevant. As the trial court's response, *see infra* n.11, was prompted by an objection from Thomas that the testimony was irrelevant, we will proceed with a *de novo* review and hold that the trial court did not err.

Thomas cites no case law for his proposition that inconclusive expert testimony is inadmissible on grounds of relevancy. A lack of certainty does not provide an absolute

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[11] In response to Thomas's objection that Dr. Meyer's testimony was irrelevant, the court replied:

> [THE COURT]: [Y]ou know, we'll deal with it as we would do relevance . . . a [Md. Rule] 5-403. I mean, but at this point in time . . . I'm not going to strike her under [Md. Rule] 5-702.

Md. Rule 5-403, however, deals with evidence that has already been deemed relevant:

> Although relevant, evidence may be excluded if its probative value is substantially outweighed by the danger of unfair prejudice, confusion of the issues, or misleading the jury, or by considerations of undue delay, waste of time, or needless presentation of cumulative evidence.

basis for exclusion. *Miller v. State*, 421 Md. 609, 629 (2011) (holding admissible a handwriting expert's testimony that a defendant could not be eliminated as the potential source of a forged signature, when the expert could not definitively say that it was the defendant's handwriting). With regard to medical experts, the Court of Appeals has further explained that:

> The opinion of an expert as to the probability, or even the possibility, of the cause of a certain condition may frequently be of aid to the jury; for when the facts tend to show that an accident was the cause of the condition, the assurance of an expert that the causal connection is scientifically possible may be helpful in determining what are reasonable inferences to be drawn from the facts.

Id. at 627 (quoting *Langenfelder v. Thompson*, 179 Md. 502, 505 (1941)). "The causation of a progressive injury is a subject particularly appropriate for expert testimony." *CSX Transp., Inc. v. Miller*, 159 Md. App. 123, 184 (2004). Medical expert testimony as to potential sources of harm is particularly relevant in a case where causation is contested, so long as there is a sufficient causal connection between the potential source and the resulting harm. *Id*.

At trial, Dr. Meyer testified to the following:

> [COUNSEL FOR KKI]: Do you have an opinion to a reasonable degree of medical certainty if in July of 1996 . . . whether Mr. Thomas's brain had already suffered an injury?
>
> [DR. MEYER]: Yes.
>
> * * *
>
> [I]t was clear from looking at the medical record that he had already experienced a slowing of his brain growth, . . .

> microcephaly, . . . and he was already experiencing an elevated lead level[,] and he had also the anemia.
>
> [I]n addition[,] he was born somewhat premature and was demonstrating . . . feeding difficulties at birth[,] which suggests that there may even have been brain impairment at birth. All or some of those difficulties or problems have clearly affected his development because here on July 3, 1996 he is demonstrating significant developmental delay.

While Dr. Meyer was unable to definitively state which, if any, of the factors – microcephaly, anemia, prematurity, difficulty feeding, early exposure to lead, and a slowing of brain growth, − caused Thomas's neurological impairment, in a lawsuit where the source of the injury was at issue, her testimony was helpful in assisting the trier of fact in showing the potential causal connection between the identified risk factors and Thomas's neurological impairment. Additionally, Dr. Meyer's testimony was not simply a randomized litany of potential risk factors, other than lead poisoning, that may have affected Thomas's development. Rather, the risk factors that she highlighted were derived from Thomas's medical records, which are not in dispute. The trial court did not err in permitting Dr. Meyer to opine, as her testimony was relevant in assisting the jury to determine whether all of Thomas's injuries were a result of lead poisoning that he allegedly experienced while in the TLC Study.

Further, Thomas argues that Dr. Meyer's testimony was contradictory, and therefore irrelevant. Dr. Meyer used a variety of terms to refer to different aspects of cognitive functioning: (1) cognitive ability; (2) cognitive impairment; (3) cognitive disorder; and (4) cognitive disability. In pertinent part, Dr. Meyer testified:

> [DR. MEYER]: Despite [the various risk factors] I think that [Thomas's] cognitive abilities fall within the low range overall.
>
> [COUNSEL FOR KKI]: Do you have an opinion to a reasonable degree of medical certainty if whether the difficulties that you've described earlier today in his first 18-20 months of his life decreased Mr. Thomas's cognitive abilities and caused neuropsychological deficits?
>
> [DR. MEYER]: Probably, yes.
>
> * * *
>
> [COUNSEL FOR KKI]: Do you have an opinion as to whether or not Mr. Thomas has a cognitive disorder?
>
> [DR MEYER]: He does not meet the criteria for a cognitive disorder as set forth in the [Diagnostic and Statistics Manual-IV]. . .
>
> [COUNSEL FOR KKI]: Do you have an opinion to a reasonable degree of medical certainty as to whether Mr. Thomas has a cognitive disability?
>
> [DR. MEYER]: In my opinion as a medical physician who would be . . . having to make that determination, he does not have a disability either from a medical or an intellectual standpoint.

After Dr. Meyer testified that Thomas had decreased cognitive abilities, but no cognitive disorders or disabilities, Thomas moved to strike the testimony on the grounds that it was contradictory. The trial court declined, and noted that Thomas was able to address any confusion on cross-examination. We agree that any alleged contradiction in Dr. Meyer's testimony was appropriately a subject of cross-examination.

In addition, we note that a plain reading of the record demonstrates that there was no inconsistency in Dr. Meyer's testimony. While Dr. Meyer testified that certain risk

factors could have contributed to a decreased cognitive ability, she concluded that Thomas did not suffer from a cognitive disorder or cognitive disability, which she explained were distinct. Dr. Meyer explained the differing terminology as follows:

> [DR. MEYER]: When one says that somebody has a cognitive disorder, which is something that I don't, a definition that I don't use as a pediatrician because cognitive disorders as set forth in the Diagnostic and Statistic Manual are typically reserved for adults who have suffered a decline in cognitive ability as one can define, such as Alzheimer's disease, delirium dementia. . . .
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> * * *
>
> When we speak of a disability we talk about people who have had impairments or disorders but who are unable to function in the world or unable to function in society because of that impairment. . . . [A] person is actually defined as having a disability if with the impairment that they have they are unable to function in the world. . . .
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> * * *
>
> So I do not think that Deishaun [Thomas] has a cognitive impairment because I think overall he has the, a capability to function in the world.

In the absence of an actual contradictory statement, Thomas's argument that contradictory evidence is inadmissible fails, and we affirm the judgment of the trial court.

CONCLUSION

For the foregoing reasons, we affirm the judgments of the Circuit Court for Baltimore City.

JUDGMENTS OF THE CIRCUIT COURT FOR BALTIMORE CITY AFFIRMED. COSTS TO BE PAID BY APPELLANT.