STATE OF MICHIGAN

COURT OF APPEALS

MARKELL VANSLEMBROUCK, Minor, by and through ERIC BRAVERMAN, Conservator,

Plaintiff-Appellee,

and

KIMBERLY A. VANSLEMBROUCK,

Plaintiff,

v

ANDREW JAY HALPERIN, M.D., and WILLIAM BEAUMONT HOSPITAL,

Defendant-Appellants.

and

MICHIGAN INSTITUTE OF GYNECOLOGY AND OBSTETRICS, P.C.,

Defendant.

UNPUBLISHED
October 28, 2014

No. 309680
Oakland Circuit Court
LC No. 2006-754585-NH

Before: GLEICHER, P.J., and BORRELLO and SERVITTO, JJ.

PER CURIAM.

This medical malpractice case arises from Markell VanSlembrouck's 1995 birth at defendant William Beaumont Hospital. Markell is now 18 years old. She cannot walk, talk, or feed herself, and requires full-time care. After an 18-day trial, a jury attributed Markell's neurologic injuries to the circumstances surrounding her birth and assessed her damages at $144 million.

The trial evidence centered on the cause of Markell's neurologic condition and the scientific validity of plaintiffs' causation theories. Fifteen expert witnesses debated these questions over the course of the lengthy trial. In a nutshell, plaintiffs' expert witnesses opined that Markell's traumatic birth caused her disabilities. Defendants' experts countered that a genetic abnormality called pontine cerebellar hypoplasia (PCH) fully accounts for Markell's

current condition. Plaintiffs' experts conceded that important components of Markell's brain never properly developed. But absent birth trauma, they contended, this abnormality would have caused Markell only relatively insignificant neurological problems.

From start to finish, this case was a battle of experts espousing widely divergent views. Ultimately the jury credited plaintiffs' negligence and causation explanations. Although the trial was far from perfect, we affirm.

I. FACTUAL OVERVIEW

The underlying record is long and complex, but presents only a handful of factual disagreements. Because most of the appellate issues hinge on evidentiary questions, we describe the medical facts in considerable detail. Although we recite the evidence in the light most favorable to the prevailing parties, we have noted important factual conflicts.

There was no debate about one central fact: Markell's birth was traumatic. She was an exceptionally large newborn, weighing in at 10.5 pounds. At delivery, Markell was limp, blue, and unresponsive. She did not breathe spontaneously. Her head, trunk, and upper extremities appeared bruised. Her collarbone was fractured during an obstetrical maneuver made necessary when her shoulders became stuck in the birth canal. Markell's one-minute Apgar score was one; a zero score would have been consistent with her death.

In the days following Markell's delivery, brain imaging studies displayed the presence of blood in several different cerebral locations. The studies also revealed a striking congenital abnormality: a portion of Markell's cerebellum was missing, as was part of a brain structure called the pons.

Plaintiffs' experts acknowledged these abnormalities, and conceded that they contributed to Markell's abnormal neurological presentation. But in their view, birth trauma markedly worsened any deficits attributable to the absence of these brain components. Plaintiffs' experts posited that Pitocin-induced hyperstimulation of Kimberly VanSlembrouck's uterus, combined with Markell's large size, compressed Markell's head during the last hour of Kimberly's labor. According to their theory, head compression resulted in cerebral ischemia (lack of adequate blood flow to the cerebrum), bleeding into the brain itself, and permanent brain damage attributable to the trauma.

Defendants' experts insisted that Kimberly's obstetrical care met all applicable standards. Further, they steadfastly maintained that Markell's neurological problems stem solely from a genetic abnormality called pontine cerebellar hypoplasia, type 2 (PCH-2). PCH-2 is a rare disorder. The children afflicted with it lack substantial portions of the cerebellum and pons, as does Markell. Two medical articles describing children afflicted with PCH-2 portray its victims as neurologically similar to Markell. Defendants' experts further contended that despite the brain bleeding and the evident trauma to Markell's head, the substance of her cerebral cortex remain uninjured. The initial indicia of trauma, defendants' experts claimed, faded quickly and produced no permanent damage.

The trial court conducted a four-day *Daubert* hearing[1] to evaluate the scientific reliability of plaintiffs' causation theory. At its conclusion, the court found plaintiffs' experts qualified and their opinions reliable under MRE 703.

A month-long, bitterly contentious trial followed. The jury found in Markell's favor and awarded the damages her counsel had sought. Defendants' many appellate challenges focus largely on issues related to causation and damages. All merit considerable discussion, but none persuade us that a new trial is required.

A. PRENATAL EVENTS

Kimberly VanSlembrouck obtained her prenatal care from defendant Andrew Jay Halperin, M.D., an employee of defendant Michigan Institute of Gynecology and Obstetrics, P.C. Kimberly gained approximately 70 pounds during her pregnancy. One week prior to delivery, Kimberly weighed 328 pounds. This weight gain exceeded normal limits.

The medical witnesses agreed that excessive weight gain during pregnancy signals the possible presence of gestational diabetes. Gestational diabetes often leads to large (macrosomic) infants.[2] Undisputed evidence established that macrosomia creates a risk of traumatic delivery or the need for a cesarean section. Plaintiffs' experts opined that Kimberly's undiagnosed gestational diabetes caused Markell's excessive growth, and that if Markell's size had been accurately established prenatally, her delivery would have been accomplished by an elective cesarean section.

The parties further agreed that the standard of obstetrical care includes screening pregnant women for gestational diabetes. Because Kimberly's initial glucose screening test was abnormal, Dr. Halperin ordered a three-hour glucose tolerance test. The three-hour test entails an analysis of blood samples obtained before and after the patient drinks a liquid containing glucose. If two values are elevated, the patient has gestational diabetes.

One of Kimberly's blood sample results was elevated; two others were one point below the normal limit. Dr. Halperin viewed this as a negative glucose tolerance test and advised Kimberly to watch her diet. Dr. Jeffrey Soffer, one of plaintiffs' obstetrical experts, conceded that Kimberly did not meet the "strict criteria" for gestational diabetes, but opined that she should have been classified with the disorder based on the lab results and her weight gain. According to Dr. Soffer, Dr. Halperin breached the standard of care by failing to maintain suspicion of gestational diabetes throughout the pregnancy and by neglecting to carefully monitor the baby's growth with serial ultrasounds. Had serial ultrasounds been obtained, Dr. Soffer testified, Dr. Halperin would have recognized that Markell was a large baby and that a cesarean delivery was required.

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[1] *Daubert v Merrell Dow Pharm, Inc*, 509 US 579; 113 S Ct 2786; 125 L Ed 2d 469 (1993).

[2] Macrosomia is defined as newborn weighing more than 4,000 grams, which is 8 pounds, 13 ounces.

Kimberly's due date was calculated as December 1, 1995. Early that morning (1:25 a.m.), she presented at Beaumont Hospital in early labor. A resident obtained a bedside ultrasound at 1:40 a.m., and calculated the baby's weight as 3,200 grams. This estimate proved to be off by approximately 35%, as Markell actually weighed 4,797 grams (just over 10.5 pounds). Dr. Halperin admitted that the resident's estimate constituted "a large error," but claimed it fell within a reasonable "margin of error," because ultrasounds are not as accurate in "heavier women." Plaintiffs' experts disagreed, asserting that the estimate was so far off that it violated the standard of care.

Dr. Halperin admitted that if he had known that Markell weighed 4,795 grams, he would have discussed a cesarean section with Kimberly and allowed her to choose her delivery method. Dr. Soffer testified that he did not know of any woman who could safely deliver a baby of Markell's size as a first child. Dr. Brian Torok, a Beaumont resident who participated in Kimberly's obstetrical care, conceded that if he had known that the baby weighed 4,795 grams, "I would not labor that patient."

B. THE DELIVERY

At 10:15 a.m. on the day of Markell's delivery, a resident attending Kimberly ordered Pitocin to augment her contractions. Plaintiffs' experts claimed that the Pitocin caused hyperstimulation of Kimberly's uterus. Hyperstimulation is defined as more than five uterine contractions during a ten-minute period.[3] When it occurs, the doctors concurred, blood flow to the baby through the placenta may be compromised. Plaintiffs' experts relied on the electronic fetal monitor tracing to support their theory that Kimberly's uterus had been hyperstimulated with Pitocin. Defendants' experts disagreed with plaintiffs' interpretation of the fetal monitor tracing.

Electronic fetal monitoring produces a graph of the fetal heart rate and the maternal contraction pattern. The parties' experts generally agreed that reduced blood flow to the fetus slows the fetal heart rate, which appears on the tracing as a dip in the heart rate graph. The dips visible on the tracing are called decelerations. A deceleration occurring during a contraction (variable deceleration) or after a contraction (late deceleration) may potentially signal inadequate fetal oxygenation.

Dr. Soffer testified that during the second stage of Kimberly's labor (the "pushing" stage), the fetal monitoring tracing demonstrated that Kimberly's uterus was being hyperstimulated by Pitocin, causing "tumultuous" contractions and "severe late decelerations and multiple variable[]" decelerations. By using Pitocin, Dr. Soffer explained, "[t]hey pushed this baby through a pelvis . . . too small for this baby to fit." Dr. Soffer maintained that the repetitive decelerations visible on the fetal monitor represented "red flags" of fetal distress, and by 3:00 p.m., Dr. Halperin should have initiated a cesarean section.

[3] Some of the testifying witnesses used the term "tachysystole" to refer to abnormally strong and rapid uterine contractions.

Markell was delivered at 4:47 p.m., after Kimberly pushed for two-and-a-half hours. Although Markell's head delivered spontaneously, Dr. Halperin encountered difficulty delivering her shoulders. Dr. Halperin performed a McRoberts maneuver, which involves repositioning the mother's legs to open her pelvis. In the process of delivering Markell's shoulders, her collarbone fractured. At birth, Markell was limp, blue, unresponsive to stimulation, not breathing, and had a slow heart rate. Her one-minute Apgar score was one.[4] Resuscitation brought her five-minute score up to seven, and she was then transferred to the Special Care Nursery.

C. THE SPECIAL CARE NURSERY

According to Special Care Nursery notations, Markell bore visible evidence of a traumatic transit through the birth canal. The medical record documents "scalp and facial bruising and swelling" as well as bruising on her left arm, left nipple, and right forearm. Nursing notes document additional bruising to Markell's torso. The swelling of Markell's head, known as a cephalohematoma, was caused by blood collecting under the tissue covering her skull bone.

In the nursery, Markell developed noticeable tremors and respiratory distress. She was unable to suck, lacked rooting and grasp reflexes, and required oxygen to maintain normal oxygen saturation. Within 24 hours of her birth Markell developed seizure activity. The physicians caring for her described her condition in the medical record as "perinatal depression."

Markell remained hospitalized in Beaumont's Special Care Nursery until December 18, 1995. Several laboratory and radiologic studies conducted during this time formed the predicates for the experts' causation opinions. We now introduce the studies.

1. The Umbilical Blood Gases

The experts concurred that one objective indicator that a newborn has been deprived of oxygen during the birth process is a decreased pH level in the umbilical arterial blood. A fetus systemically deprived of oxygen (such as might occur when the umbilical cord is clamped or compressed) accumulates lactic acid in the blood, causing the pH to decrease. An umbilical artery blood pH of 7.0 or less signifies the presence of metabolic acidosis. This finding is universally recognized as consistent with fetal hypoxia (lack of oxygen) during delivery.

Shortly after her birth, physicians attending Markell ordered an umbilical arterial blood gas study. According to the medical record, the arterial study was "cancelled." Instead of

[4] Apgar scores reflect the health of a newborn at one minute and five minutes after birth. The one minute Apgar score measures how well the baby tolerated labor and delivery, while the five minute score assesses the baby's adaptation to her environment and the efficacy of resuscitation efforts. Five criteria are assessed: heart rate, respiration, muscle tone, response to stimulation, and color. Each criteria is scored as zero, one or two, with two representing optimal health. The top score is a 10. Markell received a zero for every criteria except heart rate.

analyzing arterial umbilical blood, the Beaumont lab tested venous umbilical blood. The lab reported a pH of 7.29, which is within normal limits for venous blood.

The significance of the venous blood gas result was hotly contested throughout the trial. Plaintiffs maintained that the unexplained cancellation of the arterial blood study signaled a "cover up." Defendants contended that the arterial blood study was cancelled because the laboratory received an insufficient quantity of arterial blood. Plaintiffs argued that the venous sample was useless as an indicator of Markell's perinatal asphyxia, as venous umbilical blood derives from the mother and does not reflect the pH of the baby's blood. During cross-examination, Dr. Halperin agreed with plaintiffs' position, stating: "the venous pH is the mom's." Defendants' experts took varying positions. Some asserted that the venous umbilical blood was a mixture of the mother and the baby's blood, while others claimed it was solely the baby's blood.[5] The defense experts generally opined that the venous pH correlated well with arterial pH, and that a venous pH of 7.29 indicated that Markell had not sustained any perinatal asphyxia.[6]

2. The Cranial Ultrasound

An ultrasound of Markell's head obtained the day after her birth revealed "no definite evidence of hemorrhage," according to the Beaumont radiologist who interpreted it. The radiologist also noted: "The ventricular systems appear normal." Plaintiffs' radiology expert, Dr. Barry Pressman, reviewed the same ultrasound films, and disagreed. Pressman testified that the ventricles were "actually almost invisible" demonstrating "a swollen brain." He elaborated: "The whole brain is -- the cerebrum is swollen." According to Dr. Pressman, brain swelling is consistent with an ischemic injury (injury caused by lack of blood flow) that occurred before and during delivery.

3. The CT Scan

A CT scan was performed on December 4. A Beaumont radiologist interpreted the study in relevant part as follows:

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[5] We note that in an unpublished decision involving Dr. Ronald Gabriel, whose causation theory is also at issue here, this Court stated in a footnote: "A venous sample [from the umbilical cord] measures maternal blood gases and an arterial sample measures fetal oxygenation." *Dukes v Harper-Hutzel Hosp*, unpublished opinion per curiam of the Court of Appeals, issued January 30, 2007 (Docket No. 255824), unpub op at 3 n 3.

[6] The dispute regarding the significance of a normal umbilical venous sample relates to one of the issues presented on appeal, whether the trial court denied defendants a fair trial by excluding from evidence criteria promulgated by the American College of Obstetricians and Gynecologists (ACOG) and the American Academy of Pediatrics for diagnosing an acute intrapartum hypoxic event.

> There is a small amount of hyperdensity within the occipital horns of both lateral ventricles. This is consistent with a small amount of intraventricular hemorrhage. There is also a small amount of hyperdensity in the interhemispheric fissure which may represent a small area of hemorrhage.
>
> * * *
>
> There is hypoplasia of both cerebellar hemispheres as well as the vermis inferiorly with a correspondently enlarged surrounding CSF space believed to represent a megacisterna magna.

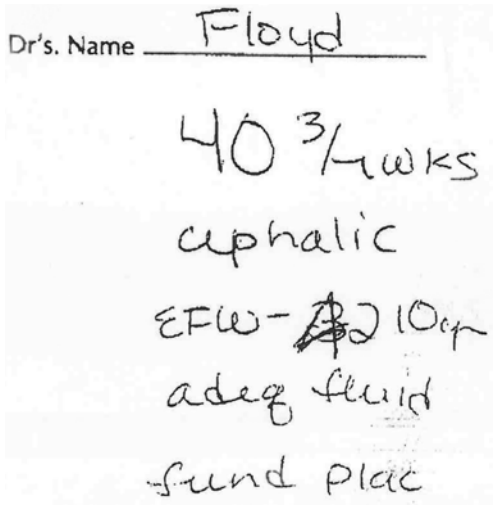
The experts for both sides agreed that this CT scan revealed two important findings: (1) the presence of blood in Markell's ventricles (the cerebrospinal fluid-filled chambers of the brain) and subdurally (beneath the dura, the covering of the brain), and (2) the partial absence ("hypoplasia") of the cerebellum. Cerebellar functions include coordinating voluntary muscle movement and modulating balance and equilibrium. The experts agreed that the abnormality of Markell's cerebellum is congenital, and not due to birth trauma. Dr. Pressman distinguished the congenital disorder from the effects of birth trauma as follows:

> So, we have a congenital hypoplasia or incomplete growth of the cerebellum. However, that has nothing to do with the fact that the brain is swollen and was traumatized and/or had inadequate blood supply or oxygen. They are totally separate conditions.

Defendants' neuroradiology expert, Dr. Douglas Quint, opined that only a tiny amount of blood ("[m]aybe a 15th of an ounce") remained in Markell's ventricle by the time the CT scan was obtained, and an equally small amount was present in her subdural space. According to Dr. Quint, one-half of normal, asymptomatic babies have small brain bleeds following vaginal delivery. He estimated that 30% of Markell's cerebellum was missing, and 20% of her pons. Dr. Quint testified that he observed none of the established indicia of hypoxic ischemia when he reviewed Markell's CT scan.

D. THE MEDICAL RECORDS

Plaintiffs employed several medical record discrepancies to buttress their negligence claims. During the trial, plaintiffs alleged that the resident who performed Kimberly's ultrasound mixed up Markell's estimated fetal weight with that of a different infant, baby boy Vergeldt. Vergeldt was a patient of Dr. William Floyd. Dr. Halperin covered for Dr. Floyd during the morning that both women labored. A resident obtained an ultrasound of the Vergeldt baby several hours after Kimberly's ultrasound had been completed. The resident estimated the Vergeldt fetal weight as 3,210 grams. Vergeldt's baby actually weighed 3,185 grams. However, a handwritten notation of the Vergeldt baby's weight reveals an obvious change. At some point, someone changed the 3 to a 4 by overwriting the 3:


Dr's. Name Floyd

40 3/4wks

cephalic

EFW - 4210gm

adeq fluid

fund plac

A weight of 4,210 grams (9.28 pounds) corresponds more accurately to Markell's delivery weight. Defendants admitted that someone had changed the record but produced no further explanation.

Dr. Halperin conceded a second mix-up regarding the Vergeldt and VanSlembrouck babies. Five days after Markell's birth, Dr. Halperin dictated an "operative report, delivery summary" describing the delivery in some detail. The summary states, "an internal scalp lead and intrauterine pressure catheter were placed. There were variable decelerations down to 90. A scalp pH was done which was normal at 7.25." Dr. Halperin admitted that the statements regarding the variable decelerations down to 90 and the scalp pH referred to the Vergeldt baby, and not to Markell. This dictation error occurred, Dr. Halperin claimed, because he had confused Mrs. Vergeldt's labor with Kimberly's.

The medical record of Markell's stay in the Special Care Nursery does not include a discharge summary. Plaintiffs alleged that hospital rules required a discharge summary. Throughout the trial, plaintiffs' counsel argued that its absence evidenced an additional cover-up.

E. THE 2010 GENETIC TESTING

After four years of litigation, defendants moved the trial court to order that Markell undergo genetic testing.[7] The trial court granted the motion. In November 2010, PreventionGenetics, a laboratory located in Marshfield, Wisconsin, reported that Markell had a genetic disorder: PCH-2 as well as subtype 4.[8] The lab report states in relevant part: "Pontocerebellar hypoplasias subtype 2 . . . and subtype 4 . . . are subsets of neurodegenerative disorders, characterized by small cerebellum and brainstem, variable neocortical atrophy, and

[7] Genetic testing performed early in Markell's life revealed no specific abnormalities.

[8] Defendants' genetics expert admitted that most children with PCH-4 die before age four, so "by inference it's thought that she's a so-called type two."

impaired cognitive and motor development . . . ." The admissibility of the PreventionGenetics report supplies another contested issue on appeal.

II. PERTINENT PROCEDURAL BACKGROUND

Kimberly filed suit on Markell's behalf in May 2006. In August 2006, the circuit court granted defendants' motion for summary disposition, ruling that the statute of limitations barred plaintiffs' claim. This Court reversed in *Vanslembrouck v Halperin*, 277 Mich App 558; 747 NW2d 311 (2008), and the Supreme Court granted defendants' application for leave to appeal. *VanSlembrouck v Halperin*, 481 Mich 918; 750 NW2d 591 (2008). In its order granting leave, the Supreme Court directed the parties to address whether "the plaintiffs are entitled to the benefit of the tolling provision in MCL 600.5856(c) where the plaintiffs provided a notice of intent prior to the minor reaching 10 years of age but filed their complaint after the minor had reached 10 years of age," and "whether MCL 600.5851(7) provides a period of limitation." *Id.*

Following oral argument the Supreme Court vacated its order granting leave, explaining "we are no longer persuaded that the question presented should be reviewed by this Court." *VanSlembrouck v Halperin*, 483 Mich 965; 763 NW2d 919 (2009).

Thereafter, the parties brought numerous interlocutory issues to this Court's attention, including an application from the circuit court's order denying defendants' motion to strike as scientifically unreliable the testimony of plaintiffs' causation experts: Ronald Gabriel, M.D., Yitzchak Frank, M.D., and Carolyn Crawford, M.D. This Court issued the following order:

> In lieu of granting leave to appeal, pursuant to MCR 7.205(D)(2), the Court orders the case remanded to the Oakland Circuit Court for a pre-trial evidentiary hearing regarding the bases for plaintiffs' causation experts' opinions, whether those opinions are based on data viewed as legitimate in the context of their area of medical expertise, and whether the opinions based on that data were reached through reliable principles and methodology. MRE 702; *Gilbert v DaimlerChrysler Corp*, 470 Mich 749, 782-783; 685 NW2d 391 (2004). The circuit court shall perform a searching inquiry as to these factors as required by MRE 702 and *Gilbert* and make specific findings regarding those factors on the record or in a written opinion. [*VanSlembrouck v Halperin*, unpublished opinion of the Court of Appeals, entered July 12, 2011 (Docket No. 303548).]

Defendants predicate error on the trial court's ruling following the *Daubert* hearing. According to defendants, the trial court abused its discretion in finding the causation theory espoused by plaintiffs' experts scientifically valid, and committed legal error by failing to apply the reliability factors set forth in MCL 600.2955. We turn to a discussion of that hearing and our analysis of defendants' *Daubert*-related arguments.

III. THE DAUBERT HEARING

A. THE EVIDENCE

Four expert witnesses testified for plaintiffs at the *Daubert* hearing: Dr. Carolyn Crawford, a neonatologist, Drs. Yitzchak Frank and Ronald Gabriel, pediatric neurologists, and

Dr. Barry Schifrin, a specialist in maternal-fetal medicine.[9] Plaintiffs submitted dozens of medical articles, Markell's voluminous medical records, the deposition testimony of Dr. Pressman, and the depositions of several treating physicians. Defendants presented the testimony of Dr. Mary Bedard, a neonatologist, and Dr. Yoram Sorokin, a maternal-fetal medicine specialist. Defendants also produced volumes of medical articles for the trial court's review, including the ACOG criteria for hypoxic-ischemic encephalopathy.

Dr. Crawford testified that physical trauma to an infant's brain during the birth process can cause bleeding in the brain, and that this fact "has been known for years." The trauma occurs when "you have obstruction to the passage of the head[.]" In such cases, the head "can act like a battering ram against the boney pelvis," resulting in "traumatic brain lesions" manifested by brain bleeds. "[T]he process that caused those bleeds," Dr. Crawford asserted, "is what causes the Cerebral Palsy."

Markell's forehead was noticeably bruised, Dr. Crawford claimed, "[b]ecause that's where [she] got stuck." According to Dr. Crawford, a "mis-fit" between the infant's head and the mother's pelvis can lead to trauma.[10] Dr. Crawford emphasized that conceptually, it has been established "ever since babies have been born" that if a baby's brain is traumatized during birth, permanent damage may result. In her opinion, Markell's brain injury was attributable to "[l]ack of oxygen and lack of blood flow." She elaborated: "This baby was banged through the pelvis for a long period of time. The uterus was stimulated to contract excessively" by Pitocin. "[W]here you have so frequent contractions that you don't provide oxygenated blood to the baby's brain . . . [y]ou cause increased pressure, the blood can't profuse the brain."

Defense counsel challenged Dr. Crawford's testimony based on its lack of congruence with criteria published in 2003 by the ACOG Task Force on Neonatal Encephalopathy and Cerebral Palsy. See American College of Obstetricians & Gynecologists, Neonatal Encephalopathy & Cerebral Palsy (American Academy of Pediatrics, 2003). The ACOG report declares that to define an acute event during labor and delivery as sufficient to cause cerebral palsy, four "essential criteria" must be met:

> 1. Evidence of a metabolic acidosis in fetal umbilical cord arterial blood obtained at delivery (pH < 7 and base deficit ≥ 12 mmol/L)
>
> 2. Early onset of severe or moderate neonatal encephalopathy in infants born at 34 or more weeks of gestation
>
> 3. Cerebral palsy of the spastic quadriplegic or dyskinetic type

[9] Maternal-fetal medicine is a subspecialty of obstetrics and gynecology that focuses on high-risk pregnancies.

[10] This "mis-fit" is also known as cephalopelvic disproportion.

> 4. Exclusion of other identifiable etiologies, such as trauma, coagulation disorders, infectious conditions, or genetic disorders[.] [*Id.* at xviii, 74.]

Defendants closely questioned Dr. Crawford about the absence of metabolic acidosis, reflected by the normal umbilical venous pH. Dr. Crawford replied that acidosis may be absent where "there's been such an arrest of circulation before birth that the acid is still in the tissues and your cord gas may look pretty normal." She continued: "The standard is arterial. That's what's coming from the baby." Dr. Crawford then rejected the ACOG standards in their entirety, characterizing them as lacking validity and particularly inapplicable when a fetus has sustained trauma. She further charged that the ACOG criteria were not peer-reviewed, and had been "mainly developed by a bunch of maternal fetal medicine specialists who know zip about Cerebral Palsy. . . . It was self-serving to try to cut down on lawsuits[.]"[11]

Beaumont's counsel next brought up the PreventionGenetics report. Dr. Crawford admitted having read it, continuing: "And, I researched the topic and it has absolutely no bearing on the injuries that she sustained during labor and delivery and were obvious at birth. Absolutely no relationship." PCH-2, Dr. Crawford claimed, is "an incidental finding that came up subsequently after . . . variants of other types of brain malformations were eliminated." Dr. Crawford conceded that Markell has PCH. She maintained that this genetic defect has "nothing to do with the insult and the injuries that she sustained." In response to the court's questioning Dr. Crawford explained:

> [A]n example . . . would be if you have a child with Downs Syndrome and you drop them on the floor and they sustain head trauma. It's like saying well this child was going to have impaired mental development anyway so the mental development that's impaired is due to the genetic defect not the fact that you dropped him on the head and he had head trauma.
>
> In other words, you can have a child who's [sic] potential is compromised by events that happened to it at the time of birth even though it might have a genetic defect. So, you can have a child that maybe has the capability of achieving an IQ of let's say 80 . . . [b]ut, you do something to that child and you traumatize them and you let them -- you cause birth trauma, you cause hypoxic ischemic injury and their potential becomes 40 or 30.

Dr. Crawford resisted defense counsel's efforts to cross-examine her with two medical journal articles discussing PCH-2. She insisted that PCH-2 didn't fit Markell because "those babies start out with small heads and she didn't," but admitted, "there are maybe some children [with PCH-2] that are not the majority" who have a normal head size at birth and later develop microcephaly.

[11] The report itself describes that it was subject to peer review. *Id.* at xix.

Dr. Yitzchak Frank, a pediatric neurologist, emphasized that Markell's inability to suck and grasp during the first days of her life were attributable to brain injury that occurred during labor and delivery, as was her gradual acquisition of microcephaly. In Dr. Frank's view, the brain injury occurred due to "lack of blood supply. It was an ischemic abnormality to the brain." He admitted, however, that there was "[n]o significant metabolic acidosis."

Next, Dr. Gabriel set forth a "quadripartite" summary of the cause of Markell's neurological injuries. First, he proposed that Markell was a "perfectly normal child" prenatally. Her heart rate during Kimberly's labor initially appeared normal and her head circumference at birth was "perfectly normal." Second, during labor and delivery "[w]e know that there was excessive uterine activity with hyperstimulation, cephalopelvic disproportion resulting in all the things you see" in the photographs taken of Markell immediately after her birth. Further, "there was severe asphyxia, virtually dead baby with an Apgar of one which means there was an abnormally low heart rate at birth . . . but also . . . before birth." After resuscitation, "she demonstrated major acute neurological abnormalities, hypotonia, abnormal reflexes . . . . Did not suck. Did not cry without stimulation. Had no grasp. . . . [S]he had tremors and . . . was treated for convulsions." Thus, Dr. Gabriel summarized, "we know that she had an acute injury to the brain following the delivery complications."

Dr. Gabriel pointed out that the venous umbilical blood gas was "the mother's blood," and that no arterial umbilical blood gas had been obtained. He noted that the Beaumont medical records used the term "perinatal depression," summarizing "this was a child that was acutely injured during the later stages of the delivery process."

Third, Markell has both spastic and rigid quadriparesis and "extrapyramidal" movements "that go along with this kind of injury," a seizure disorder, and "language, intelligence, and behavioral retardation." Her head circumference started out at the 90th percentile, and "rapidly descended down to severe microcephaly which she now exhibits." According to Dr. Gabriel, the microcephaly developed as a consequence of her birth trauma. Dr. Gabriel described the fourth part of his analysis as follows:

> [A]bnormal non-[physiological] pressures on the [calvarium], that's the head of the fetus, can produce brain damage by two mechanisms. Number one, by stretching, tearing, and distorting the vessels and the contents of the brain because the skull plates are wide open and distensible.
>
> And number two, by virtue of reduced blood flow to the brain because the high pressure, the abnormal, the non-physiological [pressure] on the skull plates, what we call the calvari[um], during the delivery process increases the pressure in the brain which in turn reduces the ability of the arteries to supply the brain with blood. The artery pressure has to fight against the increased pressure in the brain. As a consequence blood flow diminishes and the cerebral blood flow diminishes to a point where ischemia can occur. It can occur global or [diffused] or focal or regional or multi-focal.

Dr. Gabriel summarized, "the mechanical distortion of the vessels tearing and bleeding," and "lack of blood flow, the ischemia which in turn results in reduced oxygen" had injured

Markell's brain. As support for this theory he repeatedly referenced the following excerpt from a neonatal neurology textbook:

> Determination of intracranial pressure is of particular importance in neonatal neurological disorders, since marked alterations of this pressure have major implications for diagnosis and management. Intracranial pressure alterations per se may lead to deleterious consequences via two basic mechanisms, *disturbances of CBF* [cerebral blood flow] *and shifts of neural structures within the cranium*. With the former consequence, cerebral perfusion pressure is related to the mean arterial blood pressure minus the intracranial pressure. **Therefore when intracranial pressure increases, cerebral perfusion pressure decreases; if intracranial pressure increases markedly, cerebral perfusion pressure declines below the lower limit of autoregulation and CBF may be impaired severely**. . . . [Volpe, *Neurology of the Newborn* (W.B. Saunders Co, 4th ed, 2001), p 153 (italics in original, bold added).][12]

Dr. Gabriel denied that there has ever been a "debate in the . . . field of medicine that mechanical injury or trauma to a child's brain can produce brain damage," emphasizing that he has never seen anything "in the world's medical literature that disputes this point."

Like Dr. Crawford, Dr. Gabriel conceded that Markell has PCH, but opined that "the rest of the brain which is 89 percent of the brain" was normal before her birth. He claimed, "[W]e can function near normally without a cerebellum," expounding:

> You can have a malformed [brain] for any reason and the baby goes through a very bad labor and delivery for whatever reasons, could come out with additional damage as a consequence of the hypoxic ischemia or the mechanical trauma on top of what the baby may have had from the anomaly alone.

Dr. Schifrin, a board certified specialist in obstetrics and maternal-fetal medicine, began his testimony by distinguishing between the terms "hypoxia" and "ischemia:"

> Hypoxi[a] is a deficien[c]y of oxygen availability. Ischemia is a deficiency of oxygen availability related specifically to a lack of blood flow. So, if I were to reduce the amount of oxygen in the room you would be progressively hypoxemic, . . .you would have less oxygen in your blood, but under no circumstances . . . under those conditions would I interfere with any blood flow in any vessel in your body.

[12] Defendants' primary pediatric neurology expert, Dr. Steven Leber of the University of Michigan, agreed at trial that the Volpe text is "the preeminent textbook" of neonatal neurology. As to the fourth edition, he commented: "[h]e's probably the best textbook there is."

Ischemia, on the other hand, involves "a deprivation of blood flow," which "not only deprives the brain of oxygen but it deprives it of everything else carried with the blood including sugar for energy."

Maximum oxygen exchange between baby and mother occurs when the uterus is not contracting. "The greater the amount of uterine activity . . . the greater the interference of oxygen availability." When the uterus contracts, Dr. Schifrin testified, the baby raises its blood pressure "slightly to overcome the rise in pressure in the uterus," thereby maintaining adequate blood flow to the brain. Usually, this mechanism allows a baby to preserve enough blood flow during contractions to protect the brain from injury. But the baby's ability to autoregulate flow in this manner may be overwhelmed "if the pressure is so high either because of the duration of the contractions" or when the "added effects of pushing" increase the amplitude of the contractions. Ischemia occurs when the duration or intensity of the uterine contractions overcomes the baby's ability to raise its blood pressure to compensate for the pressure being exerted by the uterus. In such circumstances, the baby may suffer an ischemic (rather than an hypoxic) injury.

The electronic fetal monitor strip "tell[s] you exactly what is happening."[13] At the outset of Kimberly's labor, the electronic fetal monitor tracing reflected "no evidence whatsoever of oxygen debt, no evidence whatsoever of ischemia." But during the second stage of Kimberly's labor, Dr. Schifrin opined, Kimberly's "uterine activity [was] simply excessive" due to the administration of Pitocin. Pitocin increased the frequency of the contractions, decreased the interval between contractions, and raised the resting tone of Kimberly's uterus.

By the end of the tracing, there were "severe decelerations" of the baby's heart rate, a rising baseline heart rate, and absent heart rate variability. Dr. Schifrin termed this "an ominous pattern, a terribly worrisome pattern. It is incompatible with any notion of [a] normally adapted fetus." The baby did not suffer injury due to "a relentless failure of oxygen availability. . . . This baby [was] having problems getting blood to its brain." Dr. Schifrin termed the electronic fetal monitor tracing "inescapable medical evidence" that during the second stage of Kimberly's labor, the contractions and maternal pushing efforts overcame Markell's ability "to provide enough blood flow to the brain." In his view, the changes on the heart rate monitor "can only be consistent with an adverse response of the fetus to . . . a [sic] severe repetitive ischemic events."

Dr. Mary Bedard, a neonatologist, testified as the defense counter to Dr. Crawford. She opined that based on the imaging studies, Markell had not sustained any lasting injury to the substance of her brain tissue caused by lack of oxygen, lack of blood flow, ischemia, or direct mechanical trauma. The trauma caused only "superficial" injury; in Dr. Bedard's view, "intraventricular bleeding is . . . not a traumatic hemorrhage." The subarachnoid hemorrhage was traumatic, but is common in vaginal deliveries. Dr. Bedard summarized: "[W]hat you really see in the literature in terms of abnormal labors, etcetera, causing brain damage is through

[13] Dr. Schifrin testified that he was one of the developers of electronic fetal monitoring during the 1970s, and has been involved in the continuing development of this technology ever since.

impaired blood supply, but not direct mechanical trauma to the brain in the absence of an operative delivery using forceps or a vacuum extractor."

Dr. Bedard conceded that "under some circumstances you can have enough trauma that causes brain injury but that's not the circumstances in this particular case." Rather, Dr. Bedard considered Markell's presentation entirely consistent with PCH-2: "The articles that describe the symptoms and clinical course fit this child to a T." According to the two articles submitted to the trial court concerning PCH, every child with PCH-2 "is profoundly retarded and [has] a spastic quadriplegi[a]."

Dr. Yoram Sorokin, a maternal-fetal medicine specialist (the defense foil to Dr. Schifrin) testified that the ACOG criteria establish the elements necessary for a diagnosis of hypoxic ischemic encephalopathy, and Markell did not meet them. Dr. Sorokin opined that plaintiffs' experts' head compression theory "is not accepted in the medical literature." He insisted that none of the articles supplied by plaintiffs supported that head compression during labor could cause brain damage.

On cross-examination, Dr. Sorokin admitted that hyperstimulation of the uterus can cause reduction of blood flow to the fetal brain. He disagreed, however, that this results in brain damage:

> The scientific literature . . . uses the scientific method in order to arrive at the conclusion if something causes something else, okay. In this particular case we're talking about a mechanism of compression that's the one mechanism and the mechanism of pressure in the vagina. And, those mechanisms I'm saying the medical literature which is scientific literature which has tried to show that that causes brain damage and has not been successful and it's not in the medical texts.

Defendants placed in evidence the depositions of two additional experts, Drs. Leber and Quint, the ACOG criteria and accompanying task force report, approximately a dozen articles and textbook excerpts, the PreventionGenetics report attesting that Markell has PCH-2, and various other materials.

B. THE TRIAL COURT'S OPINION

Following the *Daubert* hearing, Judge Nichols issued a 17-page amended opinion and order finding plaintiffs' experts' testimonies "convincing, credible and reliable by a preponderance of the evidence." The opinion commenced with a detailed summary of the "facts and medical evidence" on which Judge Nichols relied. Judge Nichols next discussed the "applicable law," citing MRE 702 and several leading cases, including *Gilbert*, 470 Mich 749, and *Chapin v A & L Parts, Inc*, 274 Mich App 122, 127; 732 NW2d 578 (2007). The opinion specifically acknowledged, "[t]he trial court must also consider all of the factors listed in MCL § 600.2955(1)," continuing, "While the trial court must consider all seven factors enumerated in the statute, it does not require that each and every one of those seven factors must favor the proffered testimony."

Judge Nichols then recounted in considerable detail the professional qualifications and testimony of each witness. Judge Nichols's legal rulings, rather than his factual findings, have triggered defendants' appellate challenges.

Judge Nichols acknowledged that in evaluating the evidence, he was required "to consider the requisites of scientific testing, peer review, generally accepted standards, potential error rate, degree of acceptance, and reliability of use by other experts and use in outside litigation[,] requisites of MCL 600.2955(1)." After twice reciting that he was bound to consider the factors set forth in MCL 600.2955(1), Judge Nichols criticized having to do so:

> Both sides, but particularly Defendant[s], took it for granted that the inquiry here was a scientific one, that is, that Plaintiff[s'] theory of causation was not well based in science and was too novel or not generally accepted to be reliable. One Michigan case even appears to hold that a trial court must consider the seven factors embodied in MCLA 600.2955. *Clerc v Chippewa Co War [Mem] [Hosp]*, 477 Mich 1067, 1068[; 729 NW2d 221 (2007)]. *That law was not designed for the judicial system, but rather for those groups supporting it in the 1990's. In other words, it was not sound judicial doctrine a court should apply and utilize as has now been established by MRE 702 as amended in 2004.*
>
> With no proof as to either medicine or science, Defendant[s have] assumed, incorrectly this Court believes, that the Court's ruling is confined to science and a scientific methodology. But medicine is not necessarily science, and MRE 702 is **not** limited to just scientific knowledge; it reads in the disjunctive to also include **technical or other specialized knowledge.** . . . *For the reasons that follow, this Court believes the latter applies to the case at bar, and that the remaining aspects of MRE 702 should apply without some of the restrictive and limiting aspects of MCLA 600.2955.* [Bold in original, italics added].

Judge Nichols proceeded to rationalize that MCL 600.2955 does not apply in this case because "medicine," in contrast with basic sciences such as "anatomy, biology, biochemistry, physiology, etc.," does not strictly qualify as "scientific." Rather, Judge Nichols propounded, the practice of medicine constitutes "technical or other specialized knowledge under MRE 702."

Judge Nichols then considered whether technical or other specialized knowledge would assist the trier of fact. In making that determination, Judge Nichols incorporated a number of "salient facts" from the medical record, echoing those recited at the outset of his opinion. Judge Nichols's central findings are located in the following two paragraphs:

> The issue to be decided by this Court is whether the testimony of Plaintiff[s'] experts, as it relates to labor and delivery causing compression to the head and brain, ischemia and brain damage, is reliable. Here the Court finds as a fact that multiple factors can be involved. Those factors include, but are not limited only to, mother's weight, birth weight of the baby, amount of stimulation to the birth canal, contractions and contraction rate, medicines administered, blood flow, physical trauma to the fetus/baby and oxygen supply. Again this list

is not inclusive but **only some of the factors at work** in this process, a clinical process in medicine called labor. The Court finds and holds from all five witnesses testifying here, as a matter of fact and law, that in combination such factors can do [sic] result in cerebral palsey [sic], mental retardation, motor dysfunction and seizures. The Court further finds the following operative facts, among others to be in dispute, Plaintiff[s'] experts testifying one way, Defendant[s'] the other:

1. The application of ACOG principles, particularly as to whether its four point criteria for whether an event such as this causes cerebral palsey [sic], is in dispute. Indeed, it may not even apply, and Defendant[s'] experts appear to be in error in saying that it does because no arterial blood was tested. Moreover, Defendant[s'] experts agree there was trauma, albeit minor, and that must [be] ruled out in criteria four. However, determining the reliability of Defendant[s'] witnesses was not the charge given this Court by the Court of Appeals, and so this Court makes only an observation of conflict in testimony and does not in this opinion rule on their admissibility or reliability;

2. Whether this was an ischemic or hypoxic event, and significance of that;

3. Whether that trauma here was major or minor;

4. Whether that trauma adversely affects blood flow to the brain and did so here;

5. Whether the labor here can be described as difficult;

6. The effects and extent of Pitocin used;

7. The extent and effect of blood on Markell's brain;

8. The significance and extent of bruising to Markell.

Incorporating the substance of the experts' testimony . . . the Court also finds each of Plaintiff[s'] Expert[s'] testimonies convincing, credible and reliable by a preponderance of the evidence. Specifically, the Court finds their testimony would assist the jury in understanding the factors at work during labor and delivery, and that from their knowledge, training and experience, they used sufficient facts and data involving principles and methods from both their training and clinical experience and applied them to the facts of the case in a reliable manner. [Bold in original].

Judge Nichols concluded by criticizing the *Daubert* hearing and MCL 600.2955:

After almost three days of testimony and five witnesses, two of whom were for Defendant[s], this Court is hard-pressed to disagree with Plaintiff[s] that this hearing was an abuse of the *Daubert* hearing proceeding by Defendant[s]. Both of Defendant[s'] experts agree there is such a thing as trauma and ischemic injury, but simply that they do not exist here to the level testified to by Plaintiff[s'] experts. This Court finds as a fact there is evidence of it and any argument about it is a matter of degree. While Defendant[s] argue[] that Markell's injuries are genetic, that fact, if proven, merely establishes its theory of the case. It does not prove that a birth trauma theory is unreliable. In fact, it is conceivable the jury might find both. Based on the Plaintiff[s'] experts' testimony, the medical reports and records relied upon, and the literature in support, this Court finds the opinions are based on legitimate data within their field of expertise, that they are reliable and that they were reliably applied in this case.

Finally, this Court believes that to superimpose the requisites of MCL 600.2955 upon MRE 702 is unduly restrictive and adds both unnecessary and unsound barriers to admissibility which operates to preclude legitimate access to the very people for whom courts exist: to serve the public, those are who have journeyed to the one and only place in our society that has as its sole purpose the resolution of disputes that arise during the course of human affairs. It does that by applying unsound judicial doctrine to medicine: the application of scientific methods and principles to something that is more than science, but also an art. It is that what we call medicine and is encapsulated in the medical record and reports. While science is intimately involved, it was not and cannot be the only knowledge used in this case. For both legal and ethical reasons we cannot and do not subject such opinions regarding effects on the fetus/baby scientific testing and replication, peer review, error rates and general principles of acceptance/rejection. There is, instead, the human factor, human discernment, wisdom and judgment, bedside manners and experience, patient histories, medical devices and tests, differential diagnoses and pharmaceutical modalities involved as well. It is, in other words, a distinct human profession we call medicine revealed through medical records. In this Court's opinion MCLA 600.2955 should be held ineffective under MRE 101 and MRE 702 should instead be applied to malpractice cases, since that itself is sound judicial doctrine embracing the best of legal principles that can operate and be applied to eliminate novel ideas and junk science in our courtroom. [Underlining in original].

Before examining Judge Nichols's opinion, we describe the controlling legal framework.

C. GOVERNING LEGAL PRINCIPLES

The admission of expert testimony is governed by MRE 702, which provides:

If the court determines that scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience,

> training, or education may testify thereto in the form of an opinion or otherwise if (1) the testimony is based on sufficient facts or data, (2) the testimony is the product of reliable principles and methods, and (3) the witness has applied the principles and methods reliably to the facts of the case.

MRE 702 "requires trial judges to act as gatekeepers who must exclude unreliable expert testimony." Staff Comment to 2004 Amendment of MRE 702. In *Gilbert*, 470 Mich at 782, our Supreme Court elaborated that the trial court's gatekeeper role

> applies to *all* stages of expert analysis. MRE 702 mandates a searching inquiry, not just of the data underlying expert testimony, but also of the manner in which the expert interprets and extrapolates from those data. Thus, it is insufficient for the proponent of expert opinion merely to show that the opinion rests on data viewed as legitimate in the context of a particular area of expertise (such as medicine). The proponent must also show that any opinion based on those data expresses conclusions reached through reliable principles and methodology. [Emphasis in original.]

Before admitting expert scientific testimony, the trial court must satisfy its "fundamental duty" of ensuring that the expert testimony is reliable and relevant. *Id*. at 781. MRE 702 explicitly incorporates the *Daubert* standards of admissibility regarding an expert's testimony. *Id*. This task requires that the proponent of the testimony establish its reliability "by showing that it 'is based on sufficient facts or data,' that it 'is the product of reliable principles and methods,' and that the proposed expert witness 'has applied the principles and methods reliably to the facts of the case.'" *People v Unger*, 278 Mich App 210, 217; 749 NW2d 272 (2008), quoting MRE 702.

This analysis does not hinge on discovering "absolute truth," or resolving "genuine scientific disputes." *Id.* at 137. "[I]t would be unreasonable to conclude that the subject of scientific testimony must be 'known' to a certainty; arguably, there are no certainties in science." *Daubert*, 509 US at 590. Rather, the trial court is tasked with filtering out unreliable expert evidence. "The inquiry is into whether the opinion is rationally derived from a sound foundation." *Chapin*, 274 Mich App at 139. "The standard focuses on the scientific validity of the expert's methods rather than on the correctness or soundness of the expert's particular proposed testimony." *Unger*, 278 Mich App at 217-218. An expert's testimony meets the *Daubert* standard when the expert "employs in the courtroom the same level of intellectual rigor that characterizes the practice of an expert in the relevant field." *Kumho Tire Co, Ltd v Carmichael*, 526 US 137, 152; 119 S Ct 1167; 143 L Ed 2d 238 (1999). As the United States Supreme Court emphasized in *Daubert*, 509 US at 594-595:

> The inquiry envisioned by Rule 702 is . . . a flexible one. Its overarching subject is the scientific validity and thus the evidentiary relevance and reliability—of the principles that underlie a proposed submission. The focus, of course, must be solely on principles and methodology, not on the conclusions that they generate.

We turn our attention to whether the scientific evidence produced during the *Daubert* hearing met the requisite reliability standards.

D. OUR STANDARD OF REVIEW

We review for an abuse of discretion a circuit court's evidentiary rulings. *People v Farquharson*, 274 Mich App 268, 271; 731 NW2d 797 (2007). When our inquiry concerns whether the trial court correctly applied a rule of evidence, our review is de novo. *People v King*, 297 Mich App 465, 472; 824 NW2d 258 (2012). Thus, we apply de novo review in assessing whether the trial court performed its gatekeeping role in conformity with the legal principles articulated in *Gilbert*, 470 Mich 749, in which our Supreme Court adopted the *Daubert* framework. If the trial court correctly executed its gatekeeping role, we review its ultimate decision to admit or exclude scientific evidence for an abuse of discretion. *Craig v Oakwood Hosp*, 471 Mich 67, 76; 684 NW2d 296 (2004). When a trial court admits evidence based on an erroneous interpretation or application of law, it necessarily abuses its discretion. *Kidder v Ptacin*, 284 Mich App 166, 170; 771 NW2d 806 (2009).

E. ANALYSIS

Defendants challenge Judge Nichols's *Daubert* ruling on four grounds: (1) Judge Nichols "stubbornly refused to apply" the § 2955 factors "to the reliability equation;" (2) the articles relied upon by Judge Nichols are "outdated" and lack applicability to the facts of this case; (3) plaintiffs' expert witnesses failed to reconcile their opinions with the "objective fact" of Markell's genetic disorder, and (4) this Court has consistently rejected as scientifically unreliable plaintiffs' "acute intrapartum hypoxic event/mechanical trauma theory." We address each argument in turn.

1. MCL 600.2955

Defendants are correct that Judge Nichols adamantly declared his opposition to applying MCL 600.2955(1) to the facts of this case. Had Judge Nichols actually failed to consider and apply the statutory criteria, he would have abused his discretion. A court acting as an expert testimony gatekeeper may not "'perform the function inadequately.'" *Gilbert*, 470 Mich at 780, quoting *Kumho Tire Co*, 526 US at 158-159 (SCALIA, J., concurring). This means that a trial court abuses its discretion by omitting a necessary component of its gatekeeping obligation. But despite Judge Nichols's gratuitous criticism of MCL 600.2955(1) and his disavowal of its mandate, he employed all relevant statutory factors when drawing his conclusions. Those factors he failed to mention either do not apply to this case or do not alter the § 2955 analysis. Judge Nichols's ostensible rejection of MCL 600.2955(1) therefore qualifies as harmless.

Consistent with its "gatekeeper" role, a trial court must consider the factors listed in MCL 600.2955(1). *Clerc*, 477 Mich at 1068. The Legislature dictated that the following factors inform a trial court's analysis under MRE 702:

> (1) In an action for the death of a person or for injury to a person or property, a scientific opinion rendered by an otherwise qualified expert is not admissible unless the court determines that the opinion is reliable and will assist the trier of fact. In making that determination, the court shall examine the opinion and the basis for the opinion, which basis includes the facts, technique,

methodology, and reasoning relied on by the expert, and shall consider all of the following factors:

(a) Whether the opinion and its basis have been subjected to scientific testing and replication.

(b) Whether the opinion and its basis have been subjected to peer review publication.

(c) The existence and maintenance of generally accepted standards governing the application and interpretation of a methodology or technique and whether the opinion and its basis are consistent with those standards.

(d) The known or potential error rate of the opinion and its basis.

(e) The degree to which the opinion and its basis are generally accepted within the relevant expert community. As used in this subdivision, "relevant expert community" means individuals who are knowledgeable in the field of study and are gainfully employed applying that knowledge on the free market.

(f) Whether the basis for the opinion is reliable and whether experts in that field would rely on the same basis to reach the type of opinion being proffered.

(g) Whether the opinion or methodology is relied upon by experts outside of the context of litigation.

(2) A novel methodology or form of scientific evidence may be admitted into evidence only if its proponent establishes that it has achieved general scientific acceptance among impartial and disinterested experts in the field.

(3) In an action alleging medical malpractice, the provisions of this section are in addition to, and do not otherwise affect, the criteria for expert testimony provided in [MCL 600.2169]. [MCL 600.2955.]

Four of the seven factors identified in MCL 600.2955 (subparts (a)-(d)) derive directly from *Daubert*, 509 US at 593-594, and overlap with the components of MRE 702. This Court has held that each of these statutory factors need not favor the proposed expert's opinion. *Chapin*, 274 Mich App at 137 (opinion by DAVIS, J.). It suffices that "the opinion is rationally derived from a sound foundation." *Id*. at 139. In *Kumho Tire Co*, 526 US at 151, the United States Supreme Court explained that a similar approach governs the application of FRE 703: "*Daubert* . . . made clear that its list of factors was meant to be helpful, not definitive. Indeed, those factors do not all necessarily apply even in every instance in which the reliability of scientific testimony is challenged."

We agree with Judge Nichols that the following § 2955 factors are not germane to this case: "(a) Whether the opinion and its basis have been subjected to scientific testing and replication," and "(d) The known or potential error rate of the opinion and its basis." Defendants do not explain how plaintiffs' theories of fetal head compression could be subjected to scientific testing and replication in human children or evaluated regarding an "error rate." Nevertheless, several medical articles submitted by plaintiffs describe scientific studies involving fetal sheep. These studies lend support to plaintiffs' causation theory.

Two of the § 2955 factors require that the trial court examine the scientific literature in determining the reliability of an expert's causation theory. Specifically, the court must evaluate: "(b) Whether the opinion and its basis have been subjected to peer review publication," and "(g) Whether the opinion or methodology is relied upon by experts outside of the context of litigation." In pursuit of this mandate, the parties inundated the trial court with medical literature. Plaintiffs' initial literature filing encompassed more than 600 pages. Defendants' literature combined with plaintiffs' additional submissions yielded more than 1,000 pages of material for the trial court's review.[14]

Defendants charge that plaintiffs failed to establish factors (b) and (g), and that no peer-reviewed literature used outside the context of litigation supports plaintiffs' causation opinions. We now consider the plethora of articles bearing these factors in mind.

Multiple peer-reviewed articles supplied to Judge Nichols lent credence to plaintiffs' experts' causation theory. Specifically, several articles and textbook excerpts substantiated that a traumatic birth process can cause fetal head compression, which in turn may result in brain bleeds and permanent neurological injury. Dr. Crawford's thesis that in the presence of cephalopelvic disproportion the fetal head acts as a "battering ram" against the maternal pelvis emanates from a 2007 article published in a peer-reviewed obstetrical journal. This article corroborates that brain bleeding may result from head trauma:

> Virtually all significant fetal head and neck injuries that are associated with vaginal (both spontaneous and operative) delivery can be explained by the use of force to overcome cephalopelvic disproportion. Cephalopelvic disproportion is a relative term as each specific maternal fetal pair is unique; unique fetal size and positioning in the maternal pelvis and unique pelvis size and shape. As the fetal head descends into the pelvis, it can be likened to a battering ram taking the brunt of the pelvic resistance leading to molding to allow passage. Molding of the fetal cranium eventually can overcome the disproportion, but potentially at a cost. Excessive molding leads to distortion of the relatively fixed

[14] This approach to the statutory mandate does not strike us as particularly helpful. Rather than engaging in mutual "document dumps," the process and the trial court would have been better served by careful selection of a handful of the most pertinent articles for discussion during the experts' testimonies.

> tentorium and falx structures[15] and subsequent tearing leading to subdural hemorrhages. . . .
>
> The scalp is the fetal defense to the resistance of the birth canal tissues, both soft tissue and the bony pelvis. With significant resistance and repetitive pushing against this resistance, shear forces can be generated leading to scalp trauma and cephalohematomas. [Towner and Ciotti, *Operative Vaginal Delivery: A Cause of Birth Injury Or Is It?*, 50 Clinical Obstetrics & Gynecology 563, 571 (2007).]

A peer-reviewed medical journal article published in 1983 similarly explains that "[t]he mechanical forces of labor subject the infant's head to considerable compression, shearing, and molding. Intrapartum and neonatal death can occur from mechanical trauma to the brain during birth." Sorbe & Dahlgren, *Some Important Factors in the Molding of the Fetal Head During Vaginal Delivery – A Photographic Study*, 21 Int'l J Gynaecology & Obstetrics 205 (1983).

Other peer-reviewed articles reinforced plaintiffs' experts' theory that compression of a fetus's skull during delivery may permanently compromise neurologic function. "Compression of the fetal skull may result from two sources: endogenous: the bony pelvis, the myometrium [uterus], the cervix, and the perineum; and exogenous[,]" the obstetrician's hand, forceps, or a vacuum extractor. Kelly, *Compression of the Fetal Brain,* 85 Am J Obstetrics & Gynecology 687 (1963). This article continues: "Compression of the fetal skull may produce brain damage by one of three mechanisms," including that:

> [t]he increased pressure is transmitted inside the calvarium where it may overcome the intravascular blood pressure resulting in arrest of the cerebral circulation. The ensuing development of anoxia and asphyxia may damage not only the brain cells, but also the blood vessel walls, making them liable to rupture when exposed to hypertension. [*Id*.]

The Volpe textbook also supports that mechanical trauma can damage a fetus's brain:

> In this discussion, . . . "perinatal trauma" refers to those adverse effects on the fetus during labor or delivery and in the neonatal period that are caused *primarily by mechanical* factors. Thus specifically excluded are the disturbances of labor and delivery that lead principally to *hypoxic-ischemic* brain injury . . . . (Nevertheless, overlap between mechanical trauma and the occurrence of hypoxic-ischemic cerebral injury is important to recognize because perinatal mechanical insults may result in primarily hypoxic-ischemic cerebral injury,

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[15] The falx and the tentorium are folds of the dura (the membrane covering the brain) that separate the major substructures of the brain. The Brain & the Cranial Nerves, <www.linguistics.ucla.edu/people/ladefoge/manual%20files/chapter5.pdf> (accessed October 2, 2014).

probably secondary to disturbances of placental or cerebral blood flow.) [Volpe, *Neurology of the Newborn* at 813 (italics in original, bold added).]

In a 1952 article, the author specifically identifies "trauma due to cephalopelvic disproportion" as a cause of cerebral palsy, elaborating:

> Most of the traumatic causes of brain injury at birth may be considered as physiologic. Just being born is a difficult hurdle to pass. In the birth process, the baby uses its head for a battering ram propelled by strong uterine contractions. When the child's head is large and the pelvis small, the natural safeguards which allow the skull to conform to the shape of the birth canal may be insufficient to protect the brain from injury. [Deaver, *Etiological Factors in Cerebral Palsy*, 28 The Bulletin: NY Acad Med 532, 536 (1952).]

At least two articles supported Dr. Gabriel's opinion that excessive uterine activity lowers the amount of oxygenated blood perfusing the fetal brain. In 2007, the American Journal of Obstetrics and Gynecology, a peer-reviewed journal, published a study evaluating "how UA [uterine activity] affects fetal outcome." The researchers analyzed 1,433 electronic fetal monitor tracings, and compared them with the newborn infants' umbilical artery pH. Bakker et al, *Elevated Uterine Activity Increases the Risk of Fetal Acidosis at Birth*, 196 Am J Obstetrics & Gynecology 313.el (2007). The study reported that "[i]ncreased uterine activity during the first and second stage of labor is associated with an increased incidence of lower pH values in the umbilical artery." *Id*. at 313.e3.

Markell's umbilical artery pH was not measured. However, the study also includes the following pertinent conclusion: "Excessive UA [uterine activity], by means of hyperstimulation and tachysystole, shortens the relaxation time. This results in higher levels of cerebral deoxygenated hemoglobin, lower levels of oxygenated hemoglobin, and decreased intracerebral saturation." *Id*. at 313.e5. The article continues: "A contraction rate of more than 4 per 10 minutes is considered ominous, leading to insufficient time for placental perfusion and iatrogenic fetal distress." *Id*.[16] A second study of 10 fetuses, also published in a peer-reviewed journal, reached a more easily understood conclusion: "These data provide evidence of a direct relation between the frequency of uterine contractions and changes in human fetal cerebral oxygen saturation, and they indicate a critical contraction interval below which cerebral saturation is likely to fall." Peebles et al, *Relation Between Frequency of Uterine Contractions & Human Fetal Cerebral Oxygen Saturation Studied During Labour by Near Infrared Spectroscopy*, 101 Brit J Obstet & Gynaecology 44, 47 (1994). These articles generally validate that cephalopelvic disproportion and difficult, traumatic delivery can cause fetal distress, compression of the fetal skull, brain bleeds, and neurologic injury, satisfying MCL 600.2955(b) and (g).[17]

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[16] Dr. Schifrin testified that in his view, Kimberly's "uterine activity . . . after the administration of [Pitocin] . . . is simply excessive." Dr. Crawford testified that Kimberly had "tachsystole."

[17] Subsection (g) requires an assessment of whether "the opinion or methodology is relied upon by experts outside the context of litigation." Defendants have not contended otherwise. As

Plaintiffs' experts' testimony does not satisfy one § 2955 factor: "(c) The existence and maintenance of generally accepted standards governing the application and interpretation of a methodology or technique and whether the opinion and its basis are consistent with those standards." The ACOG standards reflect a general consensus in the medical community regarding the criteria necessary to demonstrate hypoxic ischemic injury. However, the ACOG standards include as an essential requirement an umbilical arterial blood gas demonstrating a pH of less than 7.0. An umbilical arterial blood gas was not obtained here. Given this discrepancy, Judge Nichols did not abuse his discretion by finding the ACOG criteria inapplicable to his reliability analysis.

The remaining factors focus on whether the expert's testimony is "generally accepted" among other experts in the field, and whether other experts would reach similar conclusions:

> (e) The degree to which the opinion and its basis are generally accepted within the relevant expert community. As used in this subdivision, "relevant expert community" means individuals who are knowledgeable in the field of study and are gainfully employed applying that knowledge on the free market.
>
> (f) Whether the basis for the opinion is reliable and whether experts in that field would rely on the same basis to reach the type of opinion being proffered.

Both sides' experts repeatedly opined that their causation views were generally accepted in the medical community, and that the opposing views were not.[18] And all testifying experts were "gainfully employed" in the practice of their medical specialties rather than simply "experts for hire." Judge Nichols ruled that plaintiffs' experts' opinions "are based on legitimate data within their field of expertise, that they are reliable and that they were reliably applied in this case." Accordingly, he applied these two criteria while claiming not to have done so, the evidence supported his conclusion, and we discern no abuse of discretion.

Judge Nichols observed in his written opinion, the views expressed by all medical experts in this case derive from "principles and methods from . . . their training and clinical experiences[.]" Unlike in *Daubert*, the medical literature relied upon by the experts was, with the exception of one or two articles, written by physicians other than the testifying experts. See *Daubert v Merrell Dow Pharm, Inc*, 43 F3d 1311, 1314 (CA 9, 1995) (*Daubert* II) ("[A]part from the small but determined group of scientists testifying on behalf of the Bendectin plaintiffs in this and many other cases, there doesn't appear to be a single scientist who has concluded that Bendectin causes limb reduction defects.").

[18] Although defendants' experts claimed that plaintiffs' causation theories had been debunked or were no longer accepted as scientifically valid, defendants produced no literature supporting this argument. Given that plaintiffs' literature submissions corresponded to their causation theory, Judge Nichols did not abuse his discretion in finding the data "legitimate."

Although we have rejected defendants' claim that Judge Nichols's purported failure to apply MCL 600.2955 mandates reversal, we reiterate that application of this statute is mandatory in every case involving death or personal injury in which scientific opinions are expressed. Judge Nichols's opinion that the statute lacks applicability in medical malpractice cases is simply wrong.

2. Scientific Reliability Under MRE 702

MRE 702 requires that an expert's testimony (1) rest on sufficient facts, (2) qualify as the product of "reliable principles and methods," and (3) reflect that the expert reliably applied the principles and methods to the case facts. As a gatekeeper, Judge Nichols was required to scrutinize plaintiffs' scientific evidence to determine whether the "principles and methods" employed by the experts were reliably applied to the facts of the case.

Defendants assert that plaintiffs' experts' testimonies do not fulfill the MRE 702 requirements because the experts failed to address the existence of Markell's genetic disorder. This omission, defendants argue, rendered plaintiffs' experts' opinions unreliable. Specifically, defendants insist that plaintiffs' experts' failure to acknowledge the impact of Markell's PCH diagnosis "in and of itself renders unreliable the *ipse dixit* of Plaintiff[s'] causation experts' opinions."

We initially observe that during the *Daubert* hearing, defense counsel repeatedly questioned plaintiffs' experts about the PreventionGenetics report. Plaintiffs' experts persistently disagreed that the PCH diagnosis had any significant bearing on Markell's neurologic condition. For example, Dr. Crawford testified that Markell's brain swelling was not caused by a genetic defect, characterizing PCH as an "incidental finding" that had nothing to do with the ischemia. Dr. Gabriel disputed that the partial absence of Markell's cerebellum and pons caused her cerebral palsy. Although Dr. Gabriel maintained that Markell's neurological presentation at birth was inconsistent with PCH, he conceded that the abnormality plays some part in her disabilities:

> Q. Doctor, is it your opinion that the [PCH] in this case did not affect this child?
>
> A. No, my opinion is that had Markell not gone through this terrible labor and delivery she would be essentially near normal or normal. She would probably not be an Olympic athlete or concert pianist or architect, but she would be able to function more or less like an ordinary human being based upon what I know about the condition of [PCH].

Thus, we find no merit in defendants' contention that plaintiffs' simply ignored relevant evidence of an alternative causation mechanism.

Nor are we persuaded that the trial court abused its discretion by rejecting defendants' argument that only PCH reliably explains Markell's neurologic deficits. Trial courts must carefully evaluate whether adequate data supports an expert's opinion and whether the opinion qualifies as reliable in the relevant expert community. Part of this process involves consideration of alternate scientific explanations for a given result. The Committee Notes to FRE 702 provide

that a court may consider "[w]hether the expert has adequately accounted for obvious alternative explanations." FRE 702 (2000) Committee Note.

However, this does not mean that a trial court is empowered to decide which of two competing and adequately supported scientific theories should prevail. "Although [*Daubert*] places the judge in the role of gatekeeper for expert testimony, the key to the gate is not the ultimate correctness of the expert's conclusions." *Schultz v Akzo Nobel Paints, LLC*, 721 F3d 426, 431 (CA 7, 2013). "In evaluating proffered expert testimony, the trial court is 'a gatekeeper, not a fact finder.'" *City of Pomona v SQM North America Corp*, 750 F3d 1036, 1043 (CA 9, 2014) (citation omitted). The Supreme Court emphasized in *Daubert* that trial courts should focus "on principles and methodology, not on the conclusions they generate." *Daubert*, 509 US at 595. "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 596.

To be sure, expert testimony may be excluded when there is "too great an analytical gap between the data and the opinion proffered." *General Electric Co v Joiner*, 522 US 136, 142; 118 S Ct 512; 139 L Ed 2d 508 (1997). The Supreme Court explained in *Joiner* that "[t]rained experts commonly extrapolate from existing data. But nothing in either *Daubert* or the Federal Rules of Evidence requires a district court to admit opinion evidence that is connected to existing data only by the *ipse dixit* of the expert." *Id.* at 146. The "data" referred to by the Court in *Joiner* consisted of four epidemiological studies involving baby mice, which the plaintiff claimed as support for linking his small cell lung cancer with occupational exposure to PCBs. The district court found that the mice studies did not support the plaintiff's expert's conclusion:

> The infant mice in the studies had had massive doses of PCB's injected directly into their peritoneums or stomachs. Joiner was an adult human being whose alleged exposure to PCB's was far less than the exposure in the animal studies. The PCB's were injected into the mice in a highly concentrated form. The fluid with which Joiner had come into contact generally had a much smaller PCB concentration of between 0-to-500 parts per million. The cancer that these mice developed was alveologenic adenomas; Joiner had developed small-cell carcinomas. No study demonstrated that adult mice developed cancer after being exposed to PCB's. One of the experts admitted that no study had demonstrated that PCB's lead to cancer in any other species. [*Id.* at 144.]

As the Court of Appeals for the Third Circuit subsequently explained, "[G]iven the tenuous link in *Joiner* between plaintiff's exposure to PCBs and the onset of his cancer a number of years later, the lack of studies linking PCBs to cancer in humans left only 'the *ipse dixit* of the expert' to support his conclusion." *Heller v Shaw Indus, Inc*, 167 F3d 146, 155 (CA 3, 1999). Thus, *Joiner* instructs that trial courts must close the evidentiary gate when an expert's conclusions lack any genuine relationship to the science alleged to support them.

Here, science and fact supported both sides' causation views. That Markell's birth involved head compression resulting in brain bleeding was not contested. Objective record facts supporting birth trauma included her Apgar score of one, her lack of muscle tone and normal newborn reflexes, her rapidly-emerging seizure disorder, and the blood detected in her brain.

The medical literature discussed above links traumatic birth and neurologic injury. On the other hand, genetic evidence indisputably demonstrated PCH. According to two articles supplied to the trial court by the defense, children with PCH display near absence of cognitive and voluntary motor development and progressive microcephaly. Markell's condition fits that description. Faced with this conflict among the experts, the trial court did not abuse its discretion by deciding to admit both theories, finding both supported by peer-reviewed literature and credible expert opinion, thereby qualifying as reliable.

3. This Court's Prior Gabriel Opinions

Defendants' final argument regarding the reliability of plaintiffs' experts' opinions rests on this Court's prior unpublished opinions upholding the exclusion of Dr. Gabriel's causation testimony in other medical malpractice cases. In nine different opinions, panels of this Court have held Dr. Gabriel's causation testimony inadmissible. Unpublished opinions of this Court lack precedential value. MCR 7.215(C)(1). Moreover, our review of this Court's previous Gabriel jurisprudence reveals marked dissimilarities with this case. None of the prior cases involved a baby with obvious head trauma and a one-minute Apgar score of one. Several of the other Gabriel cases involved entirely different alleged mechanisms of injury, including neonatal ischemic stroke and chorioamnionitis.[19] Most importantly, *Daubert* and *Craig* instruct that a trial court's admissibility decision must flow from the record created during the reliability hearing. Thus, cases presenting different facts and different scientific records may yield different rulings. Just as this Court's rejection of Dr. Gabriel's testimony in other cases would not have authorized Judge Nichols to entirely forego a *Daubert* hearing, the prior cases do not permit us to deem incredible as a matter of law Dr. Gabriel's testimony here. Moreover, in this case, Dr. Gabriel was not the sole proponent of plaintiffs' causation theory. Even were we to exclude his testimony, Drs. Crawford, Schifrin and Frank attested to the same mechanical trauma theory.

Nor does our Supreme Court's opinion involving Dr. Gabriel, *Craig*, 471 Mich 67, alter our analysis. Like this case, *Craig* involved the use of Pitocin during labor. *Craig*, 471 Mich at

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[19] We note that in one case, *Mock v Hackley Hosp*, unpublished opinion per curiam of the Court of Appeals, issued November 20, 2008 (Docket No. 280269), this Court cited testimony from the defendants' experts which tends to support plaintiffs' causation theory here:

> Defendants never contested that, according to the medical literature submitted by plaintiff and the testimony of their experts, certain compressive forces on the fetal brain, such as those exerted by the use of forceps and those arising in cases of *cephalopelvic disproportion*, may cause brain damage resulting in cerebral palsy. [*Id.* at 2 (emphasis added).]

In *Mock*, this Court found that "none of the articles relied upon by Gabriel as supporting his theory and none of the defense experts stated that abnormal uterine pressures, alone, can be considered analogous to circumstances known to cause brain damage leading to cerebral palsy, such as cephalopelvic disproportion and the use of forceps[.]" *Id.* at 6.

72. According to the plaintiff's obstetrical expert witness, the baby developed a slow heart rate due to excessively long, intense contractions. *Id.* at 73. One expert described that the baby's "umbilical cord became compressed because of these contractions, thereby decreasing the amount of blood flowing to plaintiff." *Id.* At birth, the plaintiff's Apgar scores were 8 and 9, "well within the typical range," although the plaintiff contended that other evidence supported that the child had sustained head trauma. *Id.* at 73-74. Dr. Gabriel testified at deposition that "hyperstimulation of the uterus" due to Pitocin caused the fetal head to pound against his mother's pelvic anatomy, producing permanent brain damage. *Id.* at 81 (quotation marks omitted). The defendants moved for a *Davis-Frye* hearing, this state's predecessor to a *Daubert* hearing.[20] In response,

> plaintiff's attorney produced several articles and authorities that were meant to demonstrate a link between the use of Pitocin and the type of injury sustained by plaintiff. But while some of these articles described a correlation between the use of Pitocin and generalized brain injury, none of these authorities supported the theory of causation actually put forth by Dr. Gabriel. That is, none supported a causal connection between Pitocin and brain injury incurred through repeated pounding of the fetal head against maternal anatomy. [*Id.*]

The trial court denied the defendant's motion for an evidentiary hearing, and the jury returned a large verdict for the plaintiff. *Id*. at 75.

The Supreme Court held that the trial court had abused its discretion by failing to conduct a *Davis-Frye* hearing, and that the plaintiff failed to demonstrate that Dr. Gabriel's causation theory "was rooted in 'recognized' scientific or technical principles." *Id.* at 82-83. The "causal sequence" described by Dr. Gabriel, the Supreme Court explained, should have been rejected:

> Plaintiff failed to introduce a single authority that truly supported Dr. Gabriel's theory in response to defendant's motion. Instead, plaintiff repeatedly stressed that medical literature amply supported the proposition that Pitocin could cause brain damage—a proposition defendant did not contest-and supplied the court with literature to that effect. But this literature had little to do with Dr. Gabriel's causal theory and therefore did not counter the proposition that his expert opinion was based on novel science. [*Id.* at 83].

The Supreme Court rested this aspect of its opinion in *Craig* on several facts unique to that case. "For one thing," the Supreme Court observed, "Dr. Gabriel was unable to cite a single study supporting his traumatic injury theory during a voir dire conducted at trial." *Id.* at 84. Instead, Dr. Gabriel pointed only to "studies . . . in animals" involving an excessive administration of Pitocin. *Id.* "Second," the Court explained,

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[20] See *People v Davis*, 343 Mich 348; 72 NW2d 269 (1955); *Frye v United States*, 54 App DC 46; 293 F 1013 (1923).

> Dr. Gabriel's theory lacked evidentiary support. Dr. Gabriel was unable to identify the specific part of Ms. Craig's anatomy with which, according to his theory, plaintiff's head repeatedly collided during labor. Indeed, Dr. Gabriel pointedly refused to identify this anatomical structure on a chart, contending that such testimony was beyond his expertise. This failure to root his causal theory in anything but his own hypothetical depiction of female anatomy indicates that Dr. Gabriel's testimony may have been too speculative under MRE 702 to assist the trier of fact. [*Id*.]

Dr. Gabriel also failed to offer testimony that his theory of vascular trauma could cause cerebral palsy or the "asymmetrical development shown in plaintiff's MRI." *Id.* at 84-85. "[G]iven the yawning gap between Dr. Gabriel's testimony and the conclusions plaintiff hoped the jury would draw from it," the Court concluded, this evidence would not have assisted the trier of fact and should have been excluded. *Id.* at 85.

Unlike in *Craig*, the peer-reviewed literature in this case supports that head compression can cause brain injury. Here, plaintiffs' experts had no difficulty explaining the head compression mechanism: Dr. Crawford even insisted that a certain bruising pattern on Markell's head corresponded to where her head had been "banged" through the pelvis. The articles submitted to Judge Nichols involved human babies and directly corresponded to plaintiffs' experts' testimony. Thus, the evidence presented during the *Daubert* hearing responded to and overcame the evidentiary infirmities described in *Craig*.

Just as one court's *acceptance* of Gabriel's methodology and conclusions would not bind another court to embrace Gabriel's testimony without performing a "searching inquiry," our Supreme Court's rejection of Gabriel's causation opinions in a different case, expressed in a different record, does not control the outcome here. In summary, we hold that Judge Nichols did not abuse his discretion by allowing the jury to consider Dr. Gabriel's causation theory.

IV. PROXIMATE CAUSE AT THE TRIAL

Defendants next contend that the trial evidence insufficiently supported plaintiffs' causation theory. According to defendants, Markell's genetic disorder accounts for the totality of her neurologic disabilities, and plaintiffs' expert witnesses failed to support that a cesarean section "is capable of repairing genetic damage that inevitably causes profound retardation." Judge Nichols erred, defendants assert, by failing to enter a judgment notwithstanding the verdict in favor of defendants regarding proximate cause.

A. THE TRIAL EVIDENCE

Defendants premise their proximate cause argument on a central piece of the evidence: the PreventionGenetics report stating that Markell suffers from PCH-2. This genetic defect, defendants contend, constitutes the sole cause of Markell's neurologic problems. According to defendants, plaintiffs "were unable to reconcile their opinions with the PCH evidence."

Contrary to defendants' argument, plaintiffs' causation experts recognized that Markell has a genetic condition that resulted in the malformation of her cerebellum. They rejected that this genetic condition caused Markell's cerebral palsy and her mental retardation. Accordingly,

plaintiffs created a fact question regarding whether birth trauma or PCH-2 caused Markell's neurological deficits.

Defendants' proximate cause argument posits that Markell's neurologic condition was attributable *only* to PCH-2. Dr. Aubrey Milunsky served as the primary proponent of this defense at the trial. Dr. Milunsky, a professor of pediatrics, human genetics, obstetrics and gynecology and pathology at Boston University, testified that "Markell has a very well defined genetic disorder. It's called [PCH]. Well recognized, well characterized and diagnosed with great precision by molecular or DNA diagnosis. It is really dramatically straightforward." Markell's small cerebellum, he explained, "was the first flag that this is a child that was born with an abnormality." The genetic testing performed by PreventionGenetics cemented the clinical diagnosis.

Dr. Milunsky reviewed the PreventionGenetics report with the jury, explaining that the results revealed PCH types 2 and 4. In Dr. Milunsky's view, the test is 99.9% accurate. "[T]he molecular diagnosis made in this case," he opined, "is indisputable and absolute." Dr. Milunsky maintained that Markell's clinical findings of microcephaly, spasticity, seizures, mental retardation, difficulty swallowing and the inability to control her movements "are just highly typical of what's been described before" as PCH-2. The infirmities caused by PCH-2 explain why Markell spent 18 days in the Special Care Nursery. And according to Dr. Milunsky, Markell's life expectancy "is severely limited."

Dr. Milunsky rejected that Markell suffered any injury related to the circumstances surrounding her birth:

> Q. Doctor, are you able to exclude trauma to the brain as a cause of the current neurologic condition?
>
> A. There's absolutely no good reason to think trauma had anything whatsoever to do with this genetic condition.

On cross-examination, Dr. Milunsky conceded, "a child can be injured by being battered against the wall of the pelvis." On redirect examination, he stated: "There may be similar features that may appear [with perinatal depression] following lack of oxygen or . . . [b]ecause of a genetic condition." He further agreed that unlike most children with PCH-2, Markell's head circumference percentile initially increased instead of decreasing, and she has lived longer than the majority of children studied. Although Dr. Milunsky maintained that the disease is relentlessly progressive, he admitted that Markell does not appear to be getting worse; he noted, however, that at age 15 she weighed only 50 pounds.

Another defense expert, University of Michigan neuroradiologist Douglas Quint, M.D., testified that a CT scan taken when Markell was five months old demonstrated a "dragon fly pattern" in the area of her cerebellum, which is classic and diagnostic for PCH. The imaging studies did not reveal any evidence of brain abnormalities consistent with hypoxic ischemic encephalopathy, Dr. Quint maintained. Dr. Quint admitted that this is the only case of PCH that he has ever seen.

Defendants' pediatric neurology expert, Dr. Steven Leber, also testified that the imaging studies were inconsistent with hypoxic ischemic injury. The "dragon fly appearance" of Markell's cerebellum, Dr. Leber expressed, correlates with PCH-2, and the PreventionGenetics report "very much" supported this diagnosis. Dr. Leber nevertheless conceded, "all of [Markell's] clinical symptoms can be seen in children who have hypoxic ischemic injury:"

> Q. . . . All of the things that she showed when she was born you testified under oath that they're seen in children who have the injury that our experts have testified she has, right?
>
> A. That's correct.

As he had done with Dr. Milunsky, plaintiffs' counsel established on cross-examination that although PCH-2 is a progressive neurological disorder (meaning that the condition of those who have it progressively worsens), Markell seemed to have experienced periods of improvement and gains in development. Markell can sit up and roll over, unlike many children with PCH-2. Dr. Leber conceded that cerebral palsy, the diagnosis reached by Markell's treating physicians, is a nonprogressive disorder. Dr. Leber further acknowledged that his diagnosis is "[t]otally inconsistent with what her treating doctors and her medical course since birth show."

Plaintiffs' experts did not dispute that Markell has PCH. Whether PCH-2 or birth trauma caused Markell's spastic quadriparesis and mental retardation, however, separated plaintiffs' experts' causation opinions from those of the defense witnesses.

Dr. Soffer testified that regardless of the genetic findings, the malpractice surrounding Markell's birth harmed her: "The point is no matter what the condition of this baby was genetically the circumstances of events that happened during this labor made whatever condition this baby may have had at birth far, far worse than it would have been otherwise." Plaintiffs' primary proximate cause witness, Dr. Gabriel, set forth his causation opinion as follows:

> The reason for Markell's present condition is because of two factors that occurred towards the end of labor and delivery. The first factor is there was considerable mechanical pressure, abnormal mechanical pressure on the unfused skull plates. . . . You put pressure on those skull plates and you put pressure on the brain and that can distort the vessels, stretch the vessels, and tear the vessels, and that's what caused the bleeding in Markell's brain.
>
> * * *
>
> The second phenomenon or mechanism is the reduction in blood flow to the brain. We know that happened independent of the mechanical trauma but with it because when Markell was one minute of age she was essentially dead with a very low heart rate. The Apgar was one and you have essentially a dead baby with an Apgar of one. The one indicates that the heart rate was present but it was abnormally low. So, we know that there was not enough blood getting to the brain during that period of time.

In Dr. Gabriel's view, Markell's injuries could have been avoided had a cesarean section been performed "before she went through the last 30, 60, 90 minutes of labor and delivery."

Dr. Gabriel testified that the cerebellum constitutes "a very small part of the brain," and claimed that "[m]ost" of Markell's cerebellum is present. "What's missing is probably anywhere from 10 to 20--25 percent is not there because of underdevelopment." He disagreed with the opinion of defendants' experts' that Markell's pons was congenitally absent: "She has both a pons and a small bump as you'll see on the MRI." And in his view, the cerebellar abnormality does not contribute to Markell's condition:

> Q. Does anything about the cerebellum or the smallness of her brain stem have anything to do with the condition that we see Markell in today?
>
> A. No. On examination she has no abnormal cerebellar findings.
>
> * * *
>
> Q: Let's -- Doctor by the way, is she like the way she is now because she has some genetic disease they just discovered?
>
> A: No. Apart from the undergrowth of the cerebellum, no. The vast bulk of her condition is due to the mechanisms that I just mentioned.

Dr. Gabriel admitted that the cerebellar abnormality qualified as a genetic defect. He claimed to have read two research studies regarding PCH-2, but disagreed that they applied to Markell, expressing that the studies included no information regarding the "past history" of the children studied to determine whether other conditions, such as "meningitis, head trauma, birth trauma" or "toxic drugs," could account for their conditions. Dr. Gabriel further distinguished Markell's condition from that of the neurologically devastated children described in the published studies regarding PCH-2 as follows:

> She is able to reach and grasp and can transfer from hand to hand. She is interactive with her family. She makes eye contact especially with the right eye. She smiles. She enjoys music. She's actually a vibrant youngster, severely impaired, but she has a very vibrant ability to interact with her family. You see she's enjoying that. It's the kind of tactile stimulation that makes her feel good and she responds. And, you can see how she has such good head control which is important in terms of her life expectancy.

Dr. Gabriel emphasized that the majority of the children described in the PCH articles die within a few years of their birth. Nor did Dr. Gabriel discern the "classic dragonfly pattern" when he reviewed Markell's imaging studies.

Dr. Crawford, too, testified that Markell's injuries would have been prevented by a cesarean section. She rejected that the data in the PCH-2 studies applied to Markell because the children in the studies had microcephaly at birth, while Markell had a normal head size and her head actually grew normally for a short time.

Thus, the battle lines were drawn. Defendants contend that the irrefutable PCH-2 evidence is simply irreconcilable with plaintiffs' explanation for Markell's disabilities, and that plaintiffs' failure to exclude PCH from the causation equation "with a fair amount of certainty" mandated JNOV.

B. STANDARD OF REVIEW

We review de novo a trial court's decision on a motion for JNOV. *Reed v Yackell*, 473 Mich 520, 528; 703 NW2d 1 (2005). When faced with a JNOV motion, a court must "review the evidence and all legitimate inferences in the light most favorable to the nonmoving party. Only if the evidence so viewed fails to establish a claim as a matter of law, should the motion be granted." *Wilkinson v Lee*, 463 Mich 388, 391; 617 NW2d 305 (2000). Granting a JNOV is contrary to our policy of giving all due deference to jury verdicts and should not be taken lightly. "The trial court cannot substitute its judgment for that of the factfinder, and the jury's verdict should not be set aside if there is competent evidence to support it." *Ellsworth v Hotel Corp of America*, 236 Mich App 185, 194; 600 NW2d 129 (1999).

C. ANALYSIS

Plaintiffs' evidence supported that defendants' negligence constituted both the cause in fact and a proximate cause of Markell's injuries and damages. Plaintiffs admitted that Markell tested positive for PCH-2. They disagreed that this genetic condition caused her neurological picture. Plaintiffs' causation evidence was neither speculative nor insufficient. It was for the jury to sort out this disagreement.

The plaintiff in a medical malpractice case must prove that the defendant's breach of the applicable standard of care proximately caused the plaintiff's injuries. *Craig*, 471 Mich at 86. Proximate cause incorporates two separate elements: (1) cause in fact and (2) legal or proximate cause. *Skinner v Square D Co*, 445 Mich 153, 162-163; 516 NW2d 475 (1994).

Cause in fact "generally requires showing that 'but for' the defendant's actions, the plaintiff's injury would not have occurred." *Id.* at 163. "[L]egal or 'proximate cause' normally involves examining the foreseeability of consequences, and whether a defendant should be held legally responsible for them." *Id*. "To establish legal cause, the plaintiff must show that it was foreseeable that the defendant's conduct 'may create a risk of harm to the victim, and . . . [that] the result of that conduct and intervening causes were foreseeable.'" *Weymers v Khera*, 454 Mich 639, 648; 563 NW2d 647 (1997) (alterations in original), quoting *Moning v Alfono*, 400 Mich 425, 439; 254 NW2d 759 (1977). It is well established that more than one proximate cause may contribute to an injury. *O'Neal v St John Hosp & Med Ctr*, 487 Mich 485, 497; 791 NW2d 853 (2010). Proximate cause is a question for the jury to decide unless reasonable minds could not differ regarding the issue. *Nichols v Dobler*, 253 Mich App 530, 532; 655 NW2d 787 (2002).

Plaintiffs' cause-in-fact proof rests on the testimony of both the obstetrical experts (Drs. Schifrin and Soffer) and Dr. Gabriel. Both Drs. Schifrin and Soffer testified that the standard of care required that Kimberly undergo a cesarean delivery, and that the inappropriate use of Pitocin "pushed this baby through a pelvis that now we know is too small for this baby to fit."

Dr. Schifrin opined that the defendants could have prevented injury to Markell by stopping the Pitocin, and if that did not work, by performing a cesarean section. Dr Gabriel testified that had a cesarean section been performed, Markell would have avoided injury. Viewed in the light most favorable to plaintiffs, this testimony established causation in fact.

A genuine issue of material fact also existed regarding proximate cause. Defendants' reliance on *Skinner* is misplaced, as in *Skinner* "[t]here was no evidence to support the plaintiff's theory of causation," *Craig*, 471 Mich at 88-89, while here plaintiffs' evidence substantiated that Markell sustained an ischemic injury to her brain.

At the time of his death, the decedent in *Skinner* had been operating an electric metal "tumbling machine" of his own design and manufacture. *Skinner*, 445 Mich at 157. The plaintiffs theorized that defendant Square D Company defectively designed a switch that the decedent had incorporated in his tumbling machine such that the switch's "large 'phantom zone'" sometimes inaccurately signaled that the switch was "off" while power actually continued flowing to the machine. *Id.* at 158. Because no one witnessed the decedent's accident, no direct evidence linked the switch and the decedent's electrocution. The plaintiffs' case against Square D was entirely circumstantial, predicated on a mere assumption that the Square D switch had played a role in the decedent's death. *Id.* at 163. Furthermore, some of the physical evidence directly contradicted the hypothetical accident scenario proposed by the plaintiffs. *Id.* at 171-172. Square D maintained that even assuming the presence of a defect in its switch, the plaintiffs' circumstantial proofs failed to demonstrate that the decedent "was misled by the switch when he was fatally electrocuted." *Id.* at 158. The Supreme Court agreed, concluding that the record contained no direct or circumstantial evidence from which a reasonable jury could infer the mechanism of the decedent's electrocution or whether the switch contributed to the accident. *Id.* at 174. The Court emphasized in *Skinner* that "[t]o be adequate, a plaintiff's circumstantial proof must facilitate reasonable inferences of causation, not mere speculation." *Id.* at 164.

In *Craig*, the Supreme Court contrasted the facts in *Skinner* with those of *Mulholland v DEC Int'l Corp*, 432 Mich 395; 443 NW2d 340 (1989). The plaintiffs in *Mulholland* operated a dairy farm. *Id.* at 398. After they installed a new milking system supplied by the defendants, many cows developed mastitis. *Id*. at 399. An expert witness, Sidney Beale, observed the plaintiffs' milking operation and concluded that the "problems were related to the configuration of the milking machinery." *Id*. at 400. Beale recommended machinery changes which resulted in decreased mastitis and increased milk production. *Id.* In the subsequent litigation, Beale linked a milking machine defect with the cows' mastitis. *Id*. at 409. The trial court granted a directed verdict for defendants, and the Supreme Court reversed.

The Supreme Court held that Beale was qualified as an expert, and also that his testimony rested on an adequate factual foundation:

> Beale's own perceptions at the Mulholland farm provided an ample basis for the conclusion that a defective milking machine caused the mastitis in the plaintiffs' herd by making the cows more susceptible to infection. As we have noted, Beale observed a complete milking of the Mulholland herd on his first visit

> to the farm. He noticed that a number of the cows had sore teat ends and mastitis. Beale also inspected the milking machinery in particular. [*Id*. at 413.]

Beale's testimony "did not rule out every other potential cause of mastitits[.]" *Craig*, 471 Mich at 89. "[H]is opinion was nevertheless admissible and sufficient to support a finding of causation." *Id*. at 90. The *Mulholland* Court explained:

> It is, of course *possible,* as the defendants suggested throughout the trial, that the true or more immediate cause of the mastitis was improper bedding, unsanitary stalls, or even mud in the barnyard. Neither Beale's own perceptions nor those made known to him at or before trial would allow this expert to rule out these possibilities. Nevertheless, we do not find the greater wisdom in a rule which would *require* an evidentiary basis of this sort. To the extent that they are credible, the absence of an evidentiary basis upon which an expert may rule out other potential causes may reduce the credibility of the expert. To the extent that other potential causes are substantiated by the evidence of record, they may also support a verdict of comparative negligence. However, to require for each expert an evidentiary basis sufficient to negate all of the possible causes which might be asserted by opposing counsel would virtually eliminate expert testimony. We require only expertise of experts, not omniscience. In our view, it is sufficient if the expert has an evidentiary basis for his own conclusions. See, generally, 7 Wigmore, Evidence (Chadbourn rev.), § 1922, pp. 26-29.
>
> Here, the expert provided an ample basis in his own perceptions for his testimony as to the cause of mastitis in the Mulholland herd. We do not find a lack of evidentiary basis to be an adequate alternative ground upon which to uphold the ruling of the trial court. [*Mulholland*, 432 Mich at 413-414.]

Here, the jury was presented with two competing theories of causation: the mechanical pressure/ischemia explanation, and defendants' claim that PCH-2 doomed Markell to suffer the neurologic abnormalities she exhibits. Plaintiffs' theory rested on an evidentiary foundation: Markell's large size, the electronic fetal monitor evidence of hyperstimulation and decelerations, the difficult delivery, Markell's brain bleeds, her low Apgar score, her neurologic problems at delivery, and the radiologic findings which, according to plaintiffs' radiology expert, were consistent with ischemic brain injury. In other words, plaintiffs presented evidence illustrating a logical sequence of cause and effect. Unlike the plaintiffs in *Skinner*, who lacked any factual support connecting the switch with the mechanism of the decedent's death, plaintiffs here marshaled evidence from the medical records from which a jury could reasonably conclude that Markell sustained an ischemic injury to the brain. Even Dr. Milunsky admitted that "a child can be injured by being battered against the wall of the pelvis," and that the clinical presentation of PCH-2 shares "similar features" with perinatal depression due to birth trauma. Thus, plaintiffs' proximate cause analysis was plausible and nonspeculative.

Moreover, plaintiffs cast some doubt on the credibility of defendants' experts' conclusion that PCH-2 completely explained Markell's problems. Plaintiffs questioning highlighted that Markell's condition differed from that of the children described in the PCH-2 articles relied upon by defendants' experts. She had lived to an age almost unheard of in the articles, had some

control of her motor functions, and her head initially grew at a normal rate rather than becoming progressively smaller in comparison to her peers. In other words, plaintiffs' experts stressed that the defense had conflated the *laboratory* diagnosis of PCH-2 with an immutable *clinical* presentation.

Given the potential weaknesses in Dr. Milunsky's claim that PCH-2 fully explained Markell's condition, Dr. Milunsky's causation theory was subject to disbelief by the jury. And even absent facts that seemed to distinguish Markell from the PCH-2 children described by Dr. Milunsky, the jury was entitled to reject defendants' experts' opinions. A jury may disregard testimony that, in the words of Justice Cooley, "probably ought to have satisfied any one. . . ." *Woodin v Durfee*, 46 Mich 424, 427; 9 NW 457 (1881). As the Supreme Court expressed in *Mulholland*, requiring plaintiffs to negate all other possible causes of injury "would virtually eliminate expert testimony." *Mulholland*, 432 Mich at 414.

In summary, viewed in the light most favorable to plaintiffs, Drs. Gabriel, Crawford and Soffer neither ignored nor discounted that Markell had a genetic disorder. Plaintiffs' experts disagreed that this abnormality proximately caused her profound neurological disabilities. Because the record evidence supplied a basis for this disagreement, Judge Nichols did not err by denying defendants' motion for judgment notwithstanding the verdict.

V. EXCLUSION OF THE ACOG CRITERIA

Defendants argue that Judge Nichols denied them a fair trial and abused his discretion by excluding from evidence the ACOG criteria, which defendants contend would have "destroyed" plaintiffs' argument that Markell's PCH-related disabilities were aggravated by hypoxic ischemic encephalopathy. According to defendants, the ACOG criteria represent an "international consensus . . . based upon the best science available" of the clinical findings required to define an acute event during labor and delivery as a cause of cerebral palsy. Absent admission of evidence concerning the ACOG criteria, defendants complain, the jury was left unaware that the published standards would exclude birth trauma as a potential cause of Markell's cerebral palsy.

A. AN INTRODUCTION TO THE ACOG CRITERIA

In 2003, the American College of Obstetricians and Gynecologists (ACOG) published the report of its Task Force on Neonatal Encephalopathy and Cerebral Palsy (NECP). This 105-page document was intended "to collate and review the best scientific data available on the topic and to publish these findings." ACOG at xvii. The report sets forth "clearly delineated objective criteria to use when defining an acute intrapartum hypoxic event," and explains that an examination focused on four identified benchmarks must be conducted before a physician concludes that events during labor and delivery caused a baby's cerebral palsy:

> These criteria should be examined before a label of birth asphyxia or hypoxic-ischemic encephalopathy is written into the infant's case notes and given to the parents as a diagnosis. Accurately defining the relatively uncommon event of intrapartum asphyxia, with its uncommon sequelae of neonatal encephalopathy and cerebral palsy, will allow for better definitions of the possible nonhypoxic

causes of encephalopathy and cerebral palsy. Criticism of the management of labor should not be confused with cerebral palsy causation because the two often may not be linked. [*Id.* at xi.]

The report sets forth four "essential" criteria, and five additional criteria that "collectively suggest an intrapartum timing . . . but are nonspecific to asphyxia insults." *Id.* at xviii, 74. As to the nine total criteria, the report highlights the importance of blood gases:

> The nine criteria endorsed by the ACOG Task Force in Chapter 8 emphasize that analysis of peripartum blood gases is essential to prove that hypoxia was present around birth. For a causative link to be established, a severe metabolic acidosis must occur in sequence with early neonatal encephalopathy and a type of cerebral palsy that could have been caused by the hypoxia. Because intrapartum compromise can be simply a reflection of antenatal fetal pathology, known etiologies or strong associations with subsequent cerebral palsy should help to exclude primary intrapartum hypoxia as the likely cause. [*Id.* at xii.]

Before delving into the nine criteria, the NECP report describes various fetal and maternal conditions that may generate a risk of neonatal cerebral palsy, and reviews fetal heart monitoring and its impact on preventing adverse outcomes. At the outset of Chapter 6, the report notes that "[d]ozens of distinct genetic, metabolic, and anatomic factors may contribute to the etiology of neonatal encephalopathy." *Id.* at 63. Chapter 8 addresses the "criteria required to define an acute intrapartum hypoxic event as sufficient to cause cerebral palsy." *Id.* at 73. The report provides:

> Part 1.1 of the criteria presents four essential criteria that are necessary before an intrapartum hypoxic event can be considered as a cause of cerebral palsy. If any 1 of the 4 essential criteria is not met, this provides strong evidence that intrapartum hypoxia was not the cause of cerebral palsy. [*Id.*]

We repeat the four "essential" criteria here:

> 1. Evidence of a metabolic acidosis in fetal umbilical cord arterial blood obtained at delivery (pH <7 and base deficit ≥12 mmol/L)
>
> 2. Early onset of severe or moderate neonatal encephalopathy in infants born at 34 or more weeks of gestation
>
> 3. Cerebral palsy of the spastic quadriplegic or dyskinetic type
>
> 4. Exclusion of other identifiable etiologies, such as trauma, coagulation disorders, infectious conditions, or genetic disorders. [*Id.* at xviii, 74.]

The report examines each criterion in some detail. As to the metabolic acidosis requirement, the report makes no mention of substituting a venous umbilical blood gas result for an arterial pH. See *id.* at 74. Regarding the fourth criterion, the report instructs:

> A large proportion of cerebral palsy cases are associated with maternal and antenatal factors, such as preterm birth, intrauterine growth restriction, intrauterine infection, maternal or fetal coagulation disorders, multiple pregnancy, antepartum hemorrhage, breech presentation, and chromosomal or congenital abnormalities . . . . These causes must be considered and excluded before concluding intrapartum hypoxia is the cause of cerebral palsy. [*Id.* at 75.]

B. PROCEDURAL BACKGROUND

Plaintiffs filed a motion in limine seeking to prevent defendants from referencing the ACOG criteria during the trial, arguing initially that exclusion was an appropriate sanction for Beaumont's failure to obtain an umbilical arterial blood gas or to report the results of an arterial blood gas in Markell's medical record. Plaintiffs also urged that the criteria did not apply to the facts of this case. The trial court issued a lengthy opinion and order granting plaintiffs' in-limine motion, identifying two evidentiary bases for its ruling. First, the trial court ruled that because plaintiffs' causation theory involved ischemia due to trauma and not simply hypoxia, the ACOG criteria could not be reliably applied to the facts of the case:

> Under MRE 702, the Court must say the principles and methods are reliable and reliably applied. Here the Court cannot say that Defendants are reliably applying their four criteria to establish a sufficient hypoxic-ischemic event causing cerebral palsy because Defendants are unilaterally and deliberately, it appears to this Court, distorting Plaintiff[s'] theory in saying that it must be an hypoxic–ischemic event. Plaintiff[s'] theory is a combination of trauma and ischemia leading to minor Plaintiff's injuries and damages. This is very significant, because the Court held, as a matter of fact and law on September 7, 2011, that cerebral palsy can occur in the face of a multiple of factors -- not just those in ACOG, especially here where Plaintiff[s are] not arguing hypoxia alone.

Next, the trial court found that the unavailability of an arterial blood gas result rendered scientifically unreliable any attempted application of the criteria:

> In addition, and most significantly here, the Court cannot find Defendants' defense theory was reliably employed because the Court cannot conclude that Defendants' witnesses correctly applied the medical facts to the criteria. **The Court cannot find as a fact that arterial blood was tested (and thus used) and that there was no trauma.** [ACOG at] 74 left column **("must meet all four"). The Court finds conclusively that Defendants' own witnesses say there was no arterial blood gas tested and there was trauma. Defendants fail to establish, from the medical testimony, records and reports admitted at the hearings, all of which define this case from a medical perspective, that two of its four mandated criteria apply.** [Bold in original].

The court continued:

> For these reasons, the Court cannot conclude that Defendants' attempt to use this theory in order to discredit Plaintiff[s'] case is reliable or reliably applied.

> The court holds that the Defendants have failed, in particular, to carry their burden by a preponderance of the evidence under MRE 702 that the defense theory has been reliably applied.

The trial court then turned to a discussion of MRE 403, and found that the probative value of the criteria was "significantly outweighed" by the prejudicial effect:

> Employing the weighing process of MRE 403, the probative value of Defendants' defense stating Plaintiff[s] cannot prove an hypoxic-ischemic event based upon ACOG's four criteria is significantly outweighed by its prejudicial effect, confusion of the issues, misleading the jury, and considerations of undue delay and waste of time, where, as here, it misstates Plaintiff[s'] theory of the case and has been erroneously applied in methodology. It is undisputable that the criteria required by ACOG has not been established in this case. Specifically as to the first and fourth criteria, no arterial blood was tested and birth trauma exists. To allow testimony on Defendant[s'] theory here will unnecessarily confuse and mislead the jury and be a waste of time since the criteria has not established and has even been conceded as existing as to birth trauma by Defendant[s'] own witnesses. The probative value of the evidence is clearly substantially outweighed by the potential of prejudicial effect to Plaintiff[s].

The trial court concluded:

> Finally, the Court agrees in theory that the ACOG hypoxic-ischemic event defense could be critical to Defendants. But to allow it in view of its MRE 702 deficiencies as to reliability and its MRE 403 effects would be clearly inappropriate and an invitation to error on appeal which this Court is trying to avoid.

C. ANALYSIS

We review Judge Nichols's evidentiary rulings for an abuse of discretion. *People v Bragg*, 296 Mich App 433, 445; 824 NW2d 170 (2012). "A trial court abuses its discretion when its ruling falls outside the range of principled outcomes." *Id.*

Judge Nichols perceived that the ACOG criteria lacked applicability to the facts of this case for two reasons: no arterial blood sample was obtained, and neither trauma nor genetics could be ruled out as causative of Markell's injuries. He further concluded that admission of the criteria would confuse the jury. Although we partially disagree with Judge Nichols's reasoning, his decision falls within the range of principled outcomes, and we find no error meriting reversal.

Defendants sought to use the ACOG criteria to prove that an intrapartum hypoxic event could not have caused Markell's cerebral palsy because (1) the umbilical blood test results did not demonstrate metabolic acidosis, and (2) a genetic disorder had not been excluded as a cause

of her neurological infirmities.[21] By its plain terms, however, the NECP report mandates that physicians assessing whether perinatal events caused cerebral palsy take into account an *arterial* umbilical blood gas result. Defendants presented no evidence that the ACOG criteria may be reliably applied when only a *venous* umbilical blood sample is available. None of the defense experts claimed that the ACOG guidelines treated arterial and venous samples as interchangeable or that umbilical venous blood accurately reflects fetal acid-base status at the time of delivery. And given that an arterial umbilical blood gas is one of the touchstones of the ACOG rubric, we cannot fault Judge Nichols's conclusion that application of the ACOG standards would neither qualify as reliable nor as grounded in the case facts. Thus, Judge Nichols acted within his discretion in excluding opinion testimony premised on the ACOG criteria under MRE 703. Nor do we find that Judge Nichols abused his discretion in finding admission of the criteria confusing under MRE 403.

We do take issue with one aspect of Judge Nichols's reasoning. The NECP report additionally posits that before a physician concludes that an intrapartum hypoxic event caused cerebral palsy, both traumatic and genetic causes of cerebral palsy must be ruled out. In other words, the report instructs physicians that when either trauma or genetic abnormalities are present, intrapartum hypoxia cannot be considered to have caused a child's neurologic injuries. Plaintiffs contended (and Judge Nichols agreed) that because (1) their experts premised their causation theories on ischemia rather than hypoxia, and (2) trauma cannot be ruled out as causative, the criteria lack applicability. We reject this logic. The term "trauma" is not specifically defined in the ACOG document. However, it is used along with other terms ("coagulation disorders, infectious conditions, or genetic disorders") describing *maternal* conditions or conditions unrelated to the birth process. The "trauma" alleged by plaintiffs occurred intrapartum and, according to plaintiffs, resulted in ischemia. The claimed ischemia, in turn, disrupted the supply of oxygen to involved brain tissue. Accordingly, had an arterial umbilical blood gas been obtained, the ACOG criteria would have been fully applicable.

Despite partially premising his ruling on a specious ground, Judge Nichols accurately assessed that expert testimony premised on the ACOG criteria would not "'serve to give the trier of fact a better understanding of the evidence or to assist in determining a fact in issue.'" *Craig*, 471 Mich at 79, quoting *People v Beckley*, 434 Mich 691, 711; 456 NW2d 391 (1990) (opinion of BRICKLEY, J.). In other words, the ACOG criteria would not fulfill the relevancy requirement incorporated within MRE 702. "[E]ven proposed expert testimony that is offered by a qualified expert and based on reliable scientific data and methods may be properly excluded if it is not relevant to the facts of the case[.]" *People v Kowalski*, 492 Mich 106, 122; 821 NW2d 14 (2012). Thus we find no fault with Judge Nichols's ruling that without the data necessary to perform the ACOG assessment, the criteria were inadmissible under MRE 403.

[21] Markell's condition fulfilled the remaining two criteria: she experienced an early onset of severe or moderate neonatal encephalopathy, and had been diagnosed with cerebral palsy of the quadriplegic or dyskinetic type.

In summary, because exclusion of the ACOG was a reasonable and principled outcome given that the criteria could not reliably be applied to Markell, the trial court's decision did not amount to an abuse of discretion.

VI. EXCLUSION OF THE PREVENTIONGENETICS REPORT

Defendants next assert that the trial court erred by refusing to allow them to place in evidence the PreventionGenetics report. According to defendants, the PreventionGenetics report constituted the "core of Defendants' proximate cause defense" because it confirmed with 99.9% certainty that Markell carries the gene defect that causes PCH-2. Although Judge Nichols ruled that the PreventionGenetics report satisfied the conditions precedent to admission as an exhibit, defendants claim that he inexplicably reversed this ruling during the trial, disallowed the report's use, and proceeded to denigrate the importance of the report in the jury's presence.

Plaintiffs' response to this argument is simple: the report was placed in evidence, went to the jury, and defendants' argument lacks any factual foundation. At oral argument, we explored with counsel a question we thought quite basic: did the report go to the jury, or did it not? Not surprisingly, the parties vehemently disagreed.

Thus, we are in a difficult position, as the foundation for defendants' evidentiary argument—that a key piece of evidence was improperly kept from the jury—may or may not be accurate. Based on our study of the record, we have concluded that the evidence probably was given to the jury, and that even if the report itself did not make it to the jury room, its substance was well-presented throughout the trial. The path to our decision has required us to dig deeply into the trial court record. We begin with a detailed review of the facts from which we have drawn our conclusions.

A. PROCEDURAL BACKGROUND

Pursuant to the trial court's order, in November 2010, two test tubes of Markell's blood were drawn at the Detroit Medical Center for further genetic testing.[22] The blood eventually made its way to the PreventionGenetics laboratory in Wisconsin, where a gene sequencing test proved positive for PCH-2. Plaintiffs moved in limine to exclude the PreventionGenetics report based on alleged failures of defendants to (1) establish the chain of custody of the blood, and (2) "authenticate" the test results. Plaintiffs asserted that authentication could be accomplished only "from the testimony of every witness that handled the unsealed and non-tamper proof blood, from the time it was allegedly drawn from Markell . . . at DMC Children's Hospital by a phlebotomist named Nicole Fuller in Detroit, Michigan, to then allegedly being sent to Spokane, Washington, to Salt Lake City, Utah, and/or to Marshfield, Wisconsin."

[22] All genetic testing previously performed at Beaumont had proven negative for an identifiable genetic disorder. When one of defendants' experts suggested testing Markell for the genetic defect giving rising to PCH-2, the trial court ordered additional testing.

At a hearing held on September 7, 2011, plaintiffs' counsel, Geoffrey Fieger, attempted to withdraw his motion to preclude the PreventionGenetics report, but the trial court expressed concern regarding "the nature of [the] evidence. Whether an item is what it purports to be. Authentication." Joseph Babiarz, one of defendants' attorneys, explained that the blood was obtained at the DMC, both tubes were sent to Signature Genomics, a laboratory in Washington. Signature Genomics took "a couple of drops of the blood out of one of the tubes" and sent the rest to ARUP "to do a microarray," which was "normal."[23]

While those blood tests were in progress, Mr. Babiarz learned from one of his experts that only two labs in the United States could test for the specific gene defect suspected by defendants' experts. PreventionGenetics was one of them. Mr. Babiarz averred that Signature Genomics transferred the blood to PreventionGenetics, where it tested positive for TSEN54, the genetic defect consistent with PCH-2.

Following this recitation, Mr. Fieger complained that the PreventionGenetics testing "has never been subjected to any testing" and was not peer reviewed. The trial court inquired, "Why aren't you moving to have it struck for reliability?" Mr. Fieger responded: "Because I think I want to do it at trial, but I don't want to take any more time." After more discussion on the record, the trial court stated, "both the questions regarding chain and reliability were withdrawn but reserved."

The parties reconvened on September 19, 2011. Judge Nichols introduced that day's hearing by explaining that the court would consider the chain of custody of the blood used for the PreventionGenetics testing, and would "examine the reliability of the genetics testing that was done . . . both in terms of the test and in terms of its application." The court invited defendants "to make a record regarding chain of custody."

Mr. Babiarz summarized affidavits and depositions filed with the court attesting to the chain of custody. Kelly Sartor, Supervisor of DMC University Labs, testified and averred that when Markell's blood was drawn at the DMC on November 19, 2010, the phlebotomist placed handwritten labels stating Markell's name and birth date on two tubes of blood. Joyce Simmons, a DMC employee, brought the two tubes of blood to Sartor. Sartor packaged the two tubes in a sealed bag and placed them in a "secure fridge." Sartor filled out a Signature Genomics request for genetic testing, and on November 22, 2010, packed the blood and the request in a container labeled with a Federal Express tag and placed the package in a FedEx drop-off bin at the DMC.

Dr. Bessem Bejjani, the chief medical officer for Signature Genomics in Spokane, Washington, averred that Signature Genomics received intact the FedEx package sent by Sartor. DNA was extracted and the blood was maintained under refrigeration at Signature Genomics. On December 10, 2010, Mr. Babiarz instructed Signature Genomics to send the blood to PreventionGenetics. Dr. Marwan Tayeh, a clinical molecular geneticist at PreventionGenetics, received the FedEx package from Signature Genomics on December 14, 2010. It contained one tube of blood labeled with Markell's name and birth date. Mr. Babiarz asserted that the

[23] "ARUP" refers to a lab in Utah. The microarray study it performed is inconsequential.

affidavits and deposition testimony substantiating these facts sufficed to satisfy any chain of custody concerns.

Mr. Fieger complained that defendants had failed to produce every person who had touched the blood during its travels, and pointed out that one of the tests done at Signature Genomics reported that the blood contained male chromosomes. Judge Nichols then ruled, "[E]very item that plaintiff raises in this regard goes not to admissibility but to weight. Plaintiff must let the jury decide that. The Court's opinions on whether or not and what the jury will do with it is irrelevant." Judge Nichols continued: "At this point, the matter goes forward and the, the chain of custody has been reasonably satisfied as far as this Court is concerned and it is now incumbent [upon] the parties to address the question of weight which they will do during the trial." Although this ruling seems relatively straightforward, it disintegrated into many pieces at the trial.

The court then turned its attention to whether the gene sequencing test qualified as reliable. Mr. Fieger asserted that he intended to challenge both the "scientific reliability" of the test and "the scientific basis of the conclusions" offered in the report, which he characterized as "if you have these genes you have this disease." Judge Nichols advised Mr. Babiarz:

> You need to satisfy the Court by a preponderance of the evidence that . . . the tests done here is [sic] not novel and invented by Marwan Tayeh, number one . . . . And number two, that the tests for genetic sequence allows the argument to the jury that there is a diagnostic human disease here that you can argue.

The court then took telephone testimony from Dr. Tayeh, who testified that the gene sequencing study he performed was the "gold standard method" and had been in existence "for a long time." He asserted that DNA sequencing is reliable and has been subjected to peer-review testing. Dr. Tayeh further claimed that "[w]hat we found is consistent with the diagnosis" of PCH. During deposition testimony later read to the jury, Dr. Tayeh displayed a test tube with three labels, each bearing Markell's name, and stated that the blood used to conduct the genetic testing came from that tube. PreventionGenetics also kept a log listing the names of every person who had received and handled the blood.

On September 20, 2011, the parties again gathered in Judge Nichols's courtroom to argue about the trial exhibits. During the arguments, Judge Nichols and Mr. Babiarz engaged in the following exchange regarding plaintiffs' chain of custody challenge to the admissibility of the PreventionGenetics report:

> *Mr. Babiarz*: Your Honor, since the Court has already ruled that the chain of custody is not relevant what's the --
>
> *The Court*: Hold on, hold on --
>
> *Mr. Fieger*: No.
>
> *The Court*: -- Mr. Babiarz, I don't like you misstating things I say.
>
> *Mr. Babiarz*: I'm sorry if I did, your Honor.

The Court: And I don't like it if Mr. Fieger does too, but I seem to hear it more from you. And you misstate what I say.

Mr. Babiarz: Okay, maybe I did, your Honor.

The Court: I didn't say they weren't relevant.

Mr. Babiarz: Well yesterday, your Honor, you ruled that the chain of custody that he had failed to meet his burden attacking our chain of custody. That was my understanding of your ruling.

The Court: I, I said that -- I'm saying his arguments go to an argument to be made before the jury. Can they -- can they trust this chain or not. It's not me that can make that decision, that's what I'm saying.

At the end of that day, Judge Nichols issued a four-page opinion and order titled: "Opinion and Order Denying Plaintiff's Objections to Defendants' Genetic Testing." In his opinion and order, Judge Nichols addressed only "the Court's findings on the reliability of that testing." After summarizing the PreventionGenetics report and Dr. Tayeh's testimony, Judge Nichols concluded in relevant part:

> Having considered the arguments, the testimony of Tayeh, and referenced publications, the Court finds that the genetic testing methodology is reliable within the scientific community and is sufficiently based on discoveries of mutations that identify a genetic defect consistent with [PCH]. While Plaintiff argues no article exists establishing that a genetic defect in TSEN54 causes [PCH], the very title of *Budde* states just that -- mutations cause cerebellar hypoplasia. Moreover, while the articles use adjectives like "associated", "corresponds" and "is responsible for most patients with [PCH-2]", Tayeh testified that more probable [sic] than not, and based on the gene being reported several times with patients having [PCH], the genetic defect is the cause of Plaintiff's [PCH].
>
> To conclude, the Court finds the genetic testing and application in this case reliable under MRE 702 and existing law.

During the presentation of plaintiffs' proofs at trial, defendants frequently referenced the PreventionGenetics report. Dr. Soffer admitted that Markell tested positive for PCH-2. Dr. Gabriel acknowledged that PreventionGenetics "confirmed by DNA testing" that Markell has PCH. Kimberly VanSlembrouck, too, was questioned regarding her knowledge of the genetic testing results.

Although defendants freely referenced the report when cross-examining plaintiffs' witnesses, confusion regarding the report's admissibility surfaced during Mr. Babiarz's examination of the first defense witness, Yoram Sorokin, M.D., on the tenth day of the trial. Despite the trial court's rulings that (1) the report was scientifically reliable and admissible under MRE 702, and (2) whether the chain of custody had been satisfied would be for the jury, Mr. Fieger objected when Mr. Babiarz attempted to question Dr. Sorokin about it:

Q. Doctor, have you seen the report from PreventionGenetics?

A. Yes.

Q. Would that support your conclusion?

Mr. Fieger: Objection. That's not in evidence.

The Court: Sustained.

Mr. Babiarz: Your Honor, it's been admitted as an exhibit I thought.

Mr. Fieger: It has not. There's --

The Court: Sustained.

Mr. Fieger: Thank you.

The Court: The ruling necessarily been as to its admission or not, [sic] the ruling is as to his ability to do -- testify to that topic matter.

BY MR. BABIARZ:

Q. Doctor, if this child has been found to have a genetic disease would that assist your, your -- confirm your belief that labor and delivery did not cause her harm?

A. It will not change . . . my opinion.

Q. Would it support your opinion?

A. Yes.

At the close of Dr. Sorokin's testimony and after the jury had been excused for the day, Mr. Fieger raised the chain of custody with the trial court:

Mr. Fieger: Okay. I foresee a problem, your Honor, arising tomorrow. I want to alert the Court, I don't know if you want to deal with it now or tomorrow morning? But Doctor Milunsky is a geneticist and there has been no chain of custody evidence here.

And your order is quite clear and you can't start putting in this evidence without having a chain of custody, he just doesn't get it miraculously in.

The parties then embarked on a lengthy discussion (19 pages of transcript) regarding the chain of custody issue.

Mr. Fieger argued that Judge Nichols's original order for the genetic testing required that the DMC accomplish the testing. According to Mr. Fieger, Mr. Babiarz "ignored your order and

started sending blood all over the world. And so tests got conducted in Washington, in Salt Lake City, in Washington again and then in Wisconsin." Mr. Fieger continued: "[W]e probably [would] not have a chain of custody problem if your order had been followed. But instead now and you've ordered that I'm entitled to contest the chain of custody."

Mr. Babiarz responded in relevant part:

> Your Honor, we had a hearing a couple weeks ago on the chain of custody and you, you took testimony from Doctor Tayeh and some deposition testimony and affidavits were brought to your attention which clearly established a clear chain of custody.
>
> You found that the chain of custody he be allowed to attack it, it went to weight not admissibility, that was the Court's finding. He can attack the chain all he wants, but we'll establish without any doubt that there's a good secure chain of custody pursuant to Michigan law.
>
> * * *
>
> . . . [Y]ou made a ruling that you found the chain of custody to be sufficient under Michigan law. It went to weight not admissibility and Mr. Fieger could attack it.
>
> So here's what we're left with. You found that the, the admissibility of the document was in. It was admissible but the weight of it was in question and you found it was reliable.
>
> So, therefore, under Michigan law under 901 it meets all the criteria for inclusion as an exhibit.

Judge Nichols seemed to have difficulty recalling his ruling, and indicated: "I speak through a written order." Mr. Babiarz offered to "bring in an order that conforms with what you said from the bench[.]" Judge Nichols stated, "Well I'm not going to sign it tomorrow morning in view of this objection." After further argument, the court stated that in making its prior ruling, "I did not say that it was authenticated." The court continued, "[B]ut if a witness sits up here and testifies that, that it was marked and you know they're reasonably satisfied that it is what came from DMC then they're going to satisfy it. You can argue all you want to the jury."

Mr. Fieger continued to argue that no chain of custody could be established. Mr. Babiarz pointed out that Dr. Milunsky was scheduled to testify the next day, and that was the only day that he could appear. And defendants could not establish the chain of custody prior to Dr. Milunsky's testimony, Mr. Babiarz asserted. The Court ruled, "I mean it's conditional admissibility. . . . [I]t's not a burden that's impossible to overcome, but there's got to be some reasonable satisfaction that this DMC sample is the one that ended up where it ended up." The issue closed for the day with Judge Nichols's admonition:

> Okay, so we're not done yet. So we're going to proceed tomorrow and do remind me, I'll tell the jurors this is conditional admissibility depending upon

whether or not chain of custody has been established, but which is also a question they're going to answer to their satisfaction.

The next morning, the parties again took up the chain of custody issue. The judge stated: "But you know it's not -- folks, we're elevating this thing to way out of proportion. Chain, chain of custody is simply the jurors[']satisfaction that the blood sample started at DMC. It's a blood sample in Wisconsin." Mr. Fieger requested that the court instruct the jury that the PreventionGenetics report was "not in evidence yet." The Court evidently agreed, stating "[Y]ou've not asked for a formal admission of the sample into evidence and it's not in evidence."[24] Mr. Babiarz then moved for the introduction of "the PreventionGenetics exhibit." Mr. Fieger objected, asserting: "He wants to put it in without having to put in the chain of custody." The following colloquy ensued:

> *Mr. Babiarz*: Your Honor, you ruled that the chain of custody had been satisfied and the cases we cited in a civil case you don't have to bring in every person that handled it. In the cases we cited --
>
> *The Court*: I agree.
>
> *Mr. Babiarz*: -- say you can establish chain of custody by direct, indirect and circumstantial evidence.
>
> *The Court*: You know what--you know whether I do it or not I'm still going to let the jurors know that they'll need to be reasonably satisfied because it's their question, not the Court's. Okay?
>
> *Mr. Babiarz*: Fair enough, Your Honor.
>
> *The Court*: So I'm going to let them know one way or another. Again, we're making . . . a mountain out of a mole hill.

During Dr. Milunsky's testimony, defendants displayed the PreventionGenetics report to the jury. Mr. Fieger asked for an instruction. The court complied:

> Ladies and gentlemen, let me--let me bring this to your attention. Facts or data upon which an expert bases his opinion normally must be in evidence. The Court can in its discretion allow . . . proposed testimony with a condition that the evidence will be admitted later.
>
> Previously at a hearing that you need not be concerned with I made the decision to allow it for that hearing. That, however, is not binding on you in

[24] Here and elsewhere in the record, the Judge seemed confused about whether defendants intended or needed to introduce the actual blood "sample," or the report of the testing.

terms of whether you believe it is what defendant says it is, that is the blood sample of Markell.

In other words, I'm admitting this testimony conditionally based on this sample here, but it's up to at least six of you to decide it is the blood sample of plaintiff Markell, okay. Got that?

When testimony concluded on October 6, Mr. Babiarz's co-counsel again brought up the chain of custody issue:

Ms. Andreou: Actually I have -- tomorrow, your Honor, we have Doctor Quinn[t] but what I would like to give Mr. Fieger a heads up on is that as it relates to chain of custody if there's still a question in the Court's mind we do have the deposition of --

The Court: Okay. What do you mean if there's a question in the Court's mind?

Ms. Andreou: Well if we need further evidence on that.

The Court: Folks, I'm not the one you have to convince.

Ms. Andreou: Okay.

The Court: You have six people here that will need to decide. *I'll say it one more time and I'm not going to say it again, that the sample blood from DMC was what ended up in Wisconsin. Okay*.

Now if Mr. Fieger wants to keep poking holes at it and poking holes at it then you know maybe you go through the chain, you show it. I can't tell you how to practice. [Emphasis added].

Subsequently, defendants read into the record the deposition testimonies of Sartor, Bejjani, and Tayeh.

When questioning of defendants' final witness concluded, the following colloquy ensued:

The Court: Does defendant have any other witnesses?

Mr. Babiarz: No, your Honor. But . . . before we rest we would like to offer our exhibits and identify them for the jury if we may.

Mr. Fieger: They've already been--they've been accepted into evidence, Judge, way before this trial started.

Mr. Babiarz: Okay, I won't rattle them off then your Honor.

The Court: Okay. No other witnesses?

Mr. Babiarz: Yeah, and . . . I just want to make clear we are offering the PreventionGenetics report, your Honor, as an exhibit.

* * *

The Court: Mr. Fieger, do you have any rebuttal?

Mr. Fieger: No, your Honor.

The Court: Ladies and gentlemen, we're ready for closing arguments tomorrow morning. The game plan I think will be like this, we'll start--they can take a total together up to three hours. Not apiece, they'll take an hour and a half most, okay. It doesn't mean they have to. I keep telling them that, but I keep telling them that I'm going to tell you, remind you that what they say is not evidence. They're going to marshal the facts according to the way they see them as it pertains to their clients, okay.

But the evidence comes from what you've heard here on the witness stand and the exhibits that have been offered and received. So hold them to that test.

During closing argument, Mr. Babiarz referenced the chain of custody issue:

Let's talk a little bit about the chain of custody. You heard -- and it's a little bit boring to have depositions read to you, but -- and Mr. Fieger said we were boring the jury. Well, the reason we had to do that is because he was questioning the chain of custody and those long and boring questions were the ones being asked by his partner which he refused to read. But, let's look at the chain of custody. October second the Court orders a blood draw of Markell Vanslembrouck [sic]. November 19th, 2010, blood drawn at DMC Nicole Fuller. November 22nd, blood sent from DMC to Signature Genomics (ph). You heard the deposition of Ms. Sartor (ph) with FedEx tracking number 796477091951. November 23rd, blood received by Signature Genomics from DMC per the deposition of Dr. Bejoini (ph), exact same tracking number. December 13th, blood sent from Signature Genomics in Spokane to Prevention Genetics in Wisconsin per the deposition of Dr. Bejoini [sic], FedEx tracking number received, same tracking number -- or sent rather with this tracking number. Received by Prevention Genetics from Signature Genomics per the deposition of Dr. Tayeh (ph) with the exact same FedEx tracking number. And, then on January 24th after they complete their testing what do they report? Molecular genetics report by Prevention Genetics, [PCH], subtype two and four, TSEN-54 gene sequencing positive. There was never any break in the chain of custody. And, we are obligated to read those depositions to you to link that up.

Again, if Mr. Fieger questioned the chain of custody, why didn't he have the blood tested. Why didn't he have the parents tested? He didn't do it.

This excerpt tends to indicate that the report was, in fact, admitted in evidence.[25]

Nevertheless, defendants filed a motion for JNOV, contending that the trial court erred by excluding the report. During oral argument regarding that motion, plaintiffs' counsel (Mr. Beam) and the trial court questioned Mr. Kamenec, representing defendants, regarding whether he contended that the report had not actually gone to the jury. Mr. Kamenec responded, "I don't know if it went to the jury. It was never admitted." Mr. Beam represented: "It went to the . . . jury, Your Honor, as far . . . as I know. And if it didn't go to the jury, that was . . . nobody's fault but defense counsel." After more argument, the judge stated: "I have no doubt that it went to the jury."

B. ANALYSIS

Defendants premise their legal argument on their claim that Judge Nichols refused to admit the PreventionGenetics report in evidence. Although the numerous and protracted arguments regarding the report reflect some inconsistency and lack of clarity on Judge Nichols's part, he found that the jury was provided with the report and the record tends to support this finding.

Plaintiffs' "chain of custody" challenge to the report rested on a factually unsupported allegation that the blood tested at PreventionGenetics was not Markell's blood. Defendants argued that any gaps in the chain of custody of Markell's blood from the time it was drawn until the time it allegedly arrived in Wisconsin went to the weight of the evidence, not its admissibility. Assuming that plaintiffs' chain of custody argument had any merit whatsoever, defendants are correct. Moreover, the trial court agreed with defendants.

Plaintiffs' chain of custody argument boiled down to an assertion that defendants never properly authenticated the PreventionGenetics report. MRE 901 sets out the "requirement of authentication or identification" and governs our analysis of this issue:

> **(a) General Provision.** The requirement of authentication or identification as a condition precedent to admissibility is satisfied by evidence sufficient to support a finding that the matter in question is what its proponent claims.

[25] And even assuming that it was not, the issue was squarely placed before the jury throughout the trial. Mr. Babiarz summarized during his closing argument:

> To their credit though they all agree there's a genetic defect of the brain and they all agree it occurred in the first or second trimester of pregnancy, they just won't acknowledge what it is or what the significance of it [is]. They won't admit this child has [PCH] *even though it's been tested with DNA certainty*. [Emphasis added].

> **(b) Illustrations.** By way of illustration only, and not by way of limitation, the following are examples of authentication or identification conforming with the requirements of this rule:
>
> (1) *Testimony of Witness With Knowledge*. Testimony that a matter is what it is claimed to be. . . .

"Evidence sufficient to support a finding means evidence upon which a reasonable jury could find by a preponderance of the evidence an item to be what the proponent claims it is." 2 McCormick, Evidence (7th ed), § 212, p 6. The judge has a "limited screening role" in making this determination. *Id.* "If a witness has personal knowledge and gives direct testimony on the matter, this is sufficient." *Id.* at 6-7.

Here, the question confronting Judge Nichols was whether PreventionGenetics tested Markell's blood or that of someone else. Dr. Tayeh testified that PreventionGenetics tested a blood sample contained in a tube labeled with Markell's name. That evidence sufficed to satisfy MRE 901. Notably, plaintiffs identified no evidence supporting a gap in the chain of the blood's custody along the path it traveled to PreventionGenetics. Assuming for the sake of argument that the side trip to Signature Genomics introduced some uncertainty regarding the integrity of the blood sample, the trial court correctly allowed the jury to consider the significance of this detour.

"Once a proper foundation has been established, any deficiencies in the chain of custody go to the weight afforded to the evidence, rather than its admissibility." *People v White*, 208 Mich App 126, 133; 527 NW2d 34 (1994). Plaintiffs' unsubstantiated claims that the chain of custody had been broken did not preclude the report's admission. Rather, plaintiffs' fanciful concern that somehow other blood was substituted for that of Markell affected only the weight of the evidence. *Id.* And although Judge Nichols perhaps could have been more consistent, his core ruling—that it was for the jury to decide whether to credit that the blood sampled was that of Markell—remained unchanged.[26] The record further indicates that on more than one

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[26] Moreover, we believe that the chain-of-custody argument was legally baseless, and that Judge Nichols should have ended this controversy well before trial. Defendants sought to introduce the PreventionGenetics *report*, not the blood sample itself. The report was clearly admissible under MRE 803(6), which provides an exception to the hearsay rule for records of regularly conducted activity:

> A memorandum, report, record, or data compilation, in any form, of acts, transactions, occurrences, events, conditions, opinions, or diagnoses made at or near the time by, or from information transmitted by, a person with knowledge, if kept in the course of a regularly conducted business activity, and if it was the regular practice of that business activity to make the memorandum, report, record, or data compilation, all as shown by the testimony of the custodian or other qualified witness, *unless the source of information or the method or circumstances of preparation indicate lack of trustworthiness.* The term "business" as used in this paragraph includes business, institution, association,

occasion, Judge Nichols stated that the report satisfied the standard for admissibility with the caveat that plaintiffs remained at liberty to attack the chain of custody.

Nor do we perceive that Judge Nichols "denigrated" the report in the jury's presence. While we agree that Judge Nichols should have ruled more forcefully at the outset that the physical document containing the report would be admitted, the jury was well aware of its contents. We find no error regarding the PreventionGenetics report warranting reversal.

VI. THE ARGUMENT OF PLAINTIFFS' COUNSEL

Defendants assert that Mr. Fieger's misconduct "permeated this trial, and overshadowed the legitimate defense argued to the jury." According to defendants, Mr. Fieger employed his "signature trial strategy" of accusing defendants and their witnesses of lying, conspiring, covering up, and fabricating evidence. Mr. Fieger's misconduct reached its zenith, defendants insist, when he urged the jurors during closing argument "not to kill Markell."

The following framework guides our evaluation of this argument:

> When reviewing an appeal asserting improper conduct of an attorney, the appellate court should first determine whether or not the claimed error was in fact error and, if so, whether it was harmless. If the claimed error was not harmless, the court must then ask if the error was properly preserved by objection and request for instruction or motion for mistrial. If the error is so preserved, then there is a right to appellate review; if not, the court must still make one further inquiry. It must decide whether a new trial should nevertheless be ordered because what occurred may have caused the result or played too large a part and may have denied a party a fair trial. If the court cannot say that the result was not affected, then a new trial may be granted. Tainted verdicts need not be allowed to

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> profession, occupation, and calling of every kind, whether or not conducted for profit. [Emphasis added.]

No evidence supported that the "circumstances of preparation" of the report indicated a lack of trustworthiness. Before trial, defendants established that the report was created and kept in the regular course of business. This foundation sufficed for admission of the document. Not a shred of evidence or shadow of reasonable inference supported that the blood tested did not come from Markell. Accordingly, the report was admissible under MRE 803(6). See *Merrow v Bofferding*, 458 Mich 617, 626-627; 581 NW2d 696 (1998).

Although the issue has not been considered in Michigan, we are of the view that "chain of custody" arguments such as the one advanced by plaintiffs apply only to physical evidence or to "time-sensitive tests" taken when an event, arrest, or accident occurs, such that the result "cannot be replicated outside that time frame." *Ex parte Dep't of Health & Environmental Control v Doe*, 350 SC 243, 248-249; 565 SE2d 293 (2002). No chain of custody analysis was warranted here, as retesting could have readily confirmed the accuracy of the PreventionGenetics report, adding to its trustworthiness.

stand simply because a lawyer or judge or both failed to protect the interests of the prejudiced party by timely action. [*Reetz v Kinsman Marine Transit Co*, 416 Mich 97, 102-103; 330 NW2d 638 (1982).]

A lawyer's comments will usually not be cause for reversal unless they indicate a deliberate course of conduct aimed at preventing a fair and impartial trial or where counsel's remarks were such as to deflect the jury's attention from the issues involved and had a controlling influence on the verdict. [*Ellsworth*, 236 Mich App at 191-192.]

A. THE TRIAL

Before we describe the episodes of claimed misconduct, we offer the following overview. The record in this case reflects that counsel for both sides argued with each other incessantly, delayed the trial by making long-winded and legally meritless objections, interjected snide, sarcastic remarks at every opportunity, and otherwise acted unprofessionally on a daily basis. Neither came close to modeling acceptable courtroom behavior. Judge Nichols's frustration with the behavior of the lawyers emerged on several occasions. The following excerpts from just one trial day (September 27) illustrate the combative atmosphere that permeated these proceedings:

Mr. Fieger: You told us earlier there were no abnormal. Here's two abnormal and then there's a third one. A three hour glucose tolerance test was done. It had one abnormal value, did you write that?

A. I did write that.

Q. Okay, now --

A. Well, like I explained the one hour -- the three hour with one abnormal does not make a patient a diabetic.

Q. And, the other two were just one number below abnormal, weren't they?

A. It was normal test.

Q. Please it will be much easier. I'm just asking. The other two that [you] say were normal was one number below abnormal, wasn't it?

A. It was one below the upper limit of the normal.

Q. Right. So, if it had been one higher it would have been abnormal, the other two right?

A. Yes.

Mr. Babiarz: Your Honor, objection. If wishes were horses, beggars would ride. The test was normal.

Mr. Fieger: What does this --

The Court: What is your objection? I would appreciate not little phrases of Dickens of whoever is, but the, you know --

Mr. Babiarz: He's arguing with the witness, that's my objection.

The Court: Well, they went through different wording processes and, if anything Mr. Fieger, it's not necessary that you summarize his statement; likewise with you.

* * *

Q. She was actually -- they used an ultrasound on her didn't they on those pre-hospital admissions?

A. I believe they did just to check the position of the baby.

Q. And, the other -- if you want to you can check the size of the baby can't you?

A. Yes.

Q. But, nobody did that apparently?

A. What happened --

Q. Yes or no, did anybody do that?

A. No.

Q. Okay. I didn't ask for excuses, I'm just asking for facts.

Mr. Babiarz: Your Honor, that's argumentative --

The Court: I agree. That will be struck from the record.

Mr. Babiarz: Move to strike.

The Court: I agree.

Mr. Fieger: We'll get -- I'll get -- I'm not trying to be argumentative with you, I'm just trying to get you to answer my questions.

Mr. Babiarz: Could have fooled me, Your Honor, that was argumentative.

The Court: Both comments will be struck. Just ask the question please.

* * *

Q. And then we -- she comes into the hospital on the first of December, right?

A. Yes.

Q. Now, apparently there was another patient there by the name of Vergelt, you know that right?

Mr. Babiarz: Your Honor, I'm going to object because the records will show that Ms. Vergelt wasn't even in the hospital --

Mr. Fieger: These aren't objections. He is just testifying. He has obstructed this testimony Your Honor, for the last hour.

Mr. Babiarz: Your Honor, this is a mischaracterization. He said and there was another patient there. There was no another [sic] patient there, and that's a fact and he's mischaracterizing the testimony.

Mr. Fieger: He can't testify.

The Court: Ladies and gentlemen I'm beginning to think we need a time out and I'm almost thinking about sending you home today and coming back tomorrow if this continues. I will -- it's not fair to you and with the inherent authority I have, there's no direct authority on this. I believe I can give these gentlemen a timeout and we can come back tomorrow.

Gentlemen if this continues that will happen. That's my word to you. You're objection's overruled. It's a part of the testimony.

Mr. Fieger: Thank you, Your Honor.[27]

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[27] Before trial commenced, Messrs. Babiarz and Fieger had demonstrated hostility, intemperance, and plain rudeness on numerous occasions, particularly during the *Daubert* hearing. The trial court expressed its exasperation more than once. During a 2010 hearing regarding defendants' motion for genetic testing, Judge Nichols's had endured enough:

> *The Court*: By the way, Mr. Beam, both of you; I am going to command this lawsuit like a dictator because you two are misbehaving and so impolite with one another that I am going to run it like a dictator.
>
> My rule is law and when I tell you to jump you are to say how high. I am not taking any garbage on this, and I mean no affront to either one of you. Both of you -- this is a high -- this is one of the most contentious litigious cases I've ever had so I run it like a dictator.

Defendants argue that Mr. Fieger improperly interjected unfounded allegations of cover-up, conspiracy, and perjury during his questioning of the witnesses. To be sure, Mr. Fieger, did sound those themes during the trial. Defendants assert that similar conduct was condemned by this Court in *Badalamenti v William Beaumont Hosp-Troy*, 237 Mich App 278, 289-294; 602 NW2d 854 (1999):

> Throughout the entire trial, plaintiff's lead trial counsel completely tainted the proceedings by his misconduct. For example, through innuendo and direct attack, plaintiff's lead trial counsel repeatedly *and with no basis in fact* accused defendants and their witnesses of engaging in conspiracy, collusion, and perjury to cover up their alleged malpractice. Plaintiff's lead trial counsel continually accused defense witnesses of fabricating, in response to the instant litigation, the defense that plaintiff had a rare, severe reaction to streptokinase that caused his injuries. Indeed, this appeared to be his main theme. Plaintiff's lead trial counsel also repeatedly belittled defense witnesses and suggested, *again, with no basis in fact*, that they destroyed, altered or suppressed evidence. [*Id*. at 290-291 (emphasis added).]

Unlike *Badalamenti*, however, this case actually did present legitimate questions regarding the integrity of the medical records. Defendants admitted that Dr. Halperin confused Mrs. Vergeldt with Mrs. VanSlembrouck when he dictated the VanSlembrouck discharge summary, resulting in the entry of erroneous information in Kimberly's medical record. The alteration of the Vergeldt baby's estimated fetal weight gives rise to a reasonable inference that whoever changed the 3 to a 4 thought the alteration was being made in the VanSlembrouck record to coincide with Markell's large size. Additionally, Dr. Halperin ordered an umbilical arterial blood gas that would have provided probative information as to whether Markell had sustained birth hypoxia, but that test was not done. The medical record simply indicates without further explanation that the study was "cancelled." While defendants eventually produced evidence that the study was cancelled because an insufficient volume of blood was submitted to the lab, this explanation emerged late in the case and Judge Nichols refused to allow the jury to hear it. Additional background regarding the blood gas study places some of Mr. Fieger's trial comments in fuller context.

During discovery, plaintiffs repeatedly requested that Beaumont produce Markell's complete medical record, including the umbilical blood gas result and the discharge summary for Markell's 18-day stay in the Special Care Nursery. No additional records were produced. Defendants advised that a short note written in Markell's medical record constituted her discharge summary, although it was not formally designated as such.

Plaintiffs deposed Dr. Halperin in December 2009, and asked him why the arterial blood gas studies had been cancelled. Dr. Halperin stated: "I didn't know they were cancelled." Approximately a month before the *Daubert* hearing, defendants produced a document called an "audit trail," which defendants claimed was generated "only in response to Plaintiff[s'] false allegation that Defendants destroyed and/or discarded an arterial blood gas sample." The audit

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Unfortunately, despite this admonition, the antics continued.

trail apparently indicated that the test was not done because an insufficient volume of arterial blood had been obtained. The trial court precluded defendants from using the audit trail at the trial, finding that they had obtained it well before providing it to plaintiffs and had deliberately withheld it. The trial court's order further provides: "The document, even if admissible under a proper foundation, presents an unfair surprise and is prejudicial to Plaintiff[s] when the trial is imminent in that it is less than one week away."

The absence of a formal discharge summary in Markell's chart also engendered controversy. The parties argued at great length about whether the Joint Commission for the Accreditation of Hospitals (JCAH) required a formal discharge summary for a newborn treated in a Special Care Nursery. Mr. Fieger told the court that he intended to use the absence of a discharge summary as evidence of a missing record and concealment. Ultimately, the trial court denied plaintiffs' motion to give a missing record instruction and curtailed further discussion regarding the JCAH standards.

Defendants contend the following questioning of Dr. Schifrin regarding the blood gas results demonstrates Mr. Fieger's misconduct:

> *Mr. Fieger*: Why is it so important to take an arterial blood gas, Doctor?
>
> *A.* Well you want to understand the mechanism of problems that the baby might have.
>
> *Q.* What do you mean you want to understand? What if you don't want to understand the mechanism of problems? What if you don't want to see or anybody else to see what really happened?
>
> *Mr. Babiarz*: Your Honor, I think this is argumentative. What if you don't want someone to see I mean it's --
>
> *Mr. Fieger*: Well if you don't want -- let me answer [sic] it another way. If you don't want somebody to look or see what really happened is a way to prevent that by not being honest in the operative note and not being -- taking the tests that show it?
>
> *Mr. Babiarz*: Your Honor, again that's argumentative.
>
> *The Court*: That kind of assumes a fact the jury hasn't even been asked to decide yet.
>
> *Mr. Fieger*: Okay.
>
> *The Court*: It's kind of like -- so we need to rephrase it again.
>
> *Mr. Fieger*: I will. If you don't do these tests or describe it how will anybody coming later know?

A. One, obviously you can't know and as I said it was obviously at least a passing through for several people and would ordinarily have been an indication on the basis of either the tracing, the impression of the baby at birth would normally have required a, a, a cord blood sample.

Q. Is there any indication in this chart why it wasn't taken?

A. No. Further than that there is the -- appears to be the affirmative not[at]ion that it was canceled. See it's not a question of somebody gave the order, they did it, it was lost or forgot to do it or it was lost. Somebody actually canceled the order.

Q. Now this says here also the infant was taken over to the special care nursery for observation due to the baby's size. Is that even a true statement?

A. Well I'm sure there may have been some --

Mr. Babiarz: Your Honor, he's, he's – [*Badalamenti*]. The case law is -- the records say what they say. It's not an expert's role to say that the records are somehow inaccurate or misleading. [*Badalamenti*]. He cannot -- he may disagree what's in the record, but he can't say this is someone wrote this and -- wrote this in or anything of the sort.

Mr. Fieger: [*Badalamenti*] is my case, my response is but beyond that the records are replete in this case that the baby suffered severe injuries that are documented. Except Doctor Halperin says they were taken over for observation to do [sic] the baby's size, which are contradictive [sic] by the records in the chart, Judge.

Mr. Babiarz: Your Honor –

Mr. Fiegier: So I'm asking him if that's --

The Court: Rephrase the question.

Mr. Fieger: Okay. Does this in any way -- the infant was taken over to the special care nursery for observation. In any reflect the injuries that the -- that are reflected in this chart?

A. The answer is no not at all, but what I was trying to say is the baby's large size. So small fraction is baby's size, but that it not in any way, shape or form what is compelling about getting this baby to special care.

Mr. Fieger's questioning does not rise to the level of reversible misconduct. The inquiries were designed to highlight the medical record discrepancies that had been brought to light during the trial, the absence of an arterial blood gas result, and to infer that defendants' stated reason for admitting Markell to the Special Care Nursery—her large size—was incorrect or incomplete given her impaired neurological condition. These were genuine issues in the case.

In *Reetz*, our Supreme Court declined to find comments regarding a party's untruthfulness improper when some evidence supported that inference:

> If, as in this case, the testimony of a witness for the plaintiff directly contradicts the testimony of a witness for the defendant, and there is no reason to believe that an honest mistake has been made, so that one witness must be fabricating, each counsel has the right to argue that his witness speaks the truth while the other presents a fabrication. [*Reetz*, 416 Mich at 109.]

Despite Mr. Fieger's unnecessary inference that defendants did not want to know what happened, because the trial court had excluded the audit trail explanation (a decision that defendants do not challenge on appeal), the cited questions do not supply grounds for a new trial.

However, we agree with defendants that Mr. Fieger crossed the line on other occasions. For example, in examining Dr. Zakalik, a Beaumont neurosurgeon who examined Markell during her initial hospitalization and when she was five months old, Mr. Babiarz asked whether the doctor had sent a copy of his report regarding Markell to the VanSlembroucks. The doctor stated that they had asked for a copy, and that the report specifically stated that Markell had a congenital Dandy-Walker malformation. The questioning was interrupted by Mr. Fieger's inappropriate objection and statement:

> Q. Did Mrs. VanSlembrouck ever call you up and say hey Doctor what does this mean?
>
> A. Well I talked to her at the office and kind of explained what [a] Dandy Walker cyst is. I don't think we ever talked about it afterwards.
>
> Q. Did you explain to her it was your belief --
>
> MR. FIEGER: Objection, leading.
>
> THE COURT: It is.
>
> BY MR. BABIARZ:
>
> Q. What would you have explained to her with regard to the timing of the injury?
>
> MR. FIEGER: Objection. He said what he said already. He's just suggesting say some more, *make up some more*.
>
> MR. BABIARZ: Your Honor, I move to strike that.
>
> MR. FIEGER: Judge, this is --
>
> THE COURT: We will strike that. What was the question again? [Emphasis added].

Defendants have brought to our attention more than two-dozen additional trial excerpts that they claim reflect Mr. Fieger's misconduct. We have reviewed each excerpt and while we agree that several comments were unwarranted, we cannot conclude that Mr. Fieger's questioning or comments denied defendants a fair hearing. This was an extraordinarily long trial marked by multiple episodes of improper commentary on both sides. The trial court sustained Mr. Babiarz's objections to most of Mr. Fieger's allegedly improper statements or questions. More importantly here, unlike in *Badalamenti*, a factual basis existed for Mr. Fieger's inquiries concerning whether the medical records and testimony had been altered or fabricated. The unnecessary comments, gratuitous interjections, and pursuit of irrelevant lines of inquiry identified by defendants played little part in this long trial, likely made Mr. Fieger look foolish rather than effective, and do not justify reversal.

B. THE CLOSING ARGUMENT

Mr. Fieger's closing argument presents a far closer question. Following are the comments that raise misconduct concerns:

> *Mr. Fieger*: . . . I've been waiting over seven years for someone to hear this case. Markell has waited for 15 years. Mr. Babiarz wouldn't listen to me. He only filed motions to keep me from getting into court --
>
> *Mr. Babiarz*: Your Honor -- Your Honor, I'm sorry; this is improper argument.
>
> *The Court*: It is. It's per -- we've agreed at the outset we would not direct that to the attorney.
>
> *Mr. Fieger*: Beaumont Hospital wouldn't listen to me. They turned a deaf ear to Markell; put up defenses that you've heard here today and during the trial. Markell and I have waited all these years to be heard. And we're finally here. And I'm eager to make these final statements to you, because in the end, you eight people, and when six of the eight of you agree on a verdict, you will be the persons who hear us, and who can finally give us justice.
>
> * * *
>
> For 15 years, Kimberly and John have been responsible for the safety of Markell and her well-being. They've done a magnificent job. And then they gave her to me and asked me and I agreed to shoulder the responsibility for Markell's life. Because that's what we have in our hands right now, her life, in this case, and today, in a very, very short while, I'm going to turn over the case to you. I'm going to turn over Markell's life, quite literally, quite literally, to you. And today I pray that you treat her with the same compassion and the same justice that all of us, all of us, expect in this courtroom, in this -- they call it a temple of justice.
>
> * * *

Now we collectively can't undo what's been done. We can make her life easier until the day she dies. We can also, by your verdict, reach out to others to ensure that the injustice that's gone on here in this courtroom and for the last 15 years that the Defendant has tried to perpetrate, shall not stand. That Markell's life shall have meaning and shall have not been in vain.

It is by virtue, therefore, of what you do and what we say here today by your verdict, that we'll say injustice shall not prevail.

* * *

The damages in this case are what it takes to care for Markell. . . .

* * *

It goes out for 81 years. You will literally hold her life in your hands, because if you stop at age 30, you literally will be deciding that at age 30, if she's not dead, then she will be immediately warehoused. If you don't provide that money for her life, you will decide when her life will end, very effectively literally. You will decide that. And that is her future medical costs.

* * *

And when he says well, she's been taken care of well by the taxpayers, the VanSlembroucks, so don't make Beaumont Hospital pay, don't make them pay here; that's what he is saying. Who do you think is going to care for her?

What do we as jurors do about what's been done here? We have the power of justice in our hands. And yes, tomorrow, because in countless other cases there's innocent children being hurt. My question and I ask do we recognize the power that we have? Do we understand that in a nation whose laws are based on precedent, that there will be an endless line of innocent children who will look for guidance by what you do in this case. Do we realize that in the future, we will show and need the courage that you can provide here in this case by uncompromised justice to other innocent children? Do we understand that our verdict today may say --

Mr. Babiarz: Your Honor, I'm sorry to interrupt, but I think he's asking the jury to -- to become saviors of children in the future, which is outside the scope of this -- this case.

The Court: It's final argument. I'll instruct you --

Mr. Fieger: Do we understand that by our verdict today, we can save other children from these mistakes?

Now, most of us don't understand our power. We live so vividly in the present that we have little understanding of our consequences in the future. And I

think probably the founders of -- of this country didn't realize it either. But they're responsible for us being together today 200 years later. But for them, there wouldn't be eight people from Oakland County deciding what's right and what's wrong. As they met in Philadelphia on that hot summer day to sweat and argue in a poorly ventilated place called Constitution Hall, do you think that they foresaw that we'd be here today? Do you think that they would have a full understanding of the consequences of their actions, their labor, their love of freedom, their passion for justice? It was probably most likely just another business day for them. Business at hand. The need to act wisely, the need to act decisively, to establish a new nation. I doubt they could have understood that a jury would be evaluating the life of Markell VanSlembrouck in 2011.

So it's with us. We have the power to do what's just. We have the power to tell the world today that a hospital may not do this to a child. We have the power to say they will pay by uncompromised justice. And rarely, as I said at the very beginning of this case, does anyone have the opportunity to bring into our lives important change. Most of us are never given the chance to exercise the God-given power that's vested in each one of us. It's wasted. These are rare opportunities that respectfully fate has provided.

* * *

. . . Her only opportunity -- her only opportunity -- she may never come before anyone else again -- to have her day in court, to have justice. So that now, as I said to you at the beginning, John and Kimberly have borne that responsibility magnificently, and then they placed Kimberly in my care to care for her throughout this trial, and now I place that responsibility to you, not only for what's gone on from December 1st through today, but from today, for every year she's likely to live. And you will have her life in your hands, because if you stop at any year up until her life expectancy of 81, she will literally be cut off, she will literally be warehoused. That day I can promise you will be her death sentence, because no -- her parents are not likely to be --

Mr. Babiarz: Your Honor, I think this is improper. He's suggesting to the jury we're condemning this child to death. I think this is improper argument.

The Court: We're almost done, I think.

Mr. Fieger: Her parents may no longer be here. She will be dependent upon the kindness of strangers. She will be dependent upon the kindness of strangers. Some of those strangers to her are us.

I'm now shifting the responsibility for the -- for the days, for the weeks, the months, and the years that that little girl has lived on this earth 'til today, and then for day, and then years into the future, I shift that responsibility now to your shoulders, and hope that you bear that responsibility with the same majesty, with

> the same compassion and with the same sense of justice that we all said is inherent and believed in our system of justice.

Based on Mr. Fieger's arguments during closing, defendants sought a new trial. The trial court denied this motion, reasoning:

> Having considered the parties' arguments and statements cited by Defendants, the Court rejects defense counsel's characterization relative to misconduct as exaggerated auxesis, if not false, and a desperate attempt epitomized by Defendants to do whatever it takes to overturn what was otherwise a fair though fiercely fought medical malpractice trial. In other words, the Court finds that Plaintiff[s'] counsel's statements do not amount to misconduct and did not deny Defendants a fair trial. The majority of the statements made by Plaintiff[s'] counsel were objected to and addressed by the Court at the time they were being made. The jury was regularly instructed that what attorneys say is not evidence. In some instances, permissible inferences were made, such as alterations of documents, which, just because Defendant[s were] offended, does not mean they could not be found among possible conclusions. Still the jury was reminded that it was up to them to determine the facts and inferences therefrom. And, while misconduct in the form of scorn and contempt did occur during the trial, it occurred about equally on each side, was kept to a minimum, and was actively and forcefully dealt with by the Court whenever it came too close to having an adverse effect upon the trier of fact. For the most part, if not totally, any such conduct was from the weariness and fatigue of a lengthy and highly contested trial; in no way was it a "deliberate course of conduct" by either side. While the trial was both a protracted and vigorous one, the conduct alleged was not sufficient to constitute one in which Defendants' substantial rights were materially affected where, as here, the final verdict was 5-2, the two voting "no cause". Given the totality of this approximate four week trial, the Court finds misconduct simply did not play too large a part so as to have denied Defendant[s] a fair trial. For these reasons and those further stated by Plaintiffs, Defendants' motion for a new trial based on prevailing party misconduct and improper arguments are denied.

Instruction by a trial court that the statements of counsel are not evidence is generally sufficient to cure any prejudice that might arise from improper remarks by counsel. *Tobin v Providence Hosp*, 244 Mich App 626, 641; 624 NW2d 548 (2001). However, this Court will order a new trial where the misconduct "may have caused the result or played too large a part and may have denied a party a fair trial." *Reetz*, 416 Mich at 103. In making this determination, a reviewing court must first determine whether the attorney's conduct constituted error, "and, if so, whether it was harmless." *Id*.

Contrary to the trial court's conclusion, several of Mr. Fieger's comments did qualify as misconduct. Mr. Fieger advanced a "civic duty" argument of the sort condemned in *Joba Constr Co, Inc v Burns & Roe Inc*, 121 Mich App 615, 637; 329 NW2d 760 (1982). Mr. Fieger also improperly appealed to the jurors' passions and prejudices by exhorting them not to "decide when" Markell's life would end. Argument of this sort has no place in the courtroom.

Although Mr. Fieger employed inappropriate and objectionable rhetoric, we cannot conclude that his improper remarks reflect a studied effort to divert the jury's attention from the central issues presented in the case. Nor did they have a controlling influence on the verdict.

Portions of Mr. Fieger's argument regarding Markell's future bore a meaningful relationship to the evidence, distinguishing this argument from that in *Badalamenti*. Here, Mr. Fieger urged that if the jury failed to adequately compensate Markell for the future, she would be "warehoused" when her parents died. Mr. and Mrs. VanSlembrouck testified that they alone cared for their daughter, without assistance from anyone. They expressed concern about what would happen to Markell if they could not care for her. Dr. Gabriel testified that children with PCH-2 placed in nursing homes were at risk of death during infancy, in contrast to a child such as Markell, who received exemplary care at home. Dr. Gabriel specifically used the term "warehoused:" "She's not being warehoused or put off into some institution as so many children like Markell were in the past, especially in the past." Accordingly, issues surrounding Markell's future care and longevity were part and parcel of the case.

Furthermore, it appears that in rendering the largest portion of the verdict, that representing future economic damages and loss of earning capacity, the jury adopted without addition the figures offered by plaintiffs' economist expert.[28] Defendants did not call an economist and offered no evidence contradicting these dollar amounts.

The trial court instructed the jurors that neither sympathy nor prejudice should influence their decision. M Civ JI 3.02. The jurors were further instructed that their verdict "must be solely to compensate plaintiff for her damages, and not to punish the defendant." M Civ JI 50.01. While in *Badalamenti*, 237 Mich App at 292, counsel sought "to divert the jurors' attention from the merits of the case and to inflame the passions of the jury," here Mr. Fieger confined his comments to the issues that the jury would confront and the facts introduced in evidence. And here, unlike other cases involving Mr. Fieger, the evidence regarding economic damages was unrebutted. On the whole and in context, we hold that Mr. Fieger's improper comments were not so harmful or prejudicial that the court's instructions were incapable of curing any damage. Judge Nichols was in a far better position than are we to gauge the effect of the evidence on the jury and to evaluate the persuasiveness of the experts for both sides. His finding that any misconduct did not deny defendants a fair trial is entitled to some measure of deference. And although Mr. Fieger's conduct throughout trial and closing argument was often inappropriate and his words inflammatory, we are unable to conclude that the isolated episodes of misconduct tainted the long trial or prejudiced its result.

[28] The jury awarded $150,000 in past economic damages, $2,500,000 in past noneconomic damages, and $11,189,000 for future noneconomic damages, at a rate of $167,000 per year from 2011 through 2077. The balance represented future economic damages and lost earning capacity.

VII. JURY INSTRUCTION CHALLENGES

Defendants assert that the trial court erroneously instructed the jury pursuant to M Civ JI 50.10 and 50.11. According to defendants, neither instruction applied to the facts of this case. The former instruction addresses preexisting conditions predisposing a plaintiff to injury, such as arthritis or an undetected brain tumor. Defendants declare that PCH is not of that character. Defendants insist that no evidence supported that Markell's underlying genetic condition was aggravated by her birth or that her damages were indivisible, the underlying premises of M Civ JI 50.11. Plaintiffs respond that defendants waived any challenge to these instructions by failing to object to them in a timely manner, and that the two instructions correctly state the law applicable to this case.

We agree that defendants failed to object to the instructions within the timeframe set forth in the trial court's scheduling order. Nor are we persuaded that defendants' stated rationale for their belated objection justified relaxation of preservation requirements established by the trial court. We have considered defendants' arguments under the plain error standard and find that they do not warrant a new trial.

A. PROCEDURAL BACKGROUND

The trial court's pertinent scheduling order required plaintiffs to submit their proposed jury instructions by January 10, 2011. Plaintiffs complied, requesting the reading of M Civ JI 50.10 and 50.11. These instructions provide:

> You are instructed that the defendant takes the plaintiff as [he / she] finds [him / her]. If you find that the plaintiff was unusually susceptible to injury, that fact will not relieve the defendant from liability for any and all damages resulting to plaintiff as a proximate result of defendant's negligence. [M Civ JI 50.10.]
>
> If an injury suffered by plaintiff is a combined product of both a preexisting [disease / injury / state of health] and the effects of defendant's negligent conduct, it is your duty to determine and award damages caused by defendant's conduct alone. You must separate the damages caused by defendant's conduct from the condition which was preexisting if it is possible to do so.
>
> However, if after careful consideration, you are unable to separate the damages caused by defendant's conduct from those which were preexisting, then the entire amount of plaintiff's damages must be assessed against the defendant. [M Civ JI 50.11.]

Defendants filed extensive objections to plaintiffs' proposed instructions but raised no challenge whatsoever to M Civ JI 50.10 or 50.11. At the January 2011 hearing scheduled to address jury instruction challenges, defendants again made no mention of M Civ JI 50.10 or 50.11. Following the hearing, the trial court partially granted defendants' motion to amend other jury instructions and in a February 2011 order, ruled that it would give M Civ JI 50.10 and 50.11.

In June 2011, defendants filed a new motion regarding the jury instructions, asking for "additions" and "clarifications," and including new "objections." In relation to the current challenge, defendants argued:

> 6. Defendants further object to the giving of M Civ JI 50.10, as it is inapplicable to any theory being pursued by Plaintiffs in this case.
>
> 7. Defendants also object to the giving of M Civ JI 50.11, for the same reasons that they object to the giving of M Civ JI 50.10.

In their accompanying brief, defendants made no effort to justify or explain their delayed objections. Rather, defendants argued that plaintiffs had not "conceded that Markell . . . had any pre-existing condition which would make her 'unusually susceptible to injury' and thus, [M Civ JI 50.10] is inapplicable to the facts of this case." Defendants continued,

> [E]ven if Plaintiffs were willing to concede that genetic testing has demonstrated that Markell . . . suffers from [PCH-2], Plaintiffs have set forth no offer of proof that such made Markell 'unusually susceptible to injury;' rather, this birth defect demonstrates that Markell was already injured (and significantly so) prior to the events at issue.

Defendants asserted that a "congenital anomaly is not the type of underlying condition for which M Civ JI 50.10 is applicable," and argued that this reasoning similarly supported their objection to M Civ JI 50.11.

Plaintiffs objected to defendants' attempt to revisit the jury instructions, noting that the court had already heard arguments on this issue and entered its ruling. Plaintiffs continued, "At this point judicial economy would probably dictate that this Honorable Court hear the evidence presented at trial before further refining the jury instructions." Plaintiffs maintained this wait-and-see posture when specifically addressing defendants' objections to M Civ JI 50.10 and 50.11. Plaintiffs asserted, "[T]his is a classic case for submission of both M Civ JI 50.10 and 50.11:"

> In short, Plaintiff[s] will submit evidence that Markell's injuries and damages were proximately caused by a combination of birth trauma and hypoxia/ischemia to her brain. With the exclusion of the blood test from the purple/lavender tube, defense experts will still attempt to theorize that all of Markell's injuries and damages were caused by a congenital defect. Assuming that these two competing scenarios are presented, the jury will hear testimony that Markell was unusually susceptible to birth trauma and hypoxia/ischemia from none other than Defendants' own genetics expert Aubrey Milunsky, M.D.

Plaintiffs summarized:

> Even Defendants do not and cannot deny that Markell came out bruised, battered and purple, with a fractured clavicle, which was not because of any congenital defect. M Civ JI 50.10 and M Civ JI 50.11 were drafted for cases where a jury is presented with two convening causes for a plaintiff's injury.

The trial court did not consider defendants' new challenges to the proposed jury instructions until its September 7, 2011 pretrial hearing. In regard to the jury instructions regarding damages, the court agreed with defense counsel that those instructions would "need to [be] tweak[ed]" based on the "proofs that are ultimately submitted at trial." Defense counsel then elaborated that the question to the jury, "Has the child sustained injury?" might need to be clarified "[b]ecause we're dealing with someone who had a pre-existing congenital injury and defect" and counsel did not "want the jury to be confused about, Did she sustain an injury from this purported care and labor and delivery?" Mr. Fieger objected that the trial court had already ruled on proximate cause and the issue could not be revisited through revision of the jury instructions or verdict form.

The court wrapped up this argument at the pretrial hearing as follows:

> *The Court.* Jury Instructions. I've already ruled on that.
>
> *Mr. Fieger.* Yes.
>
> *The Court.* The Court's ruled regarding jury instructions to be given and an order dated February [16], 2011, was entered.
>
> *Mr. Fieger*. Thank you.
>
> *The Court*. Any resubmitted requests and/or objections, for example . . . 50.10, and 50.11 are denied. They were . . . untimely and/or waived.

As the trial's end drew near, the court revisited the jury instruction issues. On October 11, plaintiffs and defendants presented the court with the latest versions of their proposed instructions.[29] The court stated, "I'm going to read them just and [sic] I think at that point if you want to lay an objection that you were opposed to but I, I sustain on I mean I think it would make a better record for everybody's protection here, okay?" Plaintiffs' counsel and the court addressed the order of the instructions. Both stated on the record that M Civ JI 50.10 and 50.11 would be given. Defendants did not renew their objection to those two instructions at that time.

At the close of the trial, the court read M Civ JI 50.10 and 50.11 to the jury. Despite Judge Nichols's October 11 suggestion that in the interest of "a better record" counsel should object to any jury instructions "that you were opposed to," defense counsel raised no objection to M Civ JI 50.10 or 50.11. The court then asked the parties if they were "satisfied" with the instructions as given and defense counsel answered in the affirmative.

B. ANALYSIS

MCR 2.512(C) instructs: "A party may assign as error the giving of or the failure to give an instruction only if the party objects on the record before the jury retires to consider the verdict

[29] We have not located those documents in the record.

. . . stating specifically the matter to which the party objects and the grounds for the objection." Failure to object to a jury instruction constitutes a forfeiture of the right; nevertheless, a claim of instructional error may be reviewed on appeal for plain error. *People v Carter*, 462 Mich 206, 215; 612 NW2d 144 (2000). However, a party is deemed to have waived a challenge to the jury instructions when the party has expressed satisfaction with, or denied having any objection to, the instructions as given. *People v Lueth*, 253 Mich App 670, 688; 660 NW2d 322 (2002). A waiver extinguishes instructional error and precludes appellate review. *Carter*, 462 Mich at 215.

In contrast, we review preserved claims of instructional error de novo. *Case v Consumers Power Co*, 463 Mich 1, 6; 615 NW2d 17 (2000). When an objection to an instruction has been preserved, "we examine the jury instructions as a whole to determine whether there is error requiring reversal." *Id.* We are guided by the precepts that

> [t]he instructions should include all the elements of the plaintiff's claims and should not omit material issues, defenses, or theories if the evidence supports them. Instructions must not be extracted piecemeal to establish error. Even if somewhat imperfect, instructions do not create error requiring reversal if, on balance, the theories of the parties and the applicable law are adequately and fairly presented to the jury. [*Id.*]

Defendants failed to abide by the trial court's scheduling order and have given us no reason to find that the trial court abused its discretion by refusing to hear their tardy objections.[30] We reject defendants' argument that the instructions became objectionable only after PreventionGenetics reported the genetic-testing results in January 2011. In advance of that date, the parties were aware of the possibility that plaintiffs would pursue a claim that both conditions contributed to Markell's infirmities. At his December 2010 deposition, Dr. Milunsky opined that Markell likely suffered from PCH-2. He further testified:

> Q. Does the genetic condition shield against or protect against hypoxia or traumatic injury?
>
> A. No. It may be quite the opposite. It may make them more vulnerable.
>
> Q. And why is that?
>
> A. Well, in a general sense, and I think it's more empirical than evidentiary, that the genetic disorders generally, whatever they may be, and with special reference to brain, make an individual more susceptible to the stressors,

[30] However, "[t]rial courts have the discretion to entertain additional requests for jury instructions and, in fact, customarily do so . . . ." *Johnson v Corbet*, 423 Mich 304, 315; 377 NW2d 713 (1985). That a court has the discretion to consider late-filed instruction requests, does not require such action.

> for example, of labor and delivery or in other instances to the vagaries of infection.

Given this testimony, by January 2011, defendants knew every fact necessary to challenge giving M Civ JI 50.10 and M Civ JI 5.11. No new information emerged between December 2010 and June 2011, when defendants first brought their objections to these two jury instructions to the court's attention. Judge Nichols did not abuse his discretion by refusing to hear argument at that late date. See *Kemerko Clawson, LLC v RXIV Inc*, 269 Mich App 347, 352; 711 NW2d 801 (2005). Furthermore, defendants then failed to place an objection on the record when specifically invited to do so. We treat their objection as unpreserved and forfeited rather than waived.

M Civ JI 50.10 instructs on "a basic tort rule of law—a tortfeasor takes his victim as he finds him." *Richman v Berkley*, 84 Mich App 258, 261; 269 NW2d 555 (1978). This instruction embodies this "eggshell skull" doctrine, a venerable tort principle:

> All first-year law students are taught that a tortfeasor "takes his victim as he finds him," and are given the example of "the man with the eggshell skull." The principle is that if you hit a person on the head and a cracked skull results, you are responsible for the consequences, even if the skull was weak to begin with and you gave only a slight blow as a joke. [*Pierce v Gen Motors Corp*, 443 Mich 137, 155-156; 504 NW2d 648 (1993) (citation omitted).]

Both M Civ JI 50.10 and M Civ JI 50.10 relate to damages. *Beadle v Allis*, 165 Mich App 516, 525; 418 NW2d 906 (1987). A jury considers damages only after deciding the questions of negligence and proximate cause. M Civ JI 50.10 informs jurors that even if a plaintiff was unusually susceptible to injury, the defendant nonetheless may be held liable for damages proximately caused by defendant's negligence. The instruction does not permit a jury to assess "eggshell skull"-related damages until the jury has concluded that a defendant's negligent action or inaction proximately caused injury to the plaintiff.

Dr. Milunksy's deposition testimony created a potential fact question regarding whether Markell's PCH rendered her susceptible to birth trauma. Accordingly, plaintiffs established an evidentiary basis for *requesting* M Civ JI 50.10. And at the trial, Dr. Soffer expressed, "no matter what the condition of this baby was genetically the circumstances of events that happened during this labor made whatever condition this baby may have had at birth far, far worse than it would have been otherwise." "The determination whether an instruction is accurate and applicable" based on the characteristics of a case lies within the sound discretion of the trial court. *Stevens v Veenstra*, 226 Mich App 441, 443; 573 NW2d 341 (1997). Dr. Soffer's testimony established a factual foundation for plaintiffs' argument that if the jury determined that birth trauma proximately caused Markell's injuries and damages, she could recover even if PCH rendered her more susceptible to the effects of the trauma. We find no error, plain or otherwise.

M Civ JI 50.11 instructs a jury that it must apportion damages when both a preexisting condition and the defendant's negligence have proximately caused an injury. Only if the jury determines that it is "unable to separate the damages caused by defendant's conduct from those which were preexisting" may the "entire amount of plaintiff's damages be assessed against the

defendant." M Civ JI 50.11. Thus, this instruction informs the jury that it must strive to hold a defendant liable only for those damages attributable to the defendant's conduct. If it is simply impossible to separate the damages caused by a preexisting condition from the damages proximately caused by a defendant's negligence, a jury is permitted to impose liability for all damages on the defendant. In that circumstance, the law treats an injury as indivisible, even though two different proximate causes produced it.

Here, the parties' proximate cause arguments were poles apart. Plaintiffs maintained that defendants' obstetrical negligence standing alone proximately caused injury to Markell's brain; defendants charged that only PCH proximately caused Markell's neurologic disabilities. None of the causation experts expressed that the damages flowing from the two causes could be considered indivisible. Accordingly, the evidence did not support Judge Nichols's decision to read M Civ JI 50.11 to the jury. However, reversal is not required unless the failure to order a new trial would be inconsistent with substantial justice, MCR 2.613(A), and is not warranted if an instructional error did not affect the trial's outcome. *Jimkoski v Shupe*, 282 Mich App 1, 9; 763 NW2d 1 (2008). After reviewing the jury instructions in their entirety, we conclude that the trial court fairly presented the applicable law. A single incorrect instruction, mentioned only once and briefly during plaintiffs' closing argument, did not affect the outcome of this trial. Even were we to hold that the error in giving this instruction qualified as plain, it was harmless.

XIII. DAMAGES CHALLENGES

Defendants attack the jury's damage award on four fronts. First, defendants assert that plaintiffs presented only "incompetent" testimony concerning Markell's life expectancy, thereby invalidating the life expectancy data underlying the testimony of plaintiffs' economists and necessitating remittitur. Next, defendants urge that the lower cap on medical malpractice damages applies here, rather than the higher cap. Third, defendants contend that plaintiffs' expert economists incorrectly calculated future damages using a compound interest method. Fourth, defendants quarrel with the manner in which the trial court reduced the jury's award of future damages to present cash value.

A. LIFE EXPECTANCY EVIDENCE

Defendants filed a pretrial challenge to the anticipated life expectancy testimony of plaintiffs' experts, arguing that no scientific basis supported that Markell would live for more than an additional five years. At their depositions, Drs. Gabriel, Crawford, and Frank opined that Markell's life expectancy was "50 plus," "[m]aybe another . . . forty to fifty years," and "near normal," respectively. Defendants' motion to strike this life expectancy testimony averred that according to the published medical literature, children with cerebral palsy such as Markell have a life expectancy of less than 20 years.

Plaintiff countered by filing two peer-reviewed medical articles with the trial court. The articles reviewed study data reflecting that children with cerebral palsy who maintain an ability to roll and are not tube-fed have longer rates of survival than more neurologically devastated children. The articles further highlighted that access to acute medical care generally enhances survival. The trial court issued an order denying defendants' motion.

During the trial, Dr. Gabriel testified to his experience in treating children with cerebral palsy and maintained that Markell would have a "fairly lengthy life expectancy although not normal." Dr. Crawford testified that Markell had the opportunity to live for a "relatively normal life expectancy," explaining:

> [S]he gets really good care and she's not currently having seizures but she's on seizure medicine to prevent seizures. She doesn't have frequent hospitalizations. She's never gone back into status epilepticus. She doesn't have frequent aspiration pneumonia. She's extremely well cared for.

Dr. Gary Yarkony, a specialist in physical medicine and rehabilitation, examined Markell and opined that "if she's cared for, she should have a normal life expectancy." Dr Yarkony expanded as follows:

> I have been treating disabled people for 30 years, and I treated people regularly in their fifties, sixties, seventies. I must say only two in their eighties with cerebral palsy and brain injury, and it really -- if they don't have some degenerative disease where they don't have some medical disease, as long as they're cared for properly, they can have a long life expectancy. And particularly someone like Markell who's mobile, who's fed by mouth, who hasn't had any major complications. She's already 16 years old. She looks exactly the way I saw her two years ago. There's nothing in her medical records about any neurological deterioration by any of her doctors. It's just a matter of providing her with nursing care, and with nursing care she could have a normal life expectancy.

Defendants' experts testified that Markell's life expectancy was markedly shortened due to her PCH-2. They premised their testimony on the two articles describing children with the genetic disorder. According to the articles, (one involving 16 subjects and the other 169), life expectancy of PCH patients is "difficult to predict," with one reported patient alive at age 31.

The jury verdict included future damages until Markell reaches age 82.

Defendants sought remittitur, arguing as they do here, that the expert testimony underlying the verdict did not qualify as scientifically reliable. The trial court denied defendants' motion, reasoning:

> Both Plaintiff[s] and Defendants' experts testified regarding life expectancy and the jury believed whom they wanted. Contrary to Defendants' arguments, there was sufficient testimonial evidence regarding Plaintiff[s'] future damages which the jury was free to believe or disbelieve. To conclude that Plaintiff's life expectancy was only five years post-trial date is like asking the Court to find in favor of Defendants on their defense that Plaintiff suffers from PCH and no harm occurred at birth. Plaintiffs' expert testimony regarding future medicals was, for the most part, uncontested in an all or nothing approach by the defense.

B. ANALYSIS

We review a trial court's remittitur decision for an abuse of discretion, bearing in mind:

> An appellate court reviewing a trial court's grant or denial of remittitur must afford due deference to the trial judge since the latter has presided over the whole trial, has personally observed the evidence and witnesses, and has had the unique opportunity to evaluate the jury's reaction to the witnesses and proofs. Accordingly, the trial judge, having experienced the drama of the trial, is in the best position to determine whether the jury's verdict was motivated by such impermissible considerations as passion, bias, or anger. Deference to the trial judge simply reflects the recognition that the trial judge has observed live testimony while the appellate court merely reviews a printed record. [*Palenka v Beaumont Hosp*, 432 Mich 527, 534; 443 NW2d 354 (1989).]

We find no abuse of discretion. The evidence supplied by plaintiffs' expert witnesses, primarily Dr. Yarkony, supported that Markell would likely have a near-normal life expectancy. Dr. Yarkony in particular relied on objective criteria—Markell's health history and her current medical condition—in rendering his opinion. Viewing the evidence in the light most favorable to plaintiffs, as we must, we cannot jury's life expectance determination as excessive. See *Silberstein v Pro-Golf of America, Inc*, 278 Mich App 446, 462; 750 NW2d 615 (2008).

B. THE CORRECT CAP

Defendants cursorily argue that "[i]f Plaintiff Minor had already sustained spastic quadriplegia and mental retardation before her birth due to her preexisting condition, then the predicate for applying the higher cap amount is destroyed, and the noneconomic damages should be remitted to the lower cap amount for 2011. . . ." This argument lacks merit, as the jury's verdict unequivocally reflects that it rejected defendants' PCH-2 causation theory.

C. INTEREST CALCULATION

Next, defendants assert that plaintiffs' expert in vocational economic assessment, Dr. Anthony Gamboa, Jr., incorrectly employed a compound method to calculate future damages, which the trial court reduced using only a simple interest methodology. According to defendants, these calculations resulted in an arbitrary $2,170,969.43 "windfall" for plaintiffs. This challenge comes too late. Defendants' raised no objection to Gamboa's methodology during the trial. Defense counsel extensively cross-examined Dr. Gamboa regarding his methods, and defendants offered no expert testimony refuting the validity of Gamboa's calculations. We find no legal error.

D. REDUCTION TO PRESENT VALUE

Defendants' final argument concerning damages centers on our Supreme Court's holding in *Nation v WDE Electric Co*, 454 Mich 489; 563 NW2d 233 (1997). According to defendants, *Nation* was incorrectly decided. We are bound by *Nation*. Accordingly, we hold that the trial court did not err by reducing plaintiffs' future damages to present value using the simple interest method.

IX. THE STATUTE OF LIMITATIONS

Lastly, defendants allege that plaintiffs' lawsuit is untimely because it was not filed by Markell's 10th birthday. The law of the case doctrine controls our resolution of this question.

> Under the law of the case doctrine, "if an appellate court has passed on a legal question and remanded the case for further proceedings, the legal questions thus determined by the appellate court will not be differently determined on a subsequent appeal in the same case where the facts remain materially the same." The appellate court's decision likewise binds lower tribunals because the tribunal may not take action on remand that is inconsistent with the judgment of the appellate court. Thus, as a general rule, an appellate court's determination of an issue in a case binds lower tribunals on remand and the appellate court in subsequent appeals. [*Grievance Administrator v Lopatin*, 462 Mich 235, 259-260; 612 NW2d 120 (2000) (citations omitted).]

"The rationale supporting the doctrine is the need for finality of judgment and the want of jurisdiction in an appellate court to modify its own judgments except on rehearing." *Webb v Smith (After Second Remand)*, 224 Mich App 203, 209-210; 568 NW2d 378 (1997).

In a prior appeal in this case, this Court held that the 10th-birthday provision of MCL 600.5851(7) is a limitations period, not a saving provision. *VanSlembrouck*, 277 Mich App at 569. As such, this Court held that plaintiffs' November 2005 notice of intent tolled the statute of limitations. *Id.* at 570. While the Supreme Court initially granted leave to consider this issue, *VanSlembrouck*, 481 Mich 918, it later vacated its order and declined to consider it. *VanSlembrouck*, 483 Mich at 965. As this Court's prior opinion "is unaffected by a higher court's opinion," *McNees v Cedar Springs Stamping Co*, 219 Mich App 217, 222; 555 NW2d 481 (1996), it is the law of the case. Accordingly, we decline to further consider this issue.

We affirm.

/s/ Elizabeth L. Gleicher
/s/ Stephen L. Borrello
/s/ Deborah A. Servitto