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Minn. R. Civ. App. P. 136.01, subd. 1(c).*

**STATE OF MINNESOTA
IN COURT OF APPEALS
A23-0190**

Makenzie Moore, a minor, by and through her Conservator,
First Fiduciary Corporation,
Appellant,

vs.

Maple Grove Hospital,
Respondent,

Premier OBGYN of Minnesota PA
d/b/a Oakdale Obstetrics & Gynecology, et al.,
Respondents,

Jillian Hallstrom M.D. et al.,
Defendants.

**Filed August 21, 2023
Affirmed
Gaïtas, Judge
Concurring specially, Connolly, Judge**

Hennepin County District Court
File No. 27-CV-16-15607

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Considered and decided by Johnson, Presiding Judge; Connolly, Judge; and Gaïtas, Judge.

NONPRECEDENTIAL OPINION

GAÏTAS, Judge

Appellant Makenzie Moore appeals the summary-judgment dismissal of her medical-malpractice action against respondents Maple Grove Hospital and Premier OBGYN of Minnesota PA d/b/a Oakdale Obstetrics & Gynecology, et al., for an alleged birth injury.¹ She argues that the district court erred by excluding expert testimony regarding her primary liability theory—cranial compression ischemic encephalopathy (CCIE)—following a *Frye-Mack* hearing. Appellant further contends that the district court erred by determining that she had produced no evidence to support her additional liability theory, uteroplacental insufficiency. Because the district court did not abuse its discretion by excluding testimony concerning CCIE on the ground that the theory lacks foundational reliability and did not err in concluding that appellant had offered no admissible evidence to support her uteroplacental-insufficiency liability theory, we affirm the district court’s grant of summary judgment.

FACTS

The underlying facts, which are not disputed, are as follows. Appellant’s mother, Linaka Blair, who was pregnant and beyond her due date, went to Maple Grove Hospital

¹ Appellant is a minor child, and First Fiduciary Corporation is appellant’s conservator.

on August 12, 2014, for a scheduled induction of labor. A physician started Blair on a drug used to augment uterine activity and begin labor around 9:35 a.m. The next day, August 13, Blair's cervix became fully dilated, and she began the second stage of labor, during which a woman pushes. Blair pushed for approximately two hours but then lost the urge to push. Medical providers increased the labor-inducing drug, and Blair began pushing again. At 6:32 p.m. on August 13, Blair delivered appellant. Appellant remained in the hospital for several days after her birth receiving follow-up treatment and diagnostic imaging for hypoxic-ischemic encephalopathy (HIE) during labor.

In October 2016, appellant filed a medical malpractice lawsuit against respondents, two doctors, Nursefinders LLC, and AMN Healthcare LLC.² Appellant's complaint³ alleged that these defendants failed to adequately monitor and intervene during Blair's prolonged labor, and that their negligence caused appellant to suffer HIE, which led to permanent neurologic injury. The complaint posits two related mechanisms of injury, CCIE and "hypoxia-ischemia," which, later in the proceedings, appellant referred to as uteroplacental insufficiency or cord compression.⁴

² Doctors Jillian Hallstrom M.D. and Lisa M Shakerin M.D., Nursefinders LLC, and AMN Healthcare LLC were dismissed from the case prior to judgment and are not parties to this appeal.

³ Appellant filed several amended complaints. Here, we refer to appellant's third amended complaint, which was the final complaint filed.

⁴ Hypoxia refers to a lack of oxygen to the brain, ischemia refers to a lack of blood flow to the brain, and encephalopathy refers to a generalized dysfunction of the brain.

Frye-Mack Hearing

On September 3, 2021, respondents moved the district court to “preclude [appellant] from introducing at trial any expert testimony regarding fetal cranial-compression, [CCIE], cerebral compression and/or extracranial pressures as a mechanism of the [appellant’s] injuries.” They asserted that CCIE—a theory postulating that a laboring mother’s contracting uterine muscles during the second stage of labor can compress the fetal brain causing decreased blood flow and diffuse ischemic injury—“has no scientific basis, is rejected by the medical literature and is not generally accepted in obstetrics.” Respondents asked the district court to exclude any testimony regarding CCIE pursuant to the Minnesota Rules of Evidence and the caselaw governing the admissibility of expert testimony in Minnesota.

To decide respondents’ joint motion, the district court held a three-day *Frye-Mack* hearing⁵ in October 2021. During the hearing, respondents presented testimony from an obstetrician with expertise in maternal-fetal medicine, a neonatologist, a pediatric neurologist, and a neuroradiologist; appellant called a pediatric neurologist and a pediatric neuroradiologist. In addition to the testimony, the parties introduced multiple exhibits,

⁵ A *Frye-Mack* hearing, as further discussed below, is an evidentiary hearing that may be held when there is a question as to the admissibility of novel scientific evidence. *See State v. Roman Nose*, 649 N.W.2d 815, 818-19 (Minn. 2002). At such a hearing, the proponent of the evidence must establish that (1) the underlying scientific evidence is generally accepted in the relevant scientific community and (2) the particular scientific evidence has foundational reliability. *Doe v. Archdiocese of St. Paul*, 817 N.W.2d 150, 156 (Minn. 2012).

including the written opinions of the expert witnesses, medical records, and medical literature, and they filed legal memoranda.

On March 17, 2022, the district court issued an order barring appellant from “offering any argument, testimony, or other evidence regarding the theory of CCIE.” The district court further prohibited appellant from using any terms or concepts associated with CCIE, including the term “vaginal squeeze,” and the concepts of excessive uterine activity as a traumatic cause, hypoxic-ischemic injury to the brain due to traumatic causes, and regionalized ischemia caused by excessive fetal brain compression.⁶ According to the district court’s order, appellant failed to show that CCIE, which is a novel scientific theory, is generally accepted in the scientific community and has foundational reliability. The district court concluded that, because appellant did not satisfy these threshold legal requirements, the proffered evidence of CCIE was inadmissible.

Petition for Writ of Prohibition

Appellant petitioned this court for a writ of prohibition, seeking to preclude the district court from enforcing its March 17 order excluding evidence regarding CCIE. We denied the petition, determining that appellant had raised an alternative liability theory and that she could challenge the exclusion of the CCIE evidence in a post-judgment appeal.

Summary Judgment

Back in the district court, respondents moved for summary judgment. They asserted that appellant’s medical-malpractice claims failed as a matter of law because she had no

⁶ For simplicity, we will refer to CCIE and the umbrella terms listed in the district court’s order collectively as CCIE when discussing the excluded evidence.

expert testimony to support the alternative liability theory. In a responsive filing, appellant urged the district court to deny summary judgment, arguing she did not concede that she could not prove causation in her petition for a writ of prohibition and that there was a genuine issue of material fact as to whether “excessive uterine activity from [the labor-inducing drug] and prolonged second stage of labor caused uteroplacental insufficiency and cord compression resulting in [appellant’s] hypoxia.”

Following a hearing, the district court issued an order granting respondents’ motion for summary judgment and dismissing appellant’s claims with prejudice. The district court determined that, due to the exclusion of any evidence regarding CCIE, appellant’s only remaining theory was that she suffered HIE due to “uteroplacental insufficiency, or cord compression.” But, the district court observed, none of appellant’s qualified expert witnesses opined that uteroplacental insufficiency or umbilical cord compression caused HIE during appellant’s delivery. The district court concluded that, because appellant had not offered the expert testimony necessary “to establish that [the] alleged injury was caused by uteroplacental insufficiency or cord compression as an independent mechanism of injury,” appellant failed to make a prima facie showing of medical malpractice as required by Minnesota law.

DECISION

- I. The district court did not abuse its discretion when it excluded appellant’s expert testimony concerning CCIE on the ground that the theory lacks foundational reliability as a mechanism for appellant’s alleged injury.**

Appellant argues that the district court erred in excluding her proffered evidence of the CCIE theory as an explanation for how she received her alleged birth injury.

Specifically, appellant challenges the district court’s determinations that the CCIE theory (1) is novel scientific evidence and (2) is not generally accepted in the scientific community. Respondents contend that the district court correctly decided these legal questions. And respondents argue that, in any event, the district court was well within its discretion when it rejected CCIE evidence on the basis of another threshold admissibility requirement—that the evidence lacked foundational reliability. We agree with respondents that the district court did not abuse its discretion in determining that the CCIE evidence lacked foundational reliability, and we uphold the district court’s decision on this ground.

To be admissible at trial, “expert testimony must satisfy the basic requirements of the rules of evidence.” *Archdiocese of St. Paul*, 817 N.W.2d at 164. It must be relevant, Minn. R. Evid. 402; it must be more probative than unfairly prejudicial, Minn. R. Evid. 403; and it must meet the threshold admissibility requirements for expert testimony, Minn. R. Evid. 702. Rule 702 of the Minnesota Rules of Evidence requires the proponent of expert testimony to demonstrate that the proffered testimony satisfies four requirements: (1) the proffered witness must qualify as an expert; (2) “the expert’s opinion must have foundational reliability; (3) the expert testimony must be helpful to the trier of fact”; and (4) any testimony involving a novel scientific theory must satisfy the *Frye-Mack* standard. *Archdiocese of St. Paul*, 817 N.W.2d at 164 (citing *State v. Obeta*, 796 N.W.2d 282, 289 (Minn. 2011)).

The fourth requirement of rule 702 only applies to “novel” scientific evidence. Evidence involves a “novel scientific theory” if neither this court nor the Minnesota Supreme Court has decided that the theory satisfies the *Frye-Mack* standard. *State v.*

Edstrom, 792 N.W.2d 105, 110-11 (Minn. App. 2010) (citing *Roman Nose*, 649 N.W.2d at 821-23). The *Frye-Mack* standard has two elements, both of which must be satisfied by the proponent of the evidence. *Goeb v. Tharaldson*, 615 N.W.2d 800, 814 (Minn. 2000). First, the proponent of the evidence must establish that “the underlying scientific evidence is generally accepted in the relevant scientific community.” *Archdiocese of St. Paul*, 817 N.W.2d at 156 (quotation omitted). Second, the proponent must show that the particular scientific evidence offered has foundational reliability. *Id.*

Both rule 702 and the *Frye-Mack* standard require the proponent of expert testimony to establish the foundational reliability of the expert’s opinion. *State v. Harvey*, 932 N.W.2d 792, 806 (Minn. 2019). There is no difference between the foundational reliability required by rule 702 and by the *Frye-Mack* standard. *Id.*

“An assessment of the foundational reliability of an expert’s opinion begins by considering the purpose for which it is offered.” *State v. Berry*, 982 N.W.2d 746, 757 (Minn. 2022). The district court must also “consider the underlying reliability, consistency, and accuracy of the subject about which the expert is testifying.” *Id.* (quotation omitted). Importantly, “the party offering the evidence must show that it is reliable in that particular case.” *Id.* (quotation omitted).

An appellate court reviews the district court’s determination of foundational reliability under both rule 702 and the *Frye-Mack* standard for an abuse of discretion. *Goeb*, 615 N.W.2d at 815 (reviewing scientific evidence under *Frye-Mack*); *State v. Garland*, 942 N.W.2d 732, 742 (Minn. 2020) (reviewing scientific evidence under rule 702). “A district court abuses its discretion when its decision is based on an erroneous

view of the law or is against logic and the facts in the record.” *Garland*, 942 N.W.2d at 742 (quotation omitted). An appellate court will not reverse the district court’s evidentiary ruling unless there is clear error. *Goeb*, 615 N.W.2d at 815.

Here, the district court determined that appellant failed to show “that CCIE has a scientifically reliable foundation.” The district court identified several factual findings that supported its determination. It noted that both parties’ experts agreed there is no “test” for cranial compression in a human fetus; therefore, “[t]here are no defined measurements that can be taken, defined parameters that can be applied, or defined thresholds that must not be surpassed.” Further, the district court observed that many of the studies submitted by appellant tested the theory of CCIE on fetal sheep, and not fetal humans, but due to significant differences in skull anatomy, fetal sheep and fetal humans are not comparable. And the district court found that, although the force of uterine contractions can be quantified in a measurement called “montevideo” units, appellant’s experts “could specify neither the degree of compression nor the amount of force required to cause injury to the human fetal brain during labor.” The district court concluded that, given these limitations, appellant was unable to provide “parameters or standards” by which a jury could apply the theory of CCIE to the facts of her case. Thus, according to the district court, the theory lacked foundational reliability.

Based on our review of the record, we discern no abuse of discretion in the district court’s determination for several reasons.

First, appellant failed to present any scientific evidence connecting the compressive forces on the human fetal skull during vaginal birth to neurologic injury. Appellant’s

expert Dr. Michael Lloyd, a pediatric neurologist, who testified that CCIE was a mechanism of fetal brain injury, conceded that all of the studies he relied on to formulate his opinion that compressive forces caused increased cranial pressure in fetuses were either conducted on fetal sheep, did not actually discuss head compression, or examined compressive forces involved in forceps- or vacuum-assisted deliveries—two methods of delivery not at issue here. Both parties’ experts agreed that the skulls of fetal sheep and fetal humans differ significantly. Unlike sheep, the skulls of human fetuses are not fused at birth. And unlike sheep, human fetuses have distinct blood circulation systems to the brain that allow them to adapt to changes in cranial pressure. Both parties’ experts also agreed that cranial compression studies have not been conducted on human fetuses because of ethical concerns and practical limitations. Appellant’s expert Dr. Lloyd acknowledged that “the models of perinatal injury mimic a broad and as yet poorly-understood condition of the newborn human infants. . . . [W]e need to do further studies in order to contribute to the knowledge of this underlying mechanism.”

Second, the testimony of respondents’ experts highlighted the shortcomings of the CCIE theory. Respondents’ expert Dr. Suneet Chauhan, an obstetrician and gynecologist specializing in maternal-fetal medicine, testified that, without some measure of increased cranial pressure during labor or any studies on the impact of increased pressure on the fetal brain, a doctor cannot diagnose this condition as a cause of neurological injury. And respondents’ expert Dr. Jay Paul Goldsmith, a physician practicing neonatology, testified that appellant failed to “provide any specific criteria that might allow head compression as a cause of brain injury to be diagnosed or indeed avoided” in human fetuses.

Third, the scholarly articles that appellant submitted to the district court in support of the CCIE theory are either inapplicable to the circumstances of her case or of questionable scientific validity. As noted, several articles relied upon by appellant's expert Dr. Lloyd concern head pressure caused by forceps or vacuums, and not by the natural process of uterine contractions. One study submitted by appellant contains no reference to the conditions of hypoxia or ischemia, which appellant claims were the medical cause of her alleged birth injury. Another study that appellant submitted concerns preterm births; appellant was born at full term. Six studies focus on fetal sheep. And several studies appear to have either skirted the peer-review process or contain no information about their peer-review status.

Although appellant hardly addressed the issue of foundational reliability on appeal, we construe appellant's briefs to advance two arguments concerning this admissibility requirement.

First, appellant seems to argue that she established the foundational reliability of the CCIE theory because imaging studies of her brain performed shortly after birth are *consistent* with the theory. Appellant states the CT scan and the MRI of her brain "fit with the physiologic dynamic of the Cushing effect being overcome and progressive trauma causing brain injury and resulting [in] HIE." But this consistency alone did not impart foundational reliability. Appellant's experts could not identify any test for determining when cranial compression would cause HIE, any measurements or parameters that could be applied in appellant's case, or any standards that a jury could use in deciding whether and when uterine contractions caused appellant's alleged injury. Thus, even if the imaging

studies were consistent with the CCIE theory, the district court did not abuse its discretion in rejecting evidence of the theory on the ground of foundational reliability.

Second, appellant contends that the CCIE theory has foundational reliability because other jurisdictions have allowed evidence of the theory. We are not persuaded. To establish foundational reliability, appellant was required to show that the CCIE theory can be applied to the particular facts of her case. *See Berry*, 982 N.W.2d at 757; *see also Roman Nose*, 649 N.W.2d at 820-22 (stating that decisions of other appellate courts may be relevant evidence on the general acceptance of a scientific theory, which is distinct from how the theory applies to an individual case). Yet, as noted, appellant produced no scientific evidence showing the amount of uterine force required to cause injury to the human fetal brain during labor. Moreover, appellant presented no scientific evidence showing that prolonged labor is an established cause of HIE in human fetuses generally. Regardless of the evidence allowed in other cases in other jurisdictions, appellant failed to show that the CCIE theory had foundational reliability in her case.

Given the record before us, we discern no abuse of discretion in the district court's decision to exclude evidence of the CCIE theory on the ground of foundational reliability. Because the evidence lacked foundational reliability, it was inadmissible under the rules of evidence and the *Frye-Mack* standard for novel scientific evidence.⁷

⁷ Because we affirm the district court's decision on this basis, we do not address appellant's arguments that the CCIE theory is not "novel" and that the CCIE theory satisfied the second element of the *Frye-Mack* standard, general acceptance in the scientific community.

II. The district court did not err when it granted summary judgment in favor of respondents because appellant failed to present any opinions from experts that her second alleged mechanism of injury—uteroplacental insufficiency or cord compression—caused any injury.

Appellant argues that the district court erred in granting respondents’ summary-judgment motion after excluding evidence of the CCIE theory because appellant also presented evidence of a second “concurring or coinciding” mechanism of injury—uteroplacental insufficiency. Respondents reply that, because appellant had no admissible expert testimony to support this alternative causation theory, the district court properly granted summary judgment. We agree with respondents that the district court did not err in granting summary judgment because appellant failed to disclose any admissible expert testimony to support her claim that uteroplacental insufficiency caused HIE.

A district court shall grant summary judgment for a moving party if “the movant shows that there is no genuine issue as to any material fact and the movant is entitled to judgment as a matter of law.” Minn. R. Civ. P. 56.01. To support the assertion that there is no genuine issue as to any material fact, a party must cite to “particular parts of materials in the record, including depositions, documents, electronically stored information, affidavits, stipulations . . . , admissions, interrogatory answers, or other materials.” Minn. R. Civ. P. 56.03(a)(1).

An appeal from summary judgment is reviewed de novo. *Montemayor v. Sebright Prods., Inc.*, 898 N.W.2d 623, 628 (Minn. 2017). An appellate court reviews “the record to determine whether there is any genuine issue of material fact and whether the district

court erred in its application of the law.” *Dahlin v. Kroening*, 796 N.W.2d 503, 504 (Minn. 2011).

There are three essential elements to a medical-malpractice claim: “(1) the standard of care recognized by the medical community as applicable to the particular defendant’s conduct, (2) that the defendant in fact departed from that standard, and (3) that the defendant’s departure from the standard was a direct cause of the patient’s injuries.” *MacRae v. Grp. Health Plan, Inc.*, 753 N.W.2d 711, 717 (Minn. 2008) (quotation omitted). A plaintiff in a medical-malpractice action must make a prima facie showing of medical negligence by establishing “that it is more probable than not that his or her injury was a result of the defendant health care provider’s negligence.” *Leubner v. Sterner*, 493 N.W.2d 119, 121 (Minn. 1992). “Failure to present such proof (normally in the form of expert testimony) mandates either summary judgment or a directed verdict for the defendant.” *Id.* “Expert testimony is generally required in medical-malpractice cases because they involve complex scientific or technological issues.” *Mercer v. Andersen*, 715 N.W.2d 114, 122 (Minn. App. 2006).

When expert testimony is necessary to establish a prima facie case, Minnesota Statutes section 145.682 (2022) imposes two requirements on a plaintiff. Minn. Stat. § 145.682, subd. 2; *Anderson v. Rengachary*, 608 N.W.2d 843, 846 (Minn. 2000). First, the complaint must include an affidavit of expert review by the plaintiff’s attorney stating that the attorney has reviewed the case “with an expert whose qualifications provide a reasonable expectation that the expert’s opinions could be admissible at trial and that, in the opinion of this expert, one or more defendants deviated from the applicable standard of

care and by that action caused injury to the plaintiff.” Minn. Stat. § 145.682, subds. 2, 3(1). Second, within 180 days after commencement of discovery, a plaintiff must serve on the defendant an affidavit of expert identification that includes:

[T]he identity of each person whom plaintiff expects to call as an expert witness at trial to testify with respect to the issues of malpractice or causation, the substance of the facts and opinions to which the expert is expected to testify, and a summary of the grounds for each opinion.

Id., subd. 4(a). To satisfy this second requirement for expert-witness disclosures, the expert affidavit must articulate specific details of the expert’s testimony, including the standard of care, the acts or omissions that the plaintiff alleges violated the standard of care, and an outline of the chain of causation that resulted in the injury. *Maudsley v. Pederson*, 676 N.W.2d 8, 13 (Minn. App. 2004). General or conclusory statements concerning the standard of care, breach, or the causative link between the breach and the injury will not suffice. *See Sorenson v. St. Paul Ramsey Med. Ctr.*, 457 N.W.2d 188, 192-93 (Minn. 1990). To survive summary judgment, an expert affidavit must contain “specific details” about the expert’s anticipated testimony, including explaining “the chain of causation” between the violation of the standard of care and the plaintiff’s damages. *Lindberg v. Health Partners, Inc.*, 599 N.W.2d 572, 577 (Minn. 1999) (quotation omitted). Section 145.682 is strictly construed, and affidavits that do not meet the stringent requirements outlined in this statutory section cannot overcome summary judgment as a matter of law. *Id.* at 576-78.

Here, in granting summary judgment, the district court determined that appellant failed to establish a causal mechanism for her alleged injury. The district court noted that

it had excluded any evidence of CCIE as a cause of injury. And the district court observed that “[n]one of [appellant’s] experts who are qualified to testify as to the causal mechanism of her alleged injury have disclosed uteroplacental insufficiency or cord compression as a contributing factor to, let alone an independent cause of, [appellant’s] alleged injury.”

Our review of the record confirms that appellant’s experts did not opine that the cause of appellant’s HIE was uteroplacental insufficiency or cord compression. Indeed, of the multiple expert-witness disclosures that appellant produced, just two used the term “uteroplacental insufficiency.” One of those disclosures was from Michelle Murray, Ph.D., RNC-OB, who stated that there was evidence of “hypoxia due to uteroplacental insufficiency.” However, on October 4, 2021, the district court found that Dr. Murray, an expert as to the nursing standard of care, lacked sufficient foundation to offer an opinion regarding the cause of appellant’s alleged brain damage, a decision that appellant did not challenge. A second expert, Dr. Brian Shaffer, a physician practicing in the areas of obstetrics and maternal-fetal medicine, stated that “the cost to the unborn baby was significant utero placental insufficiency resulting in hypoxic ischemic encephalopathy.” But Dr. Shaffer’s expert-witness disclosure does not define or discuss the pathophysiology of uteroplacental insufficiency, how it is detected, and most importantly, how this condition relates to appellant’s birth. Moreover, Dr. Shaffer’s statement does not contain “specific details” outlining “the chain of causation” between the alleged violation of a standard of care and appellant’s alleged injury. *See Lindberg*, 599 N.W.2d at 577 (quotation omitted).

Appellant argues in her reply brief that the terms—such as “prolonged ischemic hypoxia”—used by some of her other experts can refer to uteroplacental insufficiency.

However, statements and arguments made by an attorney are not evidence. *State v. Johnson*, 616 N.W.2d 720, 728 (Minn. 2000). “Evidence offered to support or defeat a motion for summary judgment must be such evidence as would be admissible at trial.” *Hopkins v. Empire Fire & Marine Ins. Co.*, 474 N.W.2d 209, 212 (Minn. App. 1991) (citing *Murphy v. Country House, Inc.*, 240 N.W.2d 507, 511 (Minn. 1976)). Because appellant’s expert-witness disclosures do not state that there was uteroplacental insufficiency or cord compression, do not explain how these conditions can be identified based on the medical evidence, and do not explain how these conditions were a mechanism of appellant’s alleged injury, they do not support appellant’s theory that one or both conditions caused her HIE.

Appellant contends that the district court erred in requiring evidence that uteroplacental insufficiency or cord compression alone were the cause of her alleged injury. She argues that, in so doing, the district court overlooked “the doctrine of concurring or coinciding cause.”

We reject this argument for two reasons. First, appellant did not preserve the argument for appeal because she failed to raise it before the district court. *See Thiele v. Stich*, 425 N.W.2d 580, 582 (Minn. 1988) (holding that the appellate court improperly considered an issue not litigated during summary-judgment proceedings). Second, even if the argument were properly before us, appellant failed to present any admissible expert opinion that uteroplacental insufficiency or cord compression occurred during her birth and caused HIE. “Concurring causes are direct causes which act contemporaneously or so nearly together that the chain of causation is not broken, and together cause an injury which would not have resulted in the absence of either one.” *Roemer v. Martin*, 440 N.W.2d 122,

123 n.1 (Minn. 1989); *see also Curtis v. Klausler*, 802 N.W.2d 790, 794 (Minn. App. 2011), *rev. denied* (Minn. Oct. 18, 2011). “Before a particular factor can be said to be a concurrent cause, it must, first of all, be established that it is a cause.” *Roemer*, 440 N.W.2d at 123. Because appellant did not present evidence that uteroplacental sufficiency or cord compression was *a* cause of injury, these conditions could not be a concurring cause.⁸

Appellant failed to support either of her theories of injury with admissible expert testimony. Accordingly, based on our *de novo* review, we conclude that the district court did not err in granting respondents’ motion for summary judgment.

Affirmed.

⁸ Appellant also argues that the district court implicitly applied the doctrine of “equitable estoppel” to exclude her uteroplacental insufficiency theory once this court denied her petition for a writ of prohibition seeking review of the district court’s exclusion of CCIE evidence. She challenges the district court’s application of this doctrine as legal error. However, the district court did not cite the doctrine of equitable estoppel in its analysis, and we see no indication that the district court implicitly relied on the concept. Thus, we reject appellant’s argument as unsupported by the record.

Relatedly, appellant contends that our order denying her petition for a writ of prohibition—in which we stated that appellant had raised a second theory of injury, uteroplacental insufficiency, and accordingly, she could seek review of the district court’s order excluding CCIE evidence following a judgment—was the “law of the case,” requiring a trial on the uteroplacental-insufficiency theory. *See Peterson v. BASF Corp.*, 675 N.W.2d 57, 65 (Minn. 2004) (defining law of the case as “a rule of practice that once an issue is considered and adjudicated, that issue should not be reexamined in that court or any lower court throughout the case”), *vacated on other grounds*, 544 U.S. 1012 (2005). Our order denied appellant’s petition and did not address the merits of appellant’s underlying negligence action. We again reject this argument as unsupported by the record.

CONNOLLY, Judge (concurring specially)

I concur with the majority’s decision that the evidence regarding the theory of cranial compression ischemic encephalopathy (CCIE) is inadmissible because it lacks foundational reliability under the second prong of the *Frye-Mack* analysis.¹ But I write separately because I would go a step further and conclude that the CCIE theory is not generally accepted in the relevant scientific community and, therefore, evidence of the theory is inadmissible under the first prong of the *Frye-Mack* analysis as well.

Under Minnesota law, expert testimony is “scientific, technical, or other specialized knowledge” that will “assist the trier of fact to understand the evidence or to determine a fact in issue.” Minn. R. Evid. 702. To be admissible under rule 702, expert testimony must satisfy a four-part test: “(1) [t]he witness must qualify as an expert; (2) the expert’s opinion must have foundational reliability; (3) the expert testimony must be helpful to the trier of fact; and (4) if the testimony involves a novel scientific theory, it must satisfy the *Frye-Mack* standard.” *Doe v. Archdiocese of St. Paul*, 817 N.W.2d 150, 164 (Minn. 2012).

“Before engaging in the *Frye-Mack* analysis, a district court must first determine whether the proffered evidence involves a novel scientific theory or technique.” *State v. Garland*, 942 N.W.2d 732, 746 (Minn. 2020). “A theory or technique is novel if it is new.” *State v. Berry*, 982 N.W.2d 746, 755 (Minn. 2022). If a technique is novel, a hearing is required to determine whether the technique is generally accepted in the relevant scientific community. *State v. Roman Nose*, 649 N.W.2d 815, 822 (Minn. 2002). Whether evidence

¹ *Frye-Mack* derives from *Frye v. United States*, 293 F. 1013, 1014 (D.C. Cir. 1923), and *State v. Mack*, 292 N.W.2d 764, 768 (Minn. 1980).

involves a novel, scientific theory or technique is an issue of law that is reviewed de novo. *Berry*, 982 N.W.2d at 755.

The district court here found that CCIE evidence is a novel, scientific theory or technique, and I agree. No Minnesota court has yet to consider appellant's theory of CCIE. *See Roman Nose*, 649 N.W.2d at 821 (noting that a scientific technique is novel until "[a] court has reviewed and confirmed [its] general acceptance"). Although appellant cites several cases from other jurisdictions that have accepted a CCIE theory, those cases have applied a lesser standard.² *See, e.g., Ellis v. Fortner*, 169 N.E.3d 987, 993-95 (Ohio App. 2021) (applying *Daubert* standard in considering whether the district court abused its discretion in denying motion to exclude testimony of proximate cause theory premised upon CCIE); *Trujillo v. Vail Clinic, Inc.*, 480 P.3d 721, 724-27 (Colo. App. 2020) (discussing *Daubert* standard in considering whether to admit evidence of CCIE, but ultimately applying a totality-of-the-circumstances standard established by the Colorado Supreme Court). As such, appellant's theory has not been subjected to "the rigors of a *Frye-Mack* hearing." *See State v. Edstrom*, 792 N.W.2d 105, 110 n.1 (Minn. App. 2010) (recognizing that scientific evidence is considered novel when it has not yet been subject to "the rigors of a *Frye-Mack* hearing"). And there is no indication that CCIE has longstanding use in clinical practice, or that it exists outside of the litigation context. *See*

² *Daubert v. Merrell Dow Pharms, Inc.*, 509 U.S. 579, 589-92 (1993); *see also Goeb v. Tharaldson*, 615 N.W.2d 800, 814 (Minn. 2000) (reaffirming Minnesota's adherence to the *Frye-Mack* general-acceptance standard and rejecting the less-stringent standard set out in *Daubert*).

State v. Harvey, 932 N.W.2d 792, 808 (Minn. 2019) (recognizing that technology related to the challenged evidence had been used for over a decade).

Because the CCIE evidence is novel, the question becomes whether the underlying science is generally accepted within the relevant scientific community and whether the particular scientific evidence in the case is shown to have foundational reliability. *Doe*, 817 N.W.2d at 165. “Put another way, the *Frye-Mack* standard asks first whether experts in the field widely share the view that the results of scientific testing are scientifically reliable, and second whether the laboratory conducting the tests in the individual case complied with appropriate standards and controls.” *Roman Nose*, 649 N.W.2d at 819. Whether the underlying scientific theory is generally accepted in the relevant scientific community is a question of law that is reviewed de novo. *Goeb*, 615 N.W.2d at 815.

I conclude, as did the district court, that the CCIE theory is not generally accepted in the relevant scientific community. The CCIE theory does not appear in the medical-school textbooks that are presently being used in medical school and, in fact, it has been specifically rejected in several reputable medical textbooks. The CCIE theory is also noticeably absent from the leading textbook on pediatric neuroradiology. Although the theory has been mentioned in some published articles, several of the articles cited by appellant were either outdated or not peer reviewed.

Moreover, the CCIE theory is not mentioned in the leading monograph on neonatal encephalopathy and neurologic outcome. As the district court found, the absence of the CCIE theory is significant considering the “painstaking nature of the process” in compiling the monograph, which the district court described as follows:

There was 16 members of the taskforce [that compiled the monograph], which included [one of respondents' experts]. The taskforce utilized approximately 50 consultants, including [another one of respondents' experts]. The taskforce was a joint task force of the American College of Obstetricians and Gynecologists . . . and the American Academy of Pediatrics, charged with examining neonatal encephalopathy, its causes, its treatment, its prevention, in every aspect that could be considered. The taskforce had the previous Monograph, from 2003, with which to work, as the 16 members and roughly 50 consultants met to examine, revise, and update it. Over a period of three years, the group pursued its task, finally publishing the Monograph in 2014.

Not only does the monograph not state that cranial compression causes intracranial pressure that results in injurious hypoxia or ischemia, but the record reflects that the CCIE theory was rejected by the taskforce in compiling the monograph. Specifically, members of the taskforce that reviewed a paper expressing the theory of CCIE concluded that the article lacked scientific validity because it was ““based on a lot of conjecture”” and ““very old techniques,”” with ““some of the studies [being] 50 to 100 years old.”” The monograph has been endorsed by 12 separate national and international organizations,³ and even appellant's experts deemed the monograph “reliable.”

Finally, courts subjecting the CCIE theory to the rigors of a *Frye* hearing have concluded that the theory is not generally accepted in the scientific community. *See, e.g.*,

³ These monographs are: American College of Nurse-Midwives, American Gynecological and Obstetrical Society, American Society for Reproductive Medicine, Association of Women's Health, Obstetric and Neonatal Nurses, Australian Collaborative Cerebral Palsy Research Group, Child Neurology Society, Japan Society of Obstetrics and Gynecology, March of Dimes Foundation, Royal Australian and New Zealand College of Obstetricians and Gynaecologists, Royal College of Obstetricians and Gynaecologists, Society of Maternal-Fetal Medicine, and Society of Obstetricians and Gynaecologists of Canada.

Cumberbatch v. Blanchette, 35 A.D.3d 341, 342-43 (N.Y. App. Div. 2006) (affirming lower court’s exclusion of injurious cranial compression theory); *Del Maestro v. Grecco*, 16 A.D.3d 364, 366 (N.Y. App. Div. 2005) (affirming lower court’s exclusion of CCIE based on “the lack of medical literature, or even a single reported case study to support the plaintiffs’ theory of causation that prolonged contractions in labor are an associated risk for left middle cerebral artery infarct in full-term infants”); *Saulpaugh ex rel. Saulpaugh v. Krafte*, 5 A.D.3d 934, 936 (N.Y. App. Div. 2004) (affirming lower court’s exclusion of CCIE because the plaintiff failed to establish general acceptance of the theory). And even some courts that have applied a *Daubert* standard have excluded evidence of the CCIE theory at trial. For example, in *Smith v. Braswell*, the Georgia Court of Appeals affirmed a lower court’s exclusion of the CCIE theory because it “has not been reliably tested, has not been subject to peer review and publication, *is not generally accepted in the scientific community*, and has not been clinically diagnosed in any other patients.” 804 S.E.2d 709, 711 (Ga. Ct. App. 2017) (emphasis added).

In sum, because the CCIE theory is novel and not generally accepted in the relevant scientific community, I would conclude that the district court did not err in determining that the CCIE theory is inadmissible under both prongs of the *Frye-Mack* analysis. I also agree with the majority that the district court did not err in granting summary judgment to respondents because appellant failed to present any opinions from experts that her second alleged mechanism of injury—uteroplacental insufficiency or cord compression—caused any injury. As such, I would affirm the district court in all respects.