No. 2-08-0193 Filed: 7-27-10

IN THE

APPELLATE COURT OF ILLINOIS

SECOND DISTRICT

THE NORTHERN TRUST COMPANY, as Co-guardian of the Estate of Benjamin Hayes, a Minor, and MICHELLE HAYES and AARON HAYES, Indiv. and as Co-guardians of the Estate of Benjamin Hayes, a Minor,	)	Appeal from the Circuit Court of Du Page County.
Plaintiffs-Appellees,	)	
v.	)	No. 01--L--1115
BURANDT AND ARMBRUST, LLP, and STEVEN ARMBRUST,	)	Honorable Hollis L. Webster,
Defendants-Appellants.	)	Judge, Presiding.

JUSTICE BURKE delivered the opinion of the court:

Plaintiffs, the Northern Trust Company and Aaron and Michelle Hayes, the parents of Benjamin Hayes, filed this action alleging that defendant Dr. Steven Armbrust, a family practitioner with defendant Burandt & Armbrust, LLP, caused Benjamin to suffer neurological injuries at the time of his birth. Specifically, plaintiffs alleged that Dr. Armbrust negligently delayed the cesarean section delivery of Benjamin by (1) obtaining an operating room for Michelle too late and (2) failing to take steps to slow Michelle's contractions after Dr. Armbrust decided that a cesarean section was necessary.

Plaintiffs' theory is that Benjamin's injuries were caused by decreased oxygen flow, known as hypoxia or asphyxia. Before trial, plaintiffs successfully moved to bar defendants' expert witnesses from opining that Benjamin's injuries were caused by a preexisting infection. First, the defense experts concluded that the placenta and Michelle's amniotic cavity were infected and that the infection caused a "cascade of cytokines" that produced fetal inflammatory response syndrome (FIRS) in Benjamin, which caused his brain damage. Second, the defense experts opined that Benjamin himself was infected and that his body's response also caused brain damage. According to this infection-causation defense, Benjamin arrived at the hospital with the infection, and therefore Dr. Armbrust's actions did not proximately cause the injuries.

The trial court concluded that the defense experts relied on scientific principles and methodology that passed the "general acceptance" test of Frye v. United States, 293 F. 1013 (D.C. Cir.1923), in that they had gained general acceptance in the medical field. Nevertheless, the court excluded the experts' opinions as too speculative because the medical records did not support them. A jury found defendants liable and awarded plaintiffs $12 million.

Defendants appeal, arguing that they are entitled to a new trial because (1) the trial court abused its discretion in barring the infection-causation defense and (2) the jury's verdict is against the manifest weight of the evidence. Plaintiffs respond that the infection-causation defense was properly excluded because (1) it is too speculative; (2) defendants' offer of proof was too voluminous and was introduced late, during jury deliberations; and (3) even if there was an evidentiary foundation to support the infection-causation defense, the theory failed to pass the Frye test of "general acceptance." Plaintiffs also argue that the jury's verdict is not against the manifest weight of the evidence.

We hold that the trial court correctly ruled that the infection-causation defense passed the Frye test but that the court abused its discretion in excluding all of the related evidence as speculative. The defense experts cited sufficient evidence to support their opinions such that it was an abuse of discretion to withhold the entire theory from the jury. Specifically, the court erred in excluding evidence of sepsis in Benjamin and of maternal infection, but the exclusion of evidence of meningitis in Benjamin was appropriate.

Defendants argue that they were entitled to a directed verdict at trial because "there was a total failure of proof on the element of proximate causation," but on appeal, defendants merely request a new trial rather than an outright reversal for the alleged failure of proof. Thus, defendants have forfeited any argument that they are entitled to a directed verdict. Forfeiture notwithstanding, we conclude that the jury heard sufficient evidence to support the judgment such that a directed verdict for defendants would have been inappropriate. Based on the evidentiary error, however, we reverse the judgment and remand the cause for a new trial.

FACTS

Benjamin suffers from cerebral palsy, and he was eight years old at the time of trial. Dr. Armbrust does not perform cesarean sections because, like most family practitioners, he does not have surgical privileges. Dr. Armbrust saw Michelle regularly for prenatal care as her family practitioner.

A. The Delivery

Early in the evening on December 22, 1999, Michelle went into labor and she went to Central Du Page Hospital (CDH) to deliver Benjamin. At 5 p.m., her membranes ruptured, and around 1 a.m. or 2 a.m. on December 23, 1999, Dr. Armbrust arrived at the hospital to monitor Michelle's progress.

Dr. Armbrust ordered that Michelle be given Pitocin, a synthetic version of the hormone oxytocin, which is used to stimulate contractions. Michelle was completely dilated at 5:30 a.m. and began pushing around 6 a.m.

Michelle was administered an epidural to control the pain of her contractions. The Pitocin was turned off from 6 a.m. to 6:30 a.m. Michelle's contractions resumed within a half-hour of the Pitocin being restarted. Michelle's epidural was cut back around 7 a.m. so she could push better.

Just before 8 a.m., Dr. Armbrust brought Dr. Messitt, a physician specializing in obstetrics and gynecology with surgical privileges at CDH, to see Michelle and give a second opinion. Dr. Armbrust was concerned about Michelle's progress and thought a cesarean section might be necessary. Dr. Messitt examined Michelle and opined that the best course was to allow her to continue pushing for another hour and a half, with the epidural turned down, after which they would reassess the need for a cesarean section. Benjamin was in the undesirable "right occiput posterior position," which means that his head was facing up, but Dr. Messitt felt that this would not make the labor more complicated because the head usually rotates downward in the last phase of labor. Dr. Messitt reviewed fetal monitors that showed that Benjamin had a couple of decelerations of his heart rate, but Dr. Messitt believed those had cleared.

Around 8:30 a.m., Michelle developed a fever of 100.3 degrees. Dr. Armbrust testified that, around 8:40 a.m., he decided to go forward with the cesarean section because of his concern about the fever. Dr. Armbrust told the charge nurse that he wanted an operating room "now," but he was told that no room was ready.

A cesarean section could be performed in operating room 14, 15, or 16, all of which were near Michelle's room. The labor and delivery area was in charge of room 16, which was generally

reserved for cesarean sections. To schedule a cesarean section in room 14 or 15, the labor and delivery charge nurse must contact the operations leader in charge of the "Inner Core." The "Inner Core" refers to the entrance to the sterile area around operating rooms 14 and 15. Then the operations leader would contact an anesthesiologist and other necessary staff for the operating room. Once in a while, a doctor might contact the Inner Core directly to obtain an operating room, but those rare cases involve surgeons with surgical privileges. Beginning at 7:55 a.m., there was already a cesarean section taking place in room 16, but operating rooms 14 and 15 were open.

Carol Rimdzius was the labor and delivery charge nurse on duty on the morning of December 23, 1999. Nurse Rimdzius testified that she specifically remembered Dr. Armbrust telling her that he wanted to schedule a cesarean section and that room 16 was occupied with a cesarian section. Nurse Rimdzius testified that, in 1999, if room 16 was occupied and somebody requested a room for an emergency cesarean section, she would first need to "find out if it was by 1999's definition of an emergency, something that had to be done immediately or was it something that could wait." If the cesarean section was not an emergency, she would wait for room 16 to open rather than call the Inner Core to ask for another room. In 1999, "emergency" was defined as a life-threatening crash, with impending potential death. In a situation less serious than a "crash emergency" and more serious than a "can wait" situation, Nurse Rimdzius's decision would depend on what the doctor told her. About 20 minutes passed from when Dr. Armbrust first told her he wanted a room for a cesarean section to when Benjamin crashed. Someone from the nurses' station first contacted the Inner Core after Nurse Rimdzius knew Benjamin had crashed. She testified that, even if she had been told it was an "emergency" at 8:40 or 9 a.m., she would not have done anything differently because there had not been a crash at that time. Nurse Rimdzius testified that she would contact the Inner Core only if the

situation was a "true c-section emergency with risk of death for the baby" and that she was aware that Dr. Armbrust wanted the room "urgently" and "as soon as possible."

Dr. Armbrust testified that he did not recall any previous situation where he was unable to get an operating room when he wanted one. He testified that he told Nurse Rimdzius that he wanted a room "now" but that he did not describe the situation as an emergency because Benjamin had not crashed. Nurse Rimdzius testified that she asked Dr. Armbrust if it was an emergency, told him that room 16 was in use, and asked him if it was something that could wait. Nurse Rimdzius testified that Dr. Armbrust replied that he could wait but that he did not want to "dilly dally," so she told him she would tell the people using room 16 that a cesarean section was waiting and the room should be prepared as soon as they finished. Nurse Rimdzius admitted that she did not try to find out whether another operating room was available.

Dr. Armbrust testified that, for the 40 minutes from when he decided to proceed with the cesarean section to when it began, he traveled back and forth from Michelle's room to the nurses' station to ask for an operating room every three minutes. The nurses' station was near Michelle's room. Dr. Armbrust testified that he was concerned about Benjamin's heart rate from 9:03 and 9:07 a.m., but he was unaware that an operating room was available. Because he believed there was no operating room available, Dr. Armbrust continued to tell Michelle to push during contractions, even though he had decided to proceed with the cesarean section.

Dr. Messitt testified that Dr. Armbrust called him around 8:35 a.m. and told him that Michelle had a fever of 100 degrees and was not making any further progress. Dr. Messitt testified that he told Dr. Armbrust to tell the nursing supervisor to prepare an operating room for a cesarean section and then he went to the nurses' station. At the nurses' station, Dr. Messitt was told that they were

"getting the room ready." Drs. Armbrust and Messitt testified that they told the charge nurse that they needed an operating room "as soon as possible." Dr. Messitt testified that he stood at the nurses' station so he could monitor the baby's heart rate.

Aaron and Michelle testified that they saw Dr. Armbrust walking back and forth from Michelle's room to the nurses' station across the hall as he and Dr. Messitt tried to convey the urgency of getting an operating room. Dr. Armbrust told them that he wanted to perform a cesarean section but that he could not get an operating room. Michelle continued to receive two milliunits of Pitocin, which is a very small dose, while they waited for the operating room to become available. Michelle also received Mefoxin, an antibiotic, at 9:10 a.m. to treat her fever.

Nurse Carol Sue Borowski was a registered nurse who worked with Michelle at CDH from 7 a.m. until she delivered. Nurse Borowski testified that she had no independent recollection of any of the events of December 23, 1999, but according to the medical charts, Michelle received two milliunits of Pitocin between 7:15 a.m. and 8:45 a.m. Nurse Borowski testified that Dr. Armbrust may have told her to turn off the Pitocin before Benjamin crashed, but she could not recall.

Dr. Armbrust's notes indicated that he had told a nurse to stop administering Pitocin, although there was no written order to that effect. He testified that the order to discontinue the Pitocin did not need to be in writing to be effective and that physicians do not usually follow nurses around to confirm that orders are carried out. Dr. Armbrust testified that he told the nurse to discontinue the Pitocin when he decided to proceed with the cesarean section, but that he later discovered that the Pitocin had not been discontinued and that Michelle was still receiving it while he walked back and forth between the nurses' station and Michelle's room. Aaron testified that Dr. Armbrust told the nurses several times to turn off the Pitocin and that Dr. Armbrust eventually did so himself.

At 9:21 a.m., Benjamin's fetal heart rate dropped from 180 to 60 beats per minute. The drop to 60 beats per minute was a "crash." Dr. Armbrust had instructed Michelle to continue pushing until a few minutes before the crash, at which point he instructed her to stop pushing. Dr. Armbrust testified that it is basically impossible to tell a woman in the middle of a contraction not to push, and because he could not get an operating room, he hoped the pushing would turn the baby since the epidural had worn off.

The crash prompted Dr. Armbrust to run to get an operating room as quickly as possible. Michelle testified that she tried not to push for a couple of minutes but then she felt a "blinding pain" and all of a sudden people were grabbing things and rushing her out the door. When the monitors sounded the alarm that Benjamin's heart rate had dropped, Nurse Borowski and Dr. Armbrust started gathering Michelle's equipment and they pushed her bed down the hall. Dr. Armbrust testified that he had "no idea where [he] was going," and that he just pushed Michelle's bed into the first available operating room. Someone told Dr. Armbrust he could not go in the room, but he pushed past saying, "we're coming in now, we have to get this baby out." The anesthesiologist was prepared to restart the epidural but Dr. Armbrust instructed the anesthesiologist to put Michelle to sleep to get the baby out as quickly as possible. At that time, Dr. Messitt was in the hall at the nurses' station. Dr. Messitt "scrubbed in" and delivered Benjamin via cesarean section at 9:38 a.m., which was 17 minutes after the crash.

After the delivery, Benjamin was in the neonatal intensive care unit (ICU) and was on a ventilator for breathing for one week. Benjamin spent 14 days in the hospital. Some time after the delivery, Dr. Armbrust expressed his frustration at the hospital for not giving him an operating room sooner.

B. Plaintiffs' Medical Experts

1. Dr. Carl Hunt

Dr. Hunt, a pediatrician and neonatologist, opined that Benjamin's cerebral palsy was caused by a "hypoxic ischemic encephalopathy," which is a brain injury caused by a lack of oxygen. Dr. Hunt opined that Benjamin suffered from meconium aspiration syndrome (MAS), which is fetal fecal matter in the lungs, which hurt Benjamin's respiration initially but did not cause long-term effects. Dr. Hunt based his opinions on Benjamin's arterial blood gases, which indicated severe acidosis, as well as Benjamin's reduced heart rate and breathing rate immediately after birth, his Apgar score, and the seizures he suffered within four hours after birth.

2. Dr. Sander Alan Kushner

Dr. Kushner, a family medicine practitioner, testified to the standard of care that Dr. Armbrust owed plaintiffs. Dr. Kushner testified that Dr. Armbrust did not meet the standard of care when he failed to ensure that Benjamin was delivered by cesarean section before the crash and failed to have the Pitocin and pushing discontinued when he decided a cesarean section was necessary. According to Dr. Kushner, the fetal monitor strips put Dr. Armbrust on notice that the baby's heartbeat had a problem beginning at 8 a.m. Dr. Kushner agreed with Dr. Armbrust's assessment that a cesarean section was indicated at 8:40 a.m., but he opined that waiting for the room and telling the nurse he wanted a room "ASAP" was not within the standard of care.

Dr. Kushner opined that Benjamin's respiratory distress at birth resulted from umbilical cord compression and that the Pitocin and the pushing put pressure on the cord, preventing blood from flowing from the placenta to the baby. Dr. Kushner testified that even a small dose of Pitocin stimulates the uterus to contract. On cross-examination, Dr. Kushner opined that Benjamin's chances

would have been better if he had been delivered between 9 a.m. and 9:10 a.m. If Benjamin had been delivered before he crashed, his disabilities would have been avoided or lessened. Dr. Kushner testified that, to meet the appropriate standard of care, Dr. Armbrust should have told the labor and delivery charge nurse that the cesarean section needed to be done "now, as soon as possible," to communicate the "true urgency" of the situation.

3. Dr. John Elliot

Dr. Elliot, an expert in obstetrics and high-risk obstetrics, testified to the cause of Benjamin's condition. Dr. Elliot testified that the cause of the brain damage and resulting cerebral palsy was umbilical cord compression and uterine hyperstimulation, which caused the crash and subsequent bradycardia, or reduced heart rate. Dr. Elliot testified that Benjamin's brain injuries began at the time of the crash and continued until he was resuscitated.

Dr. Elliot opined that the oxygen delivery to Benjamin was affected by uterine hyperstimulation, or contractions coming too quickly, beginning at 8:14 a.m. on December 23, 1999. According to Dr. Elliot, uterine hyperstimulation can be caused by as little as two milliunits of Pitocin. Dr. Elliot also testified that the fetal monitor strips showed periods of hypoxia, or lack of oxygen, from 6:10 a.m. to 9:21 a.m. and that the baby's positioning during labor would make delivery more difficult. A higher dose of Pitocin is more likely to cause uterine hyperstimulation than a low dose. Dr. Elliot opined that Pitocin must have been the cause of the contractions because the contractions stopped when the Pitocin was switched off between 6 a.m. and 7:40 a.m. and then resumed almost immediately after the Pitocin was restarted. Dr. Elliot testified that the brain damage occurred between the time of the crash and the time of the delivery.

On cross-examination, Dr. Elliot testified that, if Benjamin had been delivered within six to eight minutes after the crash, he would have been fine. Dr. Elliot also testified that there is a relationship between the amount of Pitocin and the risk of hyperstimulation, but that hyperstimulation can occur in the absence of Pitocin, in response to the mother's own hormones.

4. Drs. Yarkony and Linke

Drs. Yarkony and Linke testified for the purpose of establishing the dollar amount of damages arising from Benjamin's cerebral palsy. Dr. Yarkony, a specialist in rehabilitative medicine, prepared a comprehensive "Life Care Plan" that outlined the medical treatment, therapy, and care Benjamin would need for the rest of his life. Dr. Linke, an economist, determined a present value of the predicted future medical costs and therapies, as well as lost income.

5. Dr. Adrian Upton

Dr. Upton, a physician and neurologist, testified that the damage to Benjamin's brain was consistent with a severe hypoxic ischemic injury, which results from low blood flow or low oxygen, that occurred within 15 minutes before Benjamin's delivery.

C. Defendants' Medical Experts

1. Drs. Messitt and Armbrust

Dr. Messitt testified to the appropriate standard of care of a reasonable physician. Dr. Messitt testified that when Dr. Armbrust determined that a cesarean section was necessary he did everything he possibly could have done to move it forward. Dr. Armbrust could not get the operating room ready himself or call the anesthesiologist because those things should have happened automatically when Dr. Armbrust called for a cesarean section. Dr. Messitt also testified that it was reasonable to keep the Pitocin running and to have Michelle keep pushing for one last chance for the baby to

progress. Dr. Messitt explained that neither he nor Dr. Armbrust could get an operating room sooner because the nursing supervisors controlled the rooms. Dr. Messitt testified that it takes half an hour for Pitocin to stop having an effect and that the onset of fetal distress was acute and abrupt at 9:21 a.m. and there was nothing on the fetal monitor strips before that time to indicate the baby was not tolerating labor well. Dr. Armbrust testified consistently with Dr. Messitt, stating that he did everything he could have done to get the operating room before the crash occurred.

2. Dr. Loafman

Dr. Loafman, a family practitioner with surgical privileges, testified to the appropriate standard of care and to the cause of the injuries. Dr. Loafman opined that Dr. Armbrust complied with the standard of care in all aspects of his care of Michelle and Benjamin on December 23, 1999. A cesarean section was indicated at 9:10 a.m., but it was not "absolutely indicated" until 9:21 a.m., because the monitors showed no evidence of fetal distress before then.

Dr. Loafman testified that Dr. Armbrust asking for the room "ASAP" and continuing to try to deliver the baby while waiting for the operating room were appropriate responses to the situation. According to Dr. Loafman, the standard of care did not require Dr. Armbrust to navigate the system because delivering the baby was a "team effort" and the family practitioner's duty was limited to requesting the room. Dr. Loafman also testified that continuing the Pitocin and the pushing while trying to get the room was within the standard of care because two milliunits is a very low dose and the baby still could have turned and moved out when there was no indication of fetal distress. The effects of the Pitocin continue for awhile after it is turned off.

Dr. Loafman testified that there was nothing on the fetal monitors that would have made a doctor suspect that a crash was imminent. The force of the labor did not cause Benjamin's cerebral

palsy or the crash, because if asphyxia, or hypoxia, had caused the crash, there would have been evidence of acidosis on the fetal monitors before the delivery, and there was no such evidence.

ANALYSIS

On appeal, defendants argue that they are entitled to a new trial because (1) the trial court abused its discretion in excluding expert medical opinions that a preexisting infection caused the injury and (2) the jury's verdict is against the manifest weight of the evidence. Plaintiffs respond that the infection-causation defense was properly excluded because (1) it is too speculative; (2) defendants' offer of proof was too voluminous and was late, as it was introduced during jury deliberations; and (3) even if there was an evidentiary foundation to support the infection-causation defense, the theory failed to pass the Frye test of "general acceptance." Plaintiffs also argue that the jury's verdict is not against the manifest weight of the evidence.

A trial court's ruling regarding the admissibility of an expert's opinion will be reversed only when the error was prejudicial or the result of the trial was materially affected. Scassifero v. Glaser, 333 Ill. App. 3d 846, 852 (2002). For the following reasons, we hold that (1) the infection-causation defense passed the general-acceptance test of Frye; (2) the trial court abused its discretion in excluding the defense; and (3) defendants made an adequate offer of proof to preserve the issue for this appeal. The erroneous exclusion of the infection-causation defense prejudiced defendants' case and materially affected the trial, and therefore we grant defendants their requested relief of a new trial. See Turner v. Williams, 326 Ill. App. 3d 541, 555 (2001).

On appeal, defendants also argue that they were entitled to a directed verdict at trial because "there was a total failure of proof on the element of proximate causation," but defendants do not request the judgment's outright reversal based on the alleged insufficiency of the evidence.

Defendants' prayer for relief in their appellate brief states, "the verdict in favor of plaintiffs was against the manifest weight of the evidence. The verdict with respect to the element of proximate causation is contrary to the great weight of evidence. Therefore, defendants are entitled to a new trial." We conclude that defendants have forfeited in their brief any argument that we must reverse the judgment for insufficient evidence and grant them a directed verdict. See 210 Ill. 2d R. 341(h)(7) ("Points not argued are waived and shall not be raised in the reply brief, in oral argument, or on petition for rehearing"). However, defendants' notice of appeal asks us to "vacate or reverse the judgment, to enter judgment notwithstanding the verdict in their favor, *** and to grant any other relief warranted by the applicable law and record on appeal." Because a notice of appeal is to be construed liberally (Burtell v. First Charter Service Corp., 76 Ill. 2d 427, 433-34 (1979)), we consider defendants' alternative argument that they are entitled to a directed verdict or a judgment n.o.v.

A. The Excluded Testimony

Defendants argue that the trial court committed reversible error in barring them from introducing evidence to show that Benjamin's injury was caused by a group beta strep (GBS) bacterial infection, a preexisting condition, rather than by hypoxia. Defendants argue that they were so prejudiced by the error that a new trial is required.

1. Dr. Michael Radetsky

Dr. Radetsky, a specialist in pediatric infectious diseases, opined that Benjamin acquired a GBS infection while in the womb and that the infection continued after birth. Benjamin had sepsis, as shown by his positive blood culture, his depressed state at birth, seizures, and white blood cell ratios evincing an inflammatory reaction. Sepsis is the presence of bacteria in the blood with serious clinical disease, or the presence of bacteria plus symptoms of infection. In response to the GBS

infection, cytokines were involved in causing Benjamin's brain to become inflamed. Cytokines are molecules that facilitate cellular communication, and the infection triggered the release of the cytokines. The brain damage occurred as Benjamin's body responded to the infection. Benjamin was directly infected with GBS, and he also likely had meningitis.

Moreover, Michelle had developed chorioamnionitis at the time of the delivery, as shown by a clinical evaluation and an infection found in the umbilical cord. Chorioamnionitis is an inflammation in the amniotic cavity, including the placenta and amniotic fluid. The infection caused Michelle to develop funisitis, which is an inflammation of the membranes of the umbilical cord in response to germs. Dr. Radetsky based his opinions, in part, on specific articles regarding chemical mediators of inflammation.

2. Dr. Rebecca Baergen

Dr. Baergen, a board-certified anatomical and clinical pathologist, opined that Benjamin's intrauterine environment was infected. Dr. Baergen would testify that microscopic examination of placental tissue slides revealed bacteria. After observing inflammation in the placenta and umbilical cord and comparing the finding with the records, including Benjamin's blood culture, she opined that Benjamin's infection and subsequent brain injuries were caused by GBS in utero that had been present for at least two days before the delivery. Michelle's chorioamnionitis and funisitis caused the infection. Dr. Baergen also opined that cytokines were present, though she could not say if they actually caused the brain injuries. Dr. Baergen stated that the presence of maternal fever is one of the signs and symptoms used by clinicians to diagnose acute chorioamnionitis. Her review of the placental slides showed acute chorioamnionitis. Dr. Baergen stated, based on her knowledge of the literature on the topic, that the risk for brain damage increases seven to nine times with acute

chorioamnionitis. Dr. Baergen's opinions were based, in part, on her experience and training, including five years of training with Dr. Benierschke, a world-renowned expert in placental pathology.

3. Dr. Jeremy Marks

Dr. Marks, a board-certified neonatologist, opined that Benjamin's cerebral palsy was caused by FIRS, sepsis, and possibly meningitis. Regarding sepsis and meningitis, Dr. Marks believed that, at the time of Benjamin's birth, two potential diagnoses and courses of care were equally possible. First, one could accept Benjamin's negative cerebrospinal fluid culture as being accurate and exclude meningitis as a possible cause and treat the GBS sepsis. Alternatively, one could disregard the negative spinal culture as inaccurate because such tests are "notoriously unreliable" and presumptively treat the baby for meningitis. Meningitis can injure white matter in the brain and possibly the basal ganglia. Generally, injury to white matter could result from other causes, but not in this case.

But for the GBS, Benjamin would not have been injured. Dr. Marks and Dr. Radetsky shared essentially the same opinion, except that Dr. Radetsky did not rely as heavily on the FIRS theory. Dr. Marks opined that maternal infections, like Michelle's, could produce inflammatory cytokines that could lead to cerebral palsy. Dr. Marks based his opinions, in part, on his familiarity with literature, including a publication called "the Green Book," entitled Neonatal Encephalopathy and Cerebral Palsy.

4. Dr. Messitt

Dr. Messitt testified in his deposition that Michelle's fever represented a GBS infection, and he opined that the GBS infection caused the crash.

5. Dr. Loafman

Dr. Loafman testified in his deposition that Michelle had chorioamnionitis, based upon the funisitis. Dr. Loafman concluded that Benjamin was "profoundly septic" at birth and that sepsis is a more likely explanation for Benjamin's brain damage than the short period of bradycardia, or a drop in heart rate from 160 to 110 beats per minute.

6. Dr. Jessica Corsino

Dr. Corsino, Benjamin's neonatologist, explained why a second blood culture, taken four days after Benjamin had been receiving intravenous antibiotics, could have been negative even though he had a GBS infection at the time he was born. Dr. Corsino concluded that the positive blood culture conclusively meant that Benjamin had bacteremia because bacteremia and sepsis both describe bacteria in the blood. Sepsis is simply bacteremia accompanied by clinical symptoms. Dr. Corsino opined that when a baby is treated with antibiotics for 48 to 72 hours, as Benjamin was treated, subsequent blood cultures will be negative if the antibiotics work. In fact, the reason for follow-up blood cultures is to ascertain the efficacy of the antibiotics. Dr. Corsino emphatically stated that a blood culture for GBS cannot be falsely positive and, therefore, a single positive blood test can be conclusive of a true infection.

B. The Trial Court's Ruling

The trial court found that "the defense has met its burden of showing that the methodology employed by its retained experts that forms the basis of their ultimate conclusion that infection, including a cascade of cytokines, is a potential cause of the plaintiff's cerebral palsy; that this is generally accepted by the scientific community." Nevertheless, the court concluded that the evidence must be excluded because the experts' opinions were based on speculation and conjecture. The court found that there was an inadequate foundation of evidence to support the ultimate conclusion that

the cerebral palsy was caused by an infectious process or a release of inflammatory cytokines. Specifically, the court emphasized that (1) no bacteria was found in Benjamin's cerebral spinal fluid to show that he had meningitis; (2) a single positive blood culture does not confirm sepsis, by any scientific tests or literature; and (3) no cultures from the placenta or the surrounding structures were taken and, therefore, no GBS was detected.

C. Legal Standards

Initially, defendants argued that the exclusion of their infection-causation defense amounted to a directed verdict for plaintiffs. However, defendants conceded at oral argument--and we agree--that the exclusion of the infection-causation defense did not amount to a directed verdict for plaintiffs. In a negligence action, the plaintiff must provide sufficient facts showing the existence of a duty owed by the defendant, a breach of that duty, and an injury proximately resulting from the breach. Klitzka v. Hellios, 348 Ill. App. 3d 594, 596 (2004). By excluding the infection-causation defense, the trial court did not enter a finding for plaintiffs on each of the elements of negligence. Plaintiffs still were required to prove to the jury that defendants owed a duty, breached that duty, and by that breach proximately caused the injury. The evidentiary ruling did not rise to the level of a directed verdict simply because the decision smoothed the path for plaintiffs to make their case.

It is well settled that the decision to admit or exclude expert testimony is within the sound discretion of the trial court. Thompson v. Gordon, 221 Ill. 2d 414, 428 (2006). A person may testify as an expert if his experience and qualifications afford him knowledge that is not common to laypersons and if his testimony will aid the trier of fact in reaching its conclusions. Thompson, 221 Ill. 2d at 428. " 'There is no predetermined formula for how an expert acquires specialized knowledge or experience and the expert can gain such through practical experience, scientific study, education,

training or research.' " Thompson, 221 Ill. 2d at 428-29, quoting People v. Miller, 173 Ill. 2d 167, 186 (1996). "Thus, '[f]ormal academic training or specific degrees are not required to qualify a person as an expert; practical experience in a field may serve just as well to qualify him.' " Thompson, 221 Ill. 2d at 429, quoting Lee v. Chicago Transit Authority, 152 Ill. 2d 432, 459 (1992). To testify, an expert need only have knowledge and experience beyond that of an average citizen. Thompson, 221 Ill. 2d at 429. "Expert testimony, then, is admissible 'if the proffered expert is qualified by knowledge, skill, experience, training, or education, and the testimony will assist the trier of fact in understanding the evidence.' " Thompson, 221 Ill. 2d at 429, quoting Snelson v. Kamm, 204 Ill. 2d 1, 24 (2003).

Plaintiffs do not challenge the credentials of defendants' expert witnesses. Instead, plaintiffs challenge (1) the science underlying the opinions and (2) the sufficiency of the evidence relied upon for those opinions. In Illinois, the admission of expert testimony is governed by the standard first expressed in Frye. Donaldson v. Central Illinois Public Service Co., 199 Ill. 2d 63, 76-77 (2002), overruled on other grounds, In re Commitment of Simons, 213 Ill. 2d 523 (2004). Commonly called the "general acceptance" test, the Frye standard dictates that scientific evidence is admissible at trial only if the methodology or scientific principle upon which the opinion is based is "sufficiently established to have gained general acceptance in the particular field in which it belongs." Frye, 293 F. at 1014. In this context, "general acceptance" does not mean universal acceptance, and it does not require that the methodology in question be accepted by unanimity, consensus, or even a majority of experts. Donaldson, 199 Ill. 2d at 78. Instead, evidence meets the Frye standard if the underlying method used to generate an expert's opinion is reasonably relied upon by experts in the relevant field. Donaldson, 199 Ill. 2d at 77. Significantly, the Frye test applies only to "new" or "novel" scientific

methodologies. Donaldson, 199 Ill. 2d at 78-79. Generally, a scientific methodology is considered "new" or "novel" if it is " 'original or striking' " or "does 'not resembl[e] something formerly known or used.' " Donaldson, 199 Ill. 2d at 79, quoting Webster's Third New International Dictionary 1546 (1993).

The decision as to whether an expert scientific witness is qualified to testify in a subject area, and whether the proffered testimony is relevant in a particular case, remains in the sound discretion of the trial court. Simons, 213 Ill. 2d at 530-31. The trial court's Frye analysis, however, is subject to de novo review, in which the reviewing court may consider not only the trial court record but also, where appropriate, sources outside the record, including legal and scientific articles, as well as court opinions from other jurisdictions. Simons, 213 Ill. 2d at 531.

In Simons, our supreme court plainly stated that "[u]nder the Frye standard, the trial court is not asked to determine the validity of a particular scientific technique." Simons, 213 Ill. 2d at 532. In Donaldson, the supreme court held, "[t]he trial court is not required to conduct a two-part inquiry into both the reliability of the methodology and its general acceptance." Donaldson, 199 Ill. 2d at 81. Indeed, the Donaldson court explained that "[t]he determination of the reliability of an expert's methodology is naturally subsumed by the inquiry into its general acceptance in the scientific community." Donaldson, 199 Ill. 2d at 81. In other words, once it is determined that a methodology is generally accepted, it follows that it has achieved a sufficient degree of reliability and validity to cross the threshold of admissibility. This is not to say, of course, that an opposing litigant cannot question at trial the reliability or validity of a methodology. In re Commitment of Sandry, 367 Ill. App. 3d 949, 966 (2006).

In Simons, the supreme court set forth one additional requirement for admissibility under Frye: an expert's reliance on a particular methodology must be reasonable. Simons, 213 Ill. 2d at 530, citing Donaldson, 199 Ill. 2d at 77. "Reasonable" obviously cannot mandate an inquiry into "validity" or "reliability," because Simons and Donaldson exclude those things. Sandry, 367 Ill. App. 3d at 966. Thus, the question of whether an expert's reliance on the challenged methodology is reasonable constitutes a rather low standard. "Without inquiring into the validity or reliability of a particular methodology, our analysis appears to be limited to whether there is some rational basis--not necessarily a correct basis--for an expert to rely upon it, guided largely by common sense." Sandry, 367 Ill. App. 3d at 966.

1. Frye

In their brief, plaintiffs argue that the trial court denied them a Frye hearing on the admissibility of the infection-causation defense. However, at oral argument, plaintiffs' counsel acknowledged that the proceedings in the trial court were sufficient under Frye. Indeed, the trial court heard testimony and reviewed voluminous scientific literature submitted by the parties before determining that the defense theory was based on generally accepted science.

Further, the record supports the trial court's determination that the defense experts' methodology passes the Frye test of general acceptance. Plaintiffs admit in their brief that their own scientific literature indicates that chorioamnionitis is "associated with" or "increases the risk" of brain injury, as defendants' experts opined. However, plaintiffs argue that the defense theory fails the Frye test because (1) plaintiffs' literature does not go as far as stating that chorioamnionitis "causes" brain injuries like Benjamin's, (2) plaintiffs' literature shows that the infection-causation theory is "complex and not completely understood"; and (3) plaintiffs' literature shows that there are "too few" studies

to identify a causal relationship between "specific lesions" and cerebral palsy. Plaintiffs attempt to elevate the Frye standard to requiring unanimity, which is beyond any supreme court holding. Defendants introduced numerous experts who cited specific scientific literature when concluding that the clinical observations supported the infection-causation defense. "General acceptance" does not mean universal acceptance, and it does not require that the methodology in question be accepted by unanimity, consensus, or even a majority of experts. See Donaldson, 199 Ill. 2d at 78. Defendants' evidence meets the Frye standard because defendants' experts reasonably relied on methods generally accepted in the relevant field. See Donaldson, 199 Ill. 2d at 77. Moreover, the relative complexity and novelty of the subject matter are irrelevant, as Frye applies only to "new" or "novel" scientific methodologies. See Donaldson, 199 Ill. 2d at 78-79. Plaintiffs' Frye challenge is really an argument that their evidence outweighs defendants' evidence and that, therefore, defendants' evidence should be excluded. Such a position has no support in the law or the facts of this case.

2. Admissibility of Infection-Causation Defense

The parties disagree about how passing the Frye test of general acceptance affects the admissibility of the infection-causation defense. The gist of defendants' position is that, once the trial court determined that the defense experts relied on a methodology that met the Frye standard of general acceptance, the court was required to admit the evidence and to let the jury weigh the evidence. In response, plaintiffs quote Ruffin v. Boler, 384 Ill. App. 3d 7, 18 (2008), for the proposition that " '[b]efore expert testimony will be admitted at trial, the proponent of the evidence must persuade the trial court to make three preliminary determinations: (1) the witness may be of assistance to the trier of fact; (2) the witness is qualified to give the testimony sought; and (3) the testimony sought is supported by adequate facts, data, or opinions.' " We agree with plaintiffs.

Expert opinions are offered routinely without Frye objections because the subject matter involves science and methodology that are generally, or even universally, accepted. If we were to accept defendants' proposal that all evidence passing the Frye test is admissible, no expert opinion involving well-settled principles could be excluded, regardless of the paucity of evidence to support the opinion. The supreme court did not intend such an absurd result. We agree with plaintiffs that a Frye determination is a threshold matter and that opinion evidence surviving a Frye challenge may nevertheless be excluded if it lacks an evidentiary foundation.

That said, we conclude that the trial court abused its discretion in excluding the infection-causation defense as speculative, i.e., in finding that it was not supported by adequate facts, data, or opinions. The trial court emphasized that (1) no bacteria was found in Benjamin's cerebral spinal fluid, which would have shown that he had meningitis; (2) the single blood culture testing positive for bacteria was "not confirmatory of sepsis by any scientific tests or literature"; and (3) no cultures from the placenta or the surrounding structures were taken and, therefore, no GBS bacteria were found.

However, the clinical evidence, when viewed as a whole, reasonably supports the defense experts' medical opinions. The defense experts opined that the presence of infection, which was indicated by Benjamin's positive blood culture at birth, was corroborated by the following objective indicators: (1) bacteria consistent with GBS was found on the fetal membranes covering the placenta as well as the amniotic cavity; (2) funisitis, the inflammation of the umbilical cord, indicated an ascending infection; (3) maternal fever; (4) Benjamin's depressed state at birth, seizures, and white blood cell ratios indicating an inflammatory reaction; (5) clinical signs of sepsis, including pulmonary hypertension, irritability, and hypoxia; (6) Benjamin's automated differential white blood cell count;

(7) Benjamin's manual differential white blood cell count; and (8) Benjamin's need for ventilation for seven days.

Plaintiffs rely on Simers v. Bickers, 260 Ill. App. 3d 406 (1994), in arguing that the trial court properly excluded the infection-causation defense as speculative. In Simers, the plaintiff sued an optometrist when she received eye injuries from contact lenses fitted by the optometrist. The defense expert opined that the plaintiff's eyes were injured from bacteria that formed because the plaintiff failed to clean her lenses. The expert stated that he had to " 'surmise' " the cause of the infection based upon all of the available evidence, because a culture of the solutions used was never taken. Simers, 260 Ill. App. 3d at 412. The court described the testimony as conjecture, which it defined as "a conclusion based on assumption not in evidence or contradicted by the evidence." Simers, 260 Ill. App. 3d at 412, citing Nelson v. Speed Fastener, Inc., 101 Ill. App. 3d 539 (1981). Although several physicians inferred that bacteria somehow entered the cornea or eye surface by way of the cleansing process, "there exist[ed] no factual, scientific, or expert evidence to support this." Simers, 260 Ill. App. 3d at 412. The court held that the expert's testimony that the plaintiff's eyes were infected due to her own lack of proper cleaning was mere conjecture and should have been stricken. Simers, 260 Ill. App. 3d at 413.

This case is factually distinguishable in that there was some evidence to support the defense experts' opinions. Dr. Corsino opined that a single positive blood culture could not be falsely positive and could conclusively establish the presence of GBS. Further, Dr. Corsino opined that the use of antibiotics explained why the blood culture taken four days later was negative. The single positive blood culture indicated bacteremia, the presence of bacteria in the blood, but not necessarily sepsis,

which is bacteremia plus clinical symptoms. However, the degree to which bacteremia could have caused the injury is an appropriate question to be argued to the jury.

The infection-causation defense would be stronger if cultures from the placenta and the surrounding structures had been taken and had shown GBS bacteria, but the absence of such a test and a positive result does not render the underlying theory too speculative to submit to the finder of fact. The defense had clinical evidence of inflammation in the placenta and the umbilical cord and of bacteria in the placenta. The weight to be given the evidence is to be decided by the jury, not the trial court.

However, we conclude that the trial court did not abuse its discretion in excluding the medical opinions that Benjamin was so thoroughly infected with GBS that he was born with bacterial meningitis. In asserting the meningitis theory, defendants rely solely on Drs. Radetsky and Marks, but their opinions were equivocal and speculative. In the area of medical malpractice, "proximate cause must be established by expert testimony to a reasonable degree of medical certainty." Simmons v. Garces, 198 Ill. 2d 541, 556 (2002). Dr. Marks opined that, at the time of Benjamin's birth, two potential diagnoses and courses of care were equally possible. Dr. Marks was certain that Benjamin had GBS sepsis, but he felt that the negative cerebrospinal fluid culture was not necessarily accurate, as such tests are "notoriously unreliable." Dr. Marks concluded definitely that Benjamin had GBS sepsis, but essentially he speculated that Benjamin had meningitis even though the spinal fluid culture was negative. Dr. Marks pointed to no specific evidence to indicate why the negative result was wrong. Dr. Radetsky stated at his deposition that "the baby more likely than not had meningitis," but defendants have not illustrated the basis for his conclusion. Defendants' other experts opined that

Benjamin did not have meningitis. Under these circumstances, we conclude that the court did not abuse its discretion in excluding the meningitis opinion evidence.

D. Offer of Proof

Plaintiffs argue that we must disregard defendants' offer of proof as too voluminous and as late because it was introduced during jury deliberations. We disagree.

A ruling on a motion in limine is an admissibility determination that is likely to arise at trial and is subject to reconsideration. Jones v. Rallos, 384 Ill. App. 3d 73, 88 (2008). To preserve an error in the exclusion of evidence, the proponent of the evidence must make an adequate offer of proof in the trial court. Jones, 384 Ill. App. 3d at 88. Failure to make an adequate offer of proof results in forfeiture of the issue on appeal. Jones, 384 Ill. App. 3d at 88.

An adequate offer of proof apprises the trial court of what the offered evidence is or what the expected testimony will be, by whom it will be presented, and its purpose. Kim v. Mercedes-Benz, U.S.A., Inc., 353 Ill. App. 3d 444, 451 (2004). The purpose of an offer of proof is to disclose to the trial court and opposing counsel the nature of the offered evidence and to enable a reviewing court to determine whether the exclusion of the evidence was proper. Kim, 353 Ill. App. 3d at 451. Defendants filed their offer of proof with express leave of the trial court, and the court's rulings on the parties' opposing motions in limine were consistent with the exclusion of defendants' infection-causation defense. Moreover, the large volume of documents related to defendants' offer of proof reflected the complexity of the subject matter and of the deposition testimony of the many defense experts who opined on the matter. Plaintiffs and defendants briefed and argued the issue extensively, which brought the infection-causation defense into focus for the trial court. Plaintiffs are

disingenuous in suggesting for the first time on appeal that the trial court and opposing counsel were unaware of the nature of the evidence that defendants offered.

E. Sufficiency of the Evidence

Defendants contend that the trial court erred by failing to grant them a directed verdict or a judgment n.o.v. based on plaintiffs' failure to prove the proximate-causation element of their negligence claim. A motion for a directed verdict is reviewed in the same way as a motion for a judgment n.o.v. Evans v. Shannon, 201 Ill. 2d 424, 427 (2002). The motion should be granted where all of the evidence, when viewed most favorably to the opposing party, so overwhelmingly favors the moving party that no contrary verdict based on the evidence could ever stand. Evans, 201 Ill. 2d at 428. The issue presents "a question of law as to whether, when all of the evidence is considered, together with all reasonable inferences from it in its aspect most favorable to the plaintiffs, there is a total failure or lack of evidence to prove any necessary element of the plaintiffs' case." Merlo v. Public Service Co., 381 Ill. 300, 311 (1942). Because the standard for entering a directed verdict or a judgment n.o.v. is a high one (Razor v. Hyundai Motor America, 222 Ill. 2d 75, 106 (2006)), such a judgment is inappropriate if "reasonable minds might differ as to inferences or conclusions to be drawn from the facts presented" (Pasquale v. Speed Products Engineering, 166 Ill. 2d 337, 351 (1995)). The reviewing court reviews de novo the trial court's decision on a motion for a directed verdict or a judgment n.o.v. York v. Rush-Presbyterian-St. Luke's Medical Center, 222 Ill. 2d 147, 178 (2006); Evans, 201 Ill. 2d at 427.

Plaintiffs' standard-of-care expert, Dr. Kushner, testified that Dr. Armbrust had a duty to be adamant and more aggressive in obtaining an operating room sooner. Dr. Kushner testified that Dr. Armbrust acted below the standard of care by failing to ensure that Benjamin was delivered by

cesarean section before he crashed. Specifically, one could infer from Nurse Rimdzius's testimony that Dr. Armbrust failed to communicate the appropriate level of urgency. According to Nurse Rimdzius, Dr. Armbrust did not tell her before the crash that Benjamin's condition was an emergency. Moreover, plaintiffs introduced scientific evidence from which the jury could infer that the delivery delay proximately caused Benjamin's injuries. Under these circumstances, reasonable minds might differ as to inferences or conclusions to be drawn from the facts presented such that a directed verdict or a judgment n.o.v. for defendants would have been inappropriate. See Pasquale, 166 Ill. 2d at 351.

CONCLUSION

We determine that defendants are entitled to a new trial because the trial court abused its discretion in excluding the infection-causation defense. We also determine that defendants are not entitled to the judgment's outright reversal for inadequate evidence on the proximate-causation element of plaintiffs' negligence claim.

On remand, the trial court should allow defendants to introduce the evidence supporting the medical experts' infection-causation theory of the injuries. However, based on the evidence presented at the time, the trial court did not abuse its discretion in excluding the expert opinions that meningitis contributed to Benjamin's cerebral palsy.

For the preceding reasons, the judgment of the circuit court of Du Page County is reversed, and the cause is remanded for further proceedings consistent with this opinion.

Reversed and remanded.

ZENOFF, P.J., and McLAREN, J., concur.