

United States Court of Appeals for the Federal Circuit

2008-5184

ENRIQUE M. ANDREU a minor child, by his parents and natural
guardians, ENRIQUE C. ANDREU and SONIA C. ANDREU,

Petitioners-Appellants,

v.

SECRETARY OF HEALTH AND HUMAN SERVICES,

Respondent-Appellee.

Clifford J. Shoemaker, Shoemaker and Associates, of Vienna, Virginia, argued
for petitioners-appellants.

Darryl R. Wishard, Trial Attorney, Torts Branch, Civil Division, United States
Department of Justice, of Washington, DC, argued for respondent-appellee. With him
on the brief were Timothy P. Garren, Director, Vincent J. Matanoski, Acting Deputy
Director, and Catharine E. Reeves, Assistant Director.

Appealed from: United States Court of Federal Claims

Senior Judge James F. Merow

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Respondent-Appellee.

Appeal from the United States Court of Federal Claims in case 98-VV-817, Senior
Judge James F. Merow.

DECIDED: June 18, 2009

Before NEWMAN, MAYER, and GAJARSA, Circuit Judges.

MAYER, Circuit Judge.

Enrique C. Andreu and Sonia C. Andreu (“the Andreus”), on behalf of their son, Enrique M. Andreu (“Enrique”), appeal the judgment of the United States Court of Federal Claims affirming a special master’s decision denying their petition for compensation under the National Childhood Vaccine Injury Act of 1986, 42 U.S.C. §§ 300aa-1 to -34 (“Vaccine Act”). See Andreu v. Sec’y of Health & Human Servs., No. 98-817V (Fed. Cl. July 23, 2008) (“Court of Federal Claims Decision II”). Because we conclude that the special master’s decision is inconsistent with Althen v. Secretary of

Health & Human Services, 418 F.3d 1274 (Fed. Cir. 2005), and Capizzano v. Secretary of Health & Human Services, 440 F.3d 1317 (Fed. Cir. 2006), we reverse and remand.

BACKGROUND

Enrique was born on September 5, 1995; he was a full-term baby, born after an uneventful pregnancy. On October 31, 1995, when he was eight weeks old, Enrique was inoculated with the diphtheria, whole-cell pertussis and tetanus (“DPT”) vaccine. Prior to this vaccination, Enrique was developing normally, although he had an ear infection and cold just prior to the time he was vaccinated.

Enrique cried a great deal throughout the evening of October 31, 1995. Jesus Gutierrez, Enrique’s great-grandfather, testified that on the next day, November 1, 1995, Enrique’s “left hand jumped for approximately one minute.” Enrique’s half-brother, Eric Andreu, also testified that he noticed Enrique’s arm making shaking movements on November 2, and November 6, 1995. On the evening of November 10, 1995, Enrique’s father observed Enrique’s unusual arm movements. The next day, the Andreus took Enrique to his pediatrician, who also observed Enrique’s arm movements. The pediatrician informed the Andreus that these movements were seizures, and arranged for Enrique to be taken to Miami Children’s Hospital (“MCH”). At the hospital, Enrique’s temperature was recorded at 99.4 degrees, and he was admitted for evaluation. See Andreu v. Sec’y of Health & Human Servs., No. 98-817V, 2007 U.S. Claims LEXIS 292, at *22 (Fed. Cl. Spec. Mstr. Aug. 29, 2007) (“Vaccine Court Decision I”). While at MCH, Enrique underwent a single-photon emission computed tomography (“SPECT”) scan of his brain, which was “markedly abnormal,” showing hyperfusion, or increased blood flow, in the right precentral gyrus area. Id. at *26. When a brain magnetic resonance

imaging (“MRI”) was performed two hours later, the results were normal. Id. Enrique was started on anti-seizure medication and released from the hospital on November 15, 1995.

On December 27, 1995, following his discharge from the hospital, Enrique was evaluated by Trevor Resnick, M.D., a pediatric neurologist. Resnick noted that Enrique continued to exhibit normal neurological development, but advised the Andreus that he should not receive further pertussis vaccinations. Id. at *27-28.

Enrique experienced another seizure in February 1996. He remained seizure-free until October 1996, when he was hospitalized with febrile seizures. Id. at *29. Over the next month, Enrique continued to have seizures, which began with jerking arm movements and then became generalized. Id. at *30.

By January 1998, Enrique’s seizures had become “intractable and uncontrolled by medication.” Court of Federal Claims Decision II, slip op. at 5. In July 1998, an interdisciplinary team determined that Enrique had an IQ of 63 and exhibited significant language and developmental delays. See Vaccine Court Decision I, 2007 U.S. Claims LEXIS 292, at *31.

The Andreus initiated their Vaccine Act claim on October 26, 1998, alleging that the DPT vaccine Enrique received on October 31, 1995, caused his seizure disorder. On December 4, 2001, the Andreus submitted a letter from Marcel Deray, M.D., Enrique’s treating physician, who stated:

Enrique is a patient I have followed since 11/22/96. He has an encephalopathy and seizures. There has been no neurological cause found for his encephalopathy and no other explanation other than the DPT immunization given to him when he was an infant.

Enrique's case was assigned to Special Master Richard Abell, who held an onset hearing to determine the date of Enrique's first seizure. The special master found Gutierrez, Enrique's great-grandfather, to be "a man of great personal dignity and honor," and based upon his testimony, determined that Enrique's first seizure occurred on November 1, 1995, the day after he received the DPT vaccination. The case was subsequently transferred to Special Master Denise K. Vowell.

On November 28, 2005, the Andreus filed an expert report from Carlo Tornatore, M.D., a neurologist. Tornatore opined that the DPT vaccination that Enrique received on October 31, 1995, "resulted in an acute encephalopathy and seizures secondary to the direct toxicity of the components in the whole-cell pertussis vaccine." According to Tornatore, the DPT vaccine contains pertussis toxins and endotoxins, which can cross the brain-blood barrier, causing overstimulation of the nerves and supporting cells of the brain and provoking seizures. In support of his theory, Tornatore cited six articles showing that the pertussis toxin can be used to induce "excitotoxicity" in the brains of animals. In addition, Tornatore noted that persons infected with the pertussis virus can experience encephalopathy and seizures and that this "wild-type infection is actually in some ways reproduced by the vaccination."

In contrast, the government's expert, Joel Herskowitz, M.D., asserted that Enrique's seizure disorder was not caused by the DPT vaccine he received. Herskowitz emphasized that the medical "literature does not support the occurrence of afebrile focal seizures as a consequence of a DPT whole-cell immunization." In addition, although he acknowledged that Tornatore's theory of causation was biologically plausible, Vaccine Court Decision I, 2007 U.S. Claims LEXIS 292, at *69, he asserted that if there had

been an assault to the brain from the pertussis toxin, he would “expect to see” neurological symptoms other than those Enrique experienced. For example, Herskowitz would expect that Enrique would have experienced generalized, as opposed to focal, seizures, and that he would have had a bulging fontanel and a change in personality and behavior in the period immediately following the vaccination. Upon questioning from Enrique’s counsel, however, Herskowitz acknowledged that it was “reasonable” to assume that anything that can cause a “devastating” injury to the brain “can also cause a smaller amount of brain injury in a smaller area of the brain.”

On August 29, 2007, the special master issued a decision denying Enrique compensation. On March 3, 2008, however, the Court of Federal Claims reversed. The court held that “Dr. Tornatore’s expert report and testimony, standing alone, would meet the Capizzano requirements for recovery of compensation.” Andreu v. Sec'y of Health & Human Servs., No. 98-817V, slip op. at 7 (Fed. Cl. Mar. 3, 2008) (“Court of Federal Claims Decision I”). The court also noted, however, that “[t]he question of a logical sequence of cause and effect showing that [Enrique’s] vaccination was the reason for the injury is a matter of dispute between the expert opinion expressed by Dr. Tornatore and Dr. Herskowitz’s testimony that Enrique’s clinical picture does not match that to be expected from Dr. Tornatore’s postulated series of events following administration of the whole-cell pertussis [vaccine] on October 31, 1995.” Id. at 10. Accordingly, the court ordered the special master to reevaluate the evidence and, “to the extent possible,” obtain the testimony of Enrique’s treating physicians. Id. at 11. In the court’s view, testimony from Enrique’s treating physicians would be “most helpful” in establishing

whether or not Enrique's seizure disorder was the result of the DPT vaccine he received. Id. at 12.

On remand, the special master issued a subpoena compelling Enrique's treating physicians, Deray and Resnick, to testify. Both doctors testified at a hearing held on April 28, 2008, in Miami, Florida. Resnick was asked by counsel for the government why he recommended that Enrique receive no further pertussis vaccinations. He responded that although he was "surmising," he thought he had made this recommendation because "there was a concern over the relationship with the immunization, and I felt it would be safer for him not to have the pertussis, because there was a concern about a reaction."

Resnick also testified that "[y]ou can see seizures within 24 hours of a vaccination, often in association with a fever, and that has been quite frequently reported epidemiologically." He asserted, however, that the pertussis vaccine could "provoke" a seizure in a child who was "[n]ot behaving normally" or "really irritable" even in the absence of a fever. He further noted that in some instances "temperature isn't measured," so that to conclude that a seizure provoked by the DPT vaccine must be related to a fever is "somewhat unfair." In addition, Resnick agreed that in Enrique's case no one knows whether the first seizure was febrile or afebrile.

Deray testified that it was "still [his] opinion . . . that there is no other explanation for Enrique's seizure disorder and encephalopathy other than the DPT vaccination." Deray explained that there were two reasons that he had concluded that there was a causal connection between the vaccination and Enrique's malady. First, although Deray could identify a cause for seizures in 70 to 75 percent of his patients, doctors,

despite extensive testing, had “never found anything else” to explain Enrique’s seizures. Second, since the seizures occurred soon after the vaccination, Enrique’s “history would be consistent with [the] DPT immunization causing seizures.”

In addition, Deray asserted that whether Enrique’s initial seizures were febrile as opposed to afebrile would not influence his opinion that the DPT vaccine caused Enrique’s seizure disorder. In response to a question from the special master asking whether there was anything in either the SPECT scan or the MRI suggesting that the DPT vaccine caused Enrique’s seizures, Deray replied that whether or not the scans were normal “doesn’t help us either way. . . . You can have a normal MRI for the rest of your life and have brain damage.” On May 29, 2008, the special master issued a decision, again rejecting the Andreus’ claim for compensation under the Vaccine Act. See Andreux v. Sec’y of Health & Human Servs., No. 98-817V (Fed. Cl. Spec. Mstr. May 29, 2008) (“Vaccine Court Decision II”). She concluded that the Andreus “failed to meet their burden to show a logical sequence of cause and effect” between Enrique’s October 31, 1995, DPT vaccination and his seizure disorder, noting that “[w]hatever theoretical allure the [Andreus’] excitotoxin theory regarding the cause of seizures may have, the weight of the scientific and clinical evidence adduced here does not support pertussis toxin as the cause of Enrique’s afebrile seizures.” Id. at 7, 14.

On appeal, the Court of Federal Claims affirmed, concluding that the special master’s decision to deny compensation was not arbitrary or capricious. Although the court noted that even the government’s expert did not dispute the “biologic plausibility” of Tornatore’s theory of causation, the court stated that “the clinical evidence of record concerning Enrique’s seizures does not show the extent of initial injury sufficient to

validate [the Andreus'] medical theory of DPT causation." Court of Federal Claims Decision II, slip op. at 4-5.

The Andreus then timely appealed to this court. We have jurisdiction under 42 U.S.C. § 300aa-12(f).

DISCUSSION

In reviewing an appeal from a judgment of the Court of Federal Claims in a Vaccine Act case, we apply the same standard of review as the Court of Federal Claims applied to the special master's decision. Capizzano, 440 F.3d at 1323. "While we owe no deference to either the special master or the trial court on questions of law, we review the trial court's factual findings for clear error." Althen, 418 F.3d at 1278 (citations omitted).

"Childhood vaccinations, though an important part of the public health program, are not without risk. Because vaccines often contain either killed bacteria or live but weakened viruses, they can cause serious adverse effects." Terran v. Sec'y of Health & Human Servs., 195 F.3d 1302, 1306-07 (Fed. Cir. 1999). In enacting the Vaccine Act, Congress recognized that "[w]hile most of the Nation's children enjoy great benefit from immunization programs, a small but significant number have been gravely injured." H.R. Rep. No. 99-908, 99th Cong., 2d Sess. 4 (1986). It was also acutely aware that the traditional tort system had proven ineffective in providing redress for vaccine-injured individuals "because it resulted in lengthy delays, high transaction costs, and sometimes no recovery." Lowry v. Sec'y of Health & Human Servs., 189 F.3d 1378, 1381 (Fed. Cir. 1999); see H.R. Rep. No. 99-908, at 6 (1986) (noting that the civil tort system was inadequate to compensate those individuals whose "futures [had] been destroyed" by a

vaccine-related injury and whose “mounting expenses must be met”). On the other hand, the persistent threat of tort claims caused pharmaceutical companies to consider abandoning this field of therapy to the detriment of all concerned. See H.R. Rep. No. 99-908, at 6 (1986). Accordingly, Congress created a federal no-fault compensation scheme under which awards were to be “made to vaccine-injured persons quickly, easily, and with certainty and generosity.” Id. at 3.

The Vaccine Act provides two separate mechanisms to obtain benefits: table claims and causation in fact claims. In a table claim, a claimant who shows that he or she received a vaccination listed in the Vaccine Injury Table (“table”), 42 U.S.C. § 300aa-14, and suffered an injury listed in the table within a prescribed period is afforded a presumption of causation. 42 U.S.C. § 300aa-11(c)(1)(C)(i); see Pafford v. Sec'y of Health & Human Servs., 451 F.3d 1352, 1355 (Fed. Cir. 2006). Had Enrique been born one year earlier, the Andreus may well have been able to establish that he suffered a table injury, with its attendant presumption of causation. Prior to March 10, 1995, a “residual seizure disorder” following a DPT vaccination was considered a table injury. See Terran, 195 F.3d at 1307; see also Liable v. Sec'y of Health & Human Servs., No. 98-120V, 2000 U.S. Claims LEXIS 209, at *22 (Fed. Cl. Spec. Mstr. Sept. 7, 2000) (Before 1995, “if a previously neurologically-normal person exhibited any significant symptoms of neurologic injury, including seizures, within three days of a DPT vaccination, and then went on to suffer from a chronic neurologic disorder, such person’s chronic disorder would likely be found to be presumptively vaccine-caused, pursuant to the Table.”). Under current law, however, a residual seizure disorder no longer qualifies as a table injury. See 60 Fed. Reg. 7678 (Feb. 8, 1995).

Because the Andreus cannot avail themselves of the table method of establishing causation, they must show that Enrique's seizure disorder was "caused in fact" by the DPT vaccine he received. See Capizzano, 440 F.3d at 1320. In Althen, we set forth a three-prong test for establishing causation in fact:

Concisely stated, [a claimant's] burden is to show by preponderant evidence that the vaccination brought about her injury by providing: (1) a medical theory causally connecting the vaccination and the injury; (2) a logical sequence of cause and effect showing that the vaccination was the reason for the injury; and (3) a showing of a proximate temporal relationship between vaccination and injury. If [a claimant] satisfies this burden, she is entitled to recover unless the [government] shows, also by a preponderance of evidence, that the injury was in fact caused by factors unrelated to the vaccine.

418 F.3d at 1278 (quotation marks omitted).

The Andreus argue that they satisfied all three prongs of the Althen test by: (1) setting forth what even the government's expert agreed was a "biologically plausible" theory explaining how toxins in the whole cell pertussis vaccine could cause seizures, (2) providing unequivocal testimony from Enrique's treating physician that the DPT vaccine caused Enrique's seizure disorder, and (3) establishing a medically appropriate temporal connection between Enrique's DPT vaccination and his first seizure. We agree.

Three fundamental errors infected the special master's decision to deny Enrique compensation. First, the special master incorrectly determined that the testimony of Enrique's treating physicians was insufficient to establish "a logical sequence of cause and effect" between the DPT vaccine Enrique received on October 31, 1995, and the seizure he experienced one day later. Second, she imposed upon the Andreus an elevated evidentiary burden, requiring them to submit conclusive proof in the medical

literature linking afebrile seizures to components in the whole-cell pertussis vaccine. Finally, the special master erroneously determined that Enrique's "clinical picture" precluded a finding that his seizure disorder was caused by an injury to the brain from the DPT inoculation.

I. Testimony from Treating Physicians

There is no dispute that the Andreus met the first and third prongs of the Althen test. The first prong was satisfied because Tornatore, the Andreus' expert, presented a "biologically plausible" theory establishing that toxins in the whole-cell pertussis vaccine can cause seizures.¹ Court of Federal Claims Decision II, slip op. at 4. Likewise, the third prong was satisfied by the striking temporal relationship between the DPT vaccine Enrique received on October 31, 1995, and the seizure he experienced one day later. See Court of Federal Claims Decision I, slip op. at 10 ("An acceptable temporal relationship has been established between the vaccination and the injury.").

If a claimant satisfies the first and third prongs of the Althen standard, the second prong can be met through medical opinion testimony. Capizzano, 440 F.3d at 1326. Such testimony is "quite probative" since "treating physicians are likely to be in the best position to determine whether a logical sequence of cause and effect show[s] that the vaccination was the reason for the injury." Id. (citations and internal quotation marks omitted); see also Althen, 418 F.3d at 1279-80 (noting that the Vaccine Act provides for

¹ In recent years, most children in the United States have been inoculated with the DTaP vaccine, which contains an acellular pertussis component, as opposed to the DPT vaccine, which contains a whole-cell pertussis component. See Vaccine Court Decision I, 2007 U.S. Claims LEXIS 292, at *56 n.44. The general consensus is that the older vaccine is more dangerous than the newer version. See Liable, 2000 U.S. Claims LEXIS 209, at *68-69; see also Jones v. Lederle Labs., 695 F. Supp. 700, 703 (E.D.N.Y. 1998) ("There is evidence that the whole-cell vaccine contains more toxins than does the acellular type.").

the use of “medical opinion as proof” of causation); Zatuchni v. Sec'y of Health & Human Servs., 69 Fed. Cl. 612, 623 (Fed. Cl. 2006) (relying heavily on the testimony of treating physicians in concluding that Vaccine Act causation had been established).

Here, the testimony of Deray, the pediatric neurologist who has treated Enrique since 1996, was sufficient to establish a logical sequence of cause and effect between the DPT vaccine Enrique received on October 31, 1995, and the seizure he experienced the next day. Deray stated unequivocally that he believed that the DPT inoculation caused Enrique’s seizures, and explained that there were “[t]wo things” which caused him to reach this conclusion. First, although he was able to identify a cause for seizures in 70 to 75 percent of his patients, Deray had found no cause—other than the DPT vaccination—to explain the seizures that Enrique experienced. See Liable, 2000 U.S. Claims LEXIS 209, at *14-15 (A claimant was entitled to compensation where she experienced a seizure shortly after her DPT vaccination and doctors, despite extensive testing, had “failed to identify any other cause for [her] chronic neurologic disorder.”). Second, Enrique’s history was “consistent with [the] DPT immunization causing seizures, in the sense that it occurred within three days of the shot.” See Capizzano, 440 F.3d at 1326 (A treating physician may rely on the close temporal proximity between a vaccine and an injury in concluding that there is a logical sequence of cause and effect between the vaccine and the injury.).

The testimony of Resnick, the admitting neurologist at the time of Enrique’s initial hospitalization at MCH, was not as unequivocal as that of Deray, but, read as a whole, also supports a causal connection between the DPT vaccine and Enrique’s November 1, 1995, seizure. Resnick testified that “[y]ou can see seizures within 24 hours of a

vaccination, often in association with a fever, and that has been quite frequently reported epidemiologically.” Resnick acknowledged, however, that the pertussis vaccine can provoke seizures even in the absence of a fever,² in situations where a child is “really irritable” or “[n]ot behaving normally.” He further asserted that it is “unfair” to focus on whether or not a child has a fever at the time of a seizure because “sometimes temperature isn’t measured” at that time.

Resnick acknowledged, moreover, that in 1995, shortly after Enrique was released from MCH, he had advised the Andreus that Enrique should receive no further pertussis vaccinations. Resnick testified that although he was just being “conservative,” he made this recommendation because “there was a concern over the relationship [of the seizures] with the immunization, and I felt it would be safer for [Enrique] not to have the pertussis, because there was a concern about a reaction.” A treating doctor’s recommendation to withhold a particular vaccination can provide probative evidence of a causal link between the vaccination and an injury a claimant has sustained.³ See

² In response to questioning from Enrique’s counsel, Resnick gave the following testimony at the remand hearing:

Q: But it is your understanding that pertussis can produce seizures in the absence of fever, is that correct?

A: It can, because—first of all, all the time people don’t measure the seizures so—

Q: The fever, you mean?

A: Don’t measure the fever. So you have a history where there’s an event that occurs, the fever isn’t measured, and I would call that a provoked seizure.

³ Although Resnick noted that epidemiological evidence indicates that reactions to the DPT vaccine often include fever and irritability, he never asserted that he did not believe that Enrique’s seizures were the result of the DPT vaccination he received on

Capizzano, 440 F.3d at 1320, 1326 (“[T]he chief special master erred in not considering the opinions of the treating physicians who concluded that the vaccine was the cause of [the claimant’s] injury” and who had recommended that she receive no future hepatitis B inoculations.); Kelley v. Sec’y of Health & Human Servs., 68 Fed. Cl. 84, 98, 100 (Fed. Cl. 2005) (relying on treating doctor’s recommendation to withhold future tetanus vaccinations as evidence of causation); Almeida v. Sec’y of Health & Human Servs., No. 96-412V, 1999 U.S. Claims LEXIS 294, at *3, *70 (Fed. Cl. Spec. Mstr. Dec. 20, 1999) (finding causation under the Vaccine Act where a claimant had an afebrile seizure on the evening she received a DPT vaccination and her “doctors ordered the elimination of the pertussis component from future shots”).

II. Conclusive Proof in the Medical Literature

The special master likewise erred in requiring that the Andreus provide conclusive evidence in the medical literature linking afebrile seizures to the DPT vaccine. The Andreus’ expert witness, Tornatore,⁴ testified that it was his opinion that Enrique’s “whole-cell pertussis vaccination of October 31, 1995, resulted in an acute encephalopathy and seizures secondary to the direct toxicity of the components in the whole-cell pertussis vaccine.” As the special master acknowledged, Tornatore’s theory

October 31, 1995. To the contrary, Resnick testified that he thought it would be “safer” for Enrique not to receive additional pertussis inoculations because there was “some evidence” to indicate that Enrique had had a reaction to the vaccine. In other words, Resnick thought that there was “some evidence” to indicate that Enrique’s initial seizure was a “reaction” to the DPT vaccine.

⁴ As the Court of Federal Claims correctly recognized, Tornatore has “excellent medical credentials.” Court of Federal Claims Decision I, slip op. at 7. He is director of the residency program in the neurology department at Georgetown University, has done research at the National Institutes of Health on the toxic effect of bacterial and viral products on cells, and is an expert in the pathogenesis of brain injury.

of causation is premised on “the unassailable position that the DPT vaccination Enrique received contained pertussis toxin and endotoxin.” Vaccine Court Decision I, 2007 U.S. Claims LEXIS 292, at *43. These toxins and endotoxins, according to Tornatore, are capable of crossing the brain-blood barrier very quickly, irritating the nerves and supporting cells of the brain. When the nerves of the brain become irritated, they produce excess electricity, provoking seizures.⁵ Furthermore, if nerves of the brain are injured they can die and form scars, and this area of scarring can lead to “an ongoing seizure disorder.” In Tornatore’s view, the symptoms Enrique experienced—excessive crying on the evening of the vaccination coupled with a seizure the next day—fit “perfectly” with his theory that the toxins in the pertussis vaccine can cross the brain-blood barrier fairly quickly, resulting in subsequent neurological damage.

Herskowitz, the government’s lone expert witness, did little to cast doubt on Tornatore’s theory of causation. To the contrary, he “did not dispute the biologic plausibility of Dr. Tornatore’s medical theory,” Court of Federal Claims Decision II, slip op. at 4, and acknowledged that the pertussis toxin can cause neurotoxicity and neurological symptoms. The special master refused to credit Tornatore’s theory of causation, however, on the ground that “numerous medical studies [had] failed to find a relationship between afebrile seizures and DPT vaccination.” Vaccine Court Decision II, slip op. at 12. As a preliminary matter, we note that whether the DPT vaccine can cause afebrile seizures is a matter of considerable debate. See Almeida, 1999 U.S. Claims LEXIS 294, at *68 (finding “a causal relation between the DPT vaccine and

⁵ Tornatore “explained [his] theory by analogizing nerves to electrical wires; when the nerves become excited, they produce excess electricity, a manifestation of which is a seizure.” Vaccine Court Decision I, 2007 U.S. Claims LEXIS 292, at *44.

afebrile seizures"). Indeed, as noted previously, Resnick, the physician who treated Enrique soon after his seizure disorder began, agreed that the pertussis vaccine can provoke seizures in a child who is “[n]ot behaving normally” even in the absence of fever. Deray, likewise, asserted that whether the initial seizure was febrile or afebrile would not change his opinion that the catalyst for Enrique’s seizure disorder was the DPT vaccine he received on October 31, 1995.

Furthermore, there is a real question as to whether Enrique’s first seizure was febrile or afebrile.⁶ Because Enrique’s temperature apparently was not taken at the time of his initial seizure, we have no way of knowing whether it was elevated or not. Herskowitz, the government’s expert, testified that a “febrile” seizure could occur in a child who had a temperature just one degree above normal.⁷ Thus, it is quite possible that Enrique had a low-grade fever in the period immediately after his vaccination, but that this fever went either unnoticed or unreported by his family members. Indeed, when Enrique was taken to the hospital on November 11, 1995, his temperature, recorded at 99.4 degrees, see Vaccine Court Decision I, 2007 U.S. Claims LEXIS 292 at *22, was slightly elevated. Given that Enrique’s temperature was still slightly elevated at the time he reached the hospital, one might well presume that he had an even higher temperature at the time of his initial seizures.

Even assuming arguendo that Enrique’s initial seizure was afebrile, however, the special master erred in requiring conclusive evidence in the medical literature linking the

⁶ “The term ‘afebrile’ literally means ‘without fever,’ so that the term ‘afebrile seizure’ seems to refer to a seizure that is not accompanied by an above normal body temperature.” Liable, 2000 U.S. Claims LEXIS 209, at *63 (footnotes omitted).

⁷ Herskowitz explained that “[t]he normal Fahrenheit temperature is 98.6 rectally,” so if a child has a temperature one degree higher than that when he experiences a seizure, the seizure could be considered febrile.

DPT vaccine to afebrile seizures. Requiring “epidemiologic studies . . . or general acceptance in the scientific or medical communities . . . impermissibly raises a claimant’s burden under the Vaccine Act and hinders the system created by Congress, in which close calls regarding causation are resolved in favor of injured claimants.” Capizzano, 440 F.3d at 1325-26 (citations and internal quotation marks omitted). In Althen, for example, we determined that a claimant was entitled to recover even where her theory linking the tetanus vaccine to a central nervous system injury involved “a sequence hitherto unproven in medicine.” 418 F.3d at 1280. Likewise, in Knudsen, we held that the fact that epidemiological evidence pointed to a virus, rather than the DPT vaccine, as the trigger for a child’s encephalopathy was insufficient to preclude recovery. Knudsen v. Sec'y of Health & Human Servs., 35 F.3d 543, 550 (Fed. Cir. 1994) (“The bare statistical fact that there are more reported cases of viral encephalopathies than there are reported cases of DTP encephalopathies is not evidence that in a particular case an encephalopathy following a DTP vaccination was in fact caused by a viral infection present in the child and not caused by the DTP vaccine.”). “[I]n a field bereft of complete and direct proof of how vaccines affect the human body,” a paucity of medical literature supporting a particular theory of causation cannot serve as a bar to recovery. Althen, 418 F.3d at 1280; Capizzano, 440 F.3d at 1324; see Daubert v. Merrell Dow Pharms., Inc., 509 U.S. 579, 593 (1993) (“[I]n some instances well-grounded but innovative theories will not have been published Some propositions, moreover, are too particular, too new, or of too limited interest to be published.”).

Prior to Althen, special masters applied the so-called Stevens test to determine whether a vaccine caused a claimant's injury. See Stevens v. Sec'y of Health & Human Servs., No. 99-594V, 2001 U.S. Claims LEXIS 67 (Fed. Cl. Spec. Mstr. Mar. 30, 2001). This test required “[p]roof of confirmation of medical plausibility from the medical community and literature” in order to establish causation. Id. at *95-96. In Althen, however, we expressly rejected the Stevens test, concluding that requiring “objective confirmation” in the medical literature prevents “the use of circumstantial evidence . . . and negates the system created by Congress” through the Vaccine Act. 418 F.3d at 1280. Here, however, the special master resurrected the defunct Stevens test in an effort to discredit Tornatore's theory of causation.

The special master framed her rejection of Tornatore's theory of causation under the rubric of a “credibility” determination. See Vaccine Court Decision II, slip op. at 12. While considerable deference must be accorded to the credibility determinations of special masters, see Bradley v. Sec'y of Health & Human Servs., 991 F.2d 1570, 1575 (Fed. Cir. 1993), this does not mean that a special master can cloak the application of an erroneous legal standard in the guise of a credibility determination, and thereby shield it from appellate review. A trial court makes a credibility determination in order to assess the candor of a fact witness, not to evaluate whether an expert witness' medical theory is supported by the weight of epidemiological evidence. See Lampe v. Sec'y of Health & Human Servs., 219 F.3d 1357, 1373-74 (Fed. Cir. 2000) (Plager, J., dissenting) (noting that the issue is not one of “credibility” when a highly qualified expert presents a biologically plausible theory linking a claimant's injury to the DPT vaccine).

III. Standards for Assessing Medical Literature and Epidemiological Evidence

Although Althen and Capizzano make clear that a claimant need not produce medical literature or epidemiological evidence to establish causation under the Vaccine Act, where such evidence is submitted, the special master can consider it in reaching an informed judgment as to whether a particular vaccination likely caused a particular injury. See Daubert, 509 U.S. at 593-97 (noting that one factor in assessing the reliability of expert testimony is whether the theory espoused enjoys general acceptance within a relevant scientific community). Althen makes clear that a claimant's theory of causation must be supported by a "reputable medical or scientific explanation." 418 F.3d at 1278 (citations and internal quotation marks omitted); see also Knudsen, 35 F.3d at 548 (requiring a "sound and reliable medical or scientific explanation"). The assessment of whether a proffered theory of causation is "reputable" can involve assessment of the relevant scientific data. Medical literature and epidemiological evidence must be viewed, however, not through the lens of the laboratorian, but instead from the vantage point of the Vaccine Act's preponderant evidence standard:

The standard of proof required by the [Vaccine] Act is simple preponderance of evidence; not scientific certainty. . . . [I]t is not plaintiff's burden to disprove every possible ground of causation suggested by defendant nor must the findings of the court meet the standards of the laboratorian.

Bunting v. Sec'y of Health & Human Servs., 931 F.2d 867, 873 (Fed. Cir. 1991) (citations and internal quotation marks omitted).

In medical research, "attribution of causation is typically not made until a level of very near certainty—perhaps 95% probability—is achieved." Liable, 2000 U.S. Claims LEXIS 209, at *61 (emphasis in original). In contrast, "determination of causation in fact

under the Vaccine Act involves ascertaining whether a sequence of cause and effect is ‘logical’ and legally probable, not medically or scientifically certain.” Knudsen, 35 F.3d at 548-49 (emphasis added); Bunting, 931 F.2d at 873. Here, the Andreus submitted data from the National Childhood Encephalopathy Study (“NCES”), one of the most significant studies to date of the adverse effects of DPT vaccination, showing that the DPT vaccine is linked to neurological injury,⁸ as well as data from a follow-up study of large populations of vaccinated children, which showed that although the increased risk of afebrile seizures was not as “dramatic” as the increased risk of febrile seizures in the period following DPT vaccination, it was still almost double that found in the control group. They likewise submitted data from animal studies showing that the pertussis toxin can cause neurological damage.⁹ In addition, they provided data demonstrating that those actually afflicted with pertussis—commonly known as “whooping cough”—can experience seizures and their expert, Tornatore, explained that “this wild-type infection is actually in some ways reproduced by the vaccination.” See Vaccine Court Decision I, 2007 U.S. Claims LEXIS 292, at *49-51 (discussing a report from the Institutes of Medicine indicating that central nervous complications, which include but

⁸ The special master refused to credit evidence from the NCES because she did not believe that Enrique would have qualified as an NCES “case child.” Vaccine Court Decision I, 2007 U.S. Claims LEXIS 292, at *34. Regardless of whether Enrique would have qualified as an NCES case child, however, the study shows that there is an increased risk of neurological symptoms in the post-DPT vaccination period, and thus buttresses the Andreus’ assertion that the October 31, 1995, DPT vaccination caused Enrique’s first seizure.

⁹ The special master criticized Tornatore for relying upon animal studies to show that the pertussis toxin can cause injury to brain tissue. Vaccine Court Decision II, slip op. at 8. Quite obviously, however, scientists are unwilling to biopsy brain tissue from human infants in order to study the effects of the pertussis toxin. Tornatore explained that “animal systems are fairly similar to one another” and that animal studies were “the best proxy” scientists have for studying brain toxicities.

are not limited to seizures, occur in 1.7 to 7 percent of those afflicted with pertussis). The medical literature submitted by the Andreus does not establish with scientific certainty that the DPT vaccine caused Enrique's malady, but it is an integral part of the circumstantial evidence linking the vaccine to his seizure disorder.

IV. Enrique's Clinical Picture

We also disagree with the special master's determination that Enrique's "clinical picture" was inconsistent with a toxic injury to the brain from the pertussis vaccine. Herskowitz, the government's expert witness, acknowledged that the pertussis antigen can cause neurotoxicity. Vaccine Court Decision I, 2007 U.S. Claims LEXIS 292, at *69-71. He further acknowledged that children actually afflicted with pertussis can develop neurological symptoms. Id. at *71. Herskowitz asserted, however, that if components in the whole-cell pertussis vaccine had caused an injury to Enrique's brain, he would "expect to see" symptoms such as a bulging fontanel and an immediate change in personality and behavior. Furthermore, he testified that the pertussis toxin would be unlikely to confine itself to a small area of the brain, and thus he would expect to see generalized seizures, instead of the focal seizures Enrique initially experienced.

In response to questioning from Enrique's attorney, however, Herskowitz acknowledged that if the pertussis vaccine could cause a "devastating encephalopathy," it could "also cause a smaller amount of brain injury in a smaller area of the brain." Notably, Herskowitz did not assert that it would be impossible for the pertussis toxin to injure one area of Enrique's brain while at the same time leaving other areas unscathed.

Neither the special master nor the Court of Federal Claims is "to be seen as a vehicle for ascertaining precisely how and why [the DPT vaccine] sometimes destroy[s]

the health and lives of certain children while safely immunizing most others." Knudsen, 35 F.3d at 549. By the same token, neither tribunal is to be seen as a vehicle for ascertaining why the DPT vaccine might immediately cause a devastating brain injury in one child and a more modest initial injury in another. The government does not dispute that whatever caused Enrique's first seizure also led to his subsequent seizure disorder. See Court of Federal Claims Decision I, slip op. at 3 ("It is agreed by all concerned that whatever caused the seizures commencing on November 1, 1995, is also the cause for all subsequent seizure activity."). The pivotal issue, therefore, is whether the DPT vaccine triggered Enrique's initial seizure. Although Herskowitz asserted that he would "expect to see" a more devastating initial brain injury, he did not establish that toxins from the October 31, 1995, DPT vaccination could not have caused the focal seizure Enrique experienced on the following day. Thus, his testimony, standing alone, is insufficient to discredit Tornatore's theory of causation.

Likewise, the fact that Enrique met developmental milestones for a period after his initial seizures is not inconsistent with Tornatore's postulated mechanism of causation. Presumably, Enrique's initial seizures, which were relatively brief, had little impact on his neurological development, but subsequent seizures, which "became intractable and uncontrolled by medication," caused much more significant cognitive deficits. See Lurtz v. Sec'y of Health & Humans Servs., No. 90-1703V, 1998 U.S. Claims LEXIS 127, at *8 n.5 (Fed. Cl. Spec. Mstr. June 4, 1998) (noting that "[m]any experts in vaccine cases have testified that mental retardation and other neurological deficits are likely to accompany intractable seizure disorders in young children"). In Almeida, for example, the special master explicitly rejected the government's contention

that evidence of brain injury from the DPT vaccine will manifest itself immediately. 1999 U.S. Claims LEXIS 294, at *30-33. Instead, the special master credited the testimony of the claimant's expert who explained that:

In cases of severe seizure disorders, the initial MRI is more commonly negative than it is positive, regardless of the cause of the disorder. In vaccine injury, both MRI's and CT scans will be normal initially. Over the years, one might expect to observe cerebral atrophy, but one would not observe it right away. Customarily, one will observe no immediate markers to identify a DPT injury other than its clinical course. . . . If the condition continues, pathology can be later identified . . . but would not indicate what caused the injuries.

Id. at *31 (emphasis added) (citations omitted); see Liable, 2000 U.S. Claims LEXIS 209, at *55 n.14 (rejecting the government's argument that neurological damage from the DPT vaccine will "inevitably be immediately apparent" (emphasis in original)).¹⁰

The DPT vaccine leaves no "footprint" evidencing that it was the catalyst for a particular injury. Almeida, 1999 U.S. Claims LEXIS 294, at *31. Thus, the function of a special master is not to "diagnose" vaccine-related injuries, but instead to determine "based on the record evidence as a whole and the totality of the case, whether it has been shown by a preponderance of the evidence that a vaccine caused the child's injury." Knudsen, 35 F.3d at 549. Here, the totality of the evidence—including the striking temporal connection between the vaccine and Enrique's initial seizure, the testimony of treating physicians, and the biologic and scientific plausibility of Tornatore's

¹⁰ We thus refuse to accept the government's assertion that the fact that the MRI scan of Enrique's brain was normal in the period immediately following his initial seizures precludes a finding of causation. As the special master correctly acknowledged, "[a] child may have chronic seizures without . . . MRI evidence of injury." Vaccine Court Decision I, 2007 U.S. Claims LEXIS 292, at *72. Deray explained that "[y]ou can have a normal MRI for the rest of your life and have brain damage." Indeed, as Tornatore emphasized, the MRI is "a gross tool to look at the brain. . . . [An] MRI many times doesn't show us things, yet at autopsy, we will see areas [of the brain] that are very abnormal."

theory of causation—are sufficient to meet the Vaccine Act’s preponderant evidence standard. Since the government has proffered no alternative cause for Enrique’s seizures, see 42 U.S.C. § 300aa-13(a)(1), the Andreus are entitled to compensation under the Vaccine Act.

V. Compelling Physician Testimony

As a final matter, we address the Andreus’ argument that the special master erred in requiring testimony from Enrique’s treating physicians. Under 42 U.S.C. § 300aa-12(d)(3)(B)(iii), the special master has the right to “require the testimony of any person and the production of any documents as may be reasonable and necessary.” Because: (1) the Andreus placed the testimony of Enrique’s treating physicians at issue by relying on their statements to support a determination of causation, and (2) there was ambiguity surrounding certain statements made by the physicians, the special master did not abuse her discretion in requiring Deray and Resnick to testify.

Although the Federal Rules of Evidence provide for a physician-patient privilege if it is available under state law, see Fed. R. Evid. 501, those rules are not applicable in Vaccine Court proceedings. See U.S. Ct. Fed. Cl. R., Vaccine Rule 8(b) (“In receiving evidence, the special master will not be bound by common law or statutory rules of evidence.”). In most instances, however, it is both inadvisable and unnecessary to subpoena the testimony of treating physicians. It would not be in the public interest for the specter of a subpoena to provide physicians with a disincentive to treat a vaccine-injured patient or to cause them to be less than forthright in creating medical records assessing the relationship between a vaccine and a patient’s injury. The submitted documentary evidence can, under most circumstances, provide adequate insight into

the medical opinions of treating physicians, and there is little need to subject them to cross-examination in federal court. See Cucuras v. Sec'y of Health & Human Servs., 993 F.2d 1525, 1528 (Fed. Cir. 1993) ("Medical records, in general, warrant consideration as trustworthy evidence. The records contain information supplied to or by health professionals to facilitate diagnosis and treatment of medical conditions. With proper treatment hanging in the balance, accuracy has an extra premium."); Zatuchni, 69 Fed. Cl. at 624 (characterizing the documentary evidence submitted as "compelling, consisting of the medical records of the many physicians who examined" a Vaccine Act claimant).

Requiring treating physicians to testify in Vaccine Act cases is likely to serve only to prolong and increase the adversarial nature of proceedings, contrary to Congress' objective to create a federal compensation scheme under which awards are made to "vaccine-injured persons quickly, easily, and with certainty and generosity." H.R. Rep. No. 99-908, at 3 (1986); see also 135 Cong. Rec. 16,555 (daily ed. Nov. 6, 1989) (statement of Sen. Kennedy) ("We also reiterate our expectation that the special master and the powers given to the special master will allow the proceedings to be direct and straightforward. The special master should be able to require from petitioners and respondents information sufficient to evaluate the petition without resort to complex proceedings."); Knudsen, 35 F.3d at 549 ("The Vaccine Act does not contemplate full blown tort litigation in the Court of Federal Claims.").

CONCLUSION

Accordingly, the judgment of the Court of Federal Claims is reversed and the case is remanded for an assessment of damages.

COSTS

Appellants shall have their costs.

REVERSED AND REMANDED