



On April 20, 1995, respondent filed a report in this matter recommending that compensation be denied based on the absence of evidence to support a finding that Kristie suffered a vaccine-related injury and died as a result thereof. An evidentiary hearing was held on June 20 and 21, 1996, in Seattle, Washington. At that time, petitioner presented the testimony of Virginia Kirby, Kristie's mother and petitioner herein, Dr. Marcel Kinsbourne, a pediatric neurologist, and Dr. Adam S. Hill, a hematologist and one of Kristie's treating physicians. Testifying for respondent was Dr. Rita Lee, a pediatric neurologist, and Dr. Gregory H. Reaman, a specialist of pediatric oncology and hematology.

#### FACTUAL BACKGROUND

Kristie was born on January 21, 1971, in Yakima, Washington, following an uncomplicated pregnancy. Her birth weight was seven pounds, five ounces and she had a single APGAR score of nine.<sup>(2)</sup> Petitioner Exhibit (P. Ex.) 9-B-2. Kristie was noted to have a "systolic murmur" of the heart but was otherwise normal and was released on January 24. *Id.*

Kristie was examined by her pediatrician, Dr. Merlin Anderson, on February 4, and March 4, 1971, and received her first DPT vaccination on April 15, 1971. P. Ex. 9-D-1-2. The next notation in Dr. Anderson's records regarding Kristie reports that she had diarrhea on April 27, 1971. P. Ex. 9-D-2. Mrs. Kirby testified that between the time of Kristie's first and second DPT shot, Mrs. Kirby observed Kristie, in her infant seat, experience a tic at the corner of her mouth and then jumping of her left hand two or three times. Tr. at 25. Mrs. Kirby testified the episode lasted a few seconds and then Kristie seemed fine. Tr. at 25. Mrs. Kirby recalls telling her husband about the episode, but did not notice any similar episodes after that, and they never had Kristie evaluated by a health care professional because of the episode. Tr. at 26-27. Mrs. Kirby testified "when [Kristie] went in for her second DPT shot, I don't even think I mentioned [the episode] to Dr. Anderson because it had completely gone out of my mind because nothing else happened and she was healthy." Tr. at 27-28.

Kristie received her second DPT vaccination at the offices of Dr. Anderson on May 17, 1971. P. Ex. 9-D-2. Mrs. Kirby testified she did not observe any reaction to the shot in the doctor's office and described the rest of the day as being "just a usual day." Tr. at 17. On the day following the shot, Mrs. Kirby testified, she went to wake Kristie from a nap and noticed she had changed positions. "She had been on her left side and she had rolled to her right side. So, I went in to wake her up and she was gray, lifeless, and she had vomited in her crib. . . . She was limp. I didn't think she was breathing." Tr. at 18. Mrs. Kirby testified she immediately called the doctor and her sister-in-law. With her sister-in-law, Mrs. Kirby rushed Kristie to the emergency room at St. Elizabeth's Hospital where they were met by Dr. Anderson. Tr. at 19-20.

Dr. Anderson's records of Kristie's admission report that Kristie had her second DPT vaccination the day before and there was no immediate problem. He noted Kristie had a mild seizure about two weeks prior but the mother did not notify the doctor. P. Ex. 9-D-3; 9-F-6. "Today the child apparently developed marked listlessness and seemed to be asleep, unable to be aroused." P. Ex. 9-D-3. One hospital record reports that "[e]xamination in the emergency room revealed a markedly listless 4 month old infant lying quietly. . . . Infant was placed in oxygen, placed in croupette with oxygen. Physical examination revealed a well developed, slightly pale infant, who now appears alert." P. Ex. 9-F-4.

Kristie was hospitalized overnight and Mrs. and Mr. Kirby spent the night in the hospital with her. According to Mrs. Kirby, Kristie seemed lively by the next morning and Mrs. Kirby felt it would be okay for her husband and her to leave the hospital for breakfast. They did leave for breakfast but were soon called back because Kristie had begun seizing. Tr. at 22-23, 53. According to Mrs. Kirby, it was a long time before the doctors were able to get that seizure under control, perhaps as long as three hours. Tr. at 65, 74. Records of May 19 report that Kristie had a convulsion which gradually subsided after the

administration of medications. P. Ex. 9-F-6. She remained in the hospital until May 26, 1971, when she was discharged with a final impression of "acute pharyngitis, congenital heart [sic], possible patent ductus arteriosus, and probably grand mal epilepsy seizure." P. Ex. 9-D-5. Dr. Kennedy, who evaluated Kristie, noted a "reaction to DPT immunization." P. Ex. 9-D-7. Kristie was reported to be improving on discharge. *Id.* Mrs. Kirby testified that Kristie was placed on phenobarbital and, on discharge, seemed much like her old self. Tr. at 29, 54.

About a month after her discharge from the hospital, Kristie experienced her next seizure. Tr. at 29, 53; P. Ex. 9-G-2. Thereafter, she suffered numerous seizures and her seizure disorder proved to be quite severe and intractable. Kristie returned to the hospital for seizures many times throughout her lifetime. Tr. at 29. Anticonvulsant medications were administered over the years, and she was diagnosed as severely mentally retarded and severely developmentally delayed. P. Ex. 9-G-321-22; P. Ex. 9-I-20, 22.

On April 3, 1986, at the age of 15 years, Kristie was hospitalized once again to determine the cause of recurrent upper respiratory infections, pneumonias, diarrhea, and poor blood counts. Tr. at 31. While hospitalized, it was discovered that Kristie was suffering from acute lymphoblastic leukemia. She remained hospitalized for three weeks and died on April 22, 1986. An autopsy was not performed.

The following are relevant details about Kristie's final illness. Following an April 2, 1986, examination, Dr. Adam S. Hill, a hematologist, and expert witness herein, performed a bone marrow aspiration and biopsy to learn the cause of Kristie's low blood counts. Dr. Hill concluded that Kristie was suffering from "an acute lymphoblastic leukemia." Tr. at 224; P. Ex. 9-G-322; P. Ex. 9-I-22. She was hospitalized the next day. On April 8, 1986, a second bone marrow sample was sent to the hematopathology laboratory at the University of Washington. P. Ex. 9-G-329. Dr. Hill's diagnosis of acute lymphoblastic leukemia was confirmed. P. Ex. 9-X-7.

Kristie's doctors determined that although she was fragile, Kristie would have a better chance of surviving her disease if she were given induction chemotherapy. Dr. Reaman explained that induction treatment consists of giving several toxic chemicals directly into the vein. The major danger of such treatment is that the bone marrow, which is already damaged, will become temporarily worse. In other words, while the leukemia cells are being destroyed, a number of normal cells will also be destroyed, and the patient will be extremely vulnerable to complications of bone marrow failure which include bleeding and infection. Tr. at 233. Induction chemotherapy is performed over a period of days. On the 14th day, if the person does well, the bone marrow is assessed, and, depending on what is found, additional treatment may be given at that time. Kristie was not tested on day 14 because her condition had become so critical, the doctors believed she could not tolerate further chemotherapy. Tr. at 234.

On April 4 1986, in preparation for her chemotherapy, a Hickman catheter was placed into the jugular vein at a point under the clavicle. P. Ex. 9-G-327. The procedure was difficult and did not go well due to the unusual anatomical location of Kristie's subclavian vein. P. Ex. 9-G-327; Tr. at 248. As a result of the initial catheter misplacement, Kristie developed a "pneumothorax," an accumulation of air or gas in the pleural space between the lungs and chest wall that compressed the lungs, making breathing more difficult. Tr. at 306. A "hemothorax" developed as well, *i.e.*, bleeding into the lungs and the space around the lungs. Tr. at 341. It became necessary to place a chest tube directly into her chest cavity to drain the blood and air. Tr. at 341; P. Ex. 9-G-330. Some inflammation was in fact observed, and although infection was not proved, every physician, including Dr. Hill, who participated in Kristie's care thought it was likely that there was an infection. Tr. at 238, 249.

Kristie's condition deteriorated through the course of her hospitalization. The decision not to intubate (a

"do not resuscitate" order) in the event of cardiorespiratory failure was made and fully supported by her doctor and her family.<sup>(3)</sup> *Id.*

The following events during Kristie's final days are recorded by Dr. Simms in his discharge summary. Toward the end, Kristie developed hypokalemia (depressed levels of potassium) that was treated with a potassium drip. P. Ex. 9-G-318. On the day before her death her potassium level had fallen to a dangerous low, but was beginning to rise again just prior to her demise. P. Ex. 9-G-318-19. Her respiratory status had deteriorated steadily over the period of her entire hospitalization. P. Ex. 9-G-319, 330. Oxygenation began to further deteriorate and continued to do so "until she was on 100% [oxygen] by non-breathing mask." P. Ex. 9-G-319. An EKG showed some cardiac irritability with abnormally conducted beats, but no other specific abnormalities. P. Ex. 9-G-320.

On the day prior to her death, Kristie seemed to interact somewhat better with the staff and family. The next day, however, in the hour prior to her death, she began to deteriorate back to an obtunded state. P. Ex. 9-G-319-20. She became increasingly more obtunded and her respirations became more shallow although less labored. She had a brief seizure followed by a full cardiac arrest and apnea. Bag and mask ventilation and cardiac drugs were administered with no effect, and "code" efforts were discontinued. P. Ex. 9-G-326, 435, 499a.

Dr. Simms' discharge summary lists the following as his final diagnosis:

1. Fluid and Electrolyte Abnormalities.
2. Acute Lymphoblastic Leukemia.
3. Respiratory Distress.
4. Neurologic/Static Encephalopathy.
5. Rule out Sepsis, Rule out Pneumonia.
6. Cardiac, Specifically Congenital Pulmonic Stenosis.

P. Ex. 9-G-318.

#### STATUTORY SCHEME

Under the Program, the estate of an individual whose death is shown to be associated with the administration of certain childhood vaccines may receive an award of \$250,000. §11(b)(1)(A); §15(a)(2). In order for the estate to be entitled to an award, the petitioner must demonstrate by a preponderance of the evidence that the deceased received a vaccination covered by the Act; received the vaccination in the United States or its trust territories; and sustained a serious, vaccine-related illness or injury that culminated in death, or died as a direct result of the vaccination. §11(b)(1)(A) and (c). The preponderance of the evidence standard requires the special master to determine that the existence of a fact is "more probable than not." *In re Winship*, 397 U.S. 358, 371 (1970) (Harlan, J. concurring).

A petitioner may establish causation in one of two ways. First, a petitioner may simply demonstrate what is commonly referred to as a Table case. The Vaccine Injury Table lists vaccines covered by the Act and certain injuries and conditions that may stem from the vaccines. §14. If the special master finds that a person received a vaccine listed on the Table, and suffered the onset of an injury listed on the Table or a significant aggravation of an injury listed on the Table, within the time period prescribed by

the Table, then the petitioner is entitled to a presumption that the vaccine caused the injury. §13(a)(1)(A). The petitioner must then show that the death was a sequela or acute complication of the Table injury. §14(a)(I)(E). The respondent may rebut the presumption of causation with a preponderance of the evidence that the injury or condition was due to factors unrelated to the administration of the vaccine. §13(a)(1)(B). In the alternative, respondent may contend that the death was not associated with a vaccine-related injury or condition.

Second, a petitioner may establish causation by proving by a preponderance of the evidence that the vaccine actually caused the death. Actual causation requires proof of a "logical sequence of cause and effect showing that the vaccine was the reason for the [death]." *Strother v. Secretary of HHS*, 21 Cl. Ct. 356, 370 (1990), *aff'd without opinion*, 950 F.2d 731 (Fed. Cir. 1991). The mere temporal relationship between a vaccination and death, and the absence of other obvious etiologies for the death, are patently insufficient to prove actual causation. *Wagner v. Secretary of HHS*, No. 90-1109V, 1992 WL 144668, at \*3 (Cl. Ct. Spec. Mstr. June 8, 1992). Rather, a petitioner must show a medical or scientific theory causally connecting the vaccination and the death. *Strother*, 21 Cl. Ct. at 370, *citing Hasler v. United States*, 718 F.2d 202, 205-06 (6th Cir. 1983).

While Kristie's condition within the three days following her May 17, 1971, vaccination seems superficially at least to satisfy the legal test regarding significant aggravation, as announced in *Whitcotton v. Secretary of HHS*, 81 F.3d 1099 (Fed. Cir. 1996), I do not need to directly address that issue. Ultimately, I find petitioner is not entitled to compensation. That conclusion derives from my finding that petitioner has not demonstrated that Kristie's death is a pathological consequence of her severe, chronic neurologic condition. Therefore, I will limit the discussion and my consideration of expert testimony to what I consider to be the salient issue in this case--the medical association between Kristie's compromised neurological condition and her death.

## EXPERT TESTIMONY

### Dr. Kinsbourne

Dr. Marcel Kinsbourne, a pediatric neurologist, testified on behalf of petitioner.<sup>(4)</sup> He testified that Kristie's death was multifactorial--the consequence of the combined effects of her leukemia and her chronic encephalopathy and seizures, none of which, *alone*, would have caused Kristie to die. Tr. at 136-37, 139, 140-42.

Dr. Kinsbourne's opinion is that Kristie's seizures brought about recurrent bouts of pneumonia and aspirations which cumulatively compromised the health of her lungs by diminishing the amount of pulmonary reserve, *i.e.*, the amount of well-functioning lung tissue. He explained "[w]e have a child with a respiratory system already subject to multiple pneumonias and aspirations, and now we have a child who has leukemia, which certainly reduces or is apt to reduce resistance to infection, and then we have a tube put into that space with some difficulty, as I understand. So, these are a combination of adverse events." Tr. at 123. According to Dr. Kinsbourne, a final seizure caused Kristie to stop breathing and ushered in the cardiorespiratory arrest from which Kristie died. P. filing of Sept. 18, 1995; Tr. at 97, 124-25, 127, 130, 144.

Dr. Kinsbourne explained the mechanism by which the seizure resulted in Kristie's death:

It took something to stop her breathing. When a baby stops breathing, it doesn't stop breathing because of its lungs, it stops breathing because of its brain. The brain stops sending to the lungs the signals,

"breathe." Now, therefore, the respiratory arrest in cases like this is a neurological phenomenon, as is the seizure. Insofar as the neurological event of stopping respiration happened right after the seizure or as part of the seizure, I take it to be causally related because it is the case that sometimes individuals in the course of a seizure stop breathing. . . . Now, when individuals stop breathing, the fact that their system has been weakened . . . by shallow breathing, by oxygen deprivation, must be taken into account. So, I didn't wish to discount those ongoing events which are clearly reflected in the records. Nonetheless, she died in a seizure, which is neurological, and she stopped breathing, which is neurological.

Tr. at 143-44.

#### Dr. Hill

Dr. A. Sherman Hill, a hematologist<sup>(5)</sup> and one of Kristie's treating physicians, testified on behalf of petitioner.<sup>(6)</sup> Dr. Hill testified he does not attribute Kristie's death to one cause, rather, he believes it was the combination of several factors that caused her to die, including a probable infection, compromised lung function, fluid and electrolyte abnormalities [( *i.e.*, diminished potassium levels)] and the seizure she had just before she died which was "at least in time associated with her death." Tr. at 256.

According to Dr. Hill, there is risk associated with induction therapy. However, in Dr. Hill's experience, "death in induction with acute lymphoblastic leukemia in otherwise healthy people is rare. The figure I've obtained is 3 to 5 percent death during induction." Tr. at 234-35. As well, Dr. Hill believes that Kristie most likely would have recovered from the complications of the Hickman catheter placement had she not had the nervous system disorder. Tr. at 252-53. The fluid and electrolyte abnormalities Kristie suffered may have, according to Dr. Hill, contributed to Kristie's death, but Dr. Hill does not believe they were the primary cause. Tr. at 255.

Dr. Hill testified the last seizure could be described as "the final straw in a progressively weakened person." Tr. at 271-72, 277. He explained "[s]he was extremely weak, she was getting ready to die. That happened to occur right before. Whether she would have died at that moment without that seizure, I have no way of knowing. She could have." Tr. at 277.

#### Dr. Lee

Dr. Rita Lee, a pediatric neurologist, testified on behalf of respondent.<sup>(7)</sup> Dr. Lee believes Kristie's death was caused by complications from her leukemia treatment, specifically, widespread infection, congestive heart failure, pneumonia and pulmonary edema. Tr. at 176, 182. Dr. Lee testified "it's entirely possible, given [Kristie's] bleeding tendency and low platelet count, that she may well have bled into her lungs or head, as the

terminal event, because just for example, one of the last nurse's notes said there was a large amount of red drainage being suctioned from her lungs just before she died." Tr. at 176.

It was the dying process that caused Kristie's final seizure, which, according to Dr. Lee, was an agonal one. Tr. at 177, 194. She explained that when one is in the process of dying, blood pressure is diminished and hypoxia occurs where the brain simply does not get enough oxygen. In this circumstance, there is brief twitching or a brief seizure due to the lack of oxygenated blood to the brain. Tr. at 177. Dr. Lee opined Kristie was not getting enough oxygen to her brain just prior to her last

seizure. She had very bad blood gases and her respirations were shallow.<sup>(8)</sup> Dr. Lee believes Kristie was cyanotic because she was not getting any oxygen, not because she had a seizure and did not breathe for those few seconds. Tr. at 178, 182, 209. In fact, Dr. Lee testified that, even absent the neurological disorder, Kristie would have died as a result of the complications of her leukemia treatment. Tr. at 205-06.

#### Dr. Reaman

Dr. Gregory H. Reaman, a pediatric oncologist and hematologist, testified on behalf of respondent.<sup>(9)</sup> It is Dr. Reaman's opinion that Kristie died as a result of complications of her leukemia treatment. Tr. at 303, 318. Simply, Dr. Reaman believes that as Kristie became progressively more hypoxemic, she suffered cardiorespiratory arrest and died. Tr. at 308-09, 321. Dr. Reaman believes Kristie's lung problems began after the attempted placement of the Hickman catheter--within a day or two after that attempt, Kristie developed progressive pulmonary infiltrates or pneumonia. Tr. at 309. According to Dr. Reaman, the cause of Kristie's pneumonia was multifactorial, "in part related to the chest tube insertion, in part related to the severe superficial or tunnel infection that she had from the Hickman catheter and the fact that she was immunocompromised or immunosuppressed [because of her leukemia] with a low white count and unable to fight off infection." Tr. at 345.

Dr. Reaman explained the mechanism by which he believes hypoxemia caused Kristie to die. According to Dr. Reaman, Kristie's oxygen levels were very low and were not adequately corrected by the oxygen mask which was supplying maximum amounts of oxygen. When the mask was removed, Kristie's oxygen levels were even further lowered to the point where she was not receiving enough oxygen to the part of her brain that controls cardiac function and respiration, and a seizure ensued. Tr. at 348. According to Dr. Reaman, it was the pneumonia that caused Kristie's severe hypoxia. Thus, the seizure she experienced was an agonal event. Tr. at 311, 319.

Dr. Reaman testified that an underlying seizure disorder does not predispose any child with leukemia to an increased risk of complications from chemotherapy. Tr. at 310. He testified that Kristie had a longstanding seizure disorder, mental retardation and nervous system dysfunction which had not previously caused life-threatening complications. In addition, Kristie had other seizures during her final hospitalization after which cardiorespiratory arrest did not ensue. Tr. at 319. Further, Dr. Reaman noted that the final seizure was very brief--15 seconds; "if someone had had status epilepticus and was having a seizure for minutes or longer and experienced a cardiac or respiratory arrest, then you could implicate seizure as causing the death, but certainly not a 15-second seizure in someone who was dying and profoundly hypoxic." Tr. at 350-51. Therefore, Dr. Reaman testified, it is unreasonable to conclude that a seizure caused Kristie's death. Tr. at 319.

#### DISCUSSION

In *Abbott v. Secretary of HHS*, 27 Fed. Cl. 792 (1993), the Court of Federal Claims stated that "Congress intended [the Act] to be understood--and to be applied--as it would be by a medical professional." 27 Fed. Cl. at 794. Thus, according to the Court of Federal Claims, "the words 'acute complication or sequela' are likewise to be taken as words of art that carry their own precise and special meaning." *Id.* The Court defined the terms "complication" and "sequela" as "somatic conditions or events recognizable as the pathological sequence or result of an existing disease or disorder or as an independent accompaniment of such a disease or disorder." *Id.* The Court of Appeals for the Federal Circuit confirmed that a "definition of sequela based on legal notions of proximate cause" is "legally incorrect." 19 F.3d 39 (Fed. Cir. 1994) (Table, Text in Westlaw, 1994 WL 32656, at \*2). In determining whether Kristie's death resulted from her neurologic disorder, I will apply the definition of sequela set forth in *Abbott*. Therefore, it is petitioner's burden to demonstrate, by a preponderance of the evidence, that

Kristie's death was the pathological consequence of her neurologic disorder.

The experts seem to agree that Kristie's death resulted from a combination of factors, but the relative contribution to be ascribed to each factor is controversial. Dr. Gregory Reaman for respondent places considerable emphasis on the problem of Kristie's critically reduced respiratory capability, caused by the misadventure with the Hickman catheter, infection and severe pneumonia that led to increasingly severe respiratory compromise and finally respiratory failure. It is his opinion that the brief seizure observed prior to death was not the cause of death, but more likely was, itself, caused by a profound hypoxemia. Tr. at 342-43.

Dr. Kinsbourne attributes Kristie's death to the combination of her compromised pulmonary reserve, which he believes resulted from her recurrent bouts of aspiration pneumonia due to seizures, and the complications of her leukemia treatment which put further strain on her lungs. His opinion is that Kristie's final seizure caused her to stop breathing. However, while Dr. Kinsbourne testified that Kristie's pulmonary reserve was compromised, he conceded there is nothing in her medical records to indicate that she had any kind of lung disease or compromised lung capacity at the time of her admission. Tr. at 125. He testified, "there was nothing in the records on that admission which addressed that point [that Kristie had lung compromise.] Whatever her pulmonary reserve was before she had the hemothorax, the hemothorax would have reduced it." Tr. at 127. In fact, Dr. Fukura's April 3, 1986, medical record reports that Kristie's most recent films showed her lungs to be quite clear. P. Ex. 9-G-321. His April 22, 1986, record notes that although a chest tube was placed, Kristie "developed infiltrates in the right lung over the next 24 hours. In the last 3 days, she has developed bilateral worsening infiltrates with air bronchograms throughout all lung fields." P. Ex. 9-G-323. Indeed, it is Dr. Hill's opinion that, prior to the Hickman catheter misplacement, Kristie did not have breathing problems. Further, Dr. Hill felt that had the catheter placement not gone awry, Kristie would not have developed breathing problems. Tr. at 268.

Dr. Hill was unwilling to designate a particular factor as the *primary* cause of Kristie's death. Rather, he emphasized that there were many contributing factors. He testified the seizure was the "proximate" cause of death because right after Kristie had the seizure her heart stopped beating. Tr. at 269-70. He likened that final seizure to "the last straw."

While the court found Dr. Hill to be forthright and knowledgeable, his testimony was equivocal on the issue of whether a seizure caused Kristie's death. When asked what was the immediate cause of death, Dr. Hill responded as follows:

I don't think one can -- when her heart stopped, she stopped breathing, but I don't think one can say this death was caused by this or that abnormality. . . . So, I would attribute her death to an adding up of probably infection, difficulty with lung function due to the fluid in the chest and probably infection, fluid and electrolyte abnormalities may have contributed to it. In what was the terminal event, she had a seizure shortly before she died, and that was at least in time associated with her death. I think it's hard to attribute her death to one cause.

Tr. at 256. His equivocation was demonstrated again in the following example, which is fairly characteristic of his testimony on the particular issue of the cause of Kristie's death:

Suppose she hadn't had the seizure. There were many reasons for her to have a seizure at that time. She still had plenty of reasons to die. She might have died an hour later of another seizure, or she might have died of a respiratory arrest or something else that happened. . . . If she'd not had a seizure disorder, hadn't had a seizure at that moment, she might not have died at that moment. But there were certainly

plenty of reasons for her to die quite soon.

Tr. at 270-71, 284-85. In fact, Dr. Hill testified that Kristie was having severe respiratory distress "[t]o the point of death" prior to her final tremors and that she was "extremely weak, she was getting ready to die." Tr. at 274, 277. That opinion, however, contrasts sharply with Dr. Kinsbourne's opinion that Kristie was not dying just prior to her final seizure and would not have died absent the seizure. Tr. at 98-99, 129-30.

Dr. Hill seems to connect Kristie's final seizure and her death based on the temporal relationship between the two. ("[S]he had a seizure shortly before she died, and that was at least in time associated with her death." Tr. at 256). Dr. Kinsbourne attempted to connect the two events by explaining that a seizure and the ceasing of respiration are both neurologic events. Only Dr. Kinsbourne was willing to say unequivocally that absent a seizure, Kristie would not have died. Tr. at 130-31. To further support that proposition, he places a great deal of significance on the fact that Kristie died in a seizure. However, Dr. Reaman and Dr. Lee testified that the seizure Kristie experienced just before she died was an agonal one, *i.e.*, part of the dying process. Dr. Reaman explained that such tremors in the presence of acrocyanosis, which Kristie was documented to have at that time, "when they become seizures, are highly suggestive of severe deprivation of oxygen to the brain as a likely cause of the seizure." Tr. at 345. He testified it was that profound lack of adequate oxygen to her brain that caused Kristie to die, not a brief, 15-second seizure.

Dr. Hill's reliance on the temporal proximity between the seizure and death does not satisfy petitioner's burden to demonstrate a *medical* association between the seizure and death. Nor does the special master find particularly persuasive Dr. Kinsbourne's eagerness to blame Kristie's death on her final seizure. That opinion simply does not hold up in light of the overwhelming evidence that Kristie's condition was dire just prior to her death as conceded by Dr. Hill, and conspicuously indicated in the medical records. There is also no evidence to support Dr. Kinsbourne's proposition that Kristie's lungs were already so compromised by her lifelong neurologic disorder as to have played a significant role in her death. Indeed, the medical records, and the experts in this case, make it clear that Kristie's downward spiral began shortly after the complications she experienced with the Hickman catheter placement. Finally, Dr. Reaman's exceptional testimony casts even more doubt on petitioner's already shaky, unsubstantiated theory.

The court accords Dr. Reaman's opinion more weight than those of Dr. Hill and Dr. Kinsbourne. Dr. Reaman's superior qualifications in the field of pediatric oncology and hematology and his particular expertise in childhood leukemia with special competence in acute lymphoblastic leukemia (Tr. at 303), in addition to the well-reasoned basis for his explanations, lead the court to find his opinion more persuasive. Even Dr. Kinsbourne, when asked whether the complications from treating her leukemia with the Hickman catheter more likely caused Kristie's death, conceded, "[m]y impression is that it's hardly

ever the case that a person who has this kind of event dies. Although, again, the people who actually do this work will know better." Tr. at 139.

The circumstances of Kristie Kirby's life and death are among the most tragic I have ever encountered in my years of experience under the Vaccine Program. While I am sympathetic to the ordeal Mr. and Mrs. Kirby must have endured during Kristie's life and death, and the grief they must still be suffering, I am unable to make a favorable finding for petitioner in this case. Petitioner's initial burden was to demonstrate that, more likely than not, Kristie's death was the sequela or pathological consequence of her neurologic condition. Petitioner failed to so persuade me in light of the very strong evidence that the unfortunate circumstances of Kristie's final hospitalization for the treatment of her leukemia resulted in

the rapid decline of her health. Her death, I believe, was likely caused by a number of factors, but not, I find, by the final seizure or her compromised neurologic condition.

#### CONCLUSION

Based on the foregoing, the undersigned finds, after considering the entire record in this case, that petitioner is not entitled to compensation in this case. In the absence of a motion for review filed pursuant to RCFC Appendix J, the Clerk of the court is directed to enter judgment in accordance herewith.

IT IS SO ORDERED.

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E. LaVon French

Special Master

1. The statutory provisions governing the Vaccine Act are found in 42 U.S.C. §§ 300aa-1 et seq. (1991 & Supp. 1997). Reference will be to the relevant subsection of 42 U.S.C. § 300aa.
2. An APGAR test measures heart rate, respiration, muscle tone, responsiveness to stimulation, and skin color. Generally, two tests are performed at exactly one and five minutes after birth. The maximum score is ten. The Merck Manual 1858 (15th ed. 1987). The score taken at one minute is an index of asphyxia, while the five minute score is an index of the likelihood of death or neurological residua. Nelson Textbook of Pediatrics 362 (13th ed. 1983). The accuracy of the score for the prediction of long-term outcome, however, is inconsistent. R. Summitt, Comprehensive Pediatrics 370 (1990).
3. Dr. Hill testified that Kristie's lungs were not working, she had "infiltrates," and "intubation would not have prolonged her life for more than days and would have put her and the family through a great deal of discomfort." Tr. at 238. Mrs. Kirby testified that Dr. Simms explained extreme resuscitation measures could cause internal bleeding. Tr. at 69-70. Mrs. Kirby testified that the reason she elected the do-not-resuscitate order was because she did not want her daughter to experience any more pain. Tr. at 71.
4. Dr. Kinsbourne is board-certified in pediatrics and teaches at several medical schools in the Boston, Massachusetts area. He has published extensively in the area of, among others, child neurology. P. filing of June 10, 1996.
5. Dr. Hill is board-certified in internal medicine and hematology. Tr. at 221.
6. Dr. Hill was originally consulted by Dr. Fukura to assist in Kristie's care. Tr. at 223-24, 235. Dr. Hill testified that he remembers Kristie because she was "weak." In addition, he recalls Kristie "was thin, small, did not respond vigorously to what was said to her, she had the seizure disorder . . ." Tr. at 236, 294.
7. Dr. Lee is board-certified in pediatrics and pediatric neurology. Tr. at 158-59. She is a full-time associate professor at Baylor College of Medicine in Houston, Texas, where she practices pediatric neurology. Tr. at 160.

8. Dr. Lee pointed out that Kristie's respirations were also noted to be much less labored prior to her death. Dr. Lee believes that may mean Kristie had "simply given out, that she [had] gotten too weak, too debilitated, too terminally ill to really fight for air anymore." Tr. at 178.

9. Dr. Reaman is board-certified in pediatrics and pediatric oncology and hematology. He is a professor of pediatrics at the George Washington School of Medicine and is chairman of the Department of Hematology Oncology at the Children's Hospital in Washington, D.C. Tr. at 303. Dr. Reaman is internationally recognized as an expert in childhood leukemia with particular expertise in acute lymphoblastic leukemia. Tr. at 303.