OFFICE OF SPECIAL MASTERS
No. 04-81V
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For Publication

CHRISTINE BOLANDER and JOHN A. BOLANDER, for their own benefit and the benefit of their daughter, KATLYN ANN BOLANDER,	*	
Petitioners,	*	
v.	*	Entitlement; Prevnar vaccine, latent parvovirus B19 infection, and aplastic anemia
SECRETARY OF THE DEPARTMENT OF HEALTH AND HUMAN SERVICES,	*	
Respondent.	*	

John F. McHugh, New York, NY, for petitioners.
James A. Reistrup, Washington, DC, for respondent.

MILLMAN, Special Master

DECISION[1]

Petitioners filed a petition on January 22, 2004, under the National Childhood Vaccine Injury Act, 42 U.S.C. §300aa-10 et seq., alleging that pneumococcal conjugate (Prevnar) vaccine

[1] Vaccine Rule 18(b) states that all decisions of the special masters will be made available to the public unless they contain trade secrets or commercial or financial information that is privileged and confidential, or medical or similar information whose disclosure would clearly be an unwarranted invasion of privacy. When such a decision or designated substantive order is filed, petitioner has 14 days to identify and move to delete such information prior to the document's disclosure. If the special master, upon review, agrees that the identified material fits within the banned categories listed above, the special master shall delete such material from public access.

which their daughter Katlyn Ann Bolander (hereinafter, "Katlyn") received on February 8, 2001 caused her aplastic anemia.[2]

A hearing was held on February 17, 2006. Testifying for petitioners was Dr. David Rosenstreich. Testifying for respondent was Dr. James B. Nachman.

FACTS

Katlyn was born prematurely on September 29, 1998 as one of twins. She was born at 27 weeks gestation and weighed 2 lbs. and 11 oz. She had to be evacuated because of the death of the other twin. Katlyn required mechanical ventilation for a couple of days. She remained in the hospital for two months and four days. She had a history of perinatal asphyxia resulting in mild cerebral palsy and mild right-sided hemiparesis. P. Filing of Sept. 27, 2004.

Katlyn had evidence of infection with parvovirus B-19,[3] likely within the prior two to three months. Med. recs. at p. 27. On December 1, 1998, an MRI done of Katlyn's brain revealed hemiatrophy[4] or hyoplasia[5] on the left side of her brain. Med. recs. at p. 236.

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[2] Aplastic anemia is "any of a diverse group of anemias characterized by bone marrow failure with reduction of hematopoietic cells and their replacement by fat, resulting in pancytopenia, often accompanied by granulocytopenia and thrombocytopenia. It may be hereditary; it may be secondary to causes such as toxic, radiant, or immunologic injury to bone marrow stem cells or their microenvironment; it may be associated with various diseases; or it may be idiopathic." Dorland's Illustrated Medical Dictionary, 30th ed. (2003) at 77.

[3] "Human parvoviruses cause transient aplastic crisis, acute arthritis, erythema infectiosum, hydrops fetalis, spontaneous abortion, and fetal death." Dorland's Illustrated Medical Dictionary, 30th ed. (2003) at 1382.

[4] Hemiatrophy is "atrophy of ..one half of an organ." Dorland's Illustrated Medical Dictionary, 30th ed. (2003) at 828.

[5] Hypoplasia is "incomplete development or underdevelopment of an organ...." Dorland's Illustrated Medical Dictionary, 30th ed. (2003) at 897.

Katlyn received Prevnar vaccine on February 8, 2001. Katlyn had a rash one week later. Med. recs. at p. 700. Dr. James B. Bussel, Director of Platelet Research and Treatment at Cornell, wrote on April 9, 2001 that Katlyn may have acquired amegakaryocytic thrombocytopenia[6] as a result of T-cell suppression. Because her platelet counts were so good previously, her condition might be due more from an acquired lesion than a delayed congenital flaw. Med. recs. at 147.

On April 25, 2001, Dr. Vinod Prasad of the Bone Marrow Transplantation Service wrote to Dr. Bussel a history that Katlyn saw her local pediatrician on February 15, 2001 with a history of bruises all over her body. An initial diagnosis of immune thrombocytopenia was made. There was no history of fever then or in the few weeks prior to developing the bruises. She had received Prevnar one week prior to developing the bruises.

Katlyn did not respond to significantly high doses of steroids. A bone marrow aspirate and biopsy was done on April 2, 2001, showing a remarkable lack of megakaryocyte with some degree of myeloid hypoplasia and erythroid hyperplasia. Katlyn had a good response to platelet transfusion. Dr. Prasad did not think that Prevnar was the cause of Katlyn's aplastic anemia. Katlyn's mother had parvovirus disease while Katlyn was in utero. Katlyn was slightly delayed in her motor and verbal skills. P. Filing of Sept. 27, 2004.

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[6] Thrombocytopenia is a "decrease in the number of platelets, such as thromboctyopenic purpura. See also *pancytopenia*." Dorland's Illustrated Medical Dictionary, 30th ed. (2003) at 1906. Pancytopenia is a "deficiency of all cellular elements of the blood." *Id.* at 1356.

Other Submitted Material

Petitioners filed a letter from Dr. Diane M. Cicatello, dated January 24, 2005, stating that Prevnar is the most likely cause for Katlyn's developing aplastic anemia. Dr. Cicatello does not give a basis for her opinion. P. Filing of Jan. 26, 2005.

Respondent filed Ex. B, a case report entitled "Amegakaryocytic thromboctyopenic purpura," by H.K. Shah, et al., 38 *J Postgraduate Medicine* 2:96-97 (1992). They state, "Amegakaryocytic thrombocytopenic purpura (ATP) is a hematological disorder characterised by severe thrombocytopenia, probably due to an immunologically induced absence of megakaryocytes in an otherwise normal appearing bone marrow" [footnotes omitted]." *Id.* at 97. Patients may progress to aplastic anemia. *Id.* at 98. The only real treatment is bone-marrow transplantation using a HLA-matched donor. *Id.*

Petitioners filed Ex. H, "Short Report. Severe pancytopenia triggered by recombinant hepatitis B vaccine," by J-F Viallard, et al., 110 *Br J Haematology* 1:230-35 (2000). The authors describe a teenager who developed fever, arthritis, cutaneous vasculitis, and severe pancytopenia three weeks after receiving her third recombinant hepatitis B vaccination. The authors conclude that the vaccine probably triggered the illness. *Id.* at 233. They theorize that the vaccination "might stimulate a latent autoimmune genetic predisposition." *Id.* The patient's clinical and laboratory findings documented an immune disorder and the onset was in close temporal relationship to the vaccination. *Id.*

Petitioner filed as Ex. I an abstract entitled "Relationship between human parvovirus B19 infection and aplastic anemia," by X. Qian, et al., 16 *Chin Med Sci J* 3:172-74 (2001). The authors found that in 26.7% of 60 aplastic anemia cases, the patients were human parvovirus B19

infection positive, while none of the 30 controls was positive for human parvovirus B19 infection. The authors posit that human parvovirus B19 infection might be an important viral cause for aplastic anemia in humans.

Petitioner filed as Ex. K a letter entitled "Relapse of severe aplastic anaemia after influenza immunization," by C.L. Hendry, et al., 119 *Br J of Haematology* 1:283-85 (2002). The authors report the relapse of a woman with aplastic anemia one week after receiving an influenza vaccination. *Id.* at 283. The temporal relationship between vaccination and relapse suggested to the authors that the vaccination may have precipitated the relapse. *Id.* at 284.

The undersigned filed two papers, in accordance with 42 U.S.C. § 300aa-12(d)(3)(B)(1), that a special master "may require such evidence as may be reasonable and necessary:" N.S. Young, "Acquired Aplastic Anemia," 136 *Ann Intern Med* 534-46 (2002) (C. Ex. #1); and N. Hirano, et al., "Autoantibodies frequently detected in patients with aplastic anemia," 102 *Blood* 13:4567-75 (2003) (C. Ex. #2). Young states that the "pathophysiology of aplastic anemia is now believed to be immune-mediated, with active destruction of blood-forming cells by lymphocytes. The aberrant immune response may be triggered by environmental exposures, such as to chemicals and drugs or viral infections...." 136 *Ann InternMed* at 534. "Parvovirus B19 has been implicated in a few cases." *Id.* at 539. Hirano states that aplastic anemia is probably a T-cell-mediated autoimmune disease. 102 *Blood* 13:4567.

In response to petitioners' filing of Exs. H-K, respondent filed Ex. H, Dr. Nachman's letter, dated April 18, 2006. Dr. Nachman states that the Viallard case report does not describe someone with aplastic anemia. The teenager's bone marrow showed maturation arrest rather than markedly decreased cellularity. Maturation arrest means that early bone marrow precursors

are there but do not mature into cells normally circulating in the blood. Forty days later, the patient's bone marrow showed a hypercellular marrow. Dr. Nachman does not believe hepatitis B vaccine caused this clinical syndrome. The Qian abstract does not describe criteria used to diagnose aplastic anemia and does not state whether the patients had a proceeding viral infection. It provides no evidence for the theory that hepatitis B vaccine reactivated a latent parvovirus infection. The Kellermayer abstract (P. Ex. I) offers no useful information, describing aplastic crisis, not aplastic anemia. The Hendry letter discusses relapse after flu vaccine. It is well-known that viral syndromes can produce transient marrow suppression. (In the letter, Dr. Nachman thinks that petitioners here are alleging that hepatitis B vaccine caused Katlyn's aplastic anemia, whereas the allegation is that Prevnar did so by reactivating latent parvovirus.)

Petitioners filed Dr. Rosenstreich's reply to Dr. Nachman's response, dated May 17, 2006. P. Filing of May 22, 2006. The Viallard paper confirms that immunization can damage bone marrow hematopoietic cells, causing pancytopenia. Since the Qian study, there have been two other studies confirming the association between parvovirus infection and aplastic anemia, the first also by Qian. The Hendry letter shows that a killed virus vaccine can adversely affect bone marrow.

Dr. Rosenstreich attached additional articles to his reply. The first is a case report entitled "Pancytopenia after recombinant hepatitis b vaccine - an Indian case report," by K. Ashkok Shenoy, et al., 114 *Br J of Haematology* 4:954-55 (2001). Ten days after receiving her third hepatitis B vaccination, a 19-year-old girl had appetite loss, myalgia, yellowish eyes, and a body rash. *Id.* at 954. Hepatitis-associated aplastic anemia is a known entity. *Id.* at 955. The teenager

had no viral markers in her serum. The authors posited that the vaccine caused her aplastic anemia. *Id.*

Dr. Rosenstreich attached a letter from C. Shah, et al., entitled "Case Reports of Aplastic Anemia After Vaccine Administration," *Am J Hematol* 204 (2004). The case reports describe symptoms seven days after hepatitis B vaccination and 30 days after anthrax vaccination.

Dr. Rosenstreich attached a short report from X.H. Qian, et al., entitled "Aplastic anemia associated with parvovirus B19 infection," 87 *Arch Dis Child* 436-37 (2002). They found six out of 30 patients who had aplastic anemia had active or recent parvovirus B19 infection.

Dr. Rosenstreich attached an article by B. Mishra, et al., entitled "Human Parvovirus B19 in Patients With Aplastic Anemia," 79 *Am J of Hematol* 166-67 (2005). The authors compared 27 aplastic anemia patients with 20 healthy controls and detected significantly higher numbers of patients with parvovirus B19 in the aplastic anemia patients. *Id.* at 166.

Dr. Rosenstreich attached a case report by M. Osaki, et al., entitled "Severe aplastic anemia associated with human parvovirus B19 infection in a patient without underlying disease," 78 *Ann Hematol* 83-86 (1999). The authors show that B19 virus infection is one of the causes of aplastic anemia in patients without an apparent viral infection. *Id.* at 83. The authors state, "The most plausible explanation for the pathogenesis of aplastic anemia is that some immune-mediated mechanisms induce a disturbance in the bone marrow and lead to decreased hematopoiesis." *Id.*

TESTIMONY

Dr. David Rosenstreich testified for petitioners. Tr. at 4. He is Director of the Division of Allergy and Immunology at Albert Einstein College of Medicine and Montefiore Medical

Center. *Id.* He had one patient with aplastic anemia and several patients with idiopathic thrombocytopenic purpura. Tr. at 5. Most of the problems from Prevnar relating to bone marrow are thrombocytopenia, based on the VAERS database. Tr. at 6. In that situation, the platelets disappear. *Id.* His thinking is that if Prevnar can induce a type of autoimmune reaction that will destroy platelets, it is not unreasonable to think it can also rarely cause an autoimmune reaction that damages the other bone marrow cells and the blood-forming cells. *Id.*

In thrombocytopenia, the platelet count goes low, but the white and red blood cell counts remain normal. In aplastic anemia, no cells are made. Tr. at 7. In pancytopenia, one has low numbers of blood cells. *Id.* Someone with aplastic anemia would almost certainly have pancytopenia. Tr. at 7-8. The papers Dr. Rosenstreich submitted with his report illustrate that different vaccines are capable of inducing aplastic anemia. Tr. at 11. Therefore, this is a. biologically plausible mechanism. *Id.*

Dr. Rosenstreich stated that Dr. Nachman is correct in his report that IgM antibodies are associated with immune infection as its first response. Tr. at 12. IgG is the second class of response if infection persists. In Katlyn's case, she did not have acute infection, but a latent infection which she got from her mother in utero. Tr. at 13. IgM antibodies disappear in infections lasting more than one month, leaving IgG antibodies. *Id.* Since Katlyn was only two years old, her exposure to parvovirus B19 infection could not be more than two years old. *Id.* Latent infections do not have the acute appearance of parvovirus infection and are not associated with IgM antibodies. *Id.*

Katlyn received IVIG and did not get better. Tr. at 17. Acute infections will respond to IVIG, but not latent infections. Tr. at 18. A virus in the latent form is unseen. Tr. at 19. When

it is reactivated, its protein is expressed on the surface of the cell. Tr. at 19-20. The immune system attacks the viral protein and destroys the cells in the bone marrow. Tr. at 20. The cure is to give the patient immune treatment and a bone marrow transplant. *Id.*

The medical theory behind Prevnar's causing Katlyn's aplastic anemia is that she had an exaggerated response to the vaccine. Tr. at 21. She had many infections prior to receiving Prevnar. *Id.* He assumes she developed a secondary antibody response, called a memory response, which normally occurs within a week of vaccination. *Id.* Katlyn's rash one week after vaccination was probably from having low platelets (petechiae) from the thrombocytopenia (the first manifestation of her aplastic anemia). Tr. at 51, 52.

In autoimmune diseases, the body reacts to itself in some form. In Katlyn's case, her T-cells attacked her bone marrow cells. Parvovirus fits many of the facts here: a lot of thought in the medical field is that idiopathic autoimmune diseases may be initiated by viral infections. Tr. at 22. But a more typical hypothesis would be that Prevnar (without participation of the parvovirus B19) activated the immune response, and Katlyn's T-cells began to recognize her bone marrow cells as foreign in the same way as any other autoimmune response. *Id.*

There is good evidence that Katlyn's mother was infected with parvovirus B19 and evidence in the literature suggesting that when a woman is pregnant with twins, one twin can die from parvovirus in utero. Tr. at 25. There is evidence that latent infections can come from uterine infections with parvovirus. *Id.* There is evidence that parvovirus latent infections can cause aplastic anemia and that Katlyn had an autoimmune-type aplastic anemia because she did not respond to immunosuppressive therapy. *Id.* This is a logical explanation of what happened to Katlyn. *Id.* We know that vaccines will stimulate a powerful immune response, and triggered

the whole thing in Katlyn. *Id.* Katlyn had a lot of medical interventions which may have affected her immune system as well. Tr. at 27.

In explaining Dr. Bussel's April 9, 2001 letter in which he said Katlyn may have acquired amegakaryocytic thromboctyopenia as a result of T-cell suppression, Dr. Rosenstreich said that megakaryocytes are the bone marrow cells that produce the platelets. *Id.* The cytotoxic T-cells suppress the function of the megakaryocytes so they can no longer produce platelets. *Id.*

Katlyn had a FISH (fluorescent in situ hybridization) test which looked for chromosomal abnormalities and did not find any. Therefore, her aplastic anemia was not due to congenital causes. Tr. at 30. Katlyn had an ongoing hyperactive immune response. Tr. at 31.

Aplastic anemia may be due to drugs, chemicals, viruses, or some idiopathic autoimmune reasons. Tr. at 32. He would include vaccinations under the category of drugs. Tr. at 33. He agrees with Dr. Nachman that thrombocytopenia was the first manifestation of Katlyn's aplastic anemia. Tr. at 35. Most of Dr. Rosenstreich's interest lies in the causes of hypersensitivity diseases such as asthma and allergies. Tr. at 37. Dr. Rosenstreich has edited a book on cellular functions in immunity and inflammation. Tr. at 39.

Dr. James Nachman, a pediatric hematologist, testified for respondent. Tr. at 54. He is Director of the Clinical Division of Hematology/Oncology at the University of Chicago for pediatrics. Tr. at 55. In 30 years, he has had 100 patients with aplastic anemia. *Id.* The most common cause is idiopathic. *Id.* For those cases where causation is known, the cause is congenital (e.g., Fanconi's anemia). Tr. at 56. The cause of Katlyn's aplastic anemia is idiopathic and not genetic. *Id.* Prevnar had nothing to do with it. *Id.* Aplastic anemia is never a self-limited process. Tr. at 60. It always requires treatment, either immunosuppressive or bone

marrow. *Id.* In aplastic anemia, platelets are not produced. Tr. at 61. Most aplastic anemia is due to an autoimmune phenomenon. *Id.* Something is wrong with the body because it makes antibodies to its own blood cells. Tr. at 61-62. One makes antibodies to stem cells so one does not make red or white cells or platelets. Tr. at 62. Prevnar is a bacterial vaccine, not a viral one. Tr. at 63. He thinks that Katlyn's rash seven days after her Prevnar vaccination was a platelet phenomenon (petechiae), which had nothing to do with the vaccination or virus. *Id.*

You cannot have aplastic anemia without pancytopenia. Tr. at 64. You can have pancytopenia without having aplastic anemia. *Id.* The Viallard paper deals with pancytopenia and not aplastic anemia. *Id.* We are more familiar with alloimmune disease than autoimmune disease. Tr. at 66. Alloimmune disease is where one has a virus, it causes a reaction, and antibody titers rise. *Id.* The only Table injury in this area is ITP developing within seven to 30 days after MMR vaccination. *Id.* Generally, it takes seven days and usually close to three weeks. *Id.* Alloimmune and autoimmune diseases both involve the body attacking itself, but alloimmune diseases go away when the antibody stimulus goes away because the virus goes away. Tr. at 67. In the autoimmune sense, the stimulus is ongoing because the tissues are still there. *Id.*

In the instant case, seven days would be barely enough time to have an autoimmune reaction from Prevnar. Tr. at 68. If Katlyn's parvovirus were latent and then reactivated, we should have seen it in the bone marrow, in a rise in antibody titer. Tr. at 69. Katlyn's antibody titer to parvovirus two months after the onset of her aplastic anemia was above normal, but still extremely low and did not indicate any kind of reaction. *Id.* Dr. Rosenstreich then said that

Katlyn did not have a full-blown reactivation of her parvovirus B19 infection, just viral proteins on the surface. Tr. at 69-70.

Dr. Nachman stated that there is no evidence in the medical literature to support the idea that reactivation of parvovirus causes bone marrow damage. Tr. at 70. There is no antibody response to suggest reactivation. *Id.* Dr. Rosenstreich, relying on the Qian abstract, said there is a relationship between a latent parvovirus and aplastic anemia because the authors found latent parvovirus in children and adult patients with aplastic anemia. Tr. at 71. Dr. Nachman looked at the Qian abstract and said it does not prove that a latent parvovirus infection causes aplastic anemia. Tr. at 75. Four of the six parvovirus patients had IgM antibodies, which Katlyn did not have. Tr. at 74. Five of the six were IgG seropositive. *Id.* As for a direct reaction to Prevnar rather than a reactivation of the latent parvovirus infection, Dr. Nachman stated that there is no evidence that Prevnar is associated with aplastic anemia. Tr. at 75.

Katlyn had both pancytopenia and aplastic anemia. Tr. at 77. Although there are some vaccinations associated with thrombocytopenia and some associations of vaccinations with pancytopenia, there are no known case reports of associations of vaccinations and aplastic anemia. Tr. at 80. Dr Nachman has given hundreds of Prevnar vaccinations to sickle cell children without any cases of aplastic anemia or adverse reaction. Tr. at 82. Pneumococcus as a bacterium has never been associated with aplastic anemia. Tr. at 84. Where pneumococcal disease is severe and causes sepsis, there is often associated pancytopenia due to the sepsis. *Id.* If a child came to Dr. Rosenstreich with aplastic anemia, he would send her to a hematologist for treatment. Tr. at 88.

Dr. Nachman said that the cause of aplastic anemia is an immunologic problem. Tr. at 91. In aplastic anemia, the stem cells are suppressed so they cannot divide and become differentiated. Tr. at 92. There are two different forms of aplastic anemia. *Id.* The cells can be suppressed or killed. *Id.* Because immunosuppressive therapy was successful in Katlyn's case, she had stem cells which were being suppressed. Tr. at 92-93.

Certain people are predisposed to certain diseases. Tr. at 94. Aplastic anemia is an autoimmune disease. *Id.* Dr. Rosenstreich stated that in the VAERS database, there are many associations between Prevnar vaccination and thrombocytopenia, without indicating that any of them are ITP (which Katlyn did not have). Tr. at 97-98. The VAERS reports do not indicate if it is thrombocytopenia that is the first part of aplastic anemia or ITP (which is unrelated to aplastic anemia). Tr. at 99. Dr. Nachman stated that because there were no follow-up VAERS reports for the thrombocytopenia, he assumes they were ITP and not aplastic anemia. Tr. at 104.

Viruses and vaccines can cause short- term destruction of megakaryocytes. *Id.* After immunization, the virus itself can cause a short-term destruction of stem cells. It is certainly conceivable that a virus or a viral vaccination may directly attack the stem cell and cause short-term destruction of stem cells without clinical significance. Tr. at 109. Dr. Nachman agreed with the Hendry article that it was possible a flu vaccination caused the vaccinee's aplastic anemia to relapse. *Id.* Katlyn's experience was not short-term and Dr. Nachman has never seen aplastic anemia with a bacterial vaccine such as Prevnar. *Id.*

DISCUSSION

This is a causation in fact case. To satisfy their burden of proving causation in fact, petitioners must offer "(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." Althen v. Secretary of HHS, 418 F. 3d 1274, 1278 (Fed. Cir. 2005). In Althen, the Federal Circuit quoted its opinion in Grant v. Secretary of HHS, 956 F.2d 1144, 1148 (Fed. Cir. 1992):

A persuasive medical theory is demonstrated by "proof of a logical sequence of cause and effect showing that the vaccination was the reason for the injury[,]" the logical sequence being supported by "reputable medical or scientific explanation[,]" *i.e.*, "evidence in the form of scientific studies or expert medical testimony[.]"

In Capizzano v. Secretary of HHS, 440 F.3d 1274, 1325 (Fed. Cir. 2006), the Federal Circuit said "we conclude that requiring either epidemiologic studies, rechallenge, the presence of pathological markers or genetic disposition, or general acceptance in the scientific or medical communities to establish a logical sequence of cause and effect is contrary to what we said in Althen...."

Without more, "evidence showing an absence of other causes does not meet petitioners' affirmative duty to show actual or legal causation." Grant, supra, at 1149. Mere temporal association is not sufficient to prove causation in fact. Hasler v. US, 718 F.2d 202, 205 (6th Cir. 1983), cert. denied, 469 U.S. 817 (1984).

Petitioners must show not only that but for the vaccine, Katlyn would not have had aplastic anemia, but also that the vaccine was a substantial factor in bringing about Katlyn's aplastic anemia. Shyface v. Secretary of HHS, 165 F.3d 1344, 1352 (Fed. Cir. 1999).

Close calls are to be resolved in favor of petitioners. Capizzano, supra, at 1327; Althen, supra, at 1280. *See generally*, Knudsen v. Secretary of HHS, 35 F.3d 543, 551 (Fed. Cir. 1994).

In essence, the special master is looking for a medical explanation of a logical sequence of cause and effect (Althen, supra, at 1278; Grant, supra, at 1148), and medical probability rather than certainty (Knudsen, supra, at 548-49). To the undersigned, medical probability means biologic credibility or plausibility rather than exact biologic mechanism. As the Federal Circuit stated in Knudsen, supra, at 549:

> Furthermore, to require identification and proof of specific biological mechanisms would be inconsistent with the purpose and nature of the vaccine compensation program. The Vaccine Act does not contemplate full blown tort litigation in the Court of Federal Claims. The Vaccine Act established a federal "compensation program" under which awards are to be "made to vaccine-injured persons quickly, easily, and with certainty and generosity." House Report 99-908, *supra*, at 3, 1986 U.S.C.C.A.N. at 6344.
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> The Court of Federal Claims is therefore not to be seen as a vehicle for ascertaining precisely how and why DTP and other vaccines sometimes destroy the health and lives of certain children while safely immunizing most others.

The Federal Circuit stated in Althen, supra, at 1280, that "the purpose of the Vaccine Act's preponderance standard is to allow the finding of causation in a field bereft of complete and direct proof of how vaccines affect the human body."

As the Federal Circuit stated in Knudsen, supra, at 548, "Causation in fact under the Vaccine Act is thus based on the circumstances of the particular case, having no hard and fast *per se* scientific or medical rules." The undersigned's task is to determine medical probability based on the evidence before the undersigned in this particular case. Althen, supra, at1281 ("judging the merits of individual claims on a case-by-case basis").

As for epidemiological support for causation, the Federal Circuit in Knudsen ruled for petitioners even when epidemiological evidence directly opposed causation from a vaccine. In Knudsen, even though epidemiological evidence supported the opposite conclusion, i.e., that viruses were more likely to cause encephalopathy than vaccinations, the Federal Circuit held that that fact alone was not an impediment to recovery of damages. In Knudsen, supra, at 550, the Federal Circuit stated:

> 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.

The Federal Circuit in Knudsen, supra, at 549, also stated: "The special masters are not 'diagnosing' vaccine-related injuries."

The Federal Circuit in Capizzano emphasized the opinions of petitioner's four treating doctors in that case in concluding causation of rheumatoid arthritis from hepatitis B vaccination. 440 F.3d at 1326. In the instant action, no treating doctor has opined that Prevnar vaccine either directly or by reactivating partially Katlyn's latent parvovirus B19 infection caused her aplastic anemia. (Dr. Diane Cicatello's letter offered no basis for her opinion and petitioners provided no CV to show her background.)

Petitioners' expert Dr. Rosenstreich's medical theory of causation is that Prevnar vaccine partially reactivated Katlyn's latent parvovirus B19 infection which caused her aplastic anemia. Medical literature that petitioners filed accepts a relationship between parvovirus B19 infection and aplastic anemia. Moreover, the seven-day onset between Prevnar vaccination and Katlyn's

rash which both experts attributed to petechiae (low platelets) is a proximate temporal relationship between vaccination and injury (to respondent's expert, Dr. Nachman, the temporal relationship is barely appropriate).

The logical sequence of cause and effect is that, although the parvovirus B19 antibodies were just mildly elevated, the immunologic effect of the vaccine was to reactivate the virus. Case reports have shown that parvovirus B19 has been causally related to aplastic anemia. Dr. Rosenstreich's alternate theory, i.e., Prevnar vaccine caused Katlyn's aplastic anemia without the participation of the parvovirus B19 infection is less appealing than his other medical theory of partial reactivation of the parvovirus infection because Prevnar is a bacterial vaccine and the relationship between aplastic anemia, pancytopenia, and thrombocytopenia (not idiopathic thrombocytopenic purpura for this discussion) and illnesses and/or vaccines has always focused on viruses (such as parvovirus B19) or killed virus vaccine (influenza vaccine causing a relapse of aplastic anemia) or recombinant viral vaccine (hepatitis B vaccine causing pancytopenia).

The undersigned views Dr. Nachman, respondent's expert hematologist, as eminently qualified to speak about aplastic anemia since he treats children with the condition. However, Dr. Rosenstreich, petitioners' expert immunologist, is also qualified to speak about immune reactions to antigenic stimuli. Petitioners do not have the burden of showing epidemiologic evidence or objective medical literature in support of their case, although the case reports and letters they filed add a great deal to the undersigned's understanding of the questions at issue. Petitioners also do not have the legal burden of proving a specific biologic mechanism in order to prevail although the explanation of cytotoxic T-cell suppression of stem cells (Dr. Rosenstreich's testimony and the literature) is certainly of assistance. Petitioners need only through their expert

show a medical theory causally connecting the vaccine to the injury (Prevnar partially reactivated the latent parvovirus B19 infection which caused Katlyn's aplastic anemia); a logical sequence of cause and effect (medical articles associate parvovirus B19 infection with aplastic anemia; other viruses and viral vaccines are associated with pancytopenia; numerous VAERS reports associate Prevnar vaccine with thromboctyopenia; Prevnar vaccine produced an immunologic effect in Katlyn, manifested by petechiae seven days post-vaccination, leading to suppression of her bone marrow stem cells); and a temporal relationship between vaccination and injury (the onset of Katlyn's aplastic anemia was a rash, manifesting low platelets, seven days post-vaccination, a medically-appropriate temporal period for a vaccine reaction).

Petitioners have made a prima facie case that Prevnar was a substantial factor in causing Katlyn's aplastic anemia without which she would not have had the injury.

CONCLUSION

Petitioners are entitled to reasonable compensation. The undersigned hopes that the parties may reach an amicable settlement, and will convene a telephonic status conference soon to discuss how to proceed to resolve the issue of damages.

IT IS SO ORDERED.

_____ _____

DATE Laura D. Millman
Special Master