In the United States Court of Federal Claims

OFFICE OF SPECIAL MASTERS
No. 05-1204V
November 17, 2009
To be Published

MICHELLE MOUILLE, as Legal Representative of MAURICE LAMKIN, a Minor,	*	
Petitioner,	*	
v.	*	Entitlement; upper respiratory infection and influenza vaccine followed by meningoencephalitis
SECRETARY OF THE DEPARTMENT OF HEALTH AND HUMAN SERVICES,	*	
Respondent.	*	

David G. Hart, Colleyville, TX, for petitioner.
Chrysovalantis Kefalas, Washington, DC, for respondent.

MILLMAN, Special Master

RULING ON ENTITLEMENT[1]

On November 5, 2005, petitioner filed a petition under the National Childhood Vaccine Injury Act, 42 U.S.C. §300aa-10 et seq., on behalf of her son Maurice Lamkin (hereinafter,

[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 constitute a clearly 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.

"Maurice"), alleging that an influenza (flu) vaccination administered on October 27, 2004 caused Maurice fever, seizures, and encephalopathy or encephalitis. Petition, p. 1.

A hearing was held on January 13, 2009. Testifying for petitioner was Dr. John R. Seals. Testifying for respondent were Dr. Max Wiznitzer and Dr. Neal A. Halsey.

On April 22, 2009, petitioner filed a posthearing brief.

On July 14, 2009, respondent filed a posthearing brief.

FACTS

Maurice was born on July 22, 1999.

On December 11, 2003, Maurice received flu vaccine. Med. recs. at Ex. 6, p. 3.

On September 20, 2004, Maurice was brought to San Antonio Pediatric Associates. He had congestion, rhinorrhea, and wheezing for one week, and mucous discharge. Med. recs. at Ex. 4, p. 1.

On October 27, 2004, when he was five years old, he received another flu vaccination. Med. recs. at Ex. 6, p. 3. The same day as his vaccination, he had fever, followed by seizures and brain inflammation.

On October 29, 2004, Maurice was brought in to see his personal care physician, with the complaint of fever, stomach ache for two days, and body pain. The diagnosis was sinusitis and asthma. He had 96.6° temperature at the pediatrician. Med. recs. at Ex. 4, p. 2.

On October 29, 2004, Maurice was brought into the Baptist Health System emergency room after seeing his primary care physician,. Med. recs., at Ex. H, pt. 2, p. 992. He was diagnosed with sinusitis. Immediately after taking Zithromax, he could not talk and started drooling and foaming at the mouth. He had a history of asthma. His temperature was 100.8°.

He had two-minute facial twitching and jaw twitching. His eye deviated to the right. The clinical impression was fever, seizure, strep pharyngitis, and pneumonia. Med. recs. at Ex. H, pt. 2, pp. 993, 995.

On October 29, 2004, Maurice saw Dr. Arthur E. Marlin at Baptist Health Service who wrote a history that Maurice was in good health until his admission. Med. recs. at Ex. K, p. 2. Maurice had a flu shot on October 27, 2004, but afterwards developed a fever. He saw his personal care physician. On October 29, 2004, he developed right facial seizures with aphasia and excessive salivation. He was brought to the emergency room and admitted. The seizures continued. A lumbar puncture showed 25 white blood cells. He was seen with Dr. John Seals. A CT scan showed loss of gray-white differentiation. Maurice had progressive deterioration. He developed asymmetric pupils. On physical examination, Maurice's right pupil was greater than his left pupil and he had papule edema. Med. recs. at Ex. K, p. 2.

On October 31, 2004, Maurice saw a neurologist who noted that he received a flu vaccination on October 27th and had fever that night. He complained of aching. He developed a persistent elevated temperature on October 28th. He saw his primary care physician on October 29th and developed seizures, going to the emergency room with more seizures. He was not responsive. Med. recs. at Ex. 7, p. (indecipherable).

On November 2, 2004, Maurice saw Dr. Marlin at Baptist Health Service for placement of an external ventricular drain and a brain biopsy. Med. recs. at Ex. I, p. 1. He had encephalopathy with increased intracranial pressure. His cerebrospinal fluid showed 25 white cells. *Id.*

Also on November 2, 2004, Dr. Shari Addington wrote a pathology and history report. Maurice had perivascular lymphocytic infiltration with focal glial degeneration (encephalitis). Med. recs. at Ex. I, p. 3.

From October 29-November 29, 2004, Maurice was in the Baptist Health System with encephalitis, acute respiratory failure, convulsions, streptococcal sore throat, encephalopathy, and increased intracranial pressure. Med. recs. at Ex. H, pt. 1, p. 1.

On November 29, 2004, Dr. Hugo F. Carvajal wrote a discharge summary. Maurice had a history of seizures and low-grade fever. He had fever and cough. His admitting diagnosis was pneumonia and possible viral meningitis. He had a flu vaccination Wednesday, October 27, 2004, and low grade fever Wednesday night and Thursday. He had seizures on Friday afternoon and evening. There was a question of aspiration pneumonia. He had a history of reactive airway disease. A work-up in the ER revealed positive group A strep. A lumbar puncture revealed 49 white blood cells, mainly lymphocytes. The initial diagnosis was meningitis, probably aseptic, with a seizure disorder secondary to meningitis. He had a history of reactive airway disease and aspiration pneumonia. On October 31, 2004, he had several seizures at night. A brain MRI showed that his basal ganglia were increasing. He had left meningeal enhancement with abnormal signal and right sternal capsule, leading to a diagnosis of encephalitis. He now had 103° temperature. On November 1, 2004, Maurice developed bradycardia. Dr. Seals, a neurologist, diagnosed Maurice with acute disseminated encephalomyelitis (ADEM). Biopsies revealed perivascular infiltration and some evidence of pleonecrosis compatible with a viral etiology. Med. recs. at Ex. H, pt. 1, pp. 91, 92, and 93. The diagnosis was encephalitis vs. ADEM. On October 29, 2004, Dr. Carvajal noted no abnormal reflexes and a white count

elevated at 30,000. Med. recs. at Ex. H, pt. 1, pp. 94, 96. On October 31, 2004, a brain MRI showed diffuse leptomeningeal enhancement consistent with meningitis and encephalitis predominantly of the frontal regions, according to Dr. Dacia H. Napier. Med. recs. at Ex. H, pt. 1, p. 289. On November 9, 2004, another brain MRI showed complete obliteration of the lateral ventricles and third ventricle with increased signal now involving the basal ganglia, according to Dr. Sven Kuestermann. Med. recs. at Ex. H, pt. 1, pp. 255, 256.

From November 29, 2004 to January 1, 2005, Maurice was at Warm Springs Rehabilitation Hospital. The discharge diagnosis was viral meningitis. Maurice had an episode of viral encephalitis after a flu shot on November (should be October) 27, 2004. Med. recs. at Ex. F, p. 4.

On November 29, 2004, Maurice saw Dr. Ellen Leonard who wrote a history and physical. Med. recs. at Ex. F, p. 8. Maurice had viral encephalitis after a flu shot on November (should be October) 27, 2004. He developed right facial seizures, excessive salivation, high temperature, and aphasia. He remained on life support. Increased intraventricular pressures were drained. A brain MRI showed poor differentiation of gray and white matter. CDC (Centers for Disease Control) was notified. Maurice had a history of asthma. *Id.*

On January 16, 2005, Maurice was at Baptist Health System with difficulty breathing. He was diagnosed with acute exacerbation of his asthma. Med. recs. at Ex. H, pt. 2, pp. 1035-36.

On February 28, 2005, Maurice saw Dr. Donald Currie, a pediatric rehabilitation specialist. Med. recs. at Ex. 8, p. 1. Maurice had received a flu shot which led to a high fever and status epilepticus on October 29, 2004. He had brain swelling and high intracranial pressure, and was difficult to control. Dr. John Seals diagnosed Maurice with ADEM which was probably

an idiosyncratic reaction to flu vaccine. *Id.* Maurice emerged from a coma unable to speak. He had severe neurological deficits. *Id.*

On March 9, 2005, Baptist Health System diagnosed Maurice with encephalopathy and, on May 6, 2005, with epilepsy. Med. recs. at Ex. H, pt. 2, pp. 1047, 1054.

On May 6, 2005, Dr. John R. Seals read Maurice's brain MRI as abnormal with multiple focal epileptiform discharges with maximum spike activity in the left frontotemporal and right temporal distributions consistent with and suggestive of a lowered seizure threshold. Med. recs. at Ex. H, pt. 2, p. 1060.

On July 12, 2005, Maurice underwent an EEG which was abnormal, showing lateralized and focal epileptiform discharges in the right central/parietal and temporal distribution. Med. recs. at Ex. H, pt. 2, p. 1069.

On August 2, 2005, Maurice went to the emergency room which noted seizure disorder secondary to encephalitis from flu vaccine. He had developmental and cognitive delay. Maurice also had an upper respiratory infection. Med. recs. at Ex. H, pt. 2, pp. 1075, 1076.

On August 2, 2005, Maurice had another EEG which was strikingly abnormal. He had multifocal polymorphic epileptiform discharges involving the right more than the left hemisphere and a lowered seizure threshold. Med. recs. at Ex. H, pt. 2, p. 1084.

Other Submitted Material

On September 22, 2006, petitioner filed Exhibit R, the expert report and CV of Dr. Donald Currie, and Exhibit S, the expert report and CV of Dr. John Seals. Dr. Currie is a physical rehabilitation expert. He states in his report:

> In my best medical judgment, there is almost no doubt that Maurice's acute neurological illness in 2004 and the severe

> neurological impairments from which Maurice still suffers now resulted as a rare idiosyncratic reaction to his influenza vaccination.

Ex. R, p. 2.

Dr. Seals, who is Maurice's treating pediatric neurologist, states in his report:

> Both the evolution of his clinical course as well as the dramatic findings on MRI scans were such that the initial consideration of "viral meningitis" became untenable. Rather the findings were more consistent with ADEM (Acute Disseminated Encephalomyelitis). This is a phenomenon which "may follow many infections or immunizations" (Ref: Swaiman & Ashwal: Pediatric Neurology. Principles & Practice 3rd ed. pg 852). ... Maurice's neurological impairment is the direct result of the acute illness which brought him to the hospital on 10/29/04. This illness was, within medical certainty, the direct result of the flu immunization shot he received on 10/27/04.

Exhibit S, p. 1.

On December 22, 2006, respondent filed as Exhibit A the expert report of Dr. Max Wiznitzer, a pediatric neurologist, whose CV is Exhibit B. Dr. Wiznitzer states on page 2 of his report that the most likely source of Maurice's post-vaccinal fever was sinusitis and not the immunization. He also states on page 3 of his report that Maurice's encephalitic illness is more compatible with an infectious etiology than with ADEM. Onset occurred days after he had an upper respiratory infection with evidence of leptomeningeal enhancement and absence of enhancement of white matter lesions on neuroimaging studies. He did not improve after administration of intravenous steroid therapy, unlike the vast majority of individuals with ADEM. Based on the Institute of Medicine (IOM) statement that there is no evidence showing influenza vaccine causes demyelinating disease in children from six to 23 months, Dr. Wiznitzer

denied that flu vaccine caused Maurice's encephalitis. *Id.* Attached as Exhibit C is the IOM Report which Dr. Wiznitzer referenced.

On December 28, 2006, respondent filed as Exhibit D the expert report of Dr. Neal A. Halsey, a pediatrician specializing in pediatric infectious diseases as well as the Director of the Institute for Vaccine Safety at Johns Hopkins University, whose CV is Exhibit E. Dr. Halsey states on unnumbered page 3 of his report that Maurice's encephalitis was caused by an enterovirus or Epstein-Barr virus (EBV). The records showed IgG antigen (old infection) in the blood positive for EBV, although testing for IgM antigen (new infection) was not in the records. Testing of the cerebrospinal fluid for EBV was negative. Although Dr. Halsey entertained the possibility that influenza vaccine could have caused ADEM, he regarded this as only theoretical because of the short time interval between vaccination and onset. *Id.* Relying on the IOM, Dr. Halsey states that there is inadequate epidemiologic evidence to accept or reject a causal relationship between flu vaccine and demyelinating disorders other than Guillain-Barré syndrome. Dr. Halsey explained Maurice's abdominal pain and fever as characteristic of several viral infections including many enteroviruses. *Id.*

On July 27 , 2007, petitioner filed the second report of Dr. John Seals, Maurice's treating pediatric neurologist, marked as Exhibit T, together with an article entitled "De-novo mutations of the sodium channel gene *SCN1A* in alleged vaccine encephalopathy: a retrospective study" by S.F. Berkovic, et al., 5 Lancet Neurology 488-92 (2006), marked as Exhibit U. Dr. Seals writes to petitioner's counsel that he had the opportunity to review the article provided as Exhibit U, and also once again the clinical record and MRI scans from Maurice's initial hospitalization. Dr. Seals states that from the time of Maurice's entry to the emergency room and through the first

two weeks of his illness, there were "perplexing features" of his clinical course. "The extremely rapid rate of onset of his neurologic symptoms certainly was disconcerting as was the history that he had a minor febrile illness prior to receiving the immunization." Ex. T, p. 1. Maurice does not fit into any typical pattern of adverse reaction to flu vaccine or of direct infectious process. Staff attempts to identify all known viral agents were not successful. *Id.* Dr. Sears states it is very unlikely that a viral agent could be the cause for Maurice's encephalopathy although it is possible. *Id.* But the rapidity of Maurice's encephalopathic symptomatology after his flu vaccination is atypical for a vaccine reaction. Ex. T, pp. 1-2. Dr. Seals comments that the Berkovic article (Exhibit U) might shed a considerable amount of light on this conundrum and he intended to explore whether Maurice had a SCN1A genetic mutation in order to determine if he was susceptible to having a vaccine encephalopathy. Ex. T, p. 2. In the meantime, Dr. Seals still felt that due to the atypicality of Maurice's clinical presentation, his clinical course, and the proximity of his encephalopathy to his vaccination, it was reasonable to consider the vaccine as at least a trigger mechanism to his subsequent encephalopathy. *Id.*

The Berkovic article posits that mutations in the neuronal sodium channel could be the cause of encephalopathy after administration of pertussis vaccine. They found SCN1A mutations in 11 of 14 patients with alleged vaccine encephalopathy. These were children with seizure disorders who had been diagnosed with severe myoclonic epilepsy of infancy (SMEI) or with borderline SMEI (SMEB). The authors state at the fifth page of the article that "vaccination can still be argued to be a trigger for the encephalopathy, perhaps via fever or an immune mechanism." But they did not regard fever as essential and doubted that there would be long-term adverse outcomes. They assume these mutations cause abnormal neuronal excitabilty.

There were three patients for whom the authors could not find a molecular explanation for their alleged vaccine encephalopathy.

On August 14, 2007, petitioner filed as Exhibit V the results of genetic testing on Maurice's DNA. There were no detectable SCN1A gene mutations. However, the laboratory did find one non-synonymous variant, Arg176Gln (560 G>A) detected in exon 4. The lab found it difficult to determine its pathogenicity. If either of Maurice's parents had this mutation, then it would not be the cause for Maurice's epilepsy. If neither parent had the mutation, then it was likely that Arg176G1n was pathogenic. Thus the lab suggested the parents submit blood samples for testing.

On October 17, 2007, petitioner filed as Ex. W the results of genetic testing on Maurice's mother's DNA. She did not have the genetic variant. The lab suggested testing Maurice's father's blood.

On May 7, 2008, petitioner filed as Exhibit X the third report of Dr. John Seals, who notes that the evolution of Maurice's clinical course as well as the dramatic findings on the early MRIs made untenable the initial consideration that Maurice had viral meningitis. Ex. X, p. 1. The findings were more consistent with ADEM. Ex. X, pp. 1-2. Dr. Sears states:

> In other words, it is my opinion based upon a reasonable medical probability that the combination of the minor febrile illness and an atypical immune response to the vaccine, together, caused his neurological impairment. It is further my opinion that without the febrile illness or without the vaccine, Maurice Lamkin would not have acquired his current neurological impairment. Also, it is my opinion that the combination of the minor febrile illness in combination with an atypical response to the vaccine was the reason for the extremely rapid onset of his neurological symptoms.
>
> Therefore, it remains my opinion that Maurice Lamkin's current neurological impairment is the direct result of the acute illness which brought him to the hospital on 10/29/04. This illness was,

> within medical certainty, the direct result of the flu immunization shot he received on 10/27/04 perhaps in combination with the minor febrile illness, as discussed above.

Ex. X, p. 2.

Dr. Seals did not recommend further genetic testing and Maurice's father's DNA was never tested.

On January 9, 2009, respondent filed Exhibits F-I. On January 12, 2009, respondent filed Exhibits J-L.

Respondent's Exhibit F is an article entitled "Beyond Viruses: Clinical Profiles and Etiologies Associated with Encephalitis" by C.A. Glaser, et al., 43 CID:1565-77 (2006). In the cases of 1,570 patients, the probable etiologic agent was identified for 16% of encephalitis cases. In these 16% of encephalitis cases, 69% had a virus, 20% had a bacterium, 7% had a prion, 3% had a parasite, and 1% had a fungus. The authors conclude that, although in most cases of encephalitis, the cause is unknown, there are discrete clinical profiles among patients to assist in finding the etiology. Seventy-five percent of the patients with viral encephalitides presented with fever. *Id.* at 1569. Those with influenza virus had respiratory prodromes. Sixty-two patients had intractable seizures. Most cases (73%) of this patient group had no causative agent identified. *Id.* at 1574.

Respondent's Exhibit G is an article entitled "Epstein-Barr Virus and Human Herpesvirus Type 8 Infections of the Central Nervous System" by A. Volpi, 11 Herpes Supp 2: 120A-27A (2004). The pathogenesis of EBV-associated central nervous system disorders is not completely understood but may be due to direct viral invasion of the central nervous system.

Respondent's Exhibit H is an article entitled "Diagnosis of Herpesvirus Infections of the Central Nervous System" by G. Boivin, 11 Herpes Supp 2:48A–56A (2004). There does not seem to be anything pertinent to this case in the article.

Respondent's Exhibit I is an article entitled "Epstein-Barr virus and the nervous system" by P. Portegies and N. Corssmit, 13 Curr Opin Neurol 3:301-04 (2000). The authors state that prognosis remains good for most (i.e., 85%) EBV-related neurological complications. *Id.* at 301. They state that mainly older children and young adults are at risk for EBV-encephalitis. *Id.* at 302. Patients present one to three weeks after onset of infectious mononucleosis with fever, headache, seizures, personality changes, a diffuse encephalopathy and sometimes coma. *Id.* Most patients recover completely within several weeks. *Id.*

Respondent's Exhibit J is an article entitled "Acute Disseminated Encephalomyelitis. An Update" by T. Menge, et al., 62 Arch Neur:1673-80 (2005). The authors state, "Acute disseminated encephalomyelitis (ADEM) is a monophasic autoimmune demyelinating disease of the central nervous system that typically follows a febrile infection or a vaccination. Children are predominantly affected." *Id.* at 1673. They continue, "The clinical diagnosis of ADEM is strongly suggested by a close temporal relationship between an infectious incident or an immunization and the onset of leukoencephalopathic neurological symptoms." *Id.* The authors note that ADEM, a relatively rare disorder, was becoming increasingly relevant because vaccine schedules for children have expanded over the past years and ADEM may result in permanent neurological disability. *Id.* In children diagnosed with ADEM, a history of a febrile event can be established in 50%-75% of all cases. *Id.* at 1674. "Neurological signs and symptoms appeared days to weeks after an infection or vaccination, with an average latency of 4 to 13

days." *Id.* at 1675. "In general, neurological symptoms developed subacutely over a period of days and led to hospitalization within a week." *Id.* The authors state, "The diagnosis ADEM should be readily considered whenever there is a close temporal relation between an infection or a vaccination and the subacute, polysymptomatic onset of neurological deficits attributable to the CNS." *Id.* at 1676. "Some studies have associated an unfavorable prognosis to a sudden onset and an unusually high severity of the neurological symptoms." *Id.* at 1679.

Respondent's Exhibit K is an article entitled "Pediatric Epstein-Barr Virus-Associated Encephalitis: 10-Year Review" by A. Doja, et al., 21 J Child Neur 384-91 (2006). The authors studied 216 children with acute encephalitis and found that 9.7% had evidence of EBV. *Id.* at 385. One patient had ADEM. *Id.* at 386. The authors state that neurologic complications following symptomatic EBV are likely less than 0.5%. *Id.* at 387. The pathologic mechanisms of EBV-induced neurologic injury remain incompletely understood, but most evidence suggests that immunologic phenomena are primarily responsible rather than active viral replication. *Id.* at 389. In other words, this is an immune-mediated injury. *Id.* "Evidence of coinfection involving one or more additional potential pathogens was found in 13 of the 21 cases." *Id.* The authors theorize that in those cases, each pathogen played a role or else the other infection reactivated a latent EBV infection. *Id.* at 390. They cite an author who found that in about 25% of cases with EBV infection of the central nervous system, there was evidence of infection with other pathogens. *Id.* Forty-three percent of the authors' cohort had coinfection of EBV and M. pneumoniae. *Id.*

Respondent's Exhibit L is an article entitled "Human Herpesviruses and Neurological Disorders of Childhood" by J.F. Bale, 6 Seminars in Ped Neuro 4:278-87 (1999). There does not seem to be anything pertinent to this case in the article.

On April 15, 2009, petitioner filed Exhibits 10-12. Exhibit 12 is an article entitled "Evaluation of adverse events after influenza vaccination in hospital personnel" by D.W. Schiefele, et al., 142 Can Med Assoc J 2:127-30 (1990). Adverse events included fever (13%) within 12 hours of vaccination. *Id.* at 129.

TESTIMONY

Dr. John Seals, Maurice's treating pediatric neurologist, testified first for petitioner. Tr. at 5. He is board-certified in both pediatrics and neurology with a specialty in child neurology. Tr. at 6. He first saw Maurice during the hospital admission of October 29, 2004. Tr. at 8. He has been treating Maurice since that time. *Id.* Maurice had a pre-existing illness before he received flu vaccine and developed fever, irritability, and seizures. Tr. at 8-9. Maurice was showing progressive intracranial cerebral edema which was not being managed adequately. Tr. at 9. They did a brain biopsy which showed perivascular lymphocytic infiltration with focal glia degeneration with negative chemical stains for herpes 1, 2, B, and C. Tr. at 10. Something caused an immune response which caused infiltration of the lymphocytes along the vessels in the perivascular tissue. Tr. at 11. This is typical for encephalitis of an immune-mediated response. *Id.* All tests for infection were negative and no specific infectious etiologic agent was isolated. Tr. at 13. He felt this was an immune-mediated process because of its focal character. Tr. at 15. Dr. Seals regarded this as an immune-mediated encephalitic process. Tr. at 16.

Dr. Seals' opinion is that the influenza vaccination triggered an immune-mediated process. Tr. at 18. He thinks Maurice's pre-existing illness was a factor, saying:

> And so we were dealing with a child with a potentially revved-up immune system to begin with. And then when he did receive the immunization; received the vaccine, the immune system sort of reacted adversely and indiscriminately, in a way that involved the neural tissues.

Id. Maurice's brain biopsy supports this explanation as well as the absence of any identifiable infectious agent through cultures or serology testing. Tr. at 19. What was most striking about Maurice's brain MRI were the multiple foci of involvement. *Id.* The pre-existing illness Maurice had to which Dr. Seals referred was his upper respiratory infection. Tr. at 20.

Dr. Seals said it was more than coincidental that after Maurice was immunized, "we had this devastating cascade of events that ended up with neurologic impairment." Tr. at 21. He believes that without either the URI or the vaccination, Maurice would not have had this illness. Tr. at 21, 22. Dr. Seals explained the quickness of Maurice's reaction to the vaccination by pointing to the intercurrent minor illness that "set him up, and then the immunization response was therefore not only facilitated, but accelerated." Tr. at 23.

Dr. Seals disagreed with respondent's expert Dr. Wiznitzer's opinion that sinusitis was the sole cause of Maurice's neurological problem, stating, "I have difficulty getting a sinusitis into the type of neurologic impairment that he presented with, and continued with." Tr. at 25. There was nothing on the MRI scans to suggest that Maurice had a venous thrombosis which can be due to sinusitis. *Id.* He also disagreed with respondent's expert Dr. Halsey's opinion that Epstein Barr virus (EBV) caused Maurice's neurological problem, stating he is not aware that EBV can produce this type of problem. *Id.* Maurice had an IgG indicating that at some point in

time, he had EBV, but there was no testing of IgM to indicate he had a current or recent EBV infection. Tr. at 29. Maurice's fever might have been caused by the flu vaccine or the sinusitis or both. Tr. at 31.

Dr. Seals agreed that Maurice's immune system was already engaged with the pre-existing illness when he received the flu vaccine, giving him another antigenic stimulus, and the result of both factors was rapid deterioration and a devastating brain problem. Tr. at 32. Dr. Seals stated there was no way he could pick between the two substantial factors–the pre-existing illness and the vaccination–which was the predominant factor. Tr. at 33.

Maurice had an elevated white blood cell count, which one can see in any type of inflammatory response, when he entered the emergency room. Tr. at 47. Seizures were part of Maurice's encephalitis. *Id.* Maurice was tested for herpes, fungal infection, streptococcal infections, Herpes I and II, West Nile, LaCrosse, St. Louis, Eastern Equine, Western Equine, and varicella. Tr. at 50. Maurice's process was not demyelinating but inflammatory. Tr. at 80. In a child with a previously revved-up immune system who gets an additional challenge, response time would be fairly quick. Tr. at 81. Dr. Seals found compelling that the progression in Maurice's case was within 12 to 24 hours of his immunization. Tr. at 87. He said "it seems reasonable that the process that we witnessed could be explained on the basis of an immune-mediated response. It's inflammatory in nature, but without identifiable viral causes." Tr. at 87-88.

When asked on cross-examination if his opinion was essentially a diagnosis of exclusion, Dr. Seals replied:

> No. I think it's a diagnosis of what I would consider a logical sequence of events that occurred in relationship to immunization.

Tr. at 88.

Dr. Max Wiznitzer testified for respondent. Tr. at 95. He is a pediatric neurologist. Tr. at 96. Both encephalitis and ADEM are associated with an acute encephalopathy which is an acute change in mental status and functioning of the nervous system. Tr. at 99-100. Encephalitis is an inflammatory process involving mental status change, focal or multi-focal neurological deficits, and fever. Tr. at 100-01. ADEM is associated with acute demyelination, i.e., loss of myelin in the brain. Tr. at 101. Dr. Wiznitzer's opinion is that Maurice's flu vaccination did not cause his neurologic event on October 29, 2004. Tr. at 102. Dr. Wiznitzer diagnosed Maurice as having meningoencephalitis based on the results of the brain biopsy, particularly showing glial degeneration or cell death. Tr. at 103. Cell death is not a predominant finding in ADEM. *Id.* On MRI studies, Maurice's brain showed enhancement of the meninges. Tr. at 104. That is not typically seen in ADEM. *Id.* Involvement of gray and white matter is typical for meningoencephalitis. Tr. at 105. The elevated white blood cell count in the spinal fluid is evidence of inflammation. *Id.* Maurice had an acute change in mental status, i.e., an acute encephalopathy (an altered level of consciousness) and focal neurologic deficits, seizures, an abnormal EEG, all consistent with meningoencephalitis. *Id.*

Dr. Wiznitzer stated that he cannot give a biologically plausible argument that flu vaccine can cause meningoencephalitis. Tr. at 109. The antigenic amount in the flu vaccine is a drop in the bucket compared to the antigenic amount in an upper respiratory illness. Tr. at 109-10. Children with minor upper respiratory infections can be vaccinated. That is part of the recommendation for vaccine administration. Tr. at 110. There is no logical basis in the concept

of revving up the immune system and then introducing a small amount of some other antigen that makes it go awry. Tr. at 111.

Dr. Wiznitzer does not believe that Maurice had sinusitis because a CT scan did not show any congestion or filling of the sinuses. Tr. at 116. He had an upper respiratory infection which is more likely to be viral than bacterial. Tr. at 117, 120. Inflammatory disorders can be progressive which means they get worse over a short period of time. Tr. at 119.

Dr. Wiznitzer thinks it implausible that a combination of Maurice's URI and flu vaccination caused his neurological injury. Tr. at 121. An inactivated vaccine cannot cause encephalitis because it is not an infectious organism. *Id.* There is no logical plausibility to the conclusion that Maurice had a revved-up nervous system reacting adversely to his vaccination. *Id.* The 48-hour period between vaccination and acute neurologic injury is too soon for an immune-mediated process. Tr. at 122. Dr. Wiznitzer would not answer whether two days was too soon to have an encephalitic reaction to flu vaccine because "You can't make a claim for something that doesn't exist, for something that can't happen." Tr. at 123. He admitted that flu vaccine can produce a low-grade fever the evening of the vaccination. Tr. at 124. The flu vaccine can also cause aching. *Id.* But Dr. Wiznitzer does not believe that Maurice's flu vaccination caused his fever and aching on the evening of the vaccination. Tr. at 125. The reason is that those symptoms were also associated with stomach complaints, which is not typical for flu vaccine. It was also associated with features of an upper respiratory infection which is not consistent with flu vaccine. *Id.* Upper respiratory infection can lead to stomach ache. *Id.* Maurice might have been swallowing the green nasal discharge which can irritate the stomach. *Id.* Body pain can happen with any upper respiratory infection. Tr. at 126.

Dr. Wiznitzer agrees that flu vaccine, at least swine flu vaccine, can cause Guillain-Barré syndrome. Tr. at 127.

Dr. Neal A. Halsey testified next for respondent. Tr. at 142. He is board-certified in pediatrics and pediatric infectious diseases. Tr. at 143. He has also conducted research in vaccines and vaccine-preventable diseases. Tr. at 144. He is the director of the Institute for Vaccine Safety. Tr. at 145. Dr. Halsey's opinion is that Maurice had meningoencephalitis. Tr. at 147. His opinion is also that it is not biologically plausible that the influenza vaccine causes encephalitis or meningoencephalitis. Tr. at 147-48. Meningoencephalitis is caused almost exclusively by infections, most of which are viral. Tr. at 148. The inactivated flu vaccine does not get into the central nervous system or stimulate this type of response. *Id.* Dr. Halsey believes that Maurice's fever, aching and other clinical symptoms were caused by the infection he had. *Id.* Inactivated influenza vaccine can cause a low-grade transient fever for a couple of hours, but not a fever that lasts two days. Tr. at 149. The flu vaccine has a very tiny amount of hemagglutinin. *Id.* An acute infectious process has thousands more antigen. Tr. at 150. The small amount of antigen in the flu vaccine is enough to stimulate a protective immune response. *Id.* Dr. Halsey called Maurice's upper respiratory infection a coincidental illness because it occurred at the same time as the vaccination. *Id.* Maurice had to have been exposed to the infectious agent before the vaccination, at least a couple of days before, maybe even three or four days before the onset of symptoms. Tr. at 151.

Dr. Halsey denied that imposing another antigenic challenge (the flu vaccine) onto Maurice as he was fighting the first antigenic challenge (the URI) would have affected his response to that infection. Tr. at 151-52. People still get a good immune response to a vaccine

even if they have mild respiratory symptoms. Tr. at 152. People who get as many as nine or 10 different vaccines at the same time still get a good immune response. The vaccines do not interfere with each other. *Id.* "There is no evidence that giving vaccines to children who have mild respiratory or gastrointestinal infection will predispose to encephalitis. It just doesn't happen." *Id.*

Giving vaccines to children with a mild respiratory infection does not make the infection worse. Tr. at 153. He specifically looked at the response and adverse events associated with measles vaccine in children who did and did not have respiratory infections. Tr. at 154. There was no difference in the immune response and no increased rate of adverse events. *Id.*

Dr. Halsey does not agree with Dr. Seals' opinion that Maurice had a revved-up immune system because of his pre-existing and coincidental infectious process. *Id.* There is no evidence to support it and it does not happen. Tr. at 154-55. The normal state of the immune system is to be turned on because we are exposed to antigens. Tr. at 156. Children are constantly responding to new infectious agents and antigens in their environment all the time. *Id.* When someone gets an infection, only a small portion of his immune system responds, not all of his immune system. Tr. at 157. Some of the viruses that cause respiratory infections cause encephalitis as well. Tr. at 159. In the majority of encephalitis cases, we do not identify the cause. Tr. at 159-60. The following colloquy occurred:

> THE COURT: Let me ask you, if you had the ability to look in a crystal ball, and you saw Maurice Lamkin on October 27, and you knew, by use of this wonderful instrument, that the upper respiratory infection that he was harboring was going to cause encephalitis, would you say to his pediatrician go ahead and give him the flu vaccine?
> THE WITNESS: I think if I had that wonderful power, which would be really great if we had a way to do that, I would have

> taken Maurice Lamkin and put him in the hospital immediately. And I would have given him anti-viral agents to try to change the course of his illness. I might have also given him other drugs that might decrease inflammation. Any good clinician, knowing that something as devastating as the illness that he had, would have done anything in their power to try to prevent that from going on. Se we would have done very many different things.
> THE COURT: Would you have given him the flu vaccine?
> THE WITNESS: Oh, of course not. We wouldn't give him anything else, except for drugs to potentially treat this illness.
> THE COURT: Why wouldn't you have given him the flu vaccine?
> THE WITNESS: Because, I mean, there's no reason to give him the flu vaccine at a time. We do have, in our guidelines for the use of vaccines in children, children with moderate to severe illness we don't give vaccines. Not because we think that the vaccines are going to cause harm, but because of the confusion that occurs, such as happened in this case. Now, he had only the mild illness, you know, at the time. But I wouldn't have given it to him. But even if, as it did happen, he did receive the vaccine, that doesn't mean I believe the vaccine contributed in any way to his illness.

Tr. at 160-62.

Dr. Halsey said if they withheld vaccines from children with respiratory infections that were minor, the immunization coverage rates would be a tiny fraction of what they are now. Tr. at 163.

In the California study on encephalitis (respondent's Exhibit F), it is the host's inflammatory response to a diffuse infectious process in the central nervous system that is the basic clinical pattern we are seeing. Most of these causes are viruses. Tr. a 165. Dr. Halsey agreed that there is something probably genetic within Maurice that made him more vulnerable than other children to the effects of the infectious illness so that he was predisposed to develop encephalitis. Tr. at 165-66. In the California study, the authors could identify in only 16% of cases a specific cause. Tr. at 166. In the study, there were 17 individuals who had Epstein-Barr virus-associated encephalitis, including one death. There may have been four in a coma, similar

to Maurice. Tr. at 167. But the ones with EBV in the study had acute infections and Maurice was not tested for acute EBV. *Id.* Maurice had a relatively high titer for EBV, suggesting a recent infection, but the staff did not do the test to confirm this. Tr. at 168. Dr. Halsey said you do not need the vaccine to be a cause of Maurice's encephalitis. *Id.* Dr. Halsey stated that the vaccine does not get into the central nervous system. Tr. at 171. Inactivated influenza vaccine contains large molecules that do not cross the blood-brain barrier. It does not alter the immune system by increasing the likelihood of the virus causing encephalitis. Tr. at 175.

Dr. Halsey stated that Dr. Seals' medical theory is not biologically plausible because there is no way that the inactivated influenza vaccine would alter the immune system in such a way as to allow for the virus to get into the brain and cause meningoencephalitis. Tr. at 177. The virus got into the brain itself and in the meninges, the lining of the brain. Tr. at 179. Maurice is unusual in having been infected with EBV at an early age. Tr. at 181. Dr. Halsey was not sure that Maurice has asthma although he has wheezing episodes. Tr. at 184. Asthma is mediated immunologically and there is an inflammatory process to it. *Id.* But children with asthma are not at increased risk of getting encephalitis. *Id.* That Maurice's pupils did not match when he was hospitalized indicates brain swelling and inflammation. Tr. at 186.

Dr. Halsey stated there was no logical sequence of cause and effect between the vaccine and injury in Maurice's case. Tr. at 187. The more probable cause is the infection he had. Tr. at 188. The vaccine does not and cannot cause encephalitis. *Id.* Inactivated or killed vaccine does not contain live infectious particles that could get into the central nervous system and cause encephalitis. Tr. at 189. Dr. Halsey said he is a member of the Clinical Immunization Safety Assessment Network which the Centers for Disease Control fund. Tr. at 190. The Network

studies people all the time who have serious illnesses after vaccination to try to figure out if the two are related. Tr. at 190-91. The Network looks for all possible causes. Tr. at 191.

Inactivated flu vaccine uses subunits which are small particles. Tr. at 192-94. When the vaccine is injected intramuscularly, the host immune cells, called antigen processing cells, pick up the viral particles. Tr. at 194. The macrophages and monocytes take the viral particles to the local lymph node. *Id.* They do not cross the blood-brain barrier unless there is already damage and inflammation. Tr. at 194-95. They do not multiple and cause diffuse inflammation. Tr. at 195.

DISCUSSION

To satisfy her burden of proving causation in fact, petitioner must prove by preponderant evidence "(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 1317, 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 . . . ."

Close calls are to be resolved in favor of petitioners. Capizzano, 1440 F.3d at 1327; Althen, 418 F.3d at 1280. *See generally*, Knudsen v. Secretary of HHS, 35 F.3d 543, 551 (Fed. Cir. 1994).

Without more, "evidence showing an absence of other causes does not meet petitioners' affirmative duty to show actual or legal causation." Grant, 956 F.2d at 1149. Mere temporal association is not sufficient to prove causation in fact. *Id.* at 1148.

Petitioner must show not only that but for the vaccine, Maurice would not have had meningoencephalitis, but also that the vaccine was a substantial factor in bringing about his memingoencephalitis. Shyface v. Secretary of HHS, 165 F.3d 1344, 1352 (Fed. Cir. 1999).

In essence, the special master is looking for a medical explanation of a logical sequence of cause and effect (Althen, 418 F.3d at 1278; Grant, 956 F.2d at 1148), and medical probability rather than certainty (Knudsen, 35 F.3d 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:

> 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.
>
> 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.

35 F.3d at 549.

The Federal Circuit stated in Althen, 418 F.3d 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."

The Federal Circuit in Capizzano emphasized that the special masters are to evaluate seriously the opinions of the vaccinee's treating doctors 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." 440 F.3d at 1326. See also Andreu v. Secretary of HHS, 569 F.3d 1367, 1375-76 (Fed. Cir. 2009).

As the Federal Circuit stated in Knudsen, 35 F.3d 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, 418 F.3d at1281 ("judging the merits of individual claims on a case-by-case basis").

The parties in the instant action actually agree on one vital point: Maurice had an upper respiratory infection that was a substantial factor in causing his meningoencephalitis. (During the hearing, all three medical experts agreed that Maurice has meningoencephalitis or encephalitis and not ADEM.) Where the parties diverge is that petitioner asserts through her treating pediatric rehabilitation specialist Dr. Donald Currie and her treating pediatric neurologist Dr. John Seals (who also testified) that another substantial factor was the flu vaccine Maurice received before he had fever, seizures, brain edema, and coma.

The undersigned reflects on the testimony of respondent's excellent expert witnesses, Dr. Wiznitzer, a pediatric neurologist, and Dr. Halsey, an infectious disease and vaccine expert. Both stated that inoculating a child with a minor infection is fine and does not lead to adverse consequences. But since both doctors believe that Maurice's encephalitis was due to his upper respiratory infection (URI), how could anyone consider this URI to be a minor infection?

Dr. Halsey agreed that Maurice is unusual, probably due to an unknown genetic reason, in that, unlike the vast majority of five-year-old children, he developed encephalitis or meningoencephalitis where other children just recover and go out and play. But to the undersigned, this immunologic vulnerability has great significance. As the Federal Circuit in Knudsen stated, we need not delve into precisely how and why the substantial factors in this case caused Maurice's encephalitis. We know Maurice is vulnerable to an immunologic assault. Respondent's experts say we do not need the vaccine because the URI was enough to cause his immune-mediated encephalitis. But Maurice has just one body with one immune system. At the time he was reacting to his URI in an unusual fashion, he was exposed to more antigenic challenge in the flu vaccine. As petitioner's expert Dr. Seals, who has always been Maurice's pediatric neurologist, stated, both the URI and flu vaccine in combination caused Maurice's meningoencephalitis. Both caused the fever he had the night of the vaccination. Both were substantial factors in causing his grievous immune-mediated encephalitis. The two substantial factors, like strands of hair, became entangled in one aberrant immunological calamity.

This case is reminiscent of Shyface, in which a baby, Cheyenne Shyface, received a whole-cell DPT vaccination while he was harboring an E. coli infection. His treating physician testified that he could not discern which substantial factor–the vaccine or the infection–caused

his 107° fever. When Cheyenne reached 110°, he died. The Federal Circuit stated that both the vaccine and the infection were substantial factors and, in order for petitioners to prevail, the vaccine did not have to be the predominant factor, just a substantial factor. Petitioners prevailed.

The undersigned has also ruled in cases in which an infection and a vaccine were two substantial factors. In Herkert v. Sec'y of HHS, No. 97-518V, 2000 Wl 141263 (Fed. Cl. Spec. Mstr. 2000), John Herkert at age 18 months received acellular DPT. Unknown to his family, he was harboring cytomegalovirus (CMV). The evening of the vaccination, he was cranky and put to bed. The next morning, he was like a limp rag. He had transverse myelitis (TM) at the cervical (neck) section. Since his palms were red, the consensus was that the TM was due to the CMV. But another substantial factor was the vaccination which, according to petitioners' expert, modulated John's immune system so that he could no longer fight off the CMV. Petitioners prevailed. There was no appeal.

The undersigned also ruled in Nash v. Sec'y of HHS, No. 00-149V, 2002 WL 1906501 (Fed. Cl. Spec. Mstr. 2002), that James Nash who was already sick with pneumococcus (and feverish) and received whole-cell DPT became far sicker, with increased temperature, until he was admitted to the hospital with pneumococcal meningitis. Again, the bacterial infection was a substantial factor, but the vaccine also was a substantial factor in modulating the child's immune system so that he could no longer fight off the bacterial infection. Petitioner prevailed. There was no appeal.

The undersigned also ruled in Camerlin v. Sec'y of HHS, No. 99-615V, 2003 WL 22853070 (Fed. Cl. Spec. Mstr. 2003), that Alexander Camerlin, a nine-month-old, who had otitis media or OM (ear infection) and received hemophilus B influenza (HiB) vaccine which

was followed by transverse myelitis (TM) and/or acute disseminated encephalomyelitis (ADEM) had an adverse reaction to the combined effect of his OM and HiB. The vaccination made him more vulnerable to the infection. Petitioner prevailed. There was no appeal.

The undersigned also ruled in Pearson v. Sec'y of HHS, No. 03-2751V, 2008 WL 5093378 (Fed. Cl. Spec. Mstr. 2008), that an adult with a URI who received hepatitis B vaccine had an adverse reaction (transverse myelitis) due to both substantial factors. Petitioner prevailed. The case is still in damages.

In the instant action, the undersigned takes seriously, as the Federal Circuit has emphasized in Capizzano and Andreu, the opinions of the treating physicians, here Dr. Currie (pediatric rehabilitation specialist) and Dr. Seals (pediatric neurologist). Before there was ever any litigation, Dr. Seals wrote in the medical records that Maurice had had an adverse reaction to his flu vaccination. Dr. Currie quoted Dr. Seals' opinion in his own notes. Unusual for this Program, Dr. Seals also testified. His opinion that the combination of the effects of the URI and the flu vaccine can and did cause Maurice's meningoencephalitis is biologically plausible and shows a logical sequence of cause and effect.

Respondent's Exhibit K, an article discussing Epstein Barr virus-encephalitis, reveals that individuals had more than one infection, i.e., coinfections, in a sizable percentage of cases. In 13 out of 21 cases, the authors of the article on EBV-encephalitis found one or more additional potential pathogens. The authors theorized that in those cases, each pathogen played a role or else the other infection reactivated a latent EBV infection. They cite an author who found that in about 25% of cases with EBV infection of the central nervous system, there was evidence of infection with other pathogens. *Id.* Forty-three percent of the authors' cohort had coinfection

of EBV and M. pneumoniae. Dr. Halsey never mentioned this article or its findings in his testimony, but clearly in the world of academic studies, the notion that only one viral infection causes encephalitis is groundless. Medical authors accept that more than one infection can produce encephalitis and that a subsequent antigenic exposure can reactivate EBV and result in encephalitis.

Dr. Halsey's detailed explanation that the viral particles of the flu vaccine cannot enter the blood-brain barrier has one caveat, i.e., if the barrier is already breached because the child has an inflammation due to the URI. But we need not even get that far. If the child was trying to fight off the effects of the URI and, with the additional antigenic challenge of the flu vaccine, failed to succeed in fighting off those effects, his deplorable medical condition is just as much due to the vaccine's effect as in Shyface, Herkert, Nash, Camerlin, and Pearson. The Federal Circuit cautioned in Knudsen that petitioners do not have to prove the specific biological mechanism in order to prevail. Petitioner in the instant action did not assert and Dr. Seals did not testify that flu virus vaccine particles invaded Maurice's brain. Dr. Seals testified that the combination of the effect of the flu vaccine on Maurice who was already fighting the effects of the URI caused his immune-mediated encephalitis.

Dr. Halsey seemed to be mixing apples with oranges when he testified that people who receive nine or 10 vaccines at a time make a good immune response to each and, therefore, the coincident upper respiratory infection that Maurice had at the time he received flu vaccine means that the antigenic exposure of the flu vaccine would have no immune effect on how Maurice was coping with the URI. The general (i.e., normal) vaccinee's ability to form antibodies to multiple antigenic exposures has nothing to do with an immune-mediated, aberrant response to an

infection and a vaccination administered while an individual vulnerable for some genetic reason (i.e., abnormal) is medically struggling.

Dr. Halsey also used as a reason for the vaccine's being irrelevant to Maurice's inability to fight off the adverse effects of his URI was that this could not happen (Dr. Wiznitzer also testified it does not happen) because those in charge of making vaccine recommendations state that a child's having a minor URI is not an impediment to receipt of vaccine. Ignoring for the moment that Maurice's URI proved very much not to be a minor illness in Maurice's case because of his vulnerability as a host, this justification for vaccinating has nothing to do with whether a particular vaccination in a particular person was a substantial factor in causing illness.

Dr. Halsey's statement is reminiscent of the testimony of respondent's expert neurologist Dr. Sriram in Fisher v. Sec'y of HHS, No. 99-432, 2009 WL 2365459 (Fed. Cl. Spec. Mstr. 2009), a case in which the undersigned held that hepatitis B vaccine caused petitioner's multiple sclerosis. Dr. Sriram said in Fisher that, since doctors recommend that their MS patients receive hepatitis B vaccine, the vaccine cannot cause MS or worsen it. 2009 WL 2365459, at *16, *20. Again, the issue before us is not vaccine recommendations, which for the overwhelming number of recipients do not lead to adverse consequences. That is a policy issue based on epidemiology and public health. Here, we are faced with a rare reaction. In Knudsen, the Federal Circuit held that although epidemiology showed that a child's encephalopathy was more likely due to a virus than a vaccination, this did not mean that in that specific case, the baby's encephalopathy was due to a virus rather than the vaccination:

> 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.

35 F.3d at 550. The Federal Circuit held for petitioners in Knudsen. The fact that vaccine authorities such as Dr. Halsey seek through epidemiological studies to find adverse reactions to vaccine and do not find them does not mean that, in the rare case, a vaccine reaction does not occur. Moreover, the recommendations these vaccine authorities make does not preclude a finding of vaccine reaction in the rare case.

A vaccine recommendation based on epidemiology to guide public health does not negate the holding in a legal decision that there is a vaccine reaction based on biological plausibility and a logical sequence of cause and effect. Petitioner has satisfied the first two prongs of Althen in that coinfection of a URI and flu vaccine may, in the rare individual, lead to encephalitis (biologic plausibility) and that it did so in Maurice's case (logical sequence of cause and effect).

The last prong of Althen (medically appropriate timing for a reaction) is also satisfied here. Maurice reacted the night of his vaccination, and his symptoms got worse, not only the symptoms of the URI with the stomach ache, but also his developing central nervous system symptoms that are the nightmare of this case.

Petitioner has prevailed in proving a prima facie case. Without the flu vaccine, Maurice would not have had the dire situation which the combination of his unusual reaction to the URI plus the effect of influenza vaccine on his ability to fight this underlying immune-mediated response produced in him. He is truly unfortunate in what transpired after his URI plus flu vaccination, and he is indeed the type of person for whom the Vaccine Act was created.

CONCLUSION

Petitioner has prevailed on the issue of entitlement. The undersigned encourages the parties to settle damages in this case. A telephonic status conference will be held soon to discuss how the parties will proceed with damages.

IT IS SO ORDERED.

DATE

Laura D. Millman
Special Master