In the United States Court of Federal Claims

OFFICE OF SPECIAL MASTERS

No. 18-1217V

Filed: December 5, 2023

LEONARD THOMPSON, Petitioner, v. SECRETARY OF HEALTH AND HUMAN SERVICES, Respondent.	TO BE PUBLISHED

Michael McLaren, Black McLaren, et al., PC, Memphis, TN, for Petitioner
Andrew Henning, U.S. Department of Justice, Washington, DC, for Respondent

DECISION ON ENTITLEMENT[1]

Oler, Special Master:

On August 15, 2018, Leonard Thompson ("Petitioner" or "Mr. Thompson") filed a petition for compensation under the National Vaccine Injury Compensation Program, 42 U.S.C. § 300aa-10, *et seq*.[2] (the "Vaccine Act" or "Program"). The petition alleges that Mr. Thompson developed Polymyalgia Rheumatica ("PMR") "and/or other neurologic and physical impairments and other

[1] Because this Decision contains a reasoned explanation for the action in this case, it must be made publicly accessible and will be posted on the United States Court of Federal Claims' website, and/or at https://www.govinfo.gov/app/collection/uscourts/national/cofc, in accordance with the E-Government Act of 2002. 44 U.S.C. § 3501 note (2018) (Federal Management and Promotion of Electronic Government Services). **This means the Decision will be available to anyone with access to the internet.** In accordance with Vaccine Rule 18(b), Petitioner has 14 days to identify and move to redact medical or other information, the disclosure of which would constitute an unwarranted invasion of privacy. If, upon review, I agree that the identified material fits within this definition, I will redact such material from public access.

[2] National Childhood Vaccine Injury Act of 1986, Pub. L. No. 99-660, 100 Stat. 3755. Hereinafter, for ease of citation, all "§" references to the Vaccine Act will be to the pertinent subparagraph of 42 U.S.C. § 300aa (2012).

injuries[3] that were 'caused-in-fact' by, or, pleading in the alternative, significantly aggravated by" his Prevnar-13 vaccination. Pet. at 1, ECF No. 1.

Upon review of the evidence, I find that Petitioner has not preponderantly demonstrated that the Prevnar-13 vaccine can cause PMR or that it did so in his particular case. The petition is accordingly dismissed.

I. Procedural History

Petitioner filed his petition on August 15, 2018. Pet. at 1. He filed an affidavit and medical records in support of his petition on August 21, 2018. Exs. 1-6. He filed a statement of completion that same day. ECF No. 7.

Respondent filed his Rule 4 Report on March 25, 2020, indicating that the "case is not appropriate for compensation under the terms of the Vaccine Act." Resp't's Rep. at 1; ECF No. 14.

After that, the parties filed a series of expert reports, each offering opinions from an immunologist. Dr. M. Eric Gershwin opined on behalf of Petitioner and Dr. Mehrdad Matloubian offered an opinion in support of the Secretary. Ex. 7; Ex. A; Ex. 28; Ex. C.

On May 3, 2021, Petitioner requested that I schedule his case for an entitlement hearing. ECF No. 25. On July 1, 2021, I scheduled an entitlement hearing to commence on March 21, 2022. Scheduling Order dated July 1, 2021.

The parties filed prehearing briefs on March 7 and March 14, 2022. ECF Nos. 36, 38. I conducted an entitlement hearing via Zoom on March 21 and March 22, 2022. Petitioner presented testimony from himself, his son, and Dr. Gershwin. Respondent presented testimony from Dr. Matloubian. After the hearing, the parties submitted post-hearing briefs. ECF Nos. 47, 56, 58. This matter is now ripe for an adjudication.

II. PMR

PMR is "an inflammatory rheumatic disease, which … presents commonly in people over the age of 50 years and is characterized by pain and morning stiffness in the shoulder and pelvic girdles, alongside evidence of an underlying inflammatory reaction." A. Soriano et al., *Giant Cell Arteritis and Polymyalgia Rheumatica After Influenza Vaccination: Report of 10 Cases and Review of the Literature*, 21 LUPUS 153 (2012) (filed as Ex. 17 and Ex. 42) (hereinafter "Soriano"). "The onset can be abrupt, sometimes startlingly so, seeming to occur almost overnight" and occurs most frequently in people between 70 and 80 years of age. William P. Docken, *Clinical manifestations and diagnosis of polymyalgia rheumatica,* UPTODATE 1-26, 2-4 (2020) (filed as Ex. 10 and Ex. 41) (hereinafter "Docken"). The cause of PMR is unknown. *Id.* at 2.

[3] Although pled in the petition, Petitioner did not present evidence of other neurologic or physical impairments or other injuries. Accordingly, I have analyzed whether the Prevnar vaccine can and did cause PMR.

Both experts agree that Petitioner was correctly diagnosed with PMR. First Gershwin Rep. at 2 (Dr. Gershwin noting that "the diagnosis of PMR seems well established,"); First Matloubian Rep. at 4 (Dr. Matloubian opining that "the diagnosis of PMR is quite reasonable in this case.").

III. Medical Records

Petitioner's medical history is not in dispute. Mr. Thompson was born in 1937. On December 14, 2015, Petitioner was 78 years old with a history of coronary and vascular disease when he presented to his PCP, Dr. Jerry Ferrell, for his annual wellness exam. Ex. 2 at 34. Petitioner did not report having symptoms consistent with PMR. *Id.* He received his Prevnar-13 vaccination at this visit. *Id.* at 34, 63.

Petitioner called Dr. Ferrell on January 12, 2016, and reported that he received his Prevnar-13 vaccine in December and then experienced pain in his knees, hips, and shoulders. Ex. 2 at 39. The record further notes that "knees & hips are better but [his] shoulders [are] still really bad – can't raise them." *Id.* The "action" section of this record states "if in Fl[orida] – go to be seen maybe u[rgent] c[are]." *Id.*

Petitioner visited his PCP on April 4, 2016. Ex. 2 at 40. The record indicates that Petitioner had experienced bilateral hand edema for three months since his Prevnar-13 vaccination. *Id.* The record further documents that Petitioner had bilateral shoulder pain that resulted in decreased range of motion. Dr. Ferrell noted that he suspected Petitioner's pain was a reaction to his Prevanr-13 vaccine. *Id.* He referred Petitioner to a rheumatologist. *Id.*

Petitioner underwent x-rays of his wrists and shoulders on April 4, 2016. Ex. 2 at 10-13. The x-ray of his right wrist demonstrated "[m]ild to moderate thumb carpal and metacarpal joint degenerative changes." *Id.* at 10. X-ray of his left wrist demonstrated "[m]ild thumb metacarpal joint degenerative changes." *Id.* at 13. Petitioner's right shoulder x-ray was unremarkable, while his left shoulder x-ray revealed "[m]oderate glenohumeral and acromioclavicular joint degenerative changes. *Id.* at 11-12.

On May 25, 2016, Petitioner visited Dr. Carlos Diola, a rheumatologist. Ex. 3 at 12. Petitioner told Dr. Diola that "on 12/4/2015, he received a Prevnar13 injection. Two days later, he noted sudden onset severe knee, hip, arm and shoulder pains, to the point where he could not raise his arms at all and could not even brush his teeth." *Id.* Petitioner told Dr. Diola that two weeks later, his left hip pain started to go away, and his shoulder pain was improving, but noted that he continued to experience knee pain. *Id.* Petitioner stated that his right hip pain was almost gone by March. *Id.* Petitioner told Dr. Diola that he developed hand and wrist pain in the first week of February. *Id.* As of the date of this visit, Petitioner was still experiencing hand pain and arm tenderness. *Id.* Dr. Diola noted that Petitioner's lab work, performed in April, included an erythrocyte sedimentation rate ("ESR")[4] of 70 and a CRP of 4.9. *Id.* Dr. Diola noted that

[4] ESR is "the rate at which erythrocytes precipitate out from a well-mixed specimen of venous blood…an increase in rate is usually due to elevated levels of plasma proteins…It is increased in monoclonal gammopathy, hypergammaglobulinemia due to inflammatory disease, hyperfibrinogenemia, active

"Polymyalgia rheumatica is evident in this patient who presents with abrupt onset of bilateral and symmetric proximal girdle myalgias and arthralgias associated with elevated acute phase reactants." *Id.* at 13. He started Petitioner on 15mg of prednisone per day. *Id.*

Petitioner returned to Dr. Diola on August 25, 2016. Ex. 3 at 9. During this visit, Petitioner reported a "dramatic improvement of his pain involving muscles and joints when he started prednisone." *Id.* Dr. Diola recommended that Petitioner taper prednisone down from his then-current dose of 10mg per day to 9mg per day for one month, then by 1mg per day each month thereafter. *Id.*

On December 12, 2016, Dr. Diola noted that Petitioner continued to improve. Ex. 3 at 5. The record indicates that Petitioner "has no joint or muscle ache, pain or stiffness to complain of. He does have a lot of fatigue." *Id.* Dr. Diola documented that Petitioner's ESR was measured at 15 in August where the upper limit of normal is 10. *Id.* Dr. Diola directed Petitioner to continue tapering prednisone by 1mg each month until he is no longer taking any. *Id.*

Petitioner followed up with Dr. Diola on June 12, 2017. Ex. 3 at 1. Dr. Diola recorded that he had "no significant joint or muscle pain but has extreme fatigue when he tapered Prednisone." *Id.* Petitioner experienced morning stiffness in his hands lasting two to three minutes as well as stiffness and achiness in his knees. *Id.* Petitioner reported having to sleep ten hours each night. *Id.* Dr. Diola indicated that because Petitioner did not have recurrence of myalgias and arthralgias, he considered Petitioner's PMR to be resolved. *Id.* at 2. Because of Petitioner's elevated ESR and continued fatigue, Dr. Diola ordered testing to assess vitamin B12 and antinuclear antibodies ("ANA")[5], as well as serum protein electrophoresis. *Id.*

On June 14, 2017, Dr. Diola added a note to Petitioner's medical record stating that Petitioner's vitamin B12 level was low, which "probably explains some of his fatigue." Ex. 3 at 19. He recommended vitamin B12 injections. *Id.*

Petitioner visited his PCP on December 19, 2017. Ex. 2 at 36. The notes from this visit are extremely difficult to read. They appear to indicate that Petitioner had stopped taking prednisone and reported that he was not experiencing symptoms of PMR. *Id.* Petitioner refused pneumococcal and flu vaccination at this appointment. *Id.*

On April 24, 2018, Petitioner saw a new PCP, Dr. Edward Sorenson, for ongoing fatigue and "options for joint pain." Ex. 2 at 42. Petitioner reported that he had taken 1mg of his remaining prednisone every couple of weeks to help with his fatigue. *Id.* at 43. He further reported not having persistence of arthralgias or myalgias. *Id.* Dr. Sorenson's impression was that Petitioner's fatigue could be associated with his PMR. *Id.* at 44. In order to further evaluate Petitioner's fatigue, Dr.

---

inflammatory disease, and anemia." DORLAND'S MEDICAL DICTIONARY ONLINE, https://www.dorlandsonline.com/dorland/definition?id=102146 (last visited Nov. 29, 2023) (hereinafter "DORLAND'S").

[5] ANA: "antibodies directed against nuclear antigens; ones against a variety of different antigens are almost invariably found in systemic lupus erythematosus and are frequently found in rheumatoid arthritis, scleroderma (systemic sclerosis), Sjögren syndrome, and mixed connective tissue disease." DORLAND'S, https://www.dorlandsonline.com/dorland/definition?id=56804 (last visited on Nov. 29, 2023).

Sorenson indicated he would order an ESR test, a complete blood count, a complete chemistry panel, and a thyroid-stimulating hormone ("TSH") level. *Id.*

No other medical records relevant to my evaluation of this case have been filed.

IV. Petitioner's Affidavit and Testimony

A. Petitioner's Affidavit

Petitioner signed his affidavit on April 27, 2018. He stated that he received a Prevnar-13 vaccine on December 14, 2015, and two to three days later, he began to experience "significant pain and swelling throughout [his] body." Ex. 1 at 1.

Petitioner averred that he initially tried to contact the vaccine manufacturer, but was not successful in getting information or receiving any significant help. Ex. 1 at 2. He visited his PCP in April of 2016 and then saw a rheumatologist in May of 2016. *Id.* His rheumatologist diagnosed him with PMR. *Id.*

Petitioner averred that he continues to suffer from symptoms associated with PMR, which include pain, weakness, and fatigue. Ex. 1 at 2-3.

B. Affidavit of Gary Thompson

Mr. Gary Thompson, Petitioner's son, filed his affidavit on March 7, 2022. Ex. 48. Mr. Thompson averred that he lives close to his father in Michigan and that he sees and speaks with him frequently. Ex. 48 at 1. He recalled that prior to vaccination, his father was actively involved in carpentry and painting. *Id.* at 2. Within a few days of his vaccination, Mr. Thompson recalled his father's hands "swelling up to the point he could barely function and use them." *Id.* Mr. Thompson stated that Petitioner first complained of knee pain, which then developed to hand swelling. *Id.* Mr. Thompson averred that Petitioner's symptoms persisted for one to two years, but appear to be well managed with medication now. *Id.* He stated that "[i]n my lay opinion, the onset of his problems and the severity of them after vaccination seem consistent with what someone could expect as a rare adverse reaction to a shot." *Id.*

C. Petitioner's Testimony

Petitioner testified at the entitlement hearing. He lives in Michigan and has been retired from Dow Chemical for "quite a few years." Tr. at 9. He received his Prevnar-13 vaccine on December 14, 2015, during his yearly exam with his PCP. *Id.* at 10, 13. Between two and three days later, Petitioner testified that he developed severe pain in his knees, hips, and shoulders. *Id.* at 16. The pain was intense enough that he had difficulty moving around the house. *Id.* at 19.

Each year, Petitioner and his wife rented a house in Florida between the months of January and March. Tr. at 12. After Petitioner's pain started, the family questioned whether he could drive the car from Michigan to Florida. *Id.* at 20. Ultimately, the family decided that Petitioner's son, Gary, would drive Petitioner and Petitioner's wife to Florida. *Id.* Sometime in February or March,

the pain moved into Petitioner's hands and arms. *Id.* His hands became so swollen that he could not open a bottle of water. *Id.*

After Petitioner returned home to Michigan, he went to visit Dr. Ferrell, his PCP. Tr. at 25. Dr. Ferrell told Petitioner that his reaction was a side effect of the Prevnar-13 vaccine. *Id.* at 26. Dr. Ferrell recommended that Petitioner see a rheumatologist. *Id.*

Petitioner visited Dr. Diola, a rheumatologist, on May 25, 2016. Tr. at 28. Dr. Diola diagnosed him with PMR and told Petitioner that the Prevnar-13 vaccine likely caused his condition. *Id.*

D. Gary Thompson's Testimony

Mr. Gary Thompson also testified at the entitlement hearing. As of the date of the hearing, he had lived with his parents for two and one half years. Tr. at 37.

Mr. Thompson remembered discussing his parents' trip to Florida with his sister. Tr. at 40. Petitioner was in enough pain that Mr. Thompson did not think his father was feeling well enough to make the drive. *Id.* Mr. Thompson decided to drive them to Florida and then fly home. *Id.* At that time, Petitioner had pain in his joints, to include his hips and knees. *Id.*

When Mr. Thompson picked his parents up from Florida, his father's hands were swollen. Tr. at 43. Mr. Thompson had to drive his parents back to Michigan. *Id.*

V. Expert Opinions and Qualifications

A. Dr. M. Eric Gershwin, M.D.

Dr. Gershwin provided two expert reports in this case and testified at the entitlement hearing. Ex. 7 (hereinafter "First Gershwin Rep."); Ex. 28 (hereinafter "Second Gershwin Rep.").

1. Qualifications

Dr. Gershwin received his medical degree from Stanford University in 1971 and is board certified in internal medicine, rheumatology, and allergy and clinical immunology. Ex. 8 (hereinafter "Gershwin CV") at 1-2. He is currently the Jack and Donald Chia Professor of Medicine and a Distinguished Professor of Medicine the University of California, Davis. *Id.* at 2. Dr. Gershwin has won numerous awards including a Doctor of Philosophy Honoris Causa from the University of Athens, for his contribution in immunology and medicine, and the Professor Henry N. Neufeld Memorial Award from the United States-Israel Binational Science Foundation in 2014. *Id.* at 1. Dr. Gershwin has ten patents and serves as the editor-in-chief for Clinical Reviews in Allergy, Reviews in Autoimmunity, Autoimmunity Reviews, and Journal of Autoimmunity, as well as an ad hoc editor for numerous other publications. *See id.* at 5-7. Dr. Gershwin has published more than 900 papers, 162 book chapters, and 69 books/monographs. *See id.* at 8-12, 13-91, 92-106.

2. Expert Reports and Testimony

Dr. Gershwin opined that Petitioner was correctly diagnosed with PMR. He stated that PMR has a prevalence of approximately 1 out of every 133 individuals over the age of 50. First Gershwin Rep. at 2. The incidence of PMR increases with age and peaks between the ages of 70 and 80. *Id.* Dr. Gershwin stated that PMR is diagnosed in a clinical setting. *Id.* A diagnosis requires patients to be over 50 years of age, and present with "bilateral aching and stiffness of a month or more involving two or more areas of the body, most typically the neck, the shoulders, proximal regions of the arms, hips and proximal areas of the thighs." *Id.* He stated that an ESR of greater than 40 mm/hour is typical, and that the diagnosis requires the exclusion of other conditions that could explain the signs and symptoms. *Id.*

Dr. Gershwin conceded that "[t]he mechanism of polymyalgia rheumatica still remains enigmatic." First Gershwin Rep. at 2. He stated that PMR is an inflammatory disease and noted that levels of the cytokine interleukin 6 ("IL-6") are frequently elevated. *Id.* Dr. Gershwin opined that PMR is closely related to temporal arteritis. *Id.* He opined that "Mr. Thompson's onset with[in] 2-3 days would be consistent with a cytokine driven process by his innate or first responder immune cells." *Id.*

Dr. Gershwin stated that there have been case reports describing either temporal arteritis or PMR after vaccination. First Gershwin Rep. at 2. He further noted that PMR is "considered [to be] a vasculitis-related event but is not considered a classic vasculitis." *Id.* at 2-3. Dr. Gershwin opined that there is an enhanced pro-inflammatory response in PMR that is driven by antigens and depends on the genetic susceptibility of the host. First Gershwin Rep. at 3.

Dr. Gershwin noted that "[c]lassic epidemiologic studies of influenza vaccine do not have sufficient power to detect an increase in PMR in the specific age group herein." First Gershwin Rep. at 3. He additionally added that the body's immune response to the flu vaccine decreases with age. *Id.* He further stated that as a result, it is likely that some vaccinated elderly people likely "would become 'invisible' in such epidemiologic responses because of a lack of response and/or reduction of response." *Id.*

Dr. Gershwin stated that because PMR is an age-related disease, any discussion concerning PMR must consider that aging is associated with "both qualitative and quantitative changes in immunity, often called immunosenescence." First Gershwin Rep. at 3. Dr. Gershwin stated that there is a large genetic variation in immune response. *Id.* This makes it difficult to describe or define how aging leads to a disease like PMR. *Id.*

Dr. Gershwin noted the general belief that PMR is induced, in part, by cytokines, IL-6 in particular. First Gershwin Rep, at 4. IL-6 is produced by both the innate and the adaptive immune systems. *Id.* Dr. Gershwin stated that in the innate response, IL-6 is produced "almost immediately" and will reach its peak five to seven days after vaccination. *Id.* He further stated that "[i]f it is part of the adaptive immune response, then IL-6 will be produced in a period beginning within days of challenge." *Id.* During trial, Dr. Gershwin conceded that it is not clear whether IL-6 causes PMR, but he testified that some patients with PMR have elevated IL-6. Tr. at 64-65.

Dr. Gershwin cited Ex. 23 for the proposition that vaccination, in particular the flu vaccine, can precipitate PMR. First Gershwin Rep, at 4; *citing* Patrizia Felicetti et al., *Spontaneous reports of vasculitis as an adverse event following immunization: A descriptive analysis across three international databases*, 34 VACCINE 6634-40 (2016) (filed as Ex. 23 and Ex. 44) (hereinafter "Felicetti"). He cited Ex. 16 as evidence demonstrating that the flu vaccine can cause a relapse of PMR. First Gershwin Rep, at 4 (*citing* Margaret F. Bassendine & Simon H. Bridge, *Relapse of polymyalgia rheumatica following adjuvanted influenza vaccine: A case-based review*, 7(1) EUR. J. RHEUMATOLOGY 37-40 (2020) (filed as Ex. 24 and Ex. 45) (hereinafter "Bassendine & Bridge")).

Dr. Gershwin also referenced a study of 58 patients with PMR. Second Gershwin Rep. at 2. The authors of this study noted that 26% of their patients had a connection with an environmental trigger, including six who had recently received a vaccine. *Id.* (citing Paolo Falsetti et al., *Polymyalgia rheumatica following infective triggers or vaccinations: a different subset of disease?*, 58 REUMATOLOGIA 76-80 (2020) (filed as Ex. 38) (hereinafter "Falsetti")).

Dr. Gershwin conceded that he could not find any reports on Prevnar-13 vaccine and PMR. First Gershwin Rep. at 4. Tr. at 95. He stated that "[e]pidemiologic studies to specifically address PMR and Prevnar would have to include a sufficient number of subjects in Mr. Thompson's age group and have sufficient power to address rare events." First Gershwin Rep. at 4-5.

Dr. Gershwin articulated his *Althen* prong one theory of the case as follows: "Mr. Thompson has a genetic predisposition to a proinflammatory state … he had cytokines produced following the Prevnar vaccination, which in his case, as part of getting older, an immunosenescene led to some degree of dysregulation, change in homeostasis that initiated the continued inflammatory response that occurred." Tr. at 110. With respect to *Althen* prong two, Dr. Gershwin noted that "[h]owever, it was the abnormal innate immune response that targeted its articular tissue and muscles that was unique to Mr. Thompson." First Gershwin Rep. at 5. Finally, with respect to *Althen* prong three, Dr. Gershwin opined that "Mr. Thompson had no symptoms before the vaccination. The kinetics of appearance of his complaints are consistent with a normal timing of an immune response following a vaccination." *Id.*

In his second expert report, Dr. Gershwin noted several areas of disagreement with Dr. Matloubian. Second Gershwin Rep. at 1-2. Specifically he differed with Dr. Matloubian about his perceived need for "high quality studies" to link vaccination to vasculitis or PMR. *Id.* at 1. Dr. Gershwin also opined that Dr. Matloubian "does not take into account the age-dependent dysregulation of innate immunity." *Id.* at 2. Dr. Gershwin opined that "The thesis that vaccination is but one of a multitude of environmental agents that individually or collectively can induce autoimmunity is a well accepted." *Id.* He concluded his report by reiterating his conclusion that Petitioner's PMR was caused by his vaccination. *Id.* at 3.

B. Dr. Mehrdad Matloubian, M.D., Ph.D.

1. Qualifications

Dr. Matloubian is a physician and Professor of Medicine in the division of rheumatology at

the University of California, San Francisco. Ex. B at 1 (hereinafter "Matloubian CV"). He has been on faculty at UCSF for approximately 20 years. Matloubian CV at 2. Dr. Matloubian is a board-certified and practicing rheumatologist. *Id.*

Dr. Matloubian also has a Ph.D. in virology/immunology and has been engaged in research in this area for more than twenty years. First Matloubian Rep. at 1. His areas of expertise include T and B cell responses, especially to viruses as well as factors that regulate lymphocyte circulation and trafficking. *Id.* Throughout most of his research career, he has focused on innate and adaptive immune responses, including those of T and B cells, to acute and chronic viral infections. *Id.* Dr. Matloubian has published peer-reviewed articles in both areas. *Id.*

Dr. Matloubian actively evaluates and treats patients with complex autoimmune diseases at a tertiary referral center and has a great interest in mechanisms of autoimmunity. Matloubian CV at 2. Tr. at 119-20. Over the last five years, he has seen approximately 30 patients with PMR. *Id.* at 121. He stated that this is a relatively low number because many PCPs can diagnose and treat this condition. *Id.*

2. Expert Reports and Testimony

Dr. Matloubian described PMR as "an inflammatory disease of unknown etiology that is characterized by aching and morning stiffness in the shoulders, hip girdle, and the neck." First Matloubian Rep. at 3; *see also*, Tr. at 126. He noted that the prevalence of PMR can be as high as one case for every 133 people over the age of fifty years. *Id.* He described the disease as "quite common." Tr. at 127. Dr. Matloubian stated that onset of PMR can be either gradual or abrupt. First Matloubian Rep. at 3. In his experience, people generally attribute PMR to a recent activity they have performed, however, "no trigger for this disease has been identified." *Id.* Dr. Matloubian testified that he has treated one patient who attributed the abrupt onset of her PMR to working in the garden the day prior; another patient thought his car accident from three months prior had caused his condition; while a third described hiking in Vancouver and thought the straps on his backpack were too tight. Tr. at 134.

PMR is believed to be a disease of the joints, because MRI images of PMR patients have shown bursitis or synovitis; many patients also show signs of arthritis on physical exam. First Matloubian Rep. at 3. Dr. Matloubian classified PMR as a systemic inflammatory disease, and noted that it is accompanied by elevated inflammatory markers (ESR and/or CRP). *Id.* PMR is diagnosed clinically after other potential diseases have been ruled out. *Id.* Dr. Matloubian opined that Petitioner's diagnosis of PMR was "quite reasonable in this case and fits with his symptoms and excellent response to prednisone and eventual remission of his disease." *Id.* at 4.

Dr. Matloubian opined that very little is known about the pathogenesis of PMR. First Matloubian Rep. at 4. He stated that "the sequence of events that leads to development of inflammation and secretion of inflammatory cytokines, such as IL-6, is not known." *Id.* He further stated that the "absence of autoantibodies in PMR to a specific component of the musculoskeletal system suggests that this disease may not be antigen-specific, and most likely not induced through processes such as molecular mimicry." *Id.* The fact that PMR responds so well and so quickly to

prednisone also supports the fact that PMR may not be an antigen specific disease resulting in persistent inflammation. *Id.*

PMR is believed to be caused by a combination of genetic and environmental factors. First Matloubian Rep. at 4. The available genetic studies show that development of PMR may be associated with HLA-DRB1 alleles, similar to rheumatoid arthritis (RA). *Id.* Dr. Matloubian emphasized that "the environmental factors, if any, that contribute to development of PMR are not known." *Id.* (emphasis in original). Dr. Matloubian highlighted that none of the medical literature cited by Dr. Gershwin "specifically addresses the genetic or environmental contributions, if any to PMR." Second Matloubian Rep. at 1. Although studies have considered whether a specific pathogen causes PMR, no infectious trigger has been identified. First Matloubian Rep. at 4.

Because PMR is almost exclusively seen in people over 50, scientists have questioned whether age-related immune changes play a role in the pathogenesis of the disease. First Matloubian Rep. at 4. Dr. Matloubian noted that changes to our immune systems that occur as the result of aging result in a lower immune response to vaccination, as opposed to the heightened one contemplated by Dr. Gershwin's theory. Second Matloubian Rep. at 4.

Dr. Matloubian opined that although PMR can present abruptly, causing some to question an external trigger, "more likely [disease symptoms] were due to slow and previously imperceptible changes in our homeostasis." First Matloubian Rep. at 4.

Dr. Matloubian described that "developing PMR and getting vaccinated are both common occurrences in the elderly population, making it likely that they could be temporally associated through coincidence alone." Second Matloubian Rep. at 3. Dr. Matloubian estimated that approximately 100,000 people were vaccinated with Prevnar-13 in 2015. *Id.* Based on the incidence of PMR in the elderly population, he estimated that ten people would have developed PMR after vaccination through coincidence alone. *Id.*

Dr. Matloubian noted that there is a difference between developing an autoimmune disease and being diagnosed with one. First Matloubian Rep. at 5. He opined that "[a]utoimmune diseases in general do not occur overnight but instead, are years in the making and are only diagnosed when they become clinically apparent." *Id.* He noted examples of rheumatoid arthritis and type I diabetes, which involve actions by the immune system that occur over the course of years before clinical disease onset. *Id.*

Dr. Matloubian described Dr. Gershwin's theory that the Prevnar-13 vaccination caused Petitioner's PMR as speculative and unreliable. First Matloubian Rep. at 6. Dr. Matloubian summarized Dr. Gershwin's theory as follows: "PMR is an inflammatory disease and since vaccines can cause inflammation, … the Prevnar 13 vaccine led to petitioner's PMR" via activation of the immune system. *Id.*

Dr. Matloubian stated that Dr. Gershwin's inability to point to an infectious trigger for PMR is important. First Matloubian Rep. at 6. He testified that PMR is not considered to be a post-infectious autoimmune disease. Tr. at 140. While vaccines stimulate the immune system, infections do as well, and do so to a greater extent than vaccines. First Matloubian Rep. at 6. "Yet,

there are no infectious agents established as triggers of PMR and this disease itself, is not considered a postinfectious disease." *Id.*

Dr. Matloubian discussed the articles filed by Dr. Gershwin. He noted that these articles are case reports which rely on a temporal association between both PMR and giant cell arteritis ("GCA") and vaccines. First Matloubian Rep. at 6. Dr. Matloubian noted that 1) Petitioner did not have GCA, and 2) that the majority of these case reports involved the flu vaccine, which Petitioner did not receive. *Id.*

Dr. Matloubian specifically discussed Ex. 38, a study of 58 PMR patients who presented to a rheumatology clinic between 2003 and 2017. Second Matloubian Rep. at 2 (citing Falsetti). Of these 58 patients with PMR, 15 patients (26%) "described a connection with environmental agents: six PMR patients received vaccination, 4 reported a respiratory tract infection, 5 reported seasonal influenza before the onset of the disease." Second Matloubian Rep. at 2, (quoting Falsetti). Dr. Matloubian stated that the authors of this study did not disclose the interval time between the environmental trigger and PMR onset, further reducing the persuasive value of the article. Second Matloubian Rep. at 2. Further, the six cases involving vaccines discussed in this article included four with flu vaccine and two with tetanus toxoid. *Id.* He further noted that the authors favored a mechanism involving the vaccine adjuvant as a trigger for PMR. Dr. Matloubian stated that autoimmune syndrome induced by adjuvants or the "ASIA" theory has been largely discredited. *Id.*

Dr. Matloubian discussed the role of IL-6 in Petitioner's theory. He stated that Dr. Gershwin's theory is that PMR is an inflammatory disease characterized as having high levels of IL-6, an inflammatory cytokine. First Matloubian Rep. at 7. Petitioner's Prevnar-13 vaccine led to the production of IL-6 and caused Petitioner's PMR. *Id.* Dr. Matloubian described this theory as vague and speculative. *Id.* He noted that IL-6, along with other inflammatory cytokines, are produced after many infections. *Id.* He also stated that IL-6 levels are elevated in a number of autoimmune diseases. *Id.* Dr. Matloubian then opined as follows:

> There is no evidence that the primary cause or trigger of these diseases is an elevation of IL-6. There is also no evidence that an increase in IL-6 levels by itself is sufficient to initiate the disease. More likely, whatever the underlying mechanism is that leads to the development of these autoimmune diseases, results in elevation of IL-6, which in turn contributes to the inflammatory process. Therefore, IL-6 seems to be a major end result of many disease processes that cause inflammation, not the triggering cause of those conditions.

Id. He noted that if Dr. Gershwin's theory were correct, experts would not recommend vaccination for people with autoimmune diseases. *Id.* Dr. Matloubian then discussed a 2019 article which concluded that "[i]nfluenza vaccination did not influence activity of the underlying AIIRD [autoimmune inflammatory rheumatic diseases]…" *Id.;* citing Christien Rondaan et al., *Efficacy, immunogenicity and safety of vaccination in adult patients with autoimmune inflammatory rheumatic diseases: a systematic literature review for the 2019 update of EULAR recommendations*, *RMD Open* 5, e001035 (2019) (filed as Ex. A-10).

In discussing Dr. Gershwin's reference to case reports describing a temporal association between vaccination and vasculitis, Dr. Matloubian noted that databases such as VAERS are "fraught with reporting bias and many unknowns." First Matloubian Rep. at 8. He further noted that an article by Bonetto, et al., found no causal association between vaccination and vasculitis. *Id.* (citing Caterina Bonetto et al., *Vasculitis as an adverse event following immunization – Systematic literature review,* 34 VACCINE 6641-51 (2016) (filed as Ex. A-12)). Finally, Dr. Matloubian explained that "only a minority of patients with PMR have vasculitis." Second Matloubian Rep. at 4. He noted that PMR can occur with GCA or without GCA (as was the case with Petitioner). *Id.* Dr. Matloubian stated that 69-86% of PMR patients do not have either clinical or subclinical GCA. *Id.* He noted that "[t]his is the major reason why the International Chapel Hill Consensus Conference on the Nomenclature of Systemic Vasculitides has NOT classified PMR as a vasculitis." *Id.*

With respect to the timing, Dr. Matloubian opined that Petitioner's abrupt onset of PMR is consistent with the disease's typical presentation. First Matloubian Rep. at 9. He further stated that "[t]he timing fits with the kinetics of cytokine production after an immunization or infection." *Id.* He added the caveat that elevated levels of IL-6 as a trigger for PMR is a speculative theory that does not find support in the medical literature. *Id.* He opined that, more likely than not, Petitioner's Prevnar-13 vaccination did not cause him to develop PMR. First Matloubian Rep. at 10; Second Matloubian Rep. at 3; Tr. at 139.

VI. Applicable Law

A. Petitioner's Burden in Vaccine Program Cases

Under the Vaccine Act, when a petitioner suffers an alleged injury that is not listed in the Vaccine Injury Table, a petitioner may demonstrate that she suffered an "off-Table" injury. § 11(c)(1)(C)(ii).

In attempting to establish entitlement to a Vaccine Program award of compensation for an off-Table claim, a petitioner must satisfy all three of the elements established by the Federal Circuit in *Althen v. Sec'y of Health & Hum. Servs.*, 418 F.3d 1274 (Fed. Cir. 2005). *Althen* requires that petitioner establish by preponderant evidence that the vaccination she received caused her injury "by providing: (1) a medical theory causally connecting the vaccination and the injury; (2) a logical sequence of cause and effect showing that the vaccination was the reason for the injury; and (3) a showing of a proximate temporal relationship between vaccination and injury." *Id.* at 1278.

Under the first prong of *Althen*, petitioners must provide a "reputable medical theory," demonstrating that the vaccine received *can cause* the type of injury alleged. *Pafford*, 451 F.3d at 1355-56 (citations omitted). To satisfy this prong, a petitioner's theory must be based on a "sound and reliable medical or scientific explanation." *Knudsen v. Sec'y of Health & Hum. Servs*., 35 F.3d 543, 548 (Fed. Cir. 1994). Proof that the proffered medical theory is reasonable, plausible, or possible does not satisfy a petitioner's burden. *Boatmon v. Sec'y of Health & Hum. Servs*., 941 F.3d 1351, 1359-60 (Fed. Cir. 2019).

Petitioners may satisfy the first *Althen* prong without resort to medical literature, epidemiological studies, demonstration of a specific mechanism, or a generally accepted medical theory. *Andreu v. Sec'y of Health & Hum. Servs.*, 569 F.3d 1367, 1378-79 (Fed. Cir. 2009) (citing *Capizzano*, 440 F.3d at 1325-26). However, special masters are "entitled to require some indicia of reliability to support the assertion of the expert witness." *Boatmon*, 941 F.3d at 1360 (*quoting Moberly v. Sec'y of Health & Hum. Servs.*, 592 F.3d 1315, 1324 (Fed. Cir. 2010)). Special Masters, despite their expertise, are not empowered by statute to conclusively resolve what are complex scientific and medical questions, and thus scientific evidence offered to establish *Althen* prong one is viewed "not through the lens of the laboratorian, but instead from the vantage point of the Vaccine Act's preponderant evidence standard." *Id.* at 1380. Accordingly, special masters must take care not to increase the burden placed on petitioners in offering a scientific theory linking vaccine to injury. *Contreras v. Sec'y of Health & Hum. Servs*., 121 Fed. Cl. 230, 245 (2015), *vacated on other grounds*, 844 F.3d 1363 (Fed. Cir. 2017); *see also Hock v. Sec'y of Health & Hum. Servs*., No. 17-168V, 2020 U.S. Claims LEXIS 2202 at *52 (Fed. Cl. Spec. Mstr. Sept. 30, 2020).

The second *Althen* prong requires proof of a logical sequence of cause and effect, usually supported by facts derived from a petitioner's medical records. *Althen*, 418 F.3d at 1278; *Andreu*, 569 F.3d at 1375-77; *Capizzano*, 440 F.3d at 1326 ("medical records and medical opinion testimony are favored in vaccine cases, as 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'") (quoting *Althen*, 418 F.3d at 1280). Medical records are generally viewed as particularly trustworthy evidence, since they are created contemporaneously with the treatment of the patient. *Cucuras v. Sec'y of Health & Hum. Servs.*, 993 F.2d 1525, 1528 (Fed. Cir. 1993).

However, medical records and/or statements of a treating physician's views do not *per se* bind the special master to adopt the conclusions of such an individual, even if they must be considered and carefully evaluated. Section 13(b)(1) (providing that "[a]ny such diagnosis, conclusion, judgment, test result, report, or summary shall not be binding on the special master or court"). As with expert testimony offered to establish a theory of causation, the opinions or diagnoses of treating physicians are only as trustworthy as the reasonableness of their suppositions or bases. The views of treating physicians should also be weighed against other, contrary evidence also present in the record. *Hibbard v. Sec'y of Health & Hum. Servs*., 100 Fed. Cl. 742, 749 (2011), *aff'd*, 698 F.3d 1355 (Fed. Cir. 2012); *Caves v. Sec'y of Health & Hum. Servs*., No. 06-522V, 2011 WL 1935813, at *17 (Fed. Cl. Spec. Mstr. Apr. 29, 2011), *mot. for review den'd*, 100 Fed. Cl. 344, 356 (2011), *aff'd without opinion*, 475 Fed. App'x 765 (Fed. Cir. 2012).

The third *Althen* prong requires establishing a "proximate temporal relationship" between the vaccination and the injury alleged. *Althen*, 418 F.3d at 1281. That term has been equated to the phrase "medically-acceptable temporal relationship." *Id.* A petitioner must offer "preponderant proof that the onset of symptoms occurred within a timeframe which, given the medical understanding of the disorder's etiology, it is medically acceptable to infer causation." *de Bazan v. Sec'y of Health & Hum. Servs*., 539 F.3d 1347, 1352 (Fed. Cir. 2008). The explanation for what is a medically acceptable timeframe must also coincide with the theory of how the relevant vaccine can cause an injury (*Althen* prong one's requirement). *Id.* at 1352; *Shapiro v. Sec'y of Health & Hum. Servs*., 101 Fed. Cl. 532, 542 (2011), *recons. den'd after remand*, 105 Fed. Cl. 353 (2012),

aff'd mem., 503 F. App'x 952 (Fed. Cir. 2013); *Koehn v. Sec'y of Health & Hum. Servs*., No. 11-355V, 2013 WL 3214877 (Fed. Cl. Spec. Mstr. May 30, 2013), *mot. for review den'd* (Fed. Cl. Dec. 3, 2013), *aff'd*, 773 F.3d 1239 (Fed. Cir. 2014).

B. Law Governing Analysis of Fact Evidence

The process for making factual determinations in Vaccine Program cases begins with analyzing the medical records, which are required to be filed with the petition. Section 11(c)(2). The special master is required to consider "all [] relevant medical and scientific evidence contained in the record," including "any diagnosis, conclusion, medical judgment, or autopsy or coroner's report which is contained in the record regarding the nature, causation, and aggravation of the petitioner's illness, disability, injury, condition, or death," as well as the "results of any diagnostic or evaluative test which are contained in the record and the summaries and conclusions." Section 13(b)(1)(A). The special master is then required to weigh the evidence presented, including contemporaneous medical records and testimony. *See Burns v. Sec'y of Health & Hum. Servs*., 3 F.3d 413, 417 (Fed. Cir. 1993) (it is within the special master's discretion to determine whether to afford greater weight to contemporaneous medical records than to other evidence, such as oral testimony surrounding the events in question that was given at a later date, provided that such determination is evidenced by a rational determination).

Medical records created contemporaneously with the events they describe are generally trustworthy because they "contain information supplied to or by health professionals to facilitate diagnosis and treatment of medical conditions," where "accuracy has an extra premium." *Kirby v. Sec'y of Health & Hum. Servs.*, 997 F.3d 1378 (Fed. Cir. 2021) citing *Cucuras*, 993 F.2d at 1528. This presumption is based on the linked proposition that (i) sick people visit medical professionals; (ii) sick people honestly report their health problems to those professionals; and (iii) medical professionals record what they are told or observe when examining their patients in as accurate a manner as possible, so that they are aware of enough relevant facts to make appropriate treatment decisions. *Sanchez v. Sec'y of Health & Hum. Servs.*, No. 11-685V, 2013 WL 1880825 at *2 (Fed. Cl. Spec. Mstr. Apr. 10, 2013), *claim den*., 2020 WL 5641872 (Fed. Cl. Spec. Mstr. Aug. 26, 2020), *rev. den.*, 152 Fed. Cl. 782 (2021), *rev'd and remanded*, 34 F.4th 1350 (Fed. Cir. 2022).

Accordingly, if the medical records are clear, consistent, and complete, then they should be afforded substantial weight. *Lowrie v. Sec'y of Health & Hum. Servs.*, No. 03-1585V, 2005 WL 6117475 at *20 (Fed. Cl. Spec. Mstr. Dec. 12, 2005). Indeed, contemporaneous medical records are generally found to be deserving of greater evidentiary weight than oral testimony -- especially where such testimony conflicts with the record evidence. *Cucuras*, 993 F.2d at 1528; see also *Murphy v. Sec'y of Health & Hum. Servs.*, 23 Cl. Ct. 726, 733 (1991), *aff'd per curiam*, 968 F.2d 1226 (Fed. Cir. 1992), *cert. den'd*, *Murphy v. Sullivan*, 506 U.S. 974 (1992) (citing *United States v. U.S. Gypsum Co.*, 333 U.S. 364, 396 (1947) ("[i]t has generally been held that oral testimony which is in conflict with contemporaneous documents is entitled to little evidentiary weight.")).

However, there are situations in which compelling oral testimony may be more persuasive than written records, such as where records are deemed to be incomplete or inaccurate. *Campbell v. Sec'y of Health & Hum. Servs.*, 69 Fed. Cl. 775, 779 (2006) ("like any norm based upon common sense and experience, this rule should not be treated as an absolute and must yield where the factual

predicates for its application are weak or lacking"); *Lowrie*, 2005 WL 6117475 at *19 ("[w]ritten records which are, themselves, inconsistent, should be accorded less deference than those which are internally consistent") (quoting *Murphy*, 23 Cl. Ct. at 733)). Ultimately, a determination regarding a witness's credibility is needed when determining the weight that such testimony should be afforded. *Andreu*, 569 F.3d at 1379; *Bradley v. Sec'y of Health & Hum. Servs.*, 991 F.2d 1570, 1575 (Fed. Cir. 1993).

When witness testimony is offered to overcome the presumption of accuracy afforded to contemporaneous medical records, such testimony must be "consistent, clear, cogent and compelling." *Sanchez*, 2013 WL 1880825 at *3 (citing *Blutstein v. Sec'y of Health & Hum. Servs.*, No. 90-2808V, 1998 WL 408611 at *5 (Fed. Cl. Spec. Mstr. June 30, 1998)). In determining the accuracy and completeness of medical records, the Court of Federal Claims has listed four possible explanations for inconsistencies between contemporaneously created medical records and later testimony: (1) a person's failure to recount to the medical professional everything that happened during the relevant time period; (2) the medical professional's failure to document everything reported to her or him; (3) a person's faulty recollection of the events when presenting testimony; or (4) a person's purposeful recounting of symptoms that did not exist. *LaLonde v. Sec'y of Health & Hum. Servs.*, 110 Fed. Cl. 184, 203-04 (2013), aff'd, 746 F.3d 1334 (Fed. Cir. 2014). In making a determination regarding whether to afford greater weight to contemporaneous medical records or other evidence, such as testimony at hearing, there must be evidence that this decision was the result of a rational determination. *Burns*, 3 F.3d at 417.

C. Analysis of Expert Testimony

Establishing a sound and reliable medical theory connecting the vaccine to the injury often requires a petitioner to present expert testimony in support of her claim. *Lampe v. Sec'y of Health & Hum. Servs.*, 219 F.3d 1357, 1361 (Fed. Cir. 2000). Vaccine Program expert testimony is usually evaluated according to the factors for analyzing scientific reliability set forth in *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579, 594-96 (1993). *See Cedillo v. Sec'y of Health & Hum. Servs.*, 617 F.3d 1328, 1339 (Fed. Cir. 2010) (*citing Terran v. Sec'y of Health & Hum. Servs.*, 195 F.3d 1302, 1316 (Fed. Cir. 1999). "The *Daubert* factors for analyzing the reliability of testimony are: (1) whether a theory or technique can be (and has been) tested; (2) whether the theory or technique has been subjected to peer review and publication; (3) whether there is a known or potential rate of error and whether there are standards for controlling the error; and (4) whether the theory or technique enjoys general acceptance within a relevant scientific community." *Terran*, 195 F.3d at 1316 n.2 (citing *Daubert*, 509 U.S. at 592-95).

The *Daubert* factors play a slightly different role in Vaccine Program cases than they do when applied in other federal judicial fora. *Daubert* factors are employed by judges to exclude evidence that is unreliable and potentially confusing to a jury. In Vaccine Program cases, these factors are used in the weighing of the reliability of scientific evidence. *Davis v. Sec'y of Health & Hum. Servs.*, 94 Fed. Cl. 53, 66-67 (2010) ("uniquely in this Circuit, the *Daubert* factors have been employed also as an acceptable evidentiary-gauging tool with respect to persuasiveness of expert testimony already admitted").

Respondent frequently offers one or more experts of his own in order to rebut a petitioner's case. Where both sides offer expert testimony, a special master's decision may be "based on the credibility of the experts and the relative persuasiveness of their competing theories." *Broekelschen v. Sec'y of Health & Hum. Servs.*, 618 F.3d 1339, 1347 (Fed. Cir. 2010) (citing *Lampe*, 219 F.3d at 1362). However, nothing requires the acceptance of an expert's conclusion "connected to existing data only by the *ipse dixit* of the expert," especially if "there is simply too great an analytical gap between the data and the opinion proffered." *Snyder*, 88 Fed. Cl. at 743 (quoting *Gen. Elec. Co. v. Joiner*, 522 U.S. 136, 146 (1997)). A "special master is entitled to require some indicia of reliability to support the assertion of the expert witness." *Moberly*, 592 F.3d at 1324. Weighing the relative persuasiveness of competing expert testimony, based on a particular expert's credibility, is part of the overall reliability analysis to which special masters must subject expert testimony in Vaccine Program cases. *Id.* at 1325-26 ("[a]ssessments as to the reliability of expert testimony often turn on credibility determinations").

D. Consideration of Medical Literature

Although this decision discusses some but not all of the medical literature in detail, I reviewed and considered all of the medical records and literature submitted in this matter. *See Moriarty v. Sec'y of Health & Hum. Servs.*, 844 F.3d 1322, 1328 (Fed. Cir. 2016) ("We generally presume that a special master considered the relevant record evidence even though [s]he does not explicitly reference such evidence in h[er] decision."); *Simanski v. Sec'y of Health & Hum. Servs.*, 115 Fed. Cl. 407, 436 (2014) ("[A] Special Master is 'not required to discuss every piece of evidence or testimony in her decision.'" (citation omitted)), *aff'd*, 601 F. App'x 982 (Fed. Cir. 2015).

VII. Analysis

Because Petitioner does not allege an injury listed on the Vaccine Injury Table, his claim is classified as "off-Table." As noted above, to prevail on an "off-Table" claim, Petitioner must prove by preponderant evidence that he suffered an injury and that this injury was caused by the vaccination at issue. *See Capizzano*, 440 F.3d at 1320.

A. Petitioner Has Not Carried His Burden of Proof

1. *Althen* Prong One

In the context of the Program, "to establish causation, the standard of proof is preponderance of evidence, not scientific certainty." *Langland v. Sec'y of Health & Hum. Serv.*, 109 Fed. Cl. 421, 441 (2013). Petitioner's burden under *Althen*'s first prong is to provide a medical theory causally connecting the vaccination and the injury. *Id.* This theory must be sound and reliable. *Boatmon*, 941 F.3d at 1359.

Dr. Gershwin articulated Petitioner's prong one theory as follows: the Prevnar-13 vaccination caused cytokine production which, due to Petitioner's aging, "led to some degree of dysregulation, change in homeostasis that initiated the continued inflammatory responses that occurred." Tr. at 110. This theory is both vague and unsupported. Although it is well established

that vaccination leads to the short-lived production of cytokines, Petitioner has not presented persuasive evidence that the upregulation of cytokines causes a persistent autoimmune disorder.

I note that I and other special masters have found that general cytokine-based theories of causation are not persuasive. *Castaneda v. Sec'y of Health & Hum. Servs.*, No. 15-1066V, 2020 WL 3833076, at *23 (Fed. Cl. Spec. Mstr. May 18, 2020) (finding that although cytokine production is a normal vaccine reaction, "there is no indication in the record regarding the level of production necessary to lead to an inflammatory cascade."), *mot. for rev. denied*, 152 Fed. Cl. 576 (2020); *Zumwalt on behalf of L.Z. v. Sec'y of Health & Hum. Servs*., No. 16-994V, 2019 WL 1953739, at *18 (Fed. Cl. Spec. Mstr. Mar. 21, 2019) (noting that "[t]he fact that vaccines are known to stimulate cytokine production . . . does not amount to a reliable causation theory that such stimulation is necessarily disease-causing"); *Inamdar v. Sec'y of Health & Hum. Servs*., No. 15-1173V, 2019 WL 1160341, at *17 (Fed. Cl. Spec. Mstr. Feb. 8, 2019) (noting that the proposition that vaccines can cause diseases by "induc[ing] the production of proinflammatory cytokines . . . has several deficiencies"); *McCabe v. Sec'y of Health & Hum. Servs*., No. 13-570V, 2018 WL 3029175, at *47-55 (Fed. Cl. Spec. Mstr. May 17, 2018); *Dean v. Sec'y of Health & Human Servs*., No. 13-808V, 2017 WL 2926605, at *16 (Fed. Cl. Spec. Mstr. June 9, 2017) (stating that "[t]he most immediately apparent weakness in this case's causation theory is the heavy lifting it assigns to the post-vaccination cytokine production process as the cause of almost all of the pathologic effects of the vaccines at issue."); *McGuire v. Sec'y of Health & Hum. Servs*., No. 10-609V, 2015 WL 6150598 at *12-18 (Fed. Cl. Spec. Mstr. Sep. 18, 2015) (noting that the petitioner had failed to introduce "persuasive evidence to rebut the IOM's conclusion that no evidence supports a conclusion that cytokines cause a disease").

Petitioner did file medical literature supporting the fact that IL-6 is elevated in the blood of patients with PMR. Docken at 2. However, Dr. Gershwin has not articulated a mechanism by which an increase in IL-6 would lead to pathology. In fact, he acknowledged that whether PMR causes an elevation in IL-6 or whether an elevation in IL-6 causes PMR is an unanswered question. Tr. at 65. Dr. Matloubian opined that "whatever the underlying mechanism is that leads to the development of these autoimmune diseases, [it] results in elevation of IL-6, which in turn contributes to the inflammatory process. Therefore, IL-6 seems to be a major end result of many disease processes that cause inflammation, not the triggering cause of those conditions." First Matloubian Rep. at 7.

Petitioner has not cited to reliable medical or scientific literature associating the Prevnar-13 vaccine with PMR. He acknowledged this point at the entitlement hearing. Tr. at 95. Dr. Gershwin discussed three articles during his direct examination at the entitlement hearing, which are detailed below.[6]

Dr. Gershwin testified about the Soriano paper. This article described ten people who developed GCA and PMR after receipt of a flu vaccine. Soriano at 153. The authors in Soriano appear to endorse the existence of ASIA, autoimmune syndrome induced by adjuvant.[7] Soriano at 156.

[6] Although I have elected to discuss the articles Dr. Gershwin highlighted in his entitlement hearing testimony, I have considered all of the medical literature filed by both sides.

Dr. Gershwin also testified about adverse event reports of spontaneous vasculitis following immunizations across three international databases. Felicetti describes that vasculitides (which they define as "a heterogeneous group of disorders characterized by inflammation of blood vessels leading to tissue or end-organ injury") have been reported as an adverse event following vaccination, with more frequent reports in association with influenza vaccines than with any other vaccine. However, these reports are drawn from passive surveillance systems like VAERS, which rely on individuals to enter information about their condition. The authors acknowledge these limitations in their article.

> The events of vasculitis were analyzed as available in the databases without further adjudication; no exclusion criteria were adopted. Causality assessments were beyond the scope of this work. Neither the data sources nor the merely descriptive analyses allow for any inference on a causal relationship for any vaccine-event pair.

Felicetti at 6635.

Dr. Gershwin discussed the Bassendine and Bridge article. This article described one case of a PMR flare post flu vaccine. Bassendine & Bridge at 37. Bassendine & Bridge note that "[t]he adverse event (AE) could be interpreted as the newly described autoimmune/inflammatory syndrome induced by adjuvants (ASIA syndrome) as both PMR and ASIA display hyperactive immune responses." *Id.*

These articles do not increase the persuasiveness of Dr. Gershwin's opinion. The Soriano article is a collection of case reports involving a vaccine not received by Mr. Thompson. Bassendine & Bridge similarly discuss one case report involving the flu vaccine. While Felicetti does include some cases of vasculitis after a variety of vaccines, to include pneumococcal vaccine, the article is still a collection of case reports. While petitioners can present case reports in support of their causal theory, they are not an especially persuasive form of evidence.[8] *See W.C. v. Sec'y of Health & Hum. Servs.*, No. 07-456V, 2011 WL 4537887, at *13 (Fed. Cl. Spec. Mstr. Feb. 22, 2011) ("case reports are generally weak evidence of causation because case reports cannot distinguish a temporal relationship from a causal relationship"), *mot. for review den'd*, 100 Fed. Cl. 440 (2011), *aff'd*, 704 F.3d 1352 (Fed. Cir. 2013); *Caves v. Sec'y of Health & Hum. Servs.*, No. 07-443V, 2010 WL 5557542, at *14 (Fed. Cl. Spec. Mstr. Nov. 29, 2010) ("case reports do[ ] not help [petitioners] meet [their] burden of demonstrating a persuasive and reliable theory

[7] Although Dr. Gershwin does not propose an ASIA theory in this case, the endorsement of ASIA, a theory that has been discredited in the Vaccine Program, reduces the persuasive value of the Soriano paper.

[8] Case reports are not strong evidence in support of causation because they cannot distinguish between events that are temporally proximate and events that are causally related. Dr. Matloubian described that "developing PMR and getting vaccinated are both common occurrences in the elderly population." Second Matloubian Rep. at 3. Dr. Matloubian estimated that approximately 100,000 people were vaccinated with Prevnar 13 in 2015. *Id.* Based on the incidence of PMR in the elderly population, he estimated that ten people would have developed PMR after vaccination through coincidence alone. *Id.* This point highlights the low evidentiary value of the articles discussed by Dr. Gershwin.

causally connecting" vaccine to injury), *mot. for review den'd*, 100 Fed. Cl. 119 (2011), *aff'd*, 463 F. App'x 932 (Fed. Cir. 2012); *Shepperson v. Sec'y of Health & Hum. Servs.*, No. 05-1064V, 2008 WL 2156748, at *11 (Fed. Cl. Spec. Mstr. Apr. 30, 2008) (a single case report is not "sufficiently probative to begin the evidentiary climb to a preponderance"); *Muchnik v. Sec'y of Health & Hum. Servs.*, No. 90-703V, 1991 WL 217673, at *4 (Fed. Cl. Spec. Mstr. Oct. 10, 1991) ("[f]or petitioner to establish causation in fact by a preponderance of the evidence in any given case requires something more than case reports ...."). While Petitioners may satisfy the first *Althen* prong without resort to medical literature, special masters are "entitled to require some indicia of reliability to support the assertion of the expert witness." *Boatmon*, 941 F.3d at 1360, (quoting *Moberly*, 592 F.3d at 1324). Dr. Gershwin's theory, that vaccination resulted in the production of cytokines which caused a change in homeostasis leading to PMR is a vague theory that could seemingly apply to any vaccine and many autoimmune conditions. Case reports (especially those which mainly relate to a different vaccine) do not convert this vague theory to a persuasive one.

The Institute of Medicine ("IOM")[9] Committee on Adverse Effects of Immunization concluded there is "no evidence that directly or indirectly supports the over secretion of cytokines as an operative mechanism" in vaccine related adverse events. Committee to Review Adverse Effects of Vaccines, Institute of Medicine, eds., *Adverse Effects of Vaccines: Evidence and Causality,* Washington (DC): National Academies Press, p. 76 (2012) (Filed as Ex. A-13) (hereinafter "2012 IOM Report"). While not dispositive, the 2012 IOM Report further undercuts Petitioner's already weak prong one theory.

Further confounding to Petitioner's theory is the fact that infection is not known to trigger PMR, a point that Dr. Gershwin has conceded. Tr. at 86. Dr. Matloubian articulated the issue as follows:

> If Dr. Gershwin's hypothesis were true, that vaccination led to immune disturbance in this older individual and that led to development of PMR, then we should see 90 percent of people show up with PMR after an infection because infections are the number one causes of elevation of cytokines and changes in immune homeostasis.

Id. at 148. I agree with Dr. Matloubian's testimony. The fact that PMR is not a post-infectious disease undercuts Petitioner's causal theory.

I additionally note that petitioners in the Vaccine Program have been generally unsuccessful in marshaling preponderant evidence in support of a prong one theory demonstrating that vaccination can cause PMR. *See, e.g., Van Dycke v. Sec'y of Health & Hum. Servs.*, No. 18-106V, 2023 WL 4310701 (Fed. Cl. Spec. Mstr. June 7, 2023) (determining that petitioner failed to articulate a sound and reliable theory linking the Tdap vaccine with PMR and Giant Cell Arteritis); *Giesbrecht v. Sec'y of Health & Hum. Servs.*, No. 16-1338V, 2023 WL 2721578 (Fed. Cl. Spec. Mstr. Mar. 30, 2023) (describing Dr. Gershwin's cytokine-based causation theory as "underwhelming"); *Kelly v. Sec'y of Health & Hum. Servs.*, No. 17-1475V, 2022 WL 17819157 (Fed. Cl. Spec. Mstr. Oct. 12, 2022) (concluding that petitioner did not establish that the flu vaccine

[9] The Institute of Medicine (now called the National Academy of Medicine) is the medical arm of the National Academy of Sciences and provides advice to the federal government on medical issues.

can cause PMR); *C.P. v. Sec'y of Health & Hum. Servs.*, No. 14-917V, 2019 WL 5483621 at *28 (Fed. Cl. Spec. Mstr. Aug. 21, 2019) (finding that petitioner failed to articulate a sound and reliable theory connecting the flu vaccine to PMR and RA); *Suliman v. Sec'y of Health & Hum. Servs.*, No. 13-993V, 2018 WL 6803697 at *28 (Fed. Cl. Spec. Mstr. Nov. 27, 2018) (determining that petitioner did not present preponderant evidence connecting her Tdap vaccine with PMR and myositis). While these decisions are not binding on me, I find the reasoning articulated by my colleagues to be persuasive.

For the reasons articulated above, I find that Petitioner has not presented a sound a reliable theory describing how the Prevnar vaccine can cause PMR.

2. *Althen* Prong Two

Under *Althen's* second prong, a petitioner must "prove a logical sequence of cause and effect showing that the vaccination was the reason for the injury." *Althen*, 418 F.3d at 1278. The sequence of cause and effect must be "'logical' and legally probable, not medically or scientifically certain." *Id.* A petitioner is not required to show "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." *Id.* (omitting internal citations). *Capizzano v. Sec'y of Health & Hum. Servs*., 440 F.3d 1317, 1325 (Fed. Cir. 2006). Instead, circumstantial evidence and reliable medical opinions may be sufficient to satisfy the second *Althen* prong. *Isaac v. Sec'y of Health & Hum. Servs.*, No. 08-601V, 2012 WL 360999. at *24 (Fed. Cl. Spec. Mstr. July 30, 2012), *mot. for rev. denied*, 108 Fed. Cl. 743 (Fed. Cl. 2013).

Dr. Gershwin did not meaningfully address the second *Althen* prong. In his first expert report, he stated the following:

> **Althen criteria #2: A logical sequence of cause and effect showing the vaccination was the reason for the injury:** Following a vaccination, there is migration of the vaccine antigen to regional lymph nodes where it is processed by professional antigen presenting cells. This process includes production of cytokines, recruitment and activation of both antigen specific and antigenic non-specific immune cells. Such cells migrate throughout the body as part of the body's systemic ability to protect itself. Antibodies are produced, such a sequence is normal and part of the vaccination process. It was not different in the case of Mr. Thompson as anyone else. However, it was the abnormal innate immune response that targeted its articular tissue and muscles that was unique to Mr. Thompson.

First Gershwin Rep. at 5. Dr. Gershwin did not mention the "did cause" element of the case in his second expert report or during his testimony at the entitlement hearing.[10] In his post-hearing brief, Petitioner contends that he was in good health prior to the vaccine, and that within three days of vaccination, he developed PMR. Pet'r's Post-Hearing Brief at 7-8.

[10] Although Dr. Gershwin did respond "I do" to the question, "And do you believe you've given a logical sequence of cause and effect that resulted in Mr. Thompson's PMR?", he did not provide meaningful testimony supporting this opinion. Tr. at 79.

In essence, Petitioner contends that he did not have PMR before vaccination, he developed PMR after vaccination, so the Prevnar vaccine *did cause* Petitioner's condition. The Federal Circuit in *Capizzano* noted that "[t]he second prong of the Althen ... test is not without meaning." *Capizzano*, 440 F.3d at 1327. Indeed, in *Althen*, the Court stated: "Although probative, neither a mere showing of a proximate temporal relationship between vaccination and injury, nor a simplistic elimination of other potential causes of the injury suffices, without more, to meet the burden of showing actual causation." *Althen*, 418 F.3d at 1278.

Immunosenescence leading to immune dysregulation is a component of Dr. Gershwin's causation theory. However, Dr. Matloubian persuasively opined that changes to our immune systems that occur as the result of aging result in a lower immune response to vaccination, as opposed to the heightened one contemplated by Dr. Gershwin's theory. Second Matloubian Rep. at 4. This opinion is supported by the dictionary definition of immunosenescence: "decline in immunocompetence with advancing age, characterized by increased susceptibility to infection and tumor formation, decreased response to vaccination, and an increase in autoantibodies and monoclonal immunoglobulins"[11] This point reduces the likelihood that Petitioner's vaccination did cause him to develop PMR.

In weighing evidence, special masters are expected to consider the views of treating doctors. *Capizzano*, 440 F.3d at 1326. The views of treating doctors about the appropriate diagnosis are often persuasive because the doctors have direct experience with the patient whom they are diagnosing. *See McCulloch v. Sec'y of Health & Hum. Servs.*, No. 09-293V, 2015 WL 3640610, at *20 (Fed. Cl. Spec. Mstr. May 22, 2015).

On April 4, 2016, Petitioner visited his PCP, Dr. Ferrell, who noted that he "suspect[s] [Petitioner's] pain is a reaction to this shot." Ex. 2 at 40. Although Dr. Ferrell documented his belief that the Prevnar-13 vaccine caused Petitioner to develop PMR, the Court is not obliged to adopt the same view. *See* 42 U.S.C. §§ 300aa-13(b)(1) (providing that "[a]ny such diagnosis, conclusion, judgment, test result, report, or summary shall not be binding on the special master or court"); *Snyder v. Sec'y of Health & Hum. Servs.*, 88 Fed. Cl. 706, 746 n.67 (Fed. Cl. 2009) ("there is nothing . . . that mandates that the testimony of a treating physician is sacrosanct—that it must be accepted in its entirety and cannot be rebutted"). Dr. Ferrell did not provide a reason for his belief or suggest a causal theory linking the Prevnar-13 vaccine to PMR. While I have considered this statement, I do not find that it preponderantly establishes the second *Althen* prong. *See Caves v. Sec'y of Health & Hum. Servs.*, 100 Fed. Cl. 119, 139 (2011) ("notations in medical records concerning the temporal relationship between a vaccine and an injury, without any express discussion of causation, are entitled to little weight.").

Petitioner's proffered evidence is insufficient to preponderantly demonstrate that his Prevnar vaccine "did cause" his condition.

[11] *Immunosenescence*, DORLAND'S, www.dorlandsonline.com/dorland/definition?id=24933&searchterm=immunosenescence (last visited on Dec. 5, 2023).

3. *Althen* Prong Three

The timing prong contains two parts. First, a petitioner must establish the "timeframe for which it is medically acceptable to infer causation" and second, he must demonstrate that the onset of the disease occurred in this period. *Shapiro v. Sec'y of Health & Hum. Servs.,* 101 Fed. Cl. 532, 542-43 (2011), *recons. denied after remand on other grounds*, 105 Fed. Cl. 353 (2012), *aff'd without op.,* 503 F. App'x 952 (Fed. Cir. 2013).

While there is little dispute that Petitioner developed PMR between two and three days after vaccination, this fact standing alone, is insufficient for Petitioner to meet his burden under *Althen* prong three. Because *Althen* prong three coincides with *Althen* prong one, Petitioner's inability to articulate a sound and reliable causal theory effectively precludes him from establishing a medically appropriate temporal interval between vaccination and the onset of disease. Even assuming that Petitioner had satisfied *Althen* prong three, that alone would not meet Petitioner's overall burden of proof. *Veryzer v. Sec'y of Health & Hum. Servs.*, 100 Fed. Cl. 344, 356 (2011) (explaining that a "temporal relationship alone will not demonstrate the requisite causal link and that petitioner must posit a medical theory causally connecting the vaccine and injury.").

For this reason, the agreement by both experts that a cytokine response would take place in two to three days is not sufficient for Petitioner to establish the third *Althen* prong.

VIII. Conclusion

Upon careful evaluation of all the evidence submitted in this matter, including the medical records, the affidavits and testimony, as well as the experts' opinions and medical literature, I conclude that Petitioner has not shown by preponderant evidence that he is entitled to compensation under the Vaccine Act. **His petition is therefore DISMISSED. The clerk shall enter judgment accordingly.**[12]

IT IS SO ORDERED.

s/ Katherine E. Oler
Katherine E. Oler
Special Master

[12] Pursuant to Vaccine Rule 11(a), the parties may expedite entry of judgment by each filing (either jointly or separately) a notice renouncing their right to seek review.