

CORRECTED

In the United States Court of Federal Claims

No. 18-56V

Filed under seal: March 27, 2024

Reissued: April 11, 2024*

FOR PUBLICATION

HAYLEY STRICKER,

Petitioner,

v.

**SECRETARY OF HEALTH AND
HUMAN SERVICES,**

Respondent.

Andrew D. Downing, Downing, Allison & Jorgenson, Phoenix, AZ, for the petitioner.

Nina Ren, Torts Branch, Civil Division, U.S. Department of Justice, Washington, D.C., for the respondent.

MEMORANDUM OPINION AND ORDER

HERTLING, Judge

The petitioner, Hayley Stricker, seeks review of a special master’s decision denying her claim under the National Vaccine Injury Compensation Program, 42 U.S.C. § 300aa *et seq.* The petitioner alleges that the human papillomavirus (“HPV”) vaccine she received on September 29, 2015, caused her to develop systemic lupus erythematosus (“SLE”). The special master denied the petitioner’s entitlement to compensation, and the petitioner seeks review of that decision.

The petitioner argues that the special master mistreated evidence and testimony in five respects. She argues that these decisions constitute legal errors because they elevated her burden of proof. The respondent argues that the petitioner is simply attempting to relitigate factual disputes that are within the discretion of the special master to resolve.

* Pursuant to Vaccine Rule 18(b), the Court initially filed this opinion under seal and afforded the parties 14 days to notify the court of any information that should be redacted from the opinion for reasons of privilege or confidentiality. The parties did not propose any redactions. Accordingly, this opinion is reissued in its original form for public availability.

The petitioner has not identified any legal errors in the special master's decision. The resolution of the claim depended on the special master's assessment of the evidence presented by each party's experts. The special master appropriately considered the evidence and provided a rational basis for his decision, including his resolution of the issues challenged by the petitioner. The petitioner's challenges effectively amount to an invitation to reconsider the weight given to individual pieces of evidence. Such decisions, however, are within the special master's purview. Accordingly, the petitioner's motion for review (ECF 152) is denied.

I. FACTUAL BACKGROUND¹

A. Petitioner's Health Prior to Vaccination

Haley Stricker was born in 1993. Because her mother suffers from multiple sclerosis ("MS"), the petitioner was at a greater potential risk of developing an autoimmune disease, depending on whether she inherited any MS-associated genes. Her risk for SLE would then depend on whether the genes for SLE and MS are associated with one another.² The petitioner's

¹ In her motion for review, the petitioner has not raised any objection to the facts set forth in the special master's entitlement decision, objecting instead to the burden of proof placed upon her and the weight given to the testimony and documentation in evidence. Accordingly, this recitation of the factual background summarizes the special master's recitation of the background facts. The special master's internal citations are omitted. For a full recitation of the facts and procedural history, see *Stricker v. Sec'y of Health & Hum. Servs*, No. 18-56V, 2024 WL 263189, at *1-9 (Fed. Cl. Spec. Mstr. Jan. 2, 2024) ("*Entitlement Decision*").

² MS is "a disease in which there are foci of demyelination throughout the white matter of the central nervous system, sometimes extending into the grey matter; symptoms usually include weakness, incoordination, paresthesias, speech disturbances, and visual complaints. The course of the disease is usually prolonged, so that the term *multiple* also refers to remissions and relapses that occur over a period of many years. Four types are recognized, based on the course of the disease: *relapsing remitting*, *secondary progressive*, *primary progressive*, and *progressive relapsing*. The etiology is unknown." *Dorland's Illustrated Medical Dictionary* 1653 (33rd ed. 2020) (hereinafter *Dorland's*). The record notes a family history of MS within petitioner's family.

SLE is "a chronic, inflammatory, often febrile multisystemic disorder of connective tissue that proceeds through remissions and relapses; it may be either acute or insidious in onset and is characterized principally by involvement of the skin (*cutaneous l. erythematosus*), joints, kidneys, and serosal membranes. The etiology is unknown, but it may be a failure of regulatory mechanisms of the autoimmune system, since there are high levels of numerous autoantibodies against nuclear and cytoplasmic cellular components. The condition is marked by a wide variety of abnormalities, including arthritis, arthralgias, nephritis, central nervous system manifestations, pleurisy, pericarditis, leukopenia or thrombocytopenia, hemolytic anemia, an elevated

health, however, was mostly normal for her first two decades, and she was able to participate in high school sports and yoga without noted issue.

In 2010, the petitioner saw a dermatologist, Dr. Thomas Breza, after developing acne. Dr. Breza prescribed minocycline, a type of tetracycline. Minocycline has been known to cause drug-induced lupus.³ The petitioner took this medication from 2010 until 2015.

In 2015, the petitioner applied to the dental hygienist program at Broward County College. The dental hygienist program required the petitioner to receive an annual physical exam. On July 27, 2015, the petitioner's primary care physician, Dr. Janet Robinson, performed the exam and recorded that the petitioner had a healthy diet, exercised, had no fatigue, had normal skin, and showed no signs of joint swelling. Dr. Robinson ordered routine blood work, which returned normal results. These tests did not include an anti-nuclear antibody test, meaning the results did not indicate whether the petitioner was already suffering from lupus at this point.

On August 11, 2015, Dr. Breza changed the petitioner's prescription for minocycline to 100 mg of doxycycline hyclate, another tetracycline. Ten days after her appointment with Dr. Breza, the petitioner went to a different dermatologist, Dr. Green, for a second opinion. Dr. Green changed the petitioner's prescription to 150mg of Acticlate.⁴

Around the same date as her August 2015 appointment with Dr. Breza, the petitioner also received her first pap smear from her gynecologist, Dr. Bernstein.⁵ The pap smear revealed that

erythrocyte sedimentation rate, and the presence in the blood of distinctive cells called LE cells.” *Dorland's 1066*.

³ The petitioner's expert witness, Dr. Thomas Zizic, “did not challenge the proposition that tetracyclines can cause drug-induced lupus.” *Entitlement Decision*, at *26. The special master found “there is sufficient evidence to conclude that tetracyclines can cause drug-induced lupus.” *Id.* (citing *Watts v. Medicis Pharma. Corp.*, 365 P.3d 944, 947 ¶ 3 (Ariz. 2016)).

As noted by the special master, “[d]rug-induced lupus is not the same as SLE.” *Entitlement Decision*, at *25. Drug-induced lupus is “lupus erythematosus caused by any of various drugs. Hydralazine, procainamide, and minocycline are the most common ones causing systemic lupus, and various other drugs can cause subacute cutaneous lupus. It usually resolves following withdrawal of the offending drug.” *Dorland's 1065*.

⁴ Acticlate appears to be a brand name for doxycycline hyclate. *Acticlate*, RxList (May 25, 2021), <https://www.rxlist.com/acticlate-drug.htm#description>.

⁵ A pap smear or pap test is “an exfoliative cytological staining procedure for detection and diagnosis of various conditions, particularly malignant and premalignant conditions of the female genital tract (cancer of the vagina, cervix, or endometrium). Cells that have been desquamated from the genital epithelium are obtained by smears, fixed and stained, and examined under the

the petitioner was infected with a strain of HPV. When the petitioner first contracted HPV is unknown. Both the petitioner's and the respondent's expert witnesses agreed that "[i]nfections with human papillomaviruses can cause SLE." *Entitlement Decision*, at *2.

B. Vaccination and Post-Vaccination Onset of Symptoms

On September 29, 2015, the petitioner made a return visit to Dr. Bernstein at which she received her first and only dose of the HPV vaccine, Gardasil, to protect her against different strains of HPV. The petitioner received no other vaccines that day. Her claim is based on this vaccine.⁶

The petitioner's symptoms began around November 1, 2015, approximately one month after the petitioner received her Gardasil HPV vaccine. Her symptoms included rashes, fatigue, and pain in her ankles, knees, hands, and lower back. The petitioner's symptoms interfered with her usual activities, including performing the tasks and procedures required in her training to become a dental hygienist. In mid-November 2015, the petitioner began using medical tape to stabilize her wrists so she could perform various techniques in her dental hygiene program. Around Thanksgiving, after searching the internet for possible causes of her symptoms, the petitioner stopped taking her doxycycline medication.

On December 4, 2015, the petitioner visited Dr. Robinson complaining of worsened joint pain and rashes. After examination, Dr. Robinson did not observe any joint swelling but ordered a series of lab tests and assessed the petitioner as having "[a]rthralgia of multiple sites." *Id.* at *4. The petitioner discussed the HPV vaccine as a potential cause for her symptoms with Dr. Robinson. Dr. Robinson's notes from this appointment express doubt that the vaccine could cause the petitioner's symptoms because of the timing of the vaccine administration.

On December 8, 2015, the results of the lab tests revealed that the petitioner had "high levels of globulin, alkaline phosphatase, C-reactive protein, and erythrocyte sedimentation rate." *Id.* Dr. Robinson instructed the petitioner and her mother to bring the results to her dermatologist. Dr. Robinson also referred the petitioner to a rheumatologist.

On December 9, 2015, Dr. Green discontinued the petitioner on Acticlate.

The petitioner saw Dr. Jihan Saba, a rheumatologist, on December 29, 2015. During that appointment, Dr. Saba recorded the petitioner's medical history and observed swelling in various

microscope for evidence of pathologic changes. The test is also used in detection of human papillomavirus infection, evaluation of endocrine function, and diagnosis of malignancies of other organs, such as the breasts or organs of the respiratory tract and lungs, gastrointestinal tract, or urinary tract." *Dorland's* 1866.

⁶ Although the petitioner made an appointment for a second dose of the HPV vaccine, the petitioner's mother canceled the appointment due to a "gut feeling" that the September 29, 2015 dose had caused the petitioner's decline in health. *Entitlement Decision*, at *3.

joints. Dr. Saba diagnosed the petitioner with connective tissue disease. Dr. Saba informed the petitioner and her mother that because the features of this disease frequently change, the diagnosis could change. Dr. Saba also discussed the possibility of drug-induced lupus. Dr. Saba prescribed a low dose of prednisone, which the petitioner discontinued by May 2016. After ordering further lab tests, which returned “some abnormal values,” Dr. Saba prescribed the petitioner hydroxychloroquine and thereafter continued to adjust the petitioner’s medication.⁷ “The medications improved [the petitioner’s] condition.” *Id.* at *5. The petitioner also saw another rheumatologist, Dr. Jennifer Savage, on one occasion, but continued seeing Dr. Saba as her rheumatologist. The special master found that the petitioner has experienced no new symptoms since she began her prescription of hydroxychloroquine.

In December 2018, after a routine annual exam with Dr. Robinson, lab results identified that the petitioner had a double-stranded DNA antibody, which led Dr. Saba to change the petitioner’s diagnosis from connective tissue disease to SLE. According to the petitioner’s expert, rheumatologist Dr. Thomas Zizic, “antibodies against double-stranded DNA are 99 percent specific for lupus.” *Id.* at *6. One of the respondent’s experts, rheumatologist Dr. Carlos Rose, “agreed that the diagnosis was most likely systemic lupus erythematosus . . . [h]owever, Dr. Rose stated that even after the detection of anti-double stranded DNA antibodies, drug-induced lupus remains a potential diagnosis for [the petitioner].” *Id.*

As of the petitioner’s January 2022 testimony, she was taking hydroxychloroquine. Dr. Rose testified this drug may be controlling the petitioner’s condition, but the medication interferes with determining whether her lupus is active. Records from Dr. Saba indicate the petitioner has denied having problems with “joint pain, joint swelling, morning stiffness, rashes, [and] photosensitivity. . . . When these records were pointed out to [the petitioner] on cross-examination, she stated that she is frustrated with Dr. Saba” because she “d[id] not write down information” she conveyed to her. *Id.* The petitioner also testified that “she no longer complains to Dr. Saba about her joint problems.” *Id.* at *27.

In short, the petitioner may have been at a greater risk of developing lupus due to her mother having MS, and she was exposed to “various substances associated with lupus” for years before she received the HPV vaccine on September 29, 2015. *Id.* at *7. She had also contracted HPV more than one year before her vaccination. She began to develop symptoms at issue by November 1, 2015, and was diagnosed with connective tissue disease until her diagnosis was changed to SLE almost three years later.

⁷ Hydroxychloroquine is also referred to by its brand name of Plaquenil by the special master. *Entitlement Decision*, at *5-6; see also *Hydroxychloroquine (Plaquenil)*, American College of Rheumatology (Feb. 2024), <https://rheumatology.org/patients/hydroxychloroquine-plaquenil>.)

II. PROCEDURAL HISTORY AND THE SPECIAL MASTER'S DECISION

In January 2016, the petitioner submitted a form to the Vaccine Adverse Events Reporting System to report her potential adverse reaction to the HPV vaccine. She filed a petition for compensation under the vaccine program on January 11, 2018. The petitioner alleges that the HPV vaccine caused her to develop SLE. The respondent argues that the petitioner suffers from drug-induced lupus or spontaneously occurring SLE, rather than vaccine-induced SLE.

After the petition was filed, the parties submitted affidavits, medical records, expert reports, and medical literature. In support of her petition to the special master, the petitioner submitted letters from Dr. Saba, Dr. Robinson, and Dr. Breza. Additionally, the petitioner submitted two expert reports from Dr. Zizic. The respondent submitted an expert report from Dr. Rose and an expert report from Dr. James Moy, an immunologist.

The special master held an entitlement hearing from January 18 to January 21, 2022. The special master heard testimony from the petitioner, one of her friends, her mother, a teacher from her dental hygienist program, and the parties' three experts.

On January 2, 2024, the special master issued a thorough opinion denying the petitioner's claims. The special master considered whether the petitioner had demonstrated the HPV vaccine caused her to suffer from SLE under the three-prong test established in *Althen v. Secretary of Health and Human Services*, 418 F.3d 1274, 1278 (Fed. Cir. 2005). Under that test, a petitioner must set forth 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." *Id.*

For the first *Althen* prong, the special master reviewed scientific studies and reports submitted by both parties and considered the testimony of the parties' experts about these various reports.

First, the special master considered epidemiologic studies and found that the petitioner had not provided credible epidemiologic studies linking the HPV vaccine to an increased incidence of SLE. *Entitlement Decision*, at *9-17. In reaching that conclusion, the special master analyzed eight epidemiologic studies submitted by the parties and the testimony of the expert witnesses regarding these studies. *Id.* at *10-16. The special master concluded that the reliable controlled studies did not show that the HPV vaccine increased the incidence of SLE. *Id.* at *17. The only studies that supported the petitioner's claim were the *Geier* and *Wang* articles. See David A. Geier & Mark R. Geier, *A case-control study of quadrivalent human papillomavirus vaccine-associated autoimmune adverse events*, 35 Clin. Rheumatol. 1225 (2015); Bin Wang et al., *Vaccinations and risk of systemic lupus erythematosus and rheumatoid arthritis: A systematic review and meta-analysis*, 16 Autoimmun. Rev. 756 (2017). As to these two studies, the special master found that they relied on "suspect" methodology that rendered them unreliable. *Entitlement Decision*, at *17.

The special master next considered studies that examined “how vaccines affect people.” *Id.* at *17-18. The special master concluded that these studies “do not meaningfully support [the petitioner’s] claim that the HPV vaccine can cause SLE” because they either studied the effects of the flu vaccine, not the HPV vaccine, or did not show that the HPV vaccine worsened symptoms of SLE. *Id.* at *18.

The special master then considered case reports and case series submitted by the petitioner. *Id.* at *18-20. The special master gave these case reports little weight, relying in part on the implicit conclusion by the Federal Circuit that such reports merit little weight. *Id.* at *19 (citing *Porter v. Sec’y of Health & Human Servs.*, 663 F.3d 1242, 1253-54 (Fed. Cir. 2012)). Citing a Federal Judicial Center guide, the special master concluded that the case reports were at best anecdotal evidence, insufficient to show association between a vaccine and a condition. *Entitlement Decision*, at *18-19 (citing David H. Kaye and David A. Freedman, *Reference Manual on Scientific Evidence*, Reference Guide on Statistics, at 217-18 & n.14 (3d ed. 2011)). Finally, the special master credited the testimony of Dr. Rose and Dr. Moy that confirmed “case reports are generally not effective ways to show causation” and that there were specific problems with the petitioner’s proffered case reports. *Id.* at *20.

Lastly, the special master reviewed the petitioner’s proposed medical theory of molecular mimicry.⁸ *Id.* at *20-22. The special master concluded that the petitioner had failed to meet her burden of showing by preponderant evidence that molecular mimicry could serve as a theory by which the HPV vaccine can cause SLE. *Id.* at *22.

After concluding that the petitioner had not satisfied the first *Althen* prong, and before considering the second *Althen* prong, the special master considered the third *Althen* prong. He held that the petitioner “could have met her burden on prong three” if her theory of molecular mimicry had been proven under the first *Althen* prong. *Id.* at *23.

The special master next considered the second *Althen* prong. The evidence to support the petitioner’s claim on this prong was Dr. Zizic’s opinion and letters from two of the petitioner’s treating physicians. *Id.* at *23-25.

The special master concluded that the petitioner had not presented sufficient evidence to support a logical sequence of cause and effect between the vaccination and the injury. First, the special master considered Dr. Zizic’s evidence and concluded that, although Dr. Zizic established that the petitioner’s injuries manifested in a timely manner, the evidence did not sufficiently establish a causal relationship. *Id.* at *24. Next, the special master considered the letters from Dr. Saba and Dr. Robinson and found them insufficient to meet the petitioner’s burden of proof. Dr. Saba’s letter did not assist the petitioner because she noted only that it was

⁸ The special master also addressed the theory of Granzyme B, which the petitioner relied on early in the case but did not pursue during the entitlement hearing. *Entitlement Decision*, at *22-23. The petitioner has not appealed the rejection of this theory, and her only theory on appeal is based on molecular mimicry. (ECC 155 (not mentioning Granzyme B).)

“very possible” that the vaccine had caused the petitioner’s injury, and this statement did not satisfy the burden to establish a logical sequence. *Id.* (citing *Paterek v. Sec’y of Health & Hum. Servs.*, 527 F. App’x 875, 883 (Fed. Cir. 2013); *Austin v. Sec’y of Health & Hum. Servs.*, 141 Fed. Cl. 268, 280 (2018); *Doe v. Sec’y of Health & Hum. Servs.*, 19 Cl. Ct. 439, 450 (1990)).

Based on the temporal sequence, Dr. Robinson opined that “it does seem likely that [the petitioner’s] autoimmune disease was triggered by the vaccine.” *Entitlement Decision*, at * 24 (quoting Ex. 23). The special master concluded that this opinion by one of the petitioner’s treating physicians “may have been sufficient” to meet the petitioner’s burden under the second *Althen* prong. *Id.* at *25. Because the petitioner failed both to satisfy her burden under the first *Althen* prong and to rule out alternative causes, however, Dr. Robinson’s letter was insufficient to meet the petitioner’s burden under the second *Althen* prong. *Id.* (citing *Langland v. Sec’y of Health & Hum. Servs.*, 109 Fed. Cl. 421, 438 (2013)).

With respect to potential alternative causes of the petitioner’s injuries, the special master found that “tetracycline is a more likely explanation” of the petitioner’s lupus, “even if the likelihood of tetracycline is not more likely than not.” *Entitlement Decision*, at *27. The special master also found that “evidence that the HPV virus caused [the petitioner’s] lupus is slightly stronger than the evidence that the HPV vaccine caused [her] lupus,” because some evidence suggests that the HPV virus can cause lupus, but “the infectious cause itself remains very unlikely due to the uncertainties for timing.” *Id.* at *29.

On February 1, 2024, the petitioner filed a timely motion for review of the special master’s decision. (ECF 152; ECF 155.) The respondent filed a response on March 1, 2024. (ECF 157.) On March 8, 2024, the petitioner filed a reply after receiving permission from the Court. (ECF 159; ECF 160.)

III. JURISDICTION AND STANDARD OF REVIEW

The Court of Federal Claims has jurisdiction to review decisions made by special masters under the Vaccine Program. 42 U.S.C. § 300aa-12(e). Under this jurisdiction, the court may “set aside any findings of fact or conclusion of law of the special master found to be arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law and issue its own findings of fact and conclusions of law.” 42 U.S.C. § 300aa-12(e)(2)(B); *see also* Rule 27(b), Appendix B to the Rules of the Court of Federal Claims (“RCFC”).

The standard of review applied to a decision by a special master is “the most deferential possible.” *Munn v. Sec’y of Dep’t of Health & Hum. Servs.*, 970 F.2d 863, 870 (Fed. Cir. 1992). A court “may set aside the decision of a special master only if the special master’s fact findings are arbitrary and capricious, its legal conclusions are not in accordance with law, or its discretionary rulings are an abuse of discretion.” *Turner v. Sec’y of Health & Hum. Servs.*, 268 F.3d 1334, 1337 (Fed. Cir. 2001). A court “owes [the] findings and conclusions by the special master great deference—no change may be made absent first a determination that the special master was ‘arbitrary and capricious.’” *Munn*, 970 F.2d at 870. Under this standard the “court does not reweigh the factual evidence or assess whether the special master correctly evaluated the evidence.” *Porter*, 663 F.3d at 1254. It is not the court’s role to “second guess the

Special Master’s fact-intensive conclusions,” especially when the ““medical evidence of causation is in dispute.”” *Id.* at 1249 (quoting *Hodges v. Sec’y of Health & Human Servs.*, 9 F.3d 958, 961 (Fed. Cir. 1993)).

A petitioner can satisfy the *Althen* standards ““by medical records or by medical opinion.”” *Campbell v. Sec’y of Health & Hum. Servs.*, 97 Fed. Cl. 650, 659 (2011) (quoting 42 U.S.C. § 300aa–13(a)(1)). A special master may not impermissibly raise the petitioner’s burden by requiring “epidemiologic studies or general acceptance in the scientific or medical communities.” *Andreu ex rel. Andreu v. Sec’y of Dep’t of Health & Hum. Servs.*, 569 F.3d 1367, 1378 (Fed. Cir. 2009) (cleaned up). Nevertheless, special masters are “entitled to require some indicia of reliability to support the assertion of the expert witness.” *Moberly ex rel. Moberly v. Sec’y of Health & Hum. Servs.*, 592 F.3d 1315, 1324 (Fed. Cir. 2010). When the parties submit epidemiological evidence or medical literature, “the special master can consider it in reaching an informed judgment as to whether a particular vaccination likely caused a particular injury.” *Andreu*, 569 F.3d at 1379.

IV. DISCUSSION

In her motion for review, the petitioner argues that the special master made five legal errors that are grounds for reversal. Organizing these by *Althen* prong, under the first prong she argues that (1) the special master considered flawed epidemiological studies that denied causation; (2) the special master discredited the studies and literature that supported causation; and (3) the special master raised the required amount of evidence for the petitioner to demonstrate molecular mimicry. The petitioner alleges that these are all legal errors because they had the effect of improperly raising her burden of proof. (ECF 152 at 2.)

Under the second *Althen* prong, the petitioner argues that (1) the special master improperly discredited the evidence from the petitioner’s treating physician and testimony from her rheumatologist, again raising her burden of proof; and (2) the special master’s discounting of the petitioner’s treating physician on alternative causation was legal error. (*Id.* at 1-2.)

The respondent argues that the special master acted appropriately as the finder of fact, and that the petitioner’s arguments are simply attempts to relitigate these findings. (ECF 157 at 7.)

The petitioner appears to advance arguments premised on the view that the special master’s fundamental error is that he did not shift the burden to the respondent once she met her burden of proof by establishing a prima facie case. (ECF 155 at 16-17.) “Drawing on the general torts context, if this case were in district court, it **never** would have been dismissed on a motion for summary judgment. This equates with what the Special Master has done here.” (*Id.* (emphasis in original).) The petitioner acknowledges that “[i]f the Special Master wants to weigh expert opinions on both sides and render a decision on which causal opinions are more reliable, that is within his purview. But to say that the Petitioner in this case - with these facts - failed to meet her burden of proof in the Vaccine Program is not in accordance with the law.” (*Id.* at 16.) In short, the petitioner claims that because she presented prima facie evidence, she met her burden of proof, shifting the burden to the respondent to counter her evidence.

The petitioner's view of her burden is incorrect. As she acknowledges (*id.* at 19, 22), her burden is to prove all elements by preponderant evidence, not merely to show a "plausible" or "possible" causal link between a vaccine and a condition. *W.C. v. Sec'y of Health & Hum. Servs.*, 704 F.3d 1352, 1356 (Fed. Cir. 2013). Federal Circuit caselaw makes clear that a special master may view competing evidence, including evidence of other possible sources of injury "not only to the 'factors unrelated' defense, but also to whether a prima facie showing has been made that the vaccine was a substantial factor in causing the injury in question." *Stone v. Sec'y of Health & Hum. Servs.*, 676 F.3d 1373, 1379 (Fed. Cir. 2012).

"Although a Vaccine Act claimant is not required to present proof of causation to the level of scientific certainty, the special master is entitled to require some indicia of reliability to support the assertion of the expert witness." *Moberly*, 592 F.3d at 1324. "The determination of whether a proffered theory of causation is 'reputable' may 'involve [an] assessment of the relevant scientific data.'" *Hazlehurst ex rel. Hazlehurst v. Sec'y of Health & Human Servs.*, 88 Fed. Cl. 473, 479 (2009) (quoting *Andreu*, 569 F.3d at 1380). "Expert opinion testimony is just opinion, and the fact-finder may weigh and assess that opinion in coming to her own conclusions." *Sword v. United States*, 44 Fed. Cl. 183, 188 (1999). "Finders of fact are entitled—indeed, expected—to make determinations as to the reliability of the evidence presented to them and, if appropriate, as to the credibility of the persons presenting that evidence." *Moberly*, 592 F.3d at 1326 (approving of the special master making reliability and credibility determinations in a case where the special master found the petitioner had not shown a vaccine caused a petitioner's injury).

Only once a petitioner has presented reliable, preponderant evidence that meets her burden under *Althen* does the burden shift to the respondent to show by preponderant evidence that some other cause is responsible for a petitioner's condition. *See Althen*, 418 F.3d at 1278 (cleaned up) ("If [the petitioner] satisfies this burden, she is entitled to recover unless the government shows, also by a preponderance of evidence, that the injury was in fact caused by factors unrelated to the vaccine.").

Although the petitioner attempts to frame her argument as one alleging that the special master committed errors of law, that argument is rejected. The petitioner's argument, seeking to sidestep the deferential review due to a special master's factual findings, would effectively collapse the burden-shifting approach to proving non-Table vaccine claims and negate any role for the special master at the initial stage. According to the petitioner, well-pleaded allegations supported by a facially plausible theory of causation would be enough to shift the burden to the respondent. That approach is at odds with the Federal Circuit's outline of the process. *See id.* The application of general legal principles cannot substitute for gaps in the evidence a petitioner needs to prove causation in a particular case. The petitioner's assigned errors reflect challenges to the special master's evaluation of the evidence and the inferences drawn from the evidence. These arguments are reviewed under the highly deferential arbitrary-and-capricious standard. *Turner*, 268 F.3d at 1337.

The petitioner's arguments that the special master erred by critically assessing and rejecting her evidence do not show that the special master's decisions on each alleged error and on the evidence in total were arbitrary and capricious. Instead, the special master's decision

reflects a careful and considered analysis of each of the petitioner’s arguments presented on her motion for review.

A. The First *Althen* Prong

Under the first *Althen* prong, the special master considered various studies and articles addressing the evidence of a statistical connection between the HPV vaccine and lupus, as well as evidence on the petitioner’s proffered theory of the mechanism of causation: molecular mimicry. After reviewing the evidence and assessing it for reliability, the special master found that the evidence did not show that it was more likely than not that the HPV vaccine can cause lupus. The petitioner objects to the special master’s assessment of specific pieces of evidence that formed the basis of his conclusion.

1. Scientific Studies

The special master found that the petitioner had not shown that the HPV vaccine can cause SLE. In reaching this conclusion, the special master reviewed eight epidemiologic studies. The special master found that four of the studies, *Chao*, *Arnheim-Dahlström*, *Miranda*, and *Liu* “did not detect an increased incidence of SLE following HPV vaccination,” notwithstanding the petitioner’s attempts to undermine these studies. *Entitlement Decision*, at *17 (citing Chao et al., *Surveillance of autoimmune conditions following routine use of quadrivalent human papillomavirus vaccine*, 271 J. Intern. Med. 193 (2012); Lisen Arnheim-Dahlström et al., *Autoimmune, neurological, and venous thromboembolic adverse events after immunisation of adolescent girls with quadrivalent human papillomavirus vaccine in Denmark and Sweden: cohort study*, 347 BMJ 15906 (2013); Sara Miranda et al., *Human papillomavirus vaccination and risk of autoimmune diseases: A large cohort study of over 2 million young girls in France*, 35 Vaccine 4761 (2017); Erin Y. Liu, *Quadrivalent human papillomavirus vaccination in girls and the risk of autoimmune disorders: the Ontario Grade 8 HPV Vaccine Cohort Study*, 190 CMAJ E648 (2018)). The special master noted that a fifth study, *Grimaldi*, while involving a smaller sample, also showed that “HPV vaccination was not statistically associated with SLE.” *Id.* (citing Lamiae Grimaldi-Bensouda et al., *Risk of autoimmune diseases and human papillomavirus (HPV) vaccines: Six years of case-referent surveillance*, 79 J. Autoimmun. 84 (2017)).

The special master found that three of the studies, *Geier*, *Wang*, and *Jorgensen* were not reliable. *Id.* (citing *Geier, supra*; *Wang, supra*; Lars Jorgensen et al., *Benefits and harms of the human papillomavirus (HPV) vaccines: systematic review with meta-analyses of trial data from clinical study reports*, 9 Syst. Rev. 43 (2020)). The special master rejected reliance on *Geier* due to suspect methodology and the authors’ past reliability issues. Because *Wang*’s meta-analysis of other studies was skewed by considering *Geier*, the special master found *Wang* unreliable. *Id.* Finally, the special master declined to rely on *Jorgensen* because, while it suggested that HPV vaccines can cause some conditions, lupus was not one of the conditions the study examined. *Id.*

The special master also reviewed three studies that “concern[] how vaccines affect people.” *Id.* The special master found that two of these articles, *Abu-Shakra* and *Toplak*, were not helpful to the petitioner because they studied the effects of the flu vaccine rather than the

HPV vaccine. *Id.* at *17-18 (citing M. Abu-Shakra et al., *Influenza Virus Vaccination of Patients with SLE: Effects on Generation of Autoantibodies*, 21 *Clin. Rheumatol.* 361 (2002); N. Toplak & T. Avclin, *Vaccination of healthy subjects and autoantibodies: from mice through dogs to humans*, 18 *Lupus* 1186 (2009)). As for the third article, *Dhar*, it showed that the administration of the HPV vaccine to participants with SLE did not result in a worsening of their symptoms, and therefore was at least indirect evidence against the petitioner's causation theory. *Id.* at *18 (citing J. Patricia Dhar et al., *The safety and immunogenicity of Quadrivalent HPV (qHPV) vaccine in systemic lupus erythematosus*, 9 *Vaccine* 2642 (2017)).

Finally, the special master considered but rejected relying on case reports and case series, based on precedent showing that these types of evidence merit little weight. *Id.* at *18-19. The petitioner does not challenge this treatment.

The petitioner raises three challenges to the special master's evaluation of these studies in deciding whether the petitioner met her burden under the first *Althen* prong. First, the petitioner argues that the special master should have not relied on the studies that tended to show no connection between the HPV vaccine and lupus, based on Dr. Zizic's criticisms of those studies. Second, she argues that the special master improperly discounted *Geier*, *Wang*, and *Jorgensen*. Third, she argues that the special master required the petitioner to submit elevated proof to demonstrate molecular mimicry. (ECF 155 at 22-41.)

a. Petitioner's Objection to the Special Master Considering "Flawed" Studies

i. *Chao*

The petitioner challenges the special master's reliance on *Chao*, a study conducted by Merck, the manufacturer of the Gardasil HPV vaccine, in cooperation with Kaiser Permanente. The special master noted this fact in his decision, writing "Merck 'had significant input into the study design and analytic plan, all pre-specified in a protocol that was approved by [Food and Drug Administration.]'" *Entitlement Decision*, at *10 (quoting *Chao, supra*, at 202). He went on to note that while "Merck also 'took part in the review of analysis and drafting and revising the manuscript[,] [h]owever, 'Kaiser Permanente authors held final decision power about all editorial suggestions.'" *Id.* (quoting *Chao, supra*, at 202) (internal citations omitted).

Chao showed an incident rate ratio of autoimmune disease between vaccinated and unvaccinated populations that was close to 1.0. The special master addressed Dr. Zizic's criticisms of *Chao*, ultimately rejecting them. *Id.* at 11. The special master cited this study to support his finding that there was no evidence that the HPV vaccine could cause lupus, although he acknowledged that the petitioner "can legitimately point to a non-standard technique for filling in missing data, which was not really missing. Even if *Chao* is excluded, however, the *Arnheim-Dahlström*, *Miranda*, and *Liu* articles still indicate that researchers have not detected an increased incidence." *Id.* at *17.

The petitioner relies on Dr. Zizic's testimony regarding *Chao* to challenge the special master's reliance on it on two grounds. First, the petitioner argues the study was unreliable

because of the influence Merck had on the study. (ECF 155 at 24-25, 28.) Second, the petitioner argues that the study improperly imputed data about the incidence of autoimmune diseases in the unvaccinated when the study's authors could have examined the actual data about the unvaccinated. (*Id.* at 25-29.) This failure by the authors was, as Dr. Zizic put it, "a statistical manipulation fraudulently done to deceive the true results of this study." (*Id.* at 28-29 (quoting Tr. 734).)⁹

The special master considered and appropriately rejected the petitioner's arguments. Regarding the potential conflict of interest due to Merck's involvement in the study, the special master noted that "Kaiser Permanente authors held final decision power about all editorial suggestions." *Entitlement Decision*, at *10 (quoting *Chao, supra*, at 202). The special master concluded that the final control Kaiser Permanente scientists had over the final product was sufficient to guard against Merck's self-interest in a favorable study. The petitioner has not shown any reason to conclude that the special master's reliance on the study despite a potential conflict of interest was arbitrary or unreasonable.

To the extent the petitioner argues that the authors intentionally manipulated the data, the special master noted that Dr. Zizic was not persuasive in showing the data were manipulated. *Id.* at *11-12. The petitioner has not identified any basis to show that the data was, in fact, manipulated. Instead, she offers insinuations and draws a different inference than did the special master. That is insufficient to overturn a special master's reasoned decision. Although Merck may have had the opportunity to try to manipulate the data, the special master's conclusion that the study was not manipulated is reasonable, given Kaiser Permanente's control over the study.

As to the criticism of the study's use of imputed data, the special master specifically considered Dr. Zizic's criticism and found it "unpersuasive." *Id.* at *11. The special master determined that Dr. Zizic had not shown that the imputation caused any manipulation of the data. The special master did acknowledge flaws in the study. He noted that "the evidence regarding methodology is mixed," and that the petitioner "can legitimately point to a non-standard technique for filling in missing data, which was not really missing." *Id.* at *17. He therefore noted that "even if *Chao* were excluded, the *Arnheim-Dahlström*, *Miranda*, and *Liu* articles still indicate that researchers have not detected an increased incidence." *Id.*

The record reflects that the special master considered Dr. Zizic's criticisms of *Chao* and determined that these criticisms did not outweigh the study's conclusion showing no connection between the HPV vaccine and SLE. The petitioner fails to show that the special master's logic is so unsound as to be arbitrary and capricious. Instead, he acknowledged the article's flaws, recognized potential limitations, and found the article ultimately reliable. He implicitly concluded that, even though it was sub-optimal to use imputed data over available data, that weakness did not produce an inherently flawed conclusion. *Id.* at *11.

⁹ Citations to "Tr." refers to the transcript of the testimony taken at the entitlement hearing, available at ECF 125, ECF 126, ECF 133, and ECF 134.

Importantly, he also noted that even if he had declined to rely on *Chao*, he would have reached the same conclusion based on the evidence in *Arnheim-Dahlström*, *Miranda*, and *Liu*. *Id.* at *17. Thus, even if the special master’s decision to rely on *Chao* was mistaken, it was harmless error because the remaining evidence would otherwise have supported the special master’s conclusion. See *A.Y. by J.Y. v. Sec’y of Health & Hum. Servs.*, 152 Fed. Cl. 588, 599 (2021) (quoting *Hines on Behalf of Sevier v. Sec’y of Dep’t of Health & Hum. Servs.*, 940 F.2d 1518, 1526 (Fed. Cir. 1991); citing *Doe v. Sec’y of Health & Human Servs.*, 601 F.3d 1349, 1356 n.2 (Fed. Cir. 2010)) (“When ‘the special master’s decision was based on a number of factors and [petitioner] has not shown that the reliance on the [information] . . . was likely critical to the result,’ such a mistake constitutes ‘harmless error’ and does not justify reversing the special master’s decision.”).

ii. *Arnheim-Dahlström, Miranda, and Liu*

The special master relied on *Arnheim-Dahlström*, *Miranda*, and *Liu* to support his conclusion that the HPV vaccine cannot cause SLE. The petitioner reasserts arguments, rejected by the special master, made by Dr. Zizic criticizing each of these studies.

Concerning *Arnheim-Dahlström*, Dr. Zizic claimed that it was not helpful for examining lupus-related adverse outcomes from the HPV vaccine. This study was based on data collected during a six-month period from hospital patients in Sweden and Denmark. Dr. Zizic criticized it because fewer “‘than 5 percent in the last 10 years of patients with lupus are hospitalized during any one year period, much less [a] 180 day period.’” (ECF 155 at 30 (quoting Tr. 383).) The special master specifically considered and rejected this criticism. Instead, he credited Dr. Rose’s testimony that “‘pediatric rheumatologists in Europe see their patients in hospitals.’” *Entitlement Decision*, at *12. The special master’s reliance on the study was reasonable because Dr. Rose’s testimony directly undercut the basis for Dr. Zizic’s critique. The petitioner has not supplied any citation to the record to show that the special master erred in relying on Dr. Rose’s rebuttal of Dr. Zizic.

Concerning *Miranda*, Dr. Zizic claimed that it was unreliable because it relied on searches of French computer databases to identify teenage girls with autoimmune diseases, including SLE. The problem with this approach, according to Dr. Zizic, was the study’s reliance on two ICD-10 codes, which would capture patients with both SLE and subcutaneous lupus. According to Dr. Zizic, the use of ICD-10 codes diluted the data on SLE because subcutaneous lupus patients are never hospitalized. He also asserted that the study’s methodology would not “‘pick up the vast majority of lupus cases that would not be hospitalized in this population.’” (ECF 155 at 31 (quoting Tr. 724).)

The special master again specifically addressed Dr. Zizic’s criticisms of the study’s methodology. He noted that the study captured data from other records, specifically long-term illness reimbursement records. The respondent’s experts, Dr. Rose and Dr. Moy, explained that because SLE is a chronic disease, these records would capture patients suffering from SLE, and Dr. Zizic did not refute this analysis. *Entitlement Decision*, at *15. Further, the special master noted that even if there was an undercounting of lupus cases, the undercounting would have been the same for vaccinated and unvaccinated populations, something Dr. Zizic conceded. *Id.*

The special master explained his basis for rejecting Dr. Zizic's criticisms of *Miranda*. His reasons were grounded in the testimony, effectively unrefuted, of the respondent's experts. The petitioner has failed to point to any evidence the special master overlooked or otherwise failed to consider. She simply disagrees with his conclusion, but mere disagreement is not an adequate basis for rejecting a special master's reasoned conclusion.

Finally, concerning *Liu*, the petitioner's criticism in full is as follows:

Dr. Zizic states "[s]ixty days following vaccination is not a sufficient period of time to diagnose SLE for the reasons previously discussed above." Ex. 75, p. 5. Dr. Zizic also criticized the lumping of disorders into one category, and stated "[i]t does not make scientific sense to combine systemic lupus erythematosus with systemic sclerosis for example. The etiopathogenesis of these disorders are likely to be so disparate that it does nothing but confuse the analysis." *Id.* at 6. Petitioner effectively rebutted the epidemiological studies. This is not asking the Court to re-weigh the epidemiological evidence. It is to show [the] Special Master's [] arbitrary and capricious findings that somehow this epidemiological evidence carries the day, when it is completely flawed and not a requirement for Petitioner to prevail.

(ECF 155 at 32.)

On the first point, Dr. Rose testified that the 60-day window "more likely conforms to what is biologically plausible," and that, in any case, "the authors [of the study] exp[an]ded the window in a sensitivity analysis to 180 days." *Entitlement Decision*, at *16. As for the second point, the special master concluded that "Dr. Rose persuasively explained why including other diseases with SLE would not affect the analysis." *Id.*

On both issues, the special master had testimony from Dr. Rose that conflicted with Dr. Zizic's; it was up to the special master, as the fact finder, to choose between the conflicting testimony. The petitioner fails to explain why the special master's decision to find Dr. Rose's testimony more credible was so misplaced as to make that decision arbitrary and capricious; she instead simply points to conflicting evidence from Dr. Zizic and claims it is sufficient to rebut the epidemiological evidence without re-weighing it. (ECF 155 at 32.) The petitioner is mistaken; the special master had an adequate evidentiary basis for his decision, and any second-guessing on appeal of this point would very much require re-weighing the available evidence.

b. Petitioner's Objection to the Special Master Discrediting Studies that Support Causation

The special master considered but found unreliable three epidemiologic studies: *Geier*, *Wang*, and *Jorgensen*. These studies, the petitioner contended, showed a causal link between the HPV vaccine and SLE. Because *Geier* and *Wang* are interrelated, they are considered together.

The special master also found unreliable two other studies, *Abu-Shakra* and *Toplak*, that examined the effects of flu vaccinations both on persons with SLE and on healthy people.

i. Geier and Wang

Geier used the Vaccine Adverse Event Reporting System (“VAERS”) database to evaluate the potential for the HPV vaccine to induce serious autoimmune events, including SLE. *Entitlement Decision*, at *13. Dr. Zizic testified that there was nothing wrong with the methodology employed; Dr. Rose testified that the study was not reliable due to its definition of exposure and its calculations of controls versus cases. The special master found *Geier* unreliable because it relied on the VAERS database as a data source; the VAERS database has consistently been rejected as a source of reliable data. *Id.* (citing *Tompkins v. Sec’y of Health & Hum. Servs.*, 117 Fed. Cl. 713, 721 (2014); *Analla v. Sec’y of Health & Hum. Servs.*, 70 Fed. Cl. 552, 558 (2006); *Doe v. Ortho-Clinical Diagnostics, Inc.*, 440 F. Supp. 2d 465, 475-76 (M.D.N.C. 2006)). The special master also noted evidence that the Geiers “are not trustworthy,” that their “work is problematic,” and that they “have been repeatedly discredited in the Vaccine Program.” *Id.* at *13 & n.12.

The special master also found *Wang* unreliable because of its reliance on *Geier*. *Wang* is a meta-analysis of other observational studies, including five studies involving the HPV vaccine and SLE. *Id.* at *14. One of those studies was a 2017 Geier study, which is different from the *Geier* (2015) article, previously discussed, published in 2015. The difference, for the purpose of the special master’s analysis is minimal. As the special master noted, the “Wang group excluded the Geier (2015) article because its data was ‘overlapping.’” *Id.* (quoting *Wang, supra*, at 758). The special master found the inclusion of the 2017 Geier article “questionable and significant” because the Geiers’ methodology “is not reliable” and because out “[o]f the five relevant studies, the Geier study found the highest relative risk” and was the “only article in which the 95% confidence interval did not cross [a] 1.0” rate ratio. *Id.* In other words, the already-suspect Geier study was an outlier and was based on the same data as the *Geier* (2015) article. The special master, relying on Dr. Rose’s testimony, also questioned the legitimacy of the peer-review process for *Wang*; the article was accepted for publication only four days after submission and published less than two weeks later. *Id.* For these reasons, the special master therefore found that “the Wang article merits little, if any, weight.” *Id.*

The petitioner objects to this treatment of *Wang*. She argues that the special master “does not articulate anything in the Geier study at issue that is unsound,” and therefore his rejection of *Wang* based on *Geier* is likewise unsound. (ECF 155 at 33.) Dr. Zizic relied on *Wang* in testifying that it showed a significantly increased risk of SLE from the HPV vaccine. (*Id.* at 34.)

The petitioner has not identified any error in the special master’s analysis. The special master explained that the *Geier* (2015) article was unreliable because both its methodology was questionable and its authors were not trustworthy. Although the special master in his decision specifically addressed and rejected only the *Geier* (2015) article, which the petitioner had offered for evidence, he also considered the Geier (2017) article in the context of reviewing *Wang*. The authors of *Wang* had considered the data reflected in the Geier (2017) article to overlap with the data in the *Geier* (2015) article. The special master concluded therefore that the weaknesses he

had identified in *Geier* (2015) were also reflected in the *Geier* (2017) article. *Entitlement Decision*, at *14. Once the *Geier* (2017) article was excluded from *Wang*, the remaining studies *Wang* cited failed to show a 95-percent confidence interval that did not cross a 1.0 rate ratio. *Id.* The petitioner has provided no reason to conclude that the special master's decision finding *Wang* unpersuasive after excluding the *Geier* (2017) article was arbitrary and capricious; rather, the special master appropriately examined *Wang's* methodology and found it unreliable.

ii. *Jorgensen*

The special master next addressed *Jorgensen*, submitted by the petitioner. *Jorgensen* was based on data from “79% of clinical study reports, which underlie the report of HPV vaccine safety that the vaccine manufacturer submitted to European regulatory agencies.” *Id.* at *16. According to the special master, the authors conducted a meta-analysis of the results focused on various outcomes, but not on lupus. Although the authors suggested that there was a high risk of bias in manufacturer safety studies and a possibility that the HPV vaccine caused greater harm for some conditions than previously reported, these conditions did not include lupus. The special master submitted for the record an article responding to *Jorgensen*. *Id.* (citing Hilda Bastian, *What the systematic review of HPV vaccine clinical study reports does, and does not, reveal: commentary on Jørgensen et al.*, 9 *Syst. Rev.* 41 (2020)). *Bastian* argued that *Jorgensen* “demonstrates the risk of relying too much on [clinical study reports].” *Id.* (quoting *Bastian*, *supra*, at 41). Ultimately, the special master found *Jorgensen* unhelpful because it “did not provide any information helpful to determining whether HPV vaccines can cause SLE.” *Id.*

The petitioner objects to the special master *sua sponte* submitting *Bastian* and relying on it. The petitioner cited Dr. Zizic's testimony about the importance of *Jorgensen* which, Dr. Zizic claimed “should allow better detection of some of the adverse events or the harms.” (ECF 155 at 35 (quoting Tr. 246).) The petitioner, however, does not identify any testimony that explains how or why *Jorgensen* shows a connection between the HPV vaccine and SLE. The special master's decision to reject *Jorgensen* was not based on *Bastian's* criticism of *Jorgensen*. Even assuming that the special master's consideration of *Bastian* was improper, his rejection of *Jorgensen* as useful to and supportive of the petitioner's claims was unaffected by the asserted error. Thus, even if the inclusion of *Bastian* was error, it was harmless error and does not provide a basis for finding the special master's rejection of *Jorgensen* to have been arbitrary and capricious. *See A.Y. by J.Y.*, 152 Fed. Cl. at 599.

iii. *Abu-Shakra and Toplak*

The special master next examined “stud[ies] [that] concern[] how vaccines affect people.” *Entitlement Decision*, at *17. To support her claim, the petitioner submitted two articles, *Abu-Shakra* and *Toplak*. *See Abu-Shakra, supra; Toplak, supra.*

Abu-Shakra indicated that women with SLE who were given a flu vaccine had increased antibodies, including antibodies associated with lupus, six and 12 weeks after vaccination. Dr. Zizic claimed that the article indicated that flu vaccines were not safe because the resulting antibodies would cause damage to the recipient. *Entitlement Decision*, at *17. He further testified that the vaccine recipients in *Abu-Shakra* “did not have adverse consequences because

. . . they were being treated for lupus.” *Id.* The special master noted that “[w]hen asked about the people in Abu-Shakra receiving a flu vaccine versus the HPV vaccination that [the petitioner] received, Dr. Zizic’s response was the HPV vaccine is the “same difference.”” *Id.* (quoting Tr. 194).

Dr. Zizic’s testimony conflicted with the conclusions of *Abu-Shakra*, which found that “[p]atients with SLE should be encouraged to receive the influenza vaccine.” *Id.* (quoting *Abu-Shakra, supra*, at 372). Dr. Rose also testified in response to Dr. Zizic that “fluctuations in antibodies [on which Dr. Zizic had relied] do not mean much. Rheumatologists care about only a few antibodies that might correlate to disease severity.” *Id.*

Toplak found that some “apparently healthy adults” who were given the flu vaccine “experienced an increase in antibodies.” *Id.* at *18 (quoting *Toplak, supra*, at 135). The size of the increase was not described, and the study did not include controls. Dr. Rose testified that *Toplak* did not “show anything of significance,” while the special master noted “Dr. Zizic barely mentioned *Toplak* in his oral testimony.” *Id.*

The special master also considered *Dhar*, a report of a clinical trial, submitted by the respondent. *Id.* (citing *Dhar, supra*). *Dhar* showed that women with mild to moderate SLE who received the HPV vaccine did not show a flare of their symptoms. *Id.*

The special master concluded that *Abu-Shakra* and *Toplak* “do not meaningfully support [the petitioner’s] claim that the HPV vaccine can cause SLE,” because they involved the flu vaccine, not the HPV vaccine. *Id.* He also determined that none of the studies showed any worsening of the condition of vaccine recipients diagnosed with SLE. *Id.*

The petitioner objects to the special master’s conclusion that *Abu-Shakra* and *Toplak* do not meaningfully support her contention that the HPV vaccine can cause lupus. The petitioner’s objection appears to be based on three points. First, these articles showed an increase in antibody and autoantibody production from vaccines. Second, *Toplak* explained that molecular mimicry could be “[p]ossible mechanisms for this autoimmune phenomenon,” due to an increased level of autoantibodies observed in the subjects who received the flu vaccine. (ECF 155 at 37 (quoting *Toplak, supra*, at 1, 4).) Third, *Abu-Shakra* noted that “[i]nfectious agents and various vaccines may act as a trigger mechanism for the induction of autoimmunity and the development of SLE.” (*Id.* (quoting *Abu-Shakra, supra*, at 1).)

As the special master noted, *Abu-Shakra* and *Toplak* both examined the effects of the flu vaccine, not the HPV vaccine. The petitioner does not explain why the special master’s reliance on this difference is wrong and points to no evidence the special master overlooked in relying on this difference in declining to rely on these studies. In the absence of evidence or a sound explanation for equating the effects of the flu and HPV vaccines, it is not arbitrary and capricious for the special master to treat the effects of different vaccines differently and to limit the *Abu-Shakra* and *Toplak* studies’ findings to their subject matter: the flu vaccine. Without a showing that the flu and HPV vaccines produce similar antibody reactions among vaccine recipients, the petitioner cannot show that the special master’s decision was arbitrary and capricious.

The special master's consideration of the studies on causation was rational. The petitioner's arguments at best show some conflicting evidence that the special master appropriately analyzed for reliability. The petitioner has not shown that the special master raised her burden of proof. The petitioner's arguments amount to little more than claims that the special master erred by crediting the evidence showing no significant connection between the HPV vaccine and lupus and not crediting the contrary evidence. The special master explained his rationale for his acceptance or rejection of each piece of evidence. The petitioner has not shown those explanations to be arbitrary and capricious.

2. Molecular Mimicry

In cases asserting molecular mimicry, “there is an important difference between the general theory of molecular mimicry and the more specific theory that the vaccine at issue is capable of triggering an autoimmune response that culminates in the petitioner's injury.” *Duncan v. Sec'y of Health & Hum. Servs.*, 153 Fed. Cl. 642, 661 (2021) (cleaned up). To establish causation through molecular mimicry, the petitioner must show that “the relevant autoantibodies that are known to drive, or are at least associated with, the resulting [] disease are likely produced as a result of the [] vaccine” at issue. *Morgan v. Sec'y of Health & Hum. Servs.*, 148 Fed. Cl. 454, 468 (2020). Without empirical evidence that molecular mimicry occurs between a given vaccine and disease, “that general theory could be used to demonstrate an association between virtually any combination of antigens and autoimmune injuries,” in which case “the first prong of *Althen* would be rendered meaningless.” *Caves v. Sec'y of Health & Human Servs.*, 100 Fed. Cl. 119, 135 (2011), *aff'd without opn.*, 463 F. App'x 932 (Fed. Cir. 2012).

The special master explained that theories of molecular mimicry generally require the petitioner to provide “some evidence that persuasively shows that a portion of a vaccine resembles a portion of human tissue,” that it is a homology, “which contributes to causing the disease, and that the immune system will respond to the relevant amino acid sequence.”¹⁰ *Entitlement Decision*, at *20 (citing *Tullio v. Sec'y of Health & Hum. Servs.*, No. 15-51V, 2019 WL 7580149, at *12-14 (Fed. Cl. Spec. Mstr. Dec. 19, 2019), *mot. For rev. denied*, 149 Fed. Cl. 448 (2020)). The special master also relied on other vaccine cases that he concluded supported this approach. *Entitlement Decision*, at *21 (citing *Morgan*, 148 Fed. Cl. at 476-77; *Duncan*, 153 Fed. Cl. at 661; *Caredio v. Sec'y of Health & Hum. Servs.*, No. 17-79V, 2021 WL 6058835, at *11 (Fed. Cl. Dec. 3, 2021); *Yalacki v. Sec'y of Health & Hum. Servs.*, 146 Fed. Cl. 80, 91-92 (2019)). He also noted the contrary approach of *Patton v. Sec'y of Health & Hum. Servs.*, 157 Fed. Cl. 159, 169 (2021). *Entitlement Decision*, at *21.

Dr. Zizic introduced an article, *Kanduc*, showing that “viruses and people have extensive homology.” *Id.* (citing Darja Kanduc, *Peptide cross-reactivity: the original sin of vaccines*,

¹⁰ Homology can also be defined as “the quality of being homologous; the morphologic identity of corresponding parts; structural similarity due to descent from a common form.” *Dorland's* 858.

4 *Front. Biosci.* 1393 (2012)). The special master noted that *Kanduc* pointed out that “the commonness of homology undermines the idea that viral infections lead to autoimmune disease. . . . [A]fter ‘three decades of intensive research in the field . . . the molecular mimicry hypothesis has received no validation.’” *Id.*, at *21 (quoting *Kanduc, supra*, at 1395). On this same point, Dr. Rose asked rhetorically when testifying, “‘if there is no proof, why should we accept [molecular mimicry] as happening in this case?’” *Id.* (quoting Tr. 463). The special master found that Dr. Zizic “did not effectively answer Dr. Rose’s question.” *Id.*

Dr. Zizic also relied on a 2017 article, *Segal*, to identify a supposed homology “with parts of the human body involved in SLE.” *Id.* (citing Yahel Segal et al., *HPV and systemic lupus erythematosus: a mosaic of potential crossreactions*, 65 *Immunol. Res.* 564 (2017)). The special master summarized Dr. Zizic’s testimony as explaining that “an antibody’s attack on complement could interfere with the complement system and end up causing lupus.” *Id.* at *22. Dr. Zizic testified, however, that “‘we can’t prove that. All I’m saying is there’s great biologic plausibility,’” and that “‘it is very conceivable,’” that an “antibody against the components of [the] complement” could cause autoimmune disease, including lupus. *Id.* (quoting Tr. 735-36).

Dr. Rose rejected Dr. Zizic’s hypothesis during his testimony based on the lack of evidence of pathogenesis. Dr. Rose also challenged several aspects of *Segal* on which Dr. Zizic had relied. *Id.*

The special master carefully reviewed the evidence and the testimony regarding molecular mimicry. He explained why he was persuaded by Dr. Rose’s testimony and his critiques of *Segal*. In summarizing Dr. Rose’s testimony, the special master found that “[a]ny statement that antibodies to specific proteins cause lupus would exaggerate what is known.” *Id.* That shortcoming is especially true when, as the special master concluded, “[t]he triggers for lupus are not known.” *Id.* The special master also pointed out that Dr. Zizic had not established that the identified homology was in a position of the cell such that it could generate antibodies. *Id.*

The petitioner objects to the special master’s reliance on Dr. Rose’s rhetorical question, arguing that Dr. Rose’s usage of the word “proof” indicates the special master required scientific certainty rather than preponderant evidence. (ECF 155 at 38-39.) The petitioner further argues that Dr. Zizic’s testimony explained how molecular mimicry would cause the HPV vaccine to induce SLE. (*Id.* at 39-41.) The petitioner ends by arguing that the special master’s “analysis legally errs by picking apart the Segal article to the point of absurdity” by requiring the petitioner to have proven that “the pentapeptides from Segal must 1) generate antibodies and 2) must be in the correct location within a cell to produce antibodies. If no scientist could prove this, then how can [the petitioner]?” (*Id.* at 41.) The petitioner does not cite any caselaw to support these points.

The fact that a scientist could not yet prove the mechanism does not necessarily mean the special master required a scientific certainty—scientists equally cannot prove things that are untrue. The special master was aware of the appropriate burden of proof. He noted that “[s]tating that the evidence in this case is insufficient to credit molecular mimicry as a theory by which [the] HPV vaccine can cause SLE is not the same as requiring scientific certainty.”

Entitlement Decision, at *22. Instead, the special master discounted the petitioner's theory of molecular mimicry because it lacked evidence "that antibodies to specific proteins cause lupus." Such evidence is essential, he noted, because "[t]he triggers for lupus are not known." *Id.* The special master simply applied the test he identified: while "Segal and others have identified homologous sequences of five amino acids there has not been any persuasive showing that an attack on these pentapeptides would cause lupus." *Id.* The petitioner did not prove her claim because she failed to provide evidence that connected the antibodies produced from receiving the HPV vaccine to SLE. See *Duncan*, 153 Fed. Cl. at 661; *Morgan*, 148 Fed. Cl. at 468. The special master did not require scientific certainty but found the evidence of a key part of the causal chain was missing based on finding Dr. Rose's testimony more persuasive than Dr. Zizic's.

The petitioner does not challenge the special master's reading of caselaw concerning proof for molecular mimicry. (ECF 155 at 38-41.) Instead, the petitioner invites a re-weighing of the evidence by providing a different interpretation of Dr. Zizic's testimony and *Segal*. (*Id.*) "Those findings, which are at the core of the special master's decision in this case, are largely based on his assessments of the credibility of the witnesses and the relative persuasiveness of the competing medical theories of the case. As such, they are virtually unchallengeable on appeal." *Lampe v. Sec'y of Health & Hum. Servs.*, 219 F.3d 1357, 1362 (Fed. Cir. 2000). The petitioner has not identified any reason why these findings are arbitrary and capricious or legal error, and so her challenge fails.

B. The Second *Althen* Prong

The special master recognized that because the petitioner had failed to meet her burden under the first *Althen* prong, she could not meet the second. He nevertheless addressed the second prong "for [the] sake of completeness." *Entitlement Decision*, at *23. Having upheld the special master's decision on the first *Althen* prong, there is no need to address the petitioner's contentions regarding the second *Althen* prong because it is not logically possible to prevail if a claim is rejected on the first prong. Following the special master, however, for the sake of completeness, the petitioner's arguments on the second prong will be addressed here.

The special master considered the testimony of Dr. Zizic and letters from the petitioner's treating rheumatologist and primary care physician, Dr. Saba and Dr. Robinson, in evaluating the second *Althen* prong. He also considered a letter from her treating dermatologist, Dr. Breza, addressing alternative causes for her illness.

The special master concluded that Dr. Robinson's letter might have been sufficient to support entitlement, except for two reasons. First, he reiterated that the petitioner failed to meet her burden under the first *Althen* prong. Second, the special master found that it was more likely that the petitioner's acne medication caused the petitioner's lupus, not the HPV vaccine. In so doing, the special master rejected Dr. Breza's contention that because the petitioner's "symptoms have not resolved several years after discontinuation of minocycline, I can be certain that minocycline was not the cause of her connective tissue disorder." *Entitlement Decision*, at *26 (quoting Dr. Breza's letter) (noting that Dr. Breza relied on T. M. Lawson et al.,

Minocycline-induced lupus: clinical features and response to rechallenge, 40 *Rheum.* (Oxford) 329 (2001)).

The petitioner objects to the special master's rejection of Dr. Zizic's testimony and Dr. Saba's letter on causation, as well as his rejection of Dr. Breza's letter on alternate causes.

1. Evidence from the Petitioner's Treating Rheumatologist and Expert Rheumatologist on Causation

a. Dr. Saba

The petitioner's treating rheumatologist, Dr. Saba, submitted a letter in which she claimed that it was "very possible" that the HPV vaccine caused the petitioner's connective tissue disease. *Id.* at *24 (quoting Ex. 22). While acknowledging the probative value of evidence from treating physicians, the special master discounted Dr. Saba's suggestion, finding that "statements from treaters about possibilities provide little, if any, assistance to petitioners who must establish their cases with preponderate evidence." *Id.* (citing *Paterek*, 527 F. App'x at 883; *Austin*, 141 Fed. Cl. at 280; *Doe*, 19 Cl. Ct. at 450).

The petitioner objects to the special master discounting Dr. Saba's opinion. She argues that the cases the special master cited are distinguishable because they involved doctors testifying to mere possibilities without support from other evidence, whereas Dr. Saba had support for her view. (ECF 155 at 19-20.) The petitioner also claims, without support, that "Dr. Saba's language of 'very possible' was intended to meet the preponderance of the evidence standard, as she likely did not intend for her letter to fall short of the required legal standard." (*Id.* at 19.) She builds on this argument in her reply brief by relying on a dictionary definition of the word "very" and arguing that it means the phrase "very possible" exceeds the probable standard. (ECF 160 at 8-9.)

At its core, the petitioner is arguing the special master misread Dr. Saba's letter by misunderstanding what Dr. Saba meant by "very possible." That argument goes directly to the quintessential role of the finder of fact: determining what a piece of evidence means when it has multiple, reasonable interpretations. While Dr. Saba may indeed have meant to write that it is probable that the HPV vaccine caused the petitioner's condition, she did not do so clearly and unequivocally. Physicians are trained scientists, but medicine is an inexact science. Physicians are often careful to express their views with degrees of confidence or certainty; they know how to be more, or less, definite in writing about medical conclusions. Maybe Dr. Saba intended for "very" to convey her sense that causation was more likely than not. The special master's contrary interpretation of what Dr. Saba intended to convey, however, is not arbitrary and capricious, especially when viewed in the context of the other evidence the special master considered. The special master's interpretation also reflects a factual conclusion; it does not elevate the petitioner's burden of proof. *See Paterek*, 527 Fed. App'x at 882-83.

Likewise, the petitioner has not established that the special master erred by discounting what he viewed to be "indeterminant" evidence. *Entitlement Decision*, at *7. In *Paterek*, the Federal Circuit reiterated that "the statutory standard requires more than just proof of a plausible

or possible causal link between the vaccine and the injury.” 527 Fed. App’x at 883 (cleaned up). To be sure, the Federal Circuit did not say that equivocal testimony supported by other evidence can always be discounted. *Id.* The Federal Circuit did, however, note that an expert’s testimony “that causation was ‘not impossible’ fails to provide support for causation at all.” *Id.*

Just as the special master in *Paterek* reasonably found that expert testimony that causation was “not impossible” was insufficient, so too here the special master reasonably found that Dr. Saba’s testimony that a connection was “very possible” did not provide sufficient evidence to show causation. This determination was a reasonable interpretation of the words “very possible,” and is neither arbitrary and capricious nor legal error.

b. Dr. Zizic

Dr. Zizic testified about the petitioner’s condition. The special master found that, while Dr. Zizic established that the petitioner was more likely to develop an autoimmune disease due to her mother’s MS, he never connected this factor to an increased risk of SLE from the HPV vaccine. While Dr. Zizic testified as to the temporal connection between the HPV vaccine and the petitioner’s illness, the special master concluded that his testimony was not enough to satisfy the second *Althen* prong. *Entitlement Decision*, at *24.

The petitioner raises two objections to the special master’s treatment of Dr. Zizic’s testimony. First, she argues that the special master raised her burden of proof by improperly requiring her to produce evidence that does not and cannot exist. According to the petitioner, the special master effectively required her to present a study that “would require gathering enough people with 1) a family history of [MS], 2) the receipt of the HPV vaccine and 3) the development of lupus.” (ECF 155 at 21.) Second, she argues she “cannot effectively challenge general and broad statements such as ‘Dr. Zizic does not identify any facts about [the petitioner] that suggests her lupus was due to the vaccine,’” other than pointing generally to Dr. Zizic’s testimony. (*Id.* at 21-22 (quoting *Entitlement Decision*, at *24).)

The petitioner’s arguments again amount to her objecting that the special master weighed the evidence and was not persuaded by Dr. Zizic’s testimony. Under the second *Althen* prong, a petitioner must show “a logical sequence of cause and effect showing that the vaccination was the reason for the injury.” *Althen*, 418 F.3d at 1278. The petitioner has not cited any caselaw that suggests she need not meet this burden when such evidence does not or cannot exist. She put her evidence before the special master; the special master evaluated her evidence and the respondent’s evidence, and based his findings, which he explained, on that evidence. The petitioner has similarly failed to point out an aspect of Dr. Zizic’s testimony that the special master overlooked or “failed to consider genuinely the evidentiary record.” *Campbell*, 97 Fed. Cl. at 668. The special master fulfilled his role.

2. Dr. Breza and Alternative Causes of the Petitioner’s Condition

Dr. Breza, the petitioner’s treating dermatologist, submitted a letter in which he opined that minocycline did not cause the petitioner’s connective-tissue disorder, because her symptoms had not resolved, even several years after she discontinued taking this medication. *Entitlement*

Decision at *7, 26 (citing Ex. 24). The special master considered this evidence but ultimately found that it was undermined by *El-Hallak*, which showed that lupus problems could persist years after a person discontinued taking minocycline. *Id.* at *26-27 (citing Moussa El-Hallak et al., *Chronic minocycline-induced autoimmunity in children*, 153 J. Pediatr. 314 (2008)). The special master also relied on the testimony of Dr. Rose, who opined that the petitioner's series of health problems reminded him of a case of minocycline-induced lupus that he had treated, including "an acute onset of problems, a vasculitic rash, constitutional symptoms, low ANA, robust sed rate, and minor to moderate liver abnormalities." *Id.* at *26. Based on Dr. Rose's testimony, the special master also found that "[a] person with minocycline-induced lupus can develop 'real' lupus." *Id.* at *27. The special master noted that Dr. Zizic did not rebut this opinion evidence from Dr. Rose, and that it was unclear whether the petitioner was still suffering from lupus symptoms. *Id.* at *26-27.

After noting the evidence in favor of drug-induced lupus, the special master concluded that "the evidence does not preponderate in favor of finding that the HPV vaccination can cause SLE. This disparity means that tetracycline is a more likely explanation even if the likelihood of tetracycline is not more likely than not." *Id.* at *27.

According to the petitioner, this conclusion was legal error because it minimized the opinion of one of the petitioner's treating physicians. The petitioner also relies on the special master's statement that the respondent had not shown that tetracycline was a more-likely-than-not cause of her lupus to imply that the special master committed legal error by not properly applying *Althen*'s burden-shifting framework. (ECF 155 at 42-43.)

The petitioner's argument again fails. The petitioner ignores the special master's finding that she failed to provide preponderant evidence that the HPV vaccination can cause SLE. *Entitlement Decision*, at *23. She also fails to show that the special master's finding, based on un rebutted evidence, that tetracyclines can cause drug-induced lupus was erroneous. *Id.* at *25-26. Instead, she complains that simply because there were a few cases of drug-induced lupus does not mean that the petitioner herself suffered from drug-induced lupus. *Id.* (citing *El-Hallak, supra*). The special master did not find, however, that the petitioner is more likely to have suffered from drug-induced lupus; he only found that "[a]mong these two alternatives (HPV vaccine and tetracyclines), tetracycline is a better explanation." *Id.* at *27. In fact, the special master went on to note that it is quite possible that the petitioner's lupus was caused by something else, because "the cause of SLE in the vast majority of cases is unknown." *Id.* at *27 n.25.

In short, the special master did not find that the petitioner's acne medication was a more likely cause of the petitioner's lupus. He instead found that the un rebutted evidence of drug-induced lupus was more persuasive than the rebutted evidence of vaccine-induced lupus as the cause of the petitioner's illness. Admittedly, this conclusion required him to discount Dr. Breza's opinion that the petitioner did not suffer from drug-induced lupus. The special master had evidence from a study and Dr. Rose that, contrary to the express basis of Dr. Breza's opinion, supported his conclusion that a person can suffer from drug-induced lupus even years after discontinuing the drug. The special master weighed the competing evidence and reached a

reasonable conclusion based on the evidence. The petitioner has again failed to point out evidence the special master overlooked or ignored. His decision is entitled to great weight.

V. CONCLUSION

The special master appropriately evaluated the evidence before him and did not raise the petitioner's burden of proof; the special master applied the appropriate legal standards. His conclusion that the petitioner did not meet her burden to demonstrate by preponderant evidence that she met the first and second *Althen* prongs was not arbitrary and capricious. Accordingly, the special master's decision is sustained. The petitioner's motion for review (ECF 152) is **DENIED**. The Clerk is **DIRECTED** to enter judgment for the respondent.

It is so **ORDERED**.

s/ Richard A. Hertling

Richard A. Hertling
Judge