

Curing the Blue: Breaking Barriers in Pediatric Cardiology

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## Introduction

In 1944, a team of eight surgeons performed the surgery that would forever change the field of pediatric heart surgery. “Blue baby syndrome” occurs in one of three thousand babies at birth<sup>1</sup>, depriving the blood of oxygen and causing the baby’s skin to turn blue. Dr. Helen Taussig discovered a way to surgically improve the flow of oxygen into the blood, helping save millions of lives. Overcoming obstacles of deafness, dyslexia, and sexism, Taussig succeeded in medical school and entered medical practice at a time when women rarely did so, changing the world of pediatric cardiology forever.

## Early Childhood

Helen Taussig was born in May 1898 in Cambridge, Massachusetts, to Frank Taussig, a Harvard Economics professor,<sup>2</sup> and Edith Guild, one of the first female graduates of Radcliffe College. Helen was born with dyslexia, “a learning disorder that affects your ability to read, spell, write, and speak,”<sup>3</sup> which had no readily available treatments at the time. Dyslexia would be the first hurdle Taussig would need to overcome.

As a child, Taussig contracted whooping cough, which left her hearing-impaired. She also suffered from mild tuberculosis, forcing her to attend school mornings only for over a year. This made it even more difficult for her to keep pace with her peers. Helen’s mother died from tuberculosis, leaving Mr. Taussig to raise Helen alone. Looking to Helen for company, he spent

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<sup>1</sup> Keeley, Jim. “Homing In On a Cause of Blue Baby Syndrome.” HHMI.org. Howard Hughes Medical Institute, July 13, 2009.

<https://www.hhmi.org/news/homing-cause-blue-baby-syndrome>.

<sup>2</sup> Schumpeter, J. A., et al. “Frank William Taussig.” *The Quarterly Journal of Economics*, vol. 55, no. 3, 1941, pp. 337–363. *JSTOR*, [www.jstor.org/stable/1885636](http://www.jstor.org/stable/1885636).

<sup>3</sup> “What Is Dyslexia?” *WebMD*, <https://www.webmd.com/children/understanding-dyslexia-basics>.

much time with her and grew to know her well. This enabled him to help her greatly.<sup>4</sup> He was instrumental in helping Helen persevere through her hearing impairment, dyslexia, and tuberculosis, which could have kept her from medical school and prevented her accomplishments.

### **Education and Sexism**

Helen attended a private school in Waverley, later went to Buckingham School, and then studied at Cambridge School for Girls. Because of her dyslexia, her grades were dissatisfactory, and she had trouble advancing academically. Sadly, she was sometimes referred to as “retarded” by her teachers.<sup>5</sup> Her father recognized her potential and supported her education, tutoring her despite his own doubts she could complete elementary school. With her father’s help and her willingness to learn, she achieved satisfactory grades and began expressing an interest in attending medical school. “Persevering despite obstacles would help Taussig obtain her medical degree and choose a specialty.”<sup>6</sup>

In September 1917, she started Radcliffe College becoming a tennis champion and acquiring adequate grades; however, Helen was disappointed in her experience. She had visited the University of California at Berkeley and begged her father to let her attend.<sup>7</sup> After another year at Radcliffe College to improve her grades, Mr. Taussig allowed her to transfer. Helen

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<sup>4</sup> Goodman, Gerri Lynn, "A gentle heart: the life of Helen Taussig" (1983). *Yale Medicine Thesis Digital Library*. 2658. <https://elischolar.library.yale.edu/ymtdl/2658>

<sup>5</sup>Forde, Richard James. "Helen Brooke Taussig." *Jewish Women: A Comprehensive Historical Encyclopedia*. 27 February 2009. Jewish Women's Archive. <https://jwa.org/encyclopedia/article/taussig-helen-brooke>.

<sup>6</sup> Murphy, Jim. *Breakthrough!: How Three People Saved Blue Babies and Changed Medicine Forever*. Houghton Mifflin Harcourt, 2019.

<sup>7</sup> Bart, Jody, "Women Succeeding in the Sciences: Theories and Practices Across Disciplines" (June 15, 2000). Purdue University Press e-books. Book 14. [http://docs.lib.purdue.edu/purduepress\\_ebooks/14](http://docs.lib.purdue.edu/purduepress_ebooks/14)

started UC Berkeley in August 1919. While there, she was often mistaken for the daughter of an unpopular regent named Taussig, which caused her to be met with cynicism, but she ignored others and flourished academically, graduating in May 1921 with a Bachelor of Arts degree.<sup>8</sup>

After college, she pondered which career field to pursue. The School of Public Health at Harvard had just opened, so her father suggested Helen go into public health, thinking it would be a suitable field for women. “Medicine was a white, male-dominated profession when Helen sought entrance to medical school in 1921,” and “only 5 percent of practicing physicians in the United States were women,” which meant it was exceedingly difficult for women to break the gender barrier.<sup>9</sup> This makes her achievements all the more impressive. President Lowell of Harvard did not allow women to attend Harvard Medical School. When Taussig met with Dr. Rosenau, Dean of the School of Public Health, and shared her interest in the field of medicine, Rosenau acquiesced that everyone could study there, but they would not admit women as candidates for a degree. Taussig found it atrocious that women could study all those years, and a degree would not be granted. Her encounter with Dr. Rosenau only made her more determined to pursue medicine; she ultimately found a way to study at Harvard Medical School with special permission to study histology under the supervision of Dr. Bremmer in 1921.<sup>10</sup>

Being female, and under the male administration’s fear of “contamination,” Helen did not involve herself with the male students. She was forced to sit in the corner of the room while listening to lectures in class and was mandated to go into another room to observe slides,

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<sup>8</sup> "Women Succeeding in the Sciences: Theories and Practices Across Disciplines" Purdue University Press e-books. 6-15-2000

<sup>9</sup> Murphy, *Breakthrough!: How Three People Saved Blue Babies and Changed Medicine Forever*.

<sup>10</sup> Goodman "A gentle heart: the life of Helen Taussig" 2658

ostensibly to avoid a negative impact on male students.<sup>11</sup> Deeming Harvard a waste of time, Dr. Bremmer encouraged Helen to transfer to Boston University. Taussig took Dr. Bremmer's advice and transferred, thinking that to study for "four years without the prospect of a proper degree seemed a bit too ridiculous."<sup>12</sup> Also, she could study biology and anatomy there since Boston University "was the first university to open all its divisions to women."<sup>13</sup>

### **Stepping Into the Field of Cardiology**

While at Boston University, Taussig met Dr. Alexander Begg, Dean of the Medical School and Professor of Anatomy. He advised her to study the heart, one of the most important organs in the body. Her first paper impressed Dr. Begg enough he suggested she attend highly-regarded Johns Hopkins Medical School, where she would be treated as an equal.<sup>14</sup> There would be no separation of men and women, only people who shared Taussig's passion and commitment towards medicine and helping others. To enroll in Johns Hopkins Medical School, Taussig needed an exceptional letter of recommendation from Harvard. Helen decided to request a letter of recommendation from her father's close friend, Dr. Walter Cannon, Professor of Physiology at Harvard, who enthusiastically wrote the letter recommending Helen.<sup>15</sup>

Although her gender made it a challenge for Taussig to get into this prestigious school, she hoped her work would be enough to prove she belonged. She was accepted and joined the

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<sup>11</sup> Engle, M. A. "Dr. Helen Brooke Taussig, Living Legend in Cardiology." *Wiley Online Library*, John Wiley & Sons, Ltd, 5 Feb. 2009, [onlinelibrary.wiley.com/doi/pdf/10.1002/clc.4960080614](http://onlinelibrary.wiley.com/doi/pdf/10.1002/clc.4960080614).

<sup>12</sup> Van Robays, J. "Helen B. Taussig (1898-1986)." *Facts, Views & Vision in ObGyn*, vol. 8, no. 3, pp. 183–87.

<sup>13</sup> "BU Firsts and Special Achievements | BU Today." Boston University, <http://www.bu.edu/articles/2007/bu-firsts-and-special-achievements/>.

<sup>14</sup> Goodman "A gentle heart: the life of Helen Taussig" 2658

<sup>15</sup> Goodman "A gentle heart: the life of Helen Taussig" 2658

Class of 1923 along with nine other women. She had also published “a paper on ox heart muscles with Alexander Begg,”<sup>16</sup> which helped her gain admission into Johns Hopkins. Taussig did not allow gender discrimination to affect her. Instead, she persevered to complete medical school.

Taussig was later elected into Alpha Omega Alpha, an honor society in the field of medicine, and earned her Doctor of Medicine degree in 1927. She then applied for the Osler Medical Internship at Johns Hopkins University, which would only accept one woman - showing a preference for male, thus preferred, students. Another female doctor vying for the scholarship, Dr. Vivian Tappan, had a grade average slightly above Dr. Taussig's, so Taussig did not get the internship. Fortunately, Dr. Edward Carter offered Taussig a fellowship in his clinic, which she accepted graciously. She began working right away and “continued working on the physiology of the heart, and published two papers.”<sup>17</sup> After her fellowship, Dr. Taussig entered the field of Pediatrics. In 1930, Dr. Park asked her to be head of the Children's Cardiac Clinic where she remained until her retirement in 1963.<sup>18</sup>

### **Deafness Strikes**

While at the cardiac clinic, she researched anoxemia, more commonly known as “blue baby syndrome,” which “caused the deaths of 25% of babies before their first birthday and 70% before the age of 10.”<sup>19</sup> Dr. Taussig sought to find the cause of this deadly condition. To find the source of the problem, first, she needed to be able to hear the heart. Unfortunately, over the years, her hearing had only deteriorated. She was almost completely deaf by the age of 31. At

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<sup>16</sup> “Helen Taussig: Warrior of the Heart | About the Hero.” Lowell Milken Center, 5 Apr. 2018, /projects/view/warrior-of-the-heart.

<sup>17</sup> Goodman, "A gentle heart: the life of Helen Taussig" 2658.

<sup>18</sup> Murphy, *Breakthrough!: How Three People Saved Blue Babies and Changed Medicine Forever*.

<sup>19</sup> “Helen Taussig: Warrior of the Heart | About the Hero.” Lowell Milken Center.

first, a hearing aid solved most of her problems, but soon she needed something more.<sup>20</sup> Being able to hear the hearts of babies affected by anoxemia was crucial in making a diagnosis, and Taussig struggled to do so. Instead of letting her hearing impairment defeat her, she bought an amplified stethoscope; she also used her fingers to tell if the heart was healthy. Gently putting her fingers to their chest, she felt for palpitations or irregularities in the heartbeat, which helped her diagnose the babies. This method turned out to be more helpful than using a normal stethoscope.<sup>21</sup> She had also begun to rely on the use of lip-reading since she could no longer hear what others were saying to her, which made it hard for her to communicate with her fellow doctors.<sup>22</sup> By persevering, Taussig overcame another barrier. She did not let her hearing impairment stop her from doing what she loved.

### **Blue Babies**

Taussig “frequently saw babies who looked blue during and right after the delivery. After every sip at their mother’s breast, they had to gasp for air.”<sup>23</sup> She concluded there was a recurring pattern in the babies that had a cyanotic hue, which helped her diagnose them. She also noticed some blue babies died soon after birth while some lived for years. Using fluoroscopy, she determined the blue babies had an underdeveloped artery causing this syndrome,<sup>24</sup> and “discovered that the artery leading from the heart was narrowed, so an insufficient supply of

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<sup>20</sup> Forde, “Helen Brooke Taussig.”

<sup>21</sup> Murphy, *Breakthrough!: How Three People Saved Blue Babies and Changed Medicine Forever*.

<sup>22</sup> *Changing the Face of Medicine | Helen Brooke Taussig*.  
[https://cfmedicine.nlm.nih.gov/physicians/biography\\_316.html](https://cfmedicine.nlm.nih.gov/physicians/biography_316.html).

<sup>23</sup> Van Robays, “Helen B. Taussig (1898-1986)” pp. 183–87.

<sup>24</sup> *The First Blalock-Taussig Anastomosis / by Dr. Helen Taussig. 1968. soundcloud.com*,  
<https://soundcloud.com/hopkins-medical-archives/the-first-blalock-taussig-anastomosis-by-dr-helen-taussig-1968>.

blood was reaching the lungs to receive its vital oxygen. Dr. Taussig reasoned that a surgical operation might short-circuit the constriction and sidetrack blood into the lungs.”<sup>25</sup> She decided to present this to Dr. Gross, who was known as the “ductus surgeon.”<sup>26</sup> He was skeptical of the idea since he worked so hard to close the patient’s *ductus*, which was the vessel that made all the difference, and he refused to assist her.<sup>27</sup> Given the persistent sexist attitudes of the time, he possibly overlooked Taussig’s idea because of her gender.

Taussig refused to give up and went to Dr. Alfred Blalock, another heart surgeon, who listened to her carefully, despite his doubts. “They decided to ‘bypass’ the narrowed pulmonary artery, suturing a (dispensable) arm artery to the pulmonary artery just past the obstruction.”<sup>28</sup> Blalock, Taussig and Vivien Thomas worked together to ascertain the details of what would soon become known as the Blalock-Taussig-Thomas shunt.<sup>29</sup> The order of the names of this life-saving device hints at how females were perceived as inferior. Blalock is first because he was a male, even though Taussig was the one who had the idea. Thomas, a male African American, is last perhaps because of his race, despite having taught Blalock the surgery.<sup>30,31</sup>

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<sup>25</sup> Potter, Robert D. "Saving Our Doomed 'Blue' Babies." *The American Weekly* 17 Feb. 1946, Science Editor: 1. Print.

<sup>26</sup> Van Robays “Helen B. Taussig (1898-1986),” pp. 183–87.

<sup>27</sup> Taussig, Helen B. “The Development of the Blalock-Taussig Operation and Its Results Twenty Years Later.” *Proceedings of the American Philosophical Society*, vol. 120, no. 1, 1976, pp. 13–20. *JSTOR*, [www.jstor.org/stable/986348](http://www.jstor.org/stable/986348).

<sup>28</sup> Stone, John, and M.d. “BODY AND MIND; Baby Heart on Hold.” *The New York Times*, 10 July 1988. *NYTimes.com*, <https://www.nytimes.com/1988/07/10/magazine/body-and-mind-baby-heart-on-hold.html>.

<sup>29</sup> *The Blalock-Taussig-Thomas Shunt · The Blue Baby Operation · Exhibits: The Sheridan Libraries and Museums*. Accessed 02 February 2020 <https://exhibits.library.jhu.edu/exhibits/show/the-blue-baby-operation/the-blalock-taussig-thomas-shu>. Accessed 02 February 2020

<sup>30</sup> *Alfred Blalock · The Blue Baby Operation · Exhibits: The Sheridan Libraries and Museums*. Accessed 02 February 2020 <https://exhibits.library.jhu.edu/exhibits/show/the-blue-baby-operation/alfred-blalock>.



To perfect the device's design, Dr. Blalock and Thomas experimented on about two hundred dogs and performed their first human surgery in 1944 on a young girl named Eileen Saxon.<sup>32</sup> Taussig used her fingers to diagnose Eileen, and she was soon brought to the operating room and anesthetized. After the procedure, Eileen improved sufficiently, but, unfortunately, died in a follow-up surgery. During this operation and two subsequent procedures, the surgeons were slowly perfecting the placement of the shunt into the patients' hearts. The third surgery was the most successful. It was done on a frail six-year-old boy who could no longer walk. As soon as the anesthesiologist released the clamps, his complexion changed from a cyanotic blue to a rosy pink.<sup>33</sup> Dr. Taussig's idea had proven brilliant, although Blalock received the lion's share of attention, including full tenure at their university years before Taussig was awarded the same.<sup>34</sup> The operation's success would draw people from all around, giving them hope for a better life. This breakthrough in medicine would bring acclaim to Johns Hopkins as much as any other single achievement in the last seventy-five years.

Also, "Taussig was the first to give a full description of the phenomenon of squatting" after children with tetralogy of Fallot exercised. She described it as the blood flow being cut off to the legs and blood flow increasing to the lungs. This accurate description helped cardiologists

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<sup>31</sup> *General History of Medicine Oral Histories: Vivien T. Thomas : An Oral History [Sound Recording] / Interviewed by Peter D. Olch, Apr. 20, 1967.*  
<https://oculus.nlm.nih.gov/cgi/t/text/text-idx?c=oralhist;cc=oralhist;rgn=main;view=text;idno=2935102r>.

<sup>32</sup> Altman, Lawrence K. "Dr. Helen Taussig, 87, Dies; Led in Blue Baby Operation." *The New York Times*, 22 May 1986. *NYTimes.com*,  
<https://www.nytimes.com/1986/05/22/obituaries/dr-helen-taussig-87-dies-led-in-blue-baby-operation.html>.

<sup>33</sup> Taussig, "The Development of the Blalock-Taussig Operation and Its Results Twenty Years Later," pp. 13–20.

<sup>34</sup> Randal, Judith. "You've Come a Long Way, Doctor." *Change*, vol. 11, no. 8, 1979, pp. 55–69. *JSTOR*, [www.jstor.org/stable/40163318](http://www.jstor.org/stable/40163318).

better understand this disease .<sup>35</sup> After developing the operation, she spent the rest of her life researching congenital heart ailments, the effects of rheumatic fever, and heart malformations in birds.<sup>36</sup>

### **Phocomelia in Germany**

In the 1960s, a new problem arose in Germany, the Netherlands, and Belgium. Babies were born without limbs or necks as a result of the condition phocomelia. A German physician-geneticist, Widukind Lenz, discovered the drug thalidomide was causing this outbreak.<sup>37</sup> Thalidomide was being advertised as an antiemetic for pregnant women to help relieve morning sickness. However, when pregnant women took the drug in the second month of pregnancy, the fetus's development was blocked, causing the symptoms of phocomelia.<sup>38</sup>

This came to Dr. Taussig's attention in January 1962 when one of her students told her about it. Taussig decided to uncover the origin of this phenomenon and traveled to various European cities. Examining the affected babies, she concluded the drug was indeed to blame for the otherwise healthy babies' development.<sup>39</sup>

Immediately flying back to the United States, she did everything in her power to stop the Food and Drug Administration from approving this treacherous drug. She started a campaign to stop the use of this drug, warned pregnant women against it, and gave lectures for the American

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<sup>35</sup> "Squatting In Fallot's Tetralogy." *The British Medical Journal*, vol. 4, no. 5629, 1968, pp. 470–470. *JSTOR*, [www.jstor.org/stable/20394833](http://www.jstor.org/stable/20394833).

<sup>36</sup> "OBITUARIES : 'First Lady of Cardiology' Dies in Crash : Dr. Helen Brooke Taussig Pioneered 'Blue-Baby' Operation." *Los Angeles Times*, 23 May 1986, <https://www.latimes.com/archives/la-xpm-1986-05-23-me-23503-story.html>.

<sup>37</sup> Van Robays, "Helen B. Taussig (1898-1986)," pp. 183–87.

<sup>38</sup> Taussig, HB. Phocomelia and thalidomide. *Am J Obstet Gynecol*. 1962;84:979. doi:10.1016/0002-9378(62)90079-0

<sup>39</sup> Helen B. Taussig, M.D. "Dangerous Tranquility." *Science*, vol. 136, no. 3517, 1962, pp. 683–683. *JSTOR*, [www.jstor.org/stable/1709114](http://www.jstor.org/stable/1709114).

College of Physicians and the American Senate. Testifying in front of the United States of America Congress, she eventually persuaded them to ban it, potentially saving thousands of lives.<sup>40</sup>

### Later Years

In 1964, she was awarded the Medal of Freedom from President Lyndon B. Johnson for her work in pediatric cardiology and became the first-ever female president of the American Heart Association when she was 67.<sup>41</sup> She also received the French Chevalier Legion d'Honneur, the Italian Feltrinelli Prize, the Peruvian Presidential Medal of Honor, and the Albert Lasker Medical Research Award. She and Dr. Blalock also received the Passano Award, making her the first female to do so. It gave her immense happiness to be recognized after all those years of staying in the shadows and not getting credit because of her gender. A few years before she received this recognition she had written,

Over the years I've gotten recognition for what I did, but I didn't at the time. It hurt for a while. It hurt when Dr. Blalock was elected to the National Academy of Arts and Sciences and I didn't even get promoted from an assistant to associate professor.<sup>42</sup>

Her determination despite years of gender discrimination demonstrates how she broke yet another barrier in her accomplished life. Taussig died in a car crash three days before her 88th birthday near her home in Kennett Square, Pennsylvania, and donated her body to Johns Hopkins.<sup>43</sup> One of the world's greatest doctors died, but her accomplishments will always be

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<sup>40</sup> Van Robays, "Helen B. Taussig (1898-1986)," pp. 183–87.

<sup>41</sup> "DR. TAUSSIG AT 66: AS BUSY AS EVER; 'Retired' Woman Physician Is Doing Research." *The New York Times*, 20 Dec. 1964. *NYTimes.com*, <https://www.nytimes.com/1964/12/20/archives/dr-taussig-at-66-as-busy-as-eyer-retired-woman-physician-is-doing.html>.

<sup>42</sup> *The Liz Library Presents: Irene Stuber's Women of Achievement and Herstory*. <http://www.thelizlibrary.org/undelele/woa/woa05-24.html>.

<sup>43</sup> Altman, "Dr. Helen Taussig, 87, Dies; Led in Blue Baby Operation."

remembered.

### **Conclusion**

Dr. Helen Taussig was a phenomenal, kindhearted doctor who defied everyone who said she could not become a doctor or obtain a degree because she was a female. She faced adversity with perseverance. Her challenges taught her valuable lessons and deepened her compassion for others. Being dyslexic and mostly deaf, she accomplished what most of us could never even imagine. She fought through years of gender discrimination, rose to become the founder of pediatric cardiology, and saved the lives of millions of people. Her contributions to pediatric cardiology continue to save others all around the world. Those who have been saved and those who will be saved will be forever grateful to the woman who changed pediatric cardiology forever.



Taussig with children at a South African Clinic

#### Citation

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Taussig examining a baby

#### Citation

*Medical Archives - Personal Paper Collections: The Helen B. Taussig Collection.*  
<https://medicalarchives.jhmi.edu:8443/papers/taussig.html>.

## Annotated Bibliography

### Primary Sources

“Dr. Alfred Blalock Dead at 65; Developed ‘Blue Baby’ Surgery; Ex-Department Head at Johns Hopkins Performed Pioneer Operation There in 1944.” *The New York Times*, 16 Sept. 1964. *NYTimes.com*,  
<https://www.nytimes.com/1964/09/16/archives/dr-alfred-blalock-dead-at-65-developed-blue-baby-surgery.html>.

This source is a newspaper article that was used to learn more about Dr. Blalock and the surgery. I learned that the most common cause of blue baby syndrome was narrowness or the obstruction of passages from the heart to the big pulmonary arteries that carry blood from heart to lungs, and that the first operation proved that the pulmonary artery could be bypassed. The surgeons and Taussig perfected the surgical procedure enough that it became as regular as appendectomies. I also got information about Dr. Blalock’s background. He was a professor at Vanderbilt School of Medicine, and he worked on a project in which he discovered that surgical shock often resulted from the loss of whole blood or plasma, which led to the use of blood and plasma transfusions which had not been used often until that discovery. He then returned to Johns Hopkins to the position of surgeon-in-chief and the director of the department of surgery. He contributed basic research to the blue baby operation. This information helped me with the paper because I better understood Dr. Blalock and the surgery.

Altman, Lawrence K. “Dr. Helen Taussig, 87, Dies; Led in Blue Baby Operation.” *The New York Times*, 22 May 1986. *NYTimes.com*,  
<https://www.nytimes.com/1986/05/22/obituaries/dr-helen-taussig-87-dies-led-in-blue-baby-operation.html>.

This source is a newspaper article that details how Dr. Taussig died. Taussig died right before her 88th birthday in an automobile accident near her home in Kennett Square, Pennsylvania, and she donated her body to Johns Hopkins. The article also discusses how Dr. Blalock and Taussig experimented on two hundred dogs to devise the blue baby operation. Dr. Taussig worked at the University of Delaware in Wilmington after she retired, where she studied the deformed hearts of birds. This showed me that she had a great passion for cardiology and helping others.

Bedford, D. Evan. “Squatting In Heart Disease.” *The British Medical Journal*, vol. 4, no. 5633, 1968, pp. 770–770. *JSTOR*, [www.jstor.org/stable/20395212](http://www.jstor.org/stable/20395212).

This source is a journal article that was used to learn more about the phenomenon of squatting to relieve circulatory distress. I learned that squatting is usually adapted by children who are ambulant and cyanotic. Taussig discovered that the children squatted to get relief after exercise. Some children squat by sitting up, leaning forwards with the

knees drawn up to their chest, and the head and arms resting on the knees. Others merely squat normally, and Taussig figured out that both these ways are used to bring more blood flow to the lungs. The information from this source helped me write about her discovery about squatting.

Blalock, Alfred, and Helen B. Taussig. "THE SURGICAL TREATMENT OF MALFORMATIONS OF THE HEART: IN WHICH THERE IS PULMONARY STENOSIS OR PULMONARY ATRESIA." *Journal of the American Medical Association*, vol. 128, no. 3, May 1945, pp. 189–202. *jamanetwork.com*, doi:10.1001/jama.1945.02860200029009.

This source is a journal article to learn about the success of the operation. I learned that by the time they had written this article, they had performed three surgeries, all of which had greatly benefitted the blue babies. The babies' deep cyanotic hue had greatly diminished or disappeared entirely, which signaled the doctors' success. I also learned that the babies on whom they performed these three surgeries had severe pulmonary stenosis before the surgery; this showed me how successful Taussig's idea had been because it solved a severe problem.

"DR. TAUSSIG AT 66: AS BUSY AS EVER; 'Retired' Woman Physician Is Doing Research." *The New York Times*, 20 Dec. 1964. *NYTimes.com*, <https://www.nytimes.com/1964/12/20/archives/dr-taussig-at-66-as-busy-as-eyer-retired-woman-physician-is-doing.html>.

This is a newspaper article that illustrates some of Taussig's achievements. I learned that she retired when she was sixty-five after thirty-three years of being the physician in charge of the Cardiac Clinic of the Harriet Lane Home of Johns Hopkins Hospital. I also learned that she received the Medal of Freedom and became the president of the American Heart Association, which made her the first woman to ever have that position. Dr. Taussig fought for sufficient medical care for the "aged under Social Security." Another thing she received is the Thomas Rivers Memorial Distinguished Fellowship, of which she used \$540,000 for research. She also conducted research trying to figure out the relationship between levels of Vitamin D and types of heart valve disease, as well as its connection to mental disabilities. This information helped me understand other things she did in her life and what result her breakthroughs had on the world. This source also helped me understand the different awards she earned for her achievements, and how she never gave up or stopped working.

*The First Blalock-Taussig Anastomosis / by Dr. Helen Taussig. 1968. soundcloud.com*, <https://soundcloud.com/hopkins-medical-archives/the-first-blalock-taussig-anastomosis-by-dr-helen-taussig-1968>.

This source is an interview that was used to learn more about the operation and what led up to it. I learned about how Taussig came up with the idea and developed it. She used fluoroscopy to figure out why babies were turning blue and what she could do about it. I

also got to hear her speak, which showed me how open and care-free she was, which then helped me write about her personality. This information helped me get a better understanding of the operation and how she got the idea, as well as what her personality was like.

Franklin, Alfred White. "Not Men, But A Method." *The British Medical Journal*, vol. 2, no. 5411, 1964, pp. 748–750. JSTOR, [www.jstor.org/stable/25400298](http://www.jstor.org/stable/25400298).

This source is a journal article that was used to learn more about Taussig's career. I learned that when she retired, her students from all around the world came to pay tribute to her retirement. Her achievement creating the Blalock-Taussig shunt with Dr. Blalock had brought Johns Hopkins as much glory as any other single achievement in the last 75 years (at the time this article was written). I also learned that when she worked in the Harriet Lane Home, doctors kept sending children who had congenital heart disease to her, which showed me how highly doctors valued her opinion. I also learned that Dr. Park was her chief while she was there. All of this information helped me write about her impact and life.

*General History of Medicine Oral Histories: Vivien T. Thomas : An Oral History [Sound Recording] / Interviewed by Peter D. Olch, Apr. 20, 1967.*  
<https://oculus.nlm.nih.gov/cgi/t/text/text-idx?c=oralhist;cc=oralhist;rgn=main;view=text;idno=2935102r>.

This source is an interview with Vivien Thomas, one of Taussig's collaborators on the surgery. The transcript allowed me to read his own words about the surgeries, how he became a medical technician, and how little credit he was given for his work. Thomas started working for Dr. Blalock at the start of the Great Depression, so he was glad to have any work, even though he was doing the same work as postdoctoral research assistants and being paid on the same scale as a janitor. Although Dr. Blalock apparently pushed for Thomas to work for him, something the university found a problem because of his race, he refused to push for Thomas to get more credit and more pay for their work together. This source helped me make an interpretation about why the name of the shunt used in "blue baby" operations has the names in the order that it does.

"Heart Operations Followed Up." *The British Medical Journal*, vol. 2, no. 5807, 1972, pp. 178–179. JSTOR, [www.jstor.org/stable/25418453](http://www.jstor.org/stable/25418453).

This source is a journal article that explained the surgery. I learned that Dr. Taussig's idea, along with Dr. Blalock's and Vivien Thomas's work, allowed the field of cardiac surgery to finally open and truly develop. I also learned that the surgery was more than 80% effective. People from all over the world came to Baltimore to be evaluated and treated, which showed me how far her work had reached and how many people it had helped. Also, very few patients had lasting congenital cardiac malformations, and many of the patients got happily married and conceived children, which showed me how successful the operation and shunt was, as well as how Taussig's work gave hope to



thousands, even millions, of people.

Helen B. Taussig, M.D. "Dangerous Tranquility." *Science*, vol. 136, no. 3517, 1962, pp. 683–683. *JSTOR*, [www.jstor.org/stable/1709114](http://www.jstor.org/stable/1709114).

This source is a journal article that was used to learn about thalidomide and phocomelia. I learned that in 1962, an outbreak of congenital malformations drew Taussig's attention, and she decided to examine the situation herself. The disease phocomelia had pandemic numbers, and a German physician suggested that the disease was being caused by a sleeping pill containing thalidomide. Taussig felt that because of the serious effects on children, the situation should be brought to the immediate attention of the public, which showed me her determination to stop the drug. The information found from this source helped me write about thalidomide and about Taussig's impact regarding this deadly drug.

*Helen Taussig · The Blue Baby Operation · Exhibits: The Sheridan Libraries and Museums*. Accessed 02 February 2020  
<https://exhibits.library.jhu.edu/exhibits/show/the-blue-baby-operation/helen-taussig>.

This primary source helped me understand how she interacted with her patients by showing me how gentle and caring she was because of how carefully she handled the babies and with how much love she looked at them. The other information was used to learn about her awards and contributions. I learned that she received numerous awards, including the United States of America Medal of Freedom. I also learned that she testified in the United States of America Congress while trying to ban the drug thalidomide. Dr. Taussig was also responsible for diagnosing the patients and making sure they got sufficient pre- and post- operative care. Another thing I learned was that she got the idea of the shunt in a conversation she had in 1943 with Alfred Blalock and Edwards A. Park, who was the pediatrician-in-chief at that time. They were discussing what could be used as a bypass to repair a coarctation. She had the idea to put the subclavian artery into the pulmonary artery, which helped her develop her idea for the shunt later in her career. This information helped me understand the origin of her idea and the successes of the operations.

Humanities, National Endowment for the. *The Chronicle. (Pascagoula, Miss.) 1961-1966, August 27, 1963, Image 2.* 27 Aug. 1963, p. 2.  
<https://chroniclingamerica.loc.gov/lccn/sn87065526/1963-08-27/ed-1/seq-2/>

This source is a newspaper article that was used to learn more about how Taussig helped thousands with her determination to ban thalidomide. I learned that after the thalidomide scare, drug laws became tighter which potentially saved many lives. A housewife from Phoenix, Arizona, actually legally aborted her child because she did not want to risk having a deformed child. Because of the banning of thalidomide, no more babies would be killed in such a cruel way. This information helped me write about Taussig's impact on the world getting thalidomide banned.

Humanities, National Endowment for the. *The Chronicle. (Pascagoula, Miss.) 1961-1966, March 23, 1962, Image 7.* 23 Mar. 1962. [chroniclingamerica.loc.gov, https://chroniclingamerica.loc.gov/lccn/sn87065526/1962-03-23/ed-1/seq-7/](https://chroniclingamerica.loc.gov/lccn/sn87065526/1962-03-23/ed-1/seq-7/).

This source is a newspaper article that was used to learn about how far Taussig's work had reached. I learned that Mrs. William Macy was awarded a medal for her work in heart disease. She attended a presentation in Baltimore by Helen Taussig, who was world famous by then. This showed me how far Taussig's work had reached and how it had inspired others to pursue the field of cardiology. Also, the picture that is included with this article shows Taussig handing Mrs. Macy the award, and this image displays Taussig's kindly smile and Macy's excited, awed smile. This helped me get a glimpse into Taussig's personality and helped me write about it.

Humanities, National Endowment for the. *The Chronicle-Star Combined with the Moss Point Advertiser. (Pascagoula, Miss.) 1941-1949, May 13, 1949, Image 1.* 13 May 1949. <https://chroniclingamerica.loc.gov/lccn/sn87065528/1949-05-13/ed-1/seq-1/>.

This source is a newspaper article that was used to learn about another "blue baby" story. I learned that a boy who was about to undergo the "blue baby" operation did not have enough money to get it done, but his parents were frantically trying to fund the surgery because they wanted him to have a chance at a normal life. His parents were heartbroken every time their child could not do what others could do, like toddle around. After going from doctor to doctor, they heard about the new "blue baby" operation, and they decided to get their child examined. This source helped me write about Taussig's impact and about the happiness and hope she gave others.

Humanities, National Endowment for the. *Enakopravnost. (Cleveland, O.[Ohio]) 1918-1957, February 10, 1947, Image 3.* 10 Feb. 1947. [chroniclingamerica.loc.gov, https://chroniclingamerica.loc.gov/lccn/sn83035527/1947-02-10/ed-1/seq-3/](https://chroniclingamerica.loc.gov/lccn/sn83035527/1947-02-10/ed-1/seq-3/).

This source is a newspaper article that was used to learn about a "blue baby" operation success. I learned that a small boy named Tommy Boland, at four years old, had a successful surgery at Johns Hopkins Hospital in Baltimore. He was feeling healthy enough to display interest in normal child activities. In the picture included in this article, he is shown playing with toys in his crib with a nurse at his side. He looks like any other child in the picture, which helped me understand how Taussig gave people a chance at a normal life. This helped me write about Taussig's impact and how she gave hope to everyone.

Humanities, National Endowment for the. *Evening Star. (Washington, D.C.) 1854-1972, April 13, 1947, Image 75.* 13 Apr. 1947, p. D. <https://chroniclingamerica.loc.gov/lccn/sn83045462/1947-04-13/ed-1/seq-75/>

This source is a newspaper article that was used to learn about a science award Taussig

earned. She received an award for her work on heart diseases, especially the “blue baby” operation, and because she was in charge of the Cardiac Clinic Harriet Lane Home at Johns Hopkins Hospital. I also learned that her titles at this time included an associate professor of pediatrics at Johns Hopkins University, consultant for the state of Maryland, and cardiac consultant at Sydenham Hospital in Baltimore. This information showed me how she started to earn credit for her work later in her life.

Humanities, National Endowment for the. *Evening Star*. (Washington, D.C.) 1854-1972, April 20, 1947, Image 6. 20 Apr. 1947, p. A-6.  
<https://chroniclingamerica.loc.gov/lccn/sn83045462/1947-04-20/ed-1/seq-6/>

This source is a newspaper article that was used to learn about her recognition at the Women’s Press Club. I learned that she was noted for her work on the “blue baby” operation. She was recognized for her work in the field of science. The information from this source helped me write about how she eventually got recognition for her work.

Humanities, National Endowment for the. *Evening Star*. (Washington, D.C.) 1854-1972, April 21, 1950, Image 9. 21 Apr. 1950.  
<https://chroniclingamerica.loc.gov/lccn/sn83045462/1950-04-21/ed-1/seq-9/>

This source is a newspaper article that was used to learn about the new and improved “blue baby” operation. I learned that there was a new operation that could have been called the three-leaf clover surgery. This new surgery was developed by Dr. Blalock and Dr. Russel Brock, and it was done on cyanotic children who did not respond positively to the first operation which used the Blalock-Taussig shunt. This new shunt is shaped like a three-leaf clover, hence the name, and no blood can leak back to the heart when this device is used, which makes it successful if the first one fails. This information showed me how impactful Taussig and Blalock’s work was, and how people did not like to give credit to females because Taussig’s name was not mentioned once in the article.

Humanities, National Endowment for the. *Evening Star*. (Washington, D.C.) 1854-1972, August 29, 1947, Image 20. 29 Aug. 1947. *chroniclingamerica.loc.gov*,  
<https://chroniclingamerica.loc.gov/lccn/sn83045462/1947-08-29/ed-1/seq-20/>.

This source is a newspaper article that was used to learn about another success of the blue baby operation. I learned that a little girl from France, who had a heart malformation, had a successful surgery. She had a critical case of blue baby syndrome that could have taken her life if she had not had the surgery. After she had the surgery, she was almost like any other child, which showed that the surgeons had succeeded once again. This information helped me understand how successful the operation was and how many people it affected. I also learned that it usually took about three months for the “blue babies” to be on their feet after the operation, which showed me that since there was a short recovery time after the surgery, the surgeons were very successful in treating the patient.

Humanities, National Endowment for the. *Evening Star*. (Washington, D.C.) 1854-1972, August 29, 1948, Image 13. 29 Aug. 1948, p. A.  
<https://chroniclingamerica.loc.gov/lccn/sn83045462/1948-08-29/ed-1/seq-13/>

This source is a newspaper article that was used to learn about a family that was impacted by Taussig's work. They had two "blue babies" in their family. The first one was a girl who had a successful surgery, and she was able to run and play like every other kid. The boy, Frank, could barely walk a few steps without utter exhaustion, but after a successful operation, the doctors were sure that he would have a complete recovery just like his sister. Frank's operation gave him and his parents immense hope and happiness. This source helped me understand and write about the hope that Taussig's work gave families.

Humanities, National Endowment for the. *Evening Star*. (Washington, D.C.) 1854-1972, December 03, 1948, Image 25. 3 Dec. 1948. *chroniclingamerica.loc.gov*,  
<https://chroniclingamerica.loc.gov/lccn/sn83045462/1948-12-03/ed-1/seq-25/>.

This source is a newspaper article that was used to learn about a young man named William Perry Stewart. He was born a blue baby, and he was examined by the doctors at Johns Hopkins to determine whether or not he could be helped by the operation. He wanted to get his degree in chemical engineering, but he had to drop out of university in his first semester because of the strain on his heart. Taussig's idea and work gave him and his family hope for a better future, and it gave him a chance to earn his degree and pursue his dream. This source helped me understand Taussig's impact.

Humanities, National Endowment for the. *Evening Star*. (Washington, D.C.) 1854-1972, December 04, 1945, Image 19. 4 Dec. 1945. *chroniclingamerica.loc.gov*,  
<https://chroniclingamerica.loc.gov/lccn/sn83045462/1945-12-04/ed-1/seq-19/>.

This source is a newspaper article that was used to learn about another patient. I learned that two-year-old Judith Hackman was at Johns Hopkins Hospital, being considered for the "Blalock operation." The fact that they used the word "Blalock operation," and barely mentioned Helen Taussig once in the article shows how females were seen as inferior and how Blalock received all the credit for an idea that was Taussig's. It also shows that they perceived women as inferior to men. I also learned that since the first operation, Dr. Blalock had perfected the placement of the shunt into the patient's heart, which helped me write about it. The information in this source also helped me write about how women were seen as inferior to men.

Humanities, National Endowment for the. *Evening Star*. (Washington, D.C.) 1854-1972, December 04, 1946, Image 13. 4 Dec. 1946, p. A.  
<https://chroniclingamerica.loc.gov/lccn/sn83045462/1946-12-04/ed-1/seq-13/>

This source is a newspaper article that was used to learn about another "blue baby" operation. In the photo, an ambassador is looking at the surgeons as they work on six-year-old Sandra Carson. This showed me how important Taussig, Blalock, and

Thomas's work was. The surgery was successful, and Sandra's health improved substantially to the point where her condition was satisfactory. This operation added to the growing list of success stories, which showed me how they had practically perfected the placement of the shunt into the patient's heart, which helped me write about their success and impact.

Humanities, National Endowment for the. *Evening Star. (Washington, D.C.) 1854-1972, December 09, 1945, Image 11.* 9 Dec. 1945, p. A.  
<https://chroniclingamerica.loc.gov/lccn/sn83045462/1945-12-09/ed-1/seq-11/>

This source is a newspaper article that was used to learn about another child that had the "blue baby" operation. I learned that the operation had recently been perfected, and he was to be the sixty-sixth child to be operated on with the shunt. I also learned that blue babies were susceptible to the cold and turned blue after the slightest exertion. Another child who had been growing steadily weaker from "blue baby" had been given hope from the success of Judy Hackman's operation. If not for the Blalock-Taussig shunt, the child would not have survived past his third birthday. This source helped me understand and write about the success of the operation and about the hope it gave the families of patients.

Humanities, National Endowment for the. *Evening Star. (Washington, D.C.) 1854-1972, December 10, 1948, Image 34.* 10 Dec. 1948. *chroniclingamerica.loc.gov*,  
<https://chroniclingamerica.loc.gov/lccn/sn83045462/1948-12-10/ed-1/seq-34/>.

This source is a newspaper article that covers how many people Taussig impacted with her work. I learned that there was a surgery planned for a twenty-two year-old man. The age of the man showed me that Taussig helped older people too, not just infants and children. Also, it showed me that the operation could be done on people other than small children, and it would still be as successful. This source helped me write about her impact.

Humanities, National Endowment for the. *Evening Star. (Washington, D.C.) 1854-1972, December 14, 1945, Image 18.* 14 Dec. 1945, p. A.  
<https://chroniclingamerica.loc.gov/lccn/sn83045462/1945-12-14/ed-1/seq-18/>

This newspaper article was used to learn more about Taussig's impact. It was about a Detroit "blue baby" who had died before the operation. He was four at the time of his death, and he had struggled with breathing his whole life. This information helped me understand how impactful Taussig's work was because without her hard work and ingenious idea, millions more would have died, but because of the Blalock-Taussig shunt, "blue babies" have a chance to live.

Humanities, National Endowment for the. *Evening Star. (Washington, D.C.) 1854-1972, December 21, 1945, Image 21.* 21 Dec. 1945. *chroniclingamerica.loc.gov*,  
<https://chroniclingamerica.loc.gov/lccn/sn83045462/1945-12-21/ed-1/seq-21/>.

This source is a newspaper article that was used to learn about more “blue baby” stories. It reports an 80% success rate in the surgeries and tells about three children scheduled to leave Johns Hopkins Hospital: one restored to health by the operation, the other two turned down. The children were turned down because Taussig reasoned that the operation would provide more risks than benefits, and that it would be better to leave the children alone. This showed me her kindness because she cared enough to turn the children and their parents away. She did not want to bring more pain to them, so she chose to let them down easier. This information demonstrated her kindness and compassion.

Humanities, National Endowment for the. *Evening Star*. (Washington, D.C.) 1854-1972, December 29, 1945, Image 13. 29 Dec. 1945. [chroniclingamerica.loc.gov](https://chroniclingamerica.loc.gov), <https://chroniclingamerica.loc.gov/lccn/sn83045462/1945-12-29/ed-1/seq-13/>.

This source is a newspaper article that was used to learn about another “blue baby” story. I learned that a boy who had been impacted with “blue baby” syndrome did not have enough money to go through with the operation, so his friends raised one thousand and two hundred dollars for him to go to Johns Hopkins and receive the surgery. Unfortunately, his surgery was cancelled because his respiration was dissatisfactory, but there was hope that the surgery would be set to a later date. This operation would have been the 70th operation using the Blalock-Taussig shunt. All of this information helped me understand Taussig’s impact.

Humanities, National Endowment for the. *Evening Star*. (Washington, D.C.) 1854-1972, February 17, 1951, Image 5. 17 Feb. 1951. <https://chroniclingamerica.loc.gov/lccn/sn83045462/1951-02-17/ed-1/seq-5/>

This source is a newspaper article that was used to learn about what happened once the child reached Johns Hopkins Hospital. It was an article about an infant flown into Baltimore to be examined. I learned that when he arrived, he was placed under oxygen and the doctors said that they would begin preliminary examinations the day after. This helped me understand what happened after reaching the hospital.

Humanities, National Endowment for the. *Evening Star*. (Washington, D.C.) 1854-1972, February 21, 1952, Image 10. 21 Feb. 1952. <https://chroniclingamerica.loc.gov/lccn/sn83045462/1952-02-21/ed-1/seq-10/>

This source is a newspaper article that was used to learn about the reach of the operation and how Taussig was not given credit. At the time this was written, there had been 12 operations done in Washington, and not everyone was flying to Baltimore to get the operation done anymore. Also, this article credits Dr. Blalock with the idea of the operation, as well as the technique, when it was mainly Taussig’s idea and Thomas’ procedures that led to the success. This helped me understand how far the surgery had reached, and how Taussig was not given credit.

Humanities, National Endowment for the. *Evening Star*. (Washington, D.C.) 1854-1972, January 01, 1948, Image 1. 1 Jan. 1948. [chroniclingamerica.loc.gov](https://chroniclingamerica.loc.gov), <https://chroniclingamerica.loc.gov/lccn/sn83045462/1948-01-01/ed-1/seq-1/>.

This source is a newspaper article that was used to learn about what happened right before the operation. This article was about a French boy who had a heart condition. He was brought to Baltimore from France by his parents to be tested. The doctors examined him to see if his heart condition was treatable by the Blalock-Taussig-Thomas shunt and if it would be safe for him to undergo surgery. This source helped me understand what happened right before the surgery and how much went into making sure that the patient was safe and had the best results possible.

Humanities, National Endowment for the. *Evening Star*. (Washington, D.C.) 1854-1972, January 14, 1946, Image 16. 14 Jan. 1946. [chroniclingamerica.loc.gov](https://chroniclingamerica.loc.gov), <https://chroniclingamerica.loc.gov/lccn/sn83045462/1946-01-14/ed-1/seq-16/>.

This newspaper article was used to learn a few details about the surgery. I learned that every part of the operation was critical to its success, and that the operation consisted of precise technique, in which delicacy and caution was required. This helped me understand how complicated and difficult the surgery technique was and how hard it was to have success.

Humanities, National Endowment for the. *Evening Star*. (Washington, D.C.) 1854-1972, January 15, 1946, Image 15. 15 Jan. 1946. [chroniclingamerica.loc.gov](https://chroniclingamerica.loc.gov), <https://chroniclingamerica.loc.gov/lccn/sn83045462/1946-01-15/ed-1/seq-15/>.

This source is a newspaper article that was used to learn about a mother and son's journey to get the operation. I learned that a twenty-two month-old was provided with hospital care after his mother hitchhiked for two days. This showed me how families would do anything to make sure that their children had a chance to live a normal, healthy life. Taussig changed lives, and her work was important enough that a mother would ride with strangers to come get the surgery done for her son. The boy was suffering from a heart ailment and a spinal condition, and his mother had hoped the "blue baby" operation would help him.

Humanities, National Endowment for the. *Evening Star*. (Washington, D.C.) 1854-1972, January 27, 1949, Image 3. 27 Jan. 1949, <https://chroniclingamerica.loc.gov>, <https://chroniclingamerica.loc.gov/lccn/sn83045462/1949-01-27/ed-1/seq-3/>

This source is a newspaper article that was used to learn about a person who was impacted by the operation. I learned that William Perry Stewart had the blue baby operation, which was a big success, and he was to return home. He was twenty-two years old, which made him one of the oldest people to receive this life-saving surgery. I also learned that approximately eight hundred surgeries had been performed since 1944 at this time. This information helped me understand how many people of all ages were affected

by Dr. Taussig's brilliant idea and how popular the shunt had become.

Humanities, National Endowment for the. *Evening Star*. (Washington, D.C.) 1854-1972, June 24, 1948, Image 30. 24 June 1948. [chroniclingamerica.loc.gov](https://chroniclingamerica.loc.gov), <https://chroniclingamerica.loc.gov/lccn/sn83045462/1948-06-24/ed-1/seq-30/>.

This source is a newspaper article that was used to learn about an award that Dr. Taussig and Dr. Blalock received for their work in pediatric cardiology. I learned that the \$5,000 Passano Foundation award for outstanding contribution to the field of medical science was presented to Taussig and Blalock for their work on the blue baby operation. I learned that it was the first time the award had been given to two people as well as the first time it had been given to a woman. This showed me how important and outstanding Taussig's work had been and how she received recognition later in her life.

Humanities, National Endowment for the. *Evening Star*. (Washington, D.C.) 1854-1972, March 01, 1946, Image 1. 1 Mar. 1946. [chroniclingamerica.loc.gov](https://chroniclingamerica.loc.gov), <https://chroniclingamerica.loc.gov/lccn/sn83045462/1946-03-01/ed-1/seq-1/>.

This source is a newspaper article that was used to learn more about how Taussig did not get credit for her work. It was an article about an anti-vivisection bill and how Blalock was defending himself. Since the technique used in the operation was developed through experimentation on dogs, there was disapproval surrounding Blalock's decision to use innocent animals. He tried defending himself by pointing out that he and his co-worker (most likely referring to Vivien Thomas) had needed to use dogs to perfect the technique and make sure the operation worked on human children. In this part of the article, he was credited with discovering the treatment for "blue baby" syndrome. Although Helen Taussig discovered it, he was credited with performing the whole operation. Others were involved as well. This information showed me how Taussig was not given credit, and how she was a victim of sexism in the medical field.

Humanities, National Endowment for the. *Evening Star*. (Washington, D.C.) 1854-1972, March 02, 1952, Image 47. 2 Mar. 1952, p. B. <https://chroniclingamerica.loc.gov/lccn/sn83045462/1952-03-02/ed-1/seq-47/>

This source is a newspaper article that was used to learn about the technique from the operation that helped an animal: specifically a dog. The technique Dr. William Potts learned from performing the "blue baby" operation helped him save the life of a cocker spaniel. This dog had too much blood going to the lungs which prevented the legs from getting sufficient blood flow. The doctor reasoned that a variation of the blue baby operation could help the dog, and he was proved right, The dog went home as good as new. This information showed me how Taussig's idea and work helped more than just children suffering from this syndrome. Her procedure may have inspired many other similar surgeries, just like this one. This helped me write about her enormous impact on the world.



Humanities, National Endowment for the. *Evening Star*. (Washington, D.C.) 1854-1972, March 03, 1947, Image 5. 3 Mar. 1947.  
<https://chroniclingamerica.loc.gov/lccn/sn83045462/1947-03-03/ed-1/seq-5/>

This source is a newspaper article that was used to learn about an event that Dr. Blalock participated in. It was a scientist competition where forty teenagers competed for a scholarship originally meant for John Taylor Hopkins who was unfortunately killed by lightning. Dr. Blalock spoke in the lecture at Statler Hotel, and when the article mentioned him, they said that he was the originator of the “blue baby” operation. They did not give Taussig or Thomas any credit, even though they did the majority of work developing the operation and its technique. This helped me understand the lack of credit Taussig received.

Humanities, National Endowment for the. *Evening Star*. (Washington, D.C.) 1854-1972, May 08, 1947, Image 30. 8 May 1947. *chroniclingamerica.loc.gov*,  
<https://chroniclingamerica.loc.gov/lccn/sn83045462/1947-05-08/ed-1/seq-30/>.

This source is a newspaper article that was used to learn a fact about Taussig. I learned that she got a medical post, and that she was one of the members of the Maryland Rheumatic Fever Association. This information helped me understand how involved she was, and that she never stopped working.

Humanities, National Endowment for the. *Evening Star*. (Washington, D.C.) 1854-1972, November 04, 1949, Image 13. 4 Nov. 1949, p. A.  
<https://chroniclingamerica.loc.gov/lccn/sn83045462/1949-11-04/ed-1/seq-13/>

This source is a newspaper article that was used to learn about the reach of the operation. I learned that a small boy was cyanotic and was a “blue baby.” His family did not have enough money, so his mother wrote to a newspaper publisher, and he connected with enough people that the boy was able to be examined. The doctors examined the small boy to determine whether or not a surgery would benefit him and whether it was safe enough. Nevertheless, the mere examination of the boy gave his family hope for a better future. This helped me write about how people from all over the world came to seek a cure for “blue baby,” and how it gave them hope.

Humanities, National Endowment for the. *Evening Star*. (Washington, D.C.) 1854-1972, November 12, 1946, Image 2. 12 Nov. 1946.  
<https://chroniclingamerica.loc.gov/lccn/sn83045462/1946-11-04/ed-1/seq-2/>

This source is a newspaper article that was used to understand the different techniques behind the “blue baby” operation. I learned that they started connecting an important artery instead of a minor artery. I also learned that one of two big arteries near the heart is connected with a lung artery to help the baby get the oxygen they need in order to be healthy. Vivien Thomas had to devise a special clamp that would allow the blood to keep flowing through the artery while they reattached it to the other artery. This information

helped me understand how this extensive procedure was done and how precise it had to be in order for it to be successful.

Humanities, National Endowment for the. *Evening Star*. (Washington, D.C.) 1854-1972, November 13, 1949, Image 36. 13 Nov. 1949, p. A.  
<https://chroniclingamerica.loc.gov/lccn/sn83045462/1949-11-13/ed-1/seq-36/>

This source is a newspaper article that was used to learn about one of Dr. Blalock's achievements. I learned that he received the Priz Rene Leriche award by the International Society of Surgery as the world's outstanding surgeon in vascular surgery. This information helped me understand what Blalock recognition received and how his work on the "blue baby" operation helped his career.

Humanities, National Endowment for the. *Evening Star*. (Washington, D.C.) 1854-1972, November 15, 1949, Image 2. 15 Nov. 1949.  
<https://chroniclingamerica.loc.gov/lccn/sn83045462/1949-11-15/ed-1/seq-2/>

This source is a newspaper article that was used to learn about a variation of the surgery that was done on a fourteen-year-old boy who was saved from almost certain death. However, his case was different, so Dr. Blalock asked Dr. Brock to operate on the boy instead of him. Dr. Brock used a different approach and technique to save the boy from death, and because of his quick thinking, the operation was "very satisfactory." This information showed me that because of Taussig's and Blalock's collaboration, others were learning and, therefore, coming up with new breakthroughs and saving more lives. This helped me write about Taussig's great impact.

Humanities, National Endowment for the. *Evening Star*. (Washington, D.C.) 1854-1972, November 17, 1949, Image 31. 17 Nov. 1949. *chroniclingamerica.loc.gov*,  
<https://chroniclingamerica.loc.gov/lccn/sn83045462/1949-11-17/ed-1/seq-31/>.

This source is a newspaper article that was used to learn about the dogs used in the operation. I learned that the doctors and children were booed when they showed up to defend themselves for using dogs to create the operation technique. Using dogs to develop the surgery was instrumental because their hearts are similar to that of a human child's. This article covers a hearing in which people were demanding that the doctors not be able to use dogs ever again because of animal cruelty. The "blue babies" who showed up in defense of the doctors were faced with negativity. They argued that they would not have survived without the doctors' experimentation on dogs. This source showed me how important the dogs were to the success of the operation, and how the doctors faced much controversy around the topic.

Humanities, National Endowment for the. *Evening Star*. (Washington, D.C.) 1854-1972, November 29, 1946, Image 21. 29 Nov. 1946, p. A.  
<https://chroniclingamerica.loc.gov/lccn/sn83045462/1946-11-29/ed-1/seq-21/>

This source is a newspaper article that was used to learn more about the first human operation and its success rate. I learned that the operation was reported successful 80% of the time, which meant that Dr. Taussig's idea had worked. The operation, which sometimes lasted up to three hours, became highly popular when the success was reported, and it gave hope to the parents of these cyanotic babies. Without the operation, the babies would have been doomed to an early death. I learned that Eileen was operated on because of a lack of enough blood flow to the lungs, but unfortunately, she died in a second operation several months later. This information helped me understand how important Taussig's work was and what impact she had on the affected babies and their relatives.

Humanities, National Endowment for the. *Evening Star*. (Washington, D.C.) 1854-1972, October 02, 1949, Image 17. 2 Oct. 1949.  
<https://chroniclingamerica.loc.gov/lccn/sn83045462/1949-10-02/ed-1/seq-17/>

This source is a newspaper article that was used to learn about the first successful "blue baby" operations in Washington. One boy who underwent the surgery previously had up to twelve "attacks" daily, and his skin would turn a deep blue. Another boy's condition was not as serious, but he had not been able to walk more than half a block before resting. After the surgery, his condition had improved enough that his mother was planning on sending him to school at the start of the next term. I learned that the teamwork between the x-ray, medical and surgical staff in preparing the operation was crucial to the success of the operation, and that most "blue babies" went to Baltimore to get the surgery done by surgeons who had trained under Blalock. I also learned that even after the operation, the "blue babies" would not completely lose their cyanotic hue, it would only change from severe to moderate or less, but it would give the children a chance to live a normal life. This source helped me write about the teamwork of the surgeons and Taussig's impact.

Humanities, National Endowment for the. *Evening Star*. (Washington, D.C.) 1854-1972, October 04, 1948, Image 4. 4 Oct. 1948, p. A.  
<https://chroniclingamerica.loc.gov/lccn/sn83045462/1948-10-04/ed-1/seq-4/>

This source is a newspaper article that was used to learn about the importance of the "blue baby" operation. It was an article about a television broadcast that was going to show four thousand doctors a series of different surgeries. The broadcast was going to be held at Convention Hall for the centennial celebration of the Pennsylvania Medical Society. The surgical operations were going to be composed of important obstetrical and gynecological procedures including a cesarean section, the "blue baby" operation, and gastric and biliary tract surgery. Since the "blue baby" was featured, it showed me that it had become extremely important and as regular and popular as a cesarean. This helped me write about Taussig's impact even today.

Humanities, National Endowment for the. *Evening Star*. (Washington, D.C.) 1854-1972, October 06, 1947, Image 16. 6 Oct. 1947. [chroniclingamerica.loc.gov](https://chroniclingamerica.loc.gov/),

<https://chroniclingamerica.loc.gov/lccn/sn83045462/1947-10-06/ed-1/seq-16/>.

This source is a newspaper article that was used to learn about two boys who had come to Baltimore from Ohio to participate in the “blue baby” study. They were examined to see if the operation would help them. I learned that it took a lot of thorough examination to come to a certain diagnosis, which helped me write about the complexity of “blue baby” syndrome.

Humanities, National Endowment for the. *Evening Star*. (Washington, D.C.) 1854-1972, September 06, 1949, Image 16. 6 Sept. 1949.  
<https://chroniclingamerica.loc.gov/lccn/sn83045462/1949-09-06/ed-1/seq-16/>

This source is a newspaper article that was used to learn about a teen affected by the “blue baby” operation. It was about a fifteen-year-old who had had trouble all his life with doing normal activities like walking or running without utter exhaustion because of his “blue baby” syndrome. He and his family made the trip from Israel to come to Johns Hopkins Hospital for the famous surgery. After the surgery, the only thing that remained from his former disability was a slight weakness in his legs and a long scar on his chest. His health had improved substantially enough to give him a mostly normal life and a chance to follow his lifelong dreams. This source showed me that Taussig’s impact was world-wide.

Humanities, National Endowment for the. *Laurel Outlook*. (Laurel, Mont.) 1909-Current, September 17, 1947, Image 12. 17 Sept. 1947, p. 12.  
<https://chroniclingamerica.loc.gov/lccn/sn86075258/1947-09-17/ed-1/seq-12/>

This source is a newspaper article that was used to learn about a surgery done in Baltimore. The “blue baby” operation was done successfully on a boy named Billy Corn. When he was wheeling into the operating room, he was almost completely blue. When he was wheeled out two hours later, he was pink and rosy. I learned that after the surgery Billy was placed in an oxygen tent for a 48-hour post-operative period, while his parents watched outside. Also, this article gave Taussig credit for developing the technique with Blalock which showed me how she was starting to get credit, although not as much.

Humanities, National Endowment for the. *Navajo Times*. (Window Rock, Ariz.) 1960-1984, August 29, 1962, Image 7. 29 Aug. 1962, p. 7.  
<https://chroniclingamerica.loc.gov/lccn/sn85047513/1962-08-29/ed-1/seq-7/>

This source is a newspaper article that was used to learn more about thalidomide. I learned that since the FDA was understaffed at this time, drug laws and regulations were not as extensive as they are now which meant that drugs put out on the market were not always safe. Because of this, thousands of babies were born with defects affected by the drug thalidomide. The manufacture of thalidomide distributed the drug to 1,248 doctors, who then prescribed it to 15,000 women. This helped me write about the number of people affected by thalidomide, and estimate how many lives Taussig potentially saved

with her willingness to help others.

Humanities, National Endowment for the. *The People's Voice. (Helena, Mont.) 1939-1969, September 07, 1962, Image 4.* 7 Sept. 1962, p. 4.  
<https://chroniclingamerica.loc.gov/lccn/sn86075189/1962-09-07/ed-1/seq-4/>

This source is a newspaper article that was used to learn more about the drug thalidomide. This article states that the FDA expert, Dr. Frances Kelsey, had prevented the drug thalidomide from being approved in the United States. Although this statement is partly true, this article failed to mention Dr. Taussig's contribution to the banning of thalidomide in the U.S. This showed me and helped me write about how she did not receive much credit for her hard work.

Humanities, National Endowment for the. *Tabor City Tribune. (Tabor City, N.C.) 1946-1991, June 06, 1951, Image 1.* 6 June 1951. *chroniclingamerica.loc.gov*,  
<https://chroniclingamerica.loc.gov/lccn/sn91068761/1951-06-06/ed-1/seq-1/>.

This source is a newspaper article that was used to learn more about the operation. I learned that sometimes it was necessary to operate twice on the "blue baby" if their condition was critical. This information helped me get more background on the operation.

Humanities, National Endowment for the. *Tabor City Tribune. (Tabor City, N.C.) 1946-1991, June 15, 1949, Image 4.* 15 June 1949, p. 4.  
<https://chroniclingamerica.loc.gov/lccn/sn91068761/1949-06-15/ed-1/seq-4/>

This source is a newspaper article that was used to learn about what happened after the operation. I learned that after the operation, the affected "blue baby" went home, usually better than before. The children still had to return to Johns Hopkins Hospital for routine check-ups. This helped me understand how much went into the process of operating on a child and what happened to them after they underwent surgery.

Humanities, National Endowment for the. *Tabor City Tribune. (Tabor City, N.C.) 1946-1991, March 19, 1958, Image 7.* 19 Mar. 1958, p. 7.  
<https://chroniclingamerica.loc.gov/lccn/sn91068761/1958-03-19/ed-1/seq-7/>

This source is a newspaper article that was used to learn about the popularity of the operation. I learned that even though the operation had been done thirteen years ago (at this time), people were still doubtful of it. The operation had continually saved "blue babies," and thousands had been restored back to normal. I also learned that since the development of the "blue baby" surgery, operations to correct and repair valves that had been damaged as the result of rheumatic fever had joined the list of heart-saving miracles of modern surgery. This showed me how Taussig's work had helped save millions of lives by opening the doors of cardiac surgery.

Humanities, National Endowment for the. *The Wilmington Morning Star. (Wilmington, N.C.)*

1909-1990, December 11, 1945, Image 1. 11 Dec. 1945. *chroniclingamerica.loc.gov*,  
<https://chroniclingamerica.loc.gov/lccn/sn78002169/1945-12-11/ed-1/seq-1/>.

This source is a newspaper article that was used to learn more about the patients of the operation and how successful it was. I learned that a girl, Judy Hackman, was recovering nicely from the procedure and that Dr. Taussig thought that she had a high chance of total recovery. Judy was blue before the operation because her heart was underdeveloped and this meant that she had less than a year to live if she did not have the procedure done immediately. I also learned that they moved the artery and attached it to her lungs in this operation. The information about this particular operation helped me understand how successful the operation was becoming and why the procedure was done in the first place.

Humanities, National Endowment for the. *The Wilmington Morning Star*. (Wilmington, N.C.)  
 1909-1990, January 24, 1946, Image 1. 24 Jan. 1946. *chroniclingamerica.loc.gov*,  
<https://chroniclingamerica.loc.gov/lccn/sn78002169/1946-01-24/ed-1/seq-1/>.

This source is a newspaper article that was used to learn about the results of the blue baby operation. I learned that after the operation, the baby's skin and lips turned a rosy pink instead of a sickly blue. The procedure was done by sewing a good artery to an artery that did not function well. I learned about how well the babies recovered after the operation and how thankful the parents were for Dr. Taussig's idea, and Dr. Blalock's and Dr. Thomas's technique. This information showed me how successful the operation was due to Taussig's idea.

Humanities, National Endowment for the. *The Wilmington Morning Star*. (Wilmington, N.C.)  
 1909-1990, March 29, 1946, Image 3. 29 Mar. 1946, p. 3.  
<https://chroniclingamerica.loc.gov/lccn/sn78002169/1946-03-29/ed-1/seq-3/>

This source is a newspaper article that was used to learn more about the operation. I learned that this particular operation had taken two and a half hours and that an artery from the heart was connected to the pulmonary artery to correct blue baby syndrome by increasing circulation, therefore allowing a sufficient amount of oxygen to reach the places it needed to be. I also learned that this surgery was done as a last measure because of its difficulty and preciseness.

Humanities, National Endowment for the. *The Wilmington Morning Star*. (Wilmington, N.C.)  
 1909-1990, November 29, 1945, Image 1. 29 Nov. 1945.  
<https://chroniclingamerica.loc.gov/lccn/sn78002169/1945-11-29/ed-1/seq-1/>.

This source is a newspaper article that was used to learn about another "blue baby" story. Bonnie Stewart was a strange blue color until she underwent surgery. I learned that Blalock had performed about 60 surgeries in the first year, which showed me how surgeries involving the heart were uncommon at that time. Her mother and father had both died, leaving her without parents and without hope. Taussig's idea along with Blalock's and Thomas's skill gave Bonnie hope for a better life. This information helped

me understand how impactful her work was and how she gave high hopes to many.

Humanities, National Endowment for the. *The Wilmington Morning Star*. (Wilmington, N.C.) 1909-1990, September 23, 1947, Image 10. 23 Sept. 1947, p. 10.  
<https://chroniclingamerica.loc.gov/lccn/sn78002169/1947-09-23/ed-1/seq-10/>

This source is a newspaper article that was used to learn about the result of another “blue baby” operation at Johns Hopkins Hospital. It was a picture along with a caption about a small girl named Michele Rannou who was eight-years-old at the time of her surgery. Rannou was from Paris, and she was about to board a plane to return home with her father Francis. In the picture, she looks like any other child; she was smiling and pointing, and she looked healthy. Her father’s expression was that of a parent who had experienced great joy. Taussig’s work on the shunt had given the girl and her father immense happiness, along with many others. This source helped me write about how she gave hope and happiness to millions.

Jo Lazenby'. *Media Report to Women*, vol. 4, no. 10, 1976. *JSTOR*,  
[jstor.org/stable/10.2307/community.28040557](http://jstor.org/stable/10.2307/community.28040557).

This source is a newspaper article that was used to learn about women who were selected for the Hall of Fame. I learned that Taussig was one of the twenty women selected so far for the Women’s Hall of Fame established at Seneca Falls, New York, “Birthplace of the Women’s Rights Movement.” This recognition is for women who have made contributions of the greatest value to the development of their country. Taussig was selected, which showed me that her work had impacted the whole country and world, and that she had a crucial impact in history. This information helped me write about her significance.

Neill, Catherine A. *Dr. Helen Brooke Taussig May 24, 1898 - May 21, 1986 International Cardiologist*. *International Journal of Cardiology*, 1987,  
[www.internationaljournalofcardiology.com/article/0167-5273\(87\)90017-9/pdf](http://www.internationaljournalofcardiology.com/article/0167-5273(87)90017-9/pdf).

This source was an article written right after her death used to learn about her whole life and to learn more about her impact. I learned that her understanding of the significance of decreased pulmonary blood flow in tetralogy of Fallot was an original correlation, and crucial to the development of the Blalock-Taussig anastomosis. She gave many written and video-taped accounts talking about the joy that the operation gave the children and their families, which helped me write about it. I also learned that Blalock and Taussig gave lectures all over the world, which helped me understand how the operation became so well known and popular. Also, this article had a picture of a letter that had written, “To Doctor Helen B. Taussig Guardian Angel of the Blue Babies Homage of the babies operated on at Albanese Clinic of Buenos Aires, Argentina.” This note was followed by the signatures of all the babies who were operated on at that location. This showed me how much people appreciated her work, and how many lives she saved all over the world, which helped me write about her impact.

“OBITUARIES : ‘First Lady of Cardiology’ Dies in Crash : Dr. Helen Brooke Taussig Pioneered ‘Blue-Baby’ Operation.” *Los Angeles Times*, 23 May 1986, <https://www.latimes.com/archives/la-xpm-1986-05-23-me-23503-story.html>.

This source is a newspaper article that was used to learn more about how Taussig discovered the cure for blue baby syndrome. I learned that after years of research at Johns Hopkins, she came to the conclusion that blue babies were cyanotic because they were not getting enough oxygen in their blood. I also learned that after developing the operation, she spent the rest of her life researching congenital heart ailments and the effects of rheumatic fever. She also studied heart malformations in birds later in her life. This information helped me understand what she did in her life other than help develop the blue baby operation.

Potter, Robert D. "Saving Our Doomed 'Blue' Babies." *The American Weekly* 17 Feb. 1946, Science Editor: 1. Print.

This source is a newspaper article that was used to learn more about the blue baby operation. I learned that blue babies can barely walk a few feet without being exhausted, and they usually live only a few years. I learned that the operation was done by “...rerouting an artery from the arm and making it carry blood to the lungs where it can receive its vital oxygen.” I also learned the thought process behind Dr. Taussig’s discovery. The article also covers the successful operation of a boy. This information helped me understand what happened in the operation.

Randal, Judith. “You’ve Come a Long Way, Doctor.” *Change*, vol. 11, no. 8, 1979, pp. 55–69. *JSTOR*, [www.jstor.org/stable/40163318](http://www.jstor.org/stable/40163318).

This source is a journal article that was used to learn about the gender discrimination Taussig faced. I learned that after the success of the operation, Blalock was almost immediately made a professor and Taussig had to wait for years before she received any recognition. I also learned that many universities did not let women obtain a degree, but they were slowly letting women get the same opportunities as men. Another thing I learned was that the percentage of women being admitted to medical schools had increased greatly following the success of Helen and other early female pioneers in medicine. This information helped me understand how her achievements were significant and how she was treated unfairly.

Schumpeter, J. A., et al. “Frank William Taussig.” *The Quarterly Journal of Economics*, vol. 55, no. 3, 1941, pp. 337–363. *JSTOR*, [www.jstor.org/stable/1885636](http://www.jstor.org/stable/1885636).

This source is a journal article that was used to learn about Frank Taussig, Helen Taussig’s father. I learned that he married his wife, Edith Thomas Guild, on June 29, 1888, and they had three children. He was hardworking like Helen Taussig, and he achieved many accomplishments. He was a teacher and scholar, which eventually helped



him tutor Helen. Also, this source included a picture of Frank Taussig. He had a stern, but friendly smile. This helped me write about his personality and his patience with Helen. Also, this source helped me understand exactly how much patience it took for him to tutor Helen and how much he impacted her life, helping her to overcome obstacles and break barriers.

“Squatting In Fallot's Tetralogy.” *The British Medical Journal*, vol. 4, no. 5629, 1968, pp. 470–470. *JSTOR*, [www.jstor.org/stable/20394833](http://www.jstor.org/stable/20394833).

This source is a journal article that was used to learn about another achievement of Taussig’s. I learned that Taussig was the first to give a full description of why squatting helped relieve the symptoms of tetralogy of Fallot in children: it is because it cuts off the circulation to the legs and brings more blood to the lungs. Squatting diminishes the blood flow to the legs, which helps maintain the peripheral vascular resistance, and it corrects the precipitous fall in arterial oxygen saturation that comes after exercise. This source helped me write about another one of her achievements.

Stone, John, and M.d. “BODY AND MIND; Baby Heart on Hold.” *The New York Times*, 10 July 1988. *NYTimes.com*, <https://www.nytimes.com/1988/07/10/magazine/body-and-mind-baby-heart-on-hold.html>

This source is an article written by a cardiologist who was impacted by Taussig’s work shortly after she died. It is about his encounter with a small boy with the condition, tetralogy of Fallot, the most common cause of “blue baby syndrome.” The boy’s mother was concerned about his behavior and health, and his oxygenation level was painfully low. This helped me understand how impactful Taussig’s work was and how she gave hope to everyone. I also learned that there was no surgery available for tetralogy until 1944 when Taussig’s idea was put into practice. The information from this source helped me understand Taussig’s impact and the importance of her idea. Without her groundbreaking idea, many would have lost their lives.

Taussig Helen B., et al. “Ten to Thirteen Year Follow-up on Patients after a Blalock-Taussig Operation.” *Circulation*, vol. 25, no. 4, Apr. 1962, pp. 630–34. *ahajournals.org (Atpyon)*, doi:10.1161/01.CIR.25.4.630.

This source is an article written by Taussig that was used to learn more about how successful the surgery was. I learned that the majority of the people who had had the operation were either doing well or they had failed to maintain the improvement. The people that did not have lasting improvement could be corrected by another operation. This information helped me understand how successful the procedure was and how many people had benefited from it, which showed me that Dr. Taussig’s idea had been brilliant.

Taussig, Helen B. "Phocomelia and Thalidomide." *American Journal of Obstetrics and Gynecology* 84, no. 7 (1962): 979. [https://doi.org/10.1016/0002-9378\(62\)90079-0](https://doi.org/10.1016/0002-9378(62)90079-0).

This source is a letter written by Taussig that was used to learn about her thoughts on phocomelia and thalidomide. I learned that if thalidomide had not been taken off the market, roughly 3,500 infants would be born with phocomelia, a deadly condition. This helped me understand how many lives she saved by helping get the drug banned. I also learned that thalidomide was being advertised as an antiemetic for pregnancy: Taussig heavily disapproved of it, as did other doctors. This information helped me write about her impact banning thalidomide.

Taussig, Helen B. "Acute Rheumatic Fever: The Significance and Treatment of Various Manifestations." *The Journal of Pediatrics*, vol. 14, no. 5, May 1939, pp. 581–92. [www.jpeds.com](http://www.jpeds.com), doi:10.1016/S0022-3476(39)80148-2.

This source is an article written by Taussig that was used to learn about her work on rheumatic fever. I learned that rheumatic fever has crippling effects when the disease is active. When the disease is mostly inactive, the outlook is good and no further damage occurs. Taussig believed that early recognition and treatment of the disease with plenty of bed rest while the disease was active could reduce the amount of cardiac damage and arrest the infection. She also believes that through plenty of bed rest, many chronic cases of rheumatic fever could be prevented in children. This source helped me understand and write about what she did other than develop the "blue baby" operation, and how she continued to help people throughout her life.

Taussig, Helen B. "The Development of the Blalock-Taussig Operation and Its Results Twenty Years Later." *Proceedings of the American Philosophical Society*, vol. 120, no. 1, 1976, pp. 13–20. *JSTOR*, [www.jstor.org/stable/986348](http://www.jstor.org/stable/986348).

This source is an article written by Taussig that was used to learn more about the results of the operation and the operation itself. I learned that, normally, the *ductus arteriosus* closes off shortly after birth, but if it fails to do so, the baby has a malformation, which can cause "blue baby syndrome." She realized that babies whose *ductus* remained patent survived longer than babies whose *ductus* closed immediately, so she decided to replace it with an artificial shunt if it was too close. I also learned about the first surgery and the third surgery that was the most successful, which helped me understand how successful her idea had been.

## Secondary Sources

*Alfred Blalock · The Blue Baby Operation · Exhibits: The Sheridan Libraries and Museums*. Accessed 02 February 2020. <https://exhibits.library.jhu.edu/exhibits/show/the-blue-baby-operation/alfred-blalock>.

This source is an exhibit that was used to learn about Blalock and Thomas. I learned that Thomas contributed significantly to Blalock's research and work had to give up his college dream when his life savings vanished in the stock market crash of 1929. This made him Blalock's colleague for the rest of his working career. Thomas was crucial to Blalock's success and achievements, but sadly, he never received enough credit for his work. I learned that after Taussig brought up her ingenious idea, Thomas worked for two years, doing the surgery, and then taught Blalock how to do it. All of this information helped me interpret why the order of the names for the shunt were the way that they were.

Allar, Daniel. "Article Highlights Achievements of Pediatric Cardiology Pioneer Helen Taussig." *Cardiovascular Business*, January 23, 2019.  
<https://www.cardiovascularbusiness.com/topics/structural-congenital-heart-disease/article-profiles-pediatric-cardiology-pioneer-helen>.

This source is an article that was used to learn about why she was named the "founder of pediatric cardiology." I learned that she was credited with this name because she was able to characterize and understand heart defects in humans while they were living, when before her time people had performed autopsies to figure out what caused defects in the heart. Also, Taussig trained the first generation of cardiologists specifically focused on pediatrics. This information helped me understand her impact and honorable title.

Auburn, Friends of Mount. "Helen Brooke Taussig (1898 – 1986): Mount Auburn Cemetery." *Mount Auburn Cemetery Helen Brooke Taussig 1898 1986 Comments*. Friends of Mount Auburn, July 7, 2012. <https://mountauburn.org/helen-b-taussig-1898-1986/>.

This source is an article that was used to learn more about her life. I learned that her professor at Boston University "...encouraged her to apply to medical school at Johns Hopkins, one of the only medical schools in American that accepted women at that time. Taussig applied and was accepted to Johns Hopkins, where she specialized in cardiology. She earned her medical degree in 1927." I also learned that when she lost her hearing and could no longer use a stethoscope, she used a variety of different ways to diagnose the babies. This information helped me understand more about how she overcame her barriers.

Bart, Jody, "Women Succeeding in the Sciences: Theories and Practices Across Disciplines" (June 15, 2000). *Purdue University Press e-books*. Book 14.  
[http://docs.lib.purdue.edu/purduepress\\_ebooks/14](http://docs.lib.purdue.edu/purduepress_ebooks/14)

This source is an ebook that was used to learn about Taussig's life in more detail. Many sources had a full story of Taussig's life, but this one had many details not present in other sources. I learned more about her family and her relationship with her father, her experiences at Radcliffe and Berkeley, and how people often mistook her for the daughter of a regent at Berkeley with the surname of Taussig; they were not related. This regent did not have a good reputation, but she did not let him affect her. Because of him, people doubted Helen, but she ignored them and flourished academically at Berkeley. This

source helped me understand how she got into the field of cardiology, and how hard her journey was, which helped me write about her perseverance.

*The Blalock-Taussig-Thomas Shunt · The Blue Baby Operation · Exhibits: The Sheridan Libraries and Museums*. Accessed 02 February 2020  
<https://exhibits.library.jhu.edu/exhibits/show/the-blue-baby-operation/the-blalock-taussig-thomas-shu>.

This source is an exhibit that was used to learn the results of the first few human surgeries to treat blue baby syndrome. I learned that the first human patient for the surgery, Eileen Saxon, made it through the surgery and her blue coloring faded, but in a few weeks she became cyanotic again and did not survive a second surgery. Her short recovery time showed the doctors that the procedure could work if it was done in the right conditions. As they had predicted, the next two surgeries were successful and the third patient, a six-year-old boy who could barely breathe, turned a rosy-pink as soon as the clamps were released. This information showed me that Taussig's idea was extremely successful and when it was combined with the other doctors' technique and skill, it turned into a life-saving procedure.

“BU Firsts and Special Achievements | BU Today.” Boston University,  
<http://www.bu.edu/articles/2007/bu-firsts-and-special-achievements/>.

This source is an article that was used to learn more about Boston University. I learned that it was the first university to let women into all of its divisions, and the first to admit women into its medical school. This information helped me understand how much of a problem gender discrimination was back then, which helped me understand how and why Dr. Taussig struggled so much with getting the education she wanted. It also helped me understand how much she persevered through her obstacles in school.

“Changing the Face of Medicine | Helen Brooke Taussig.” U.S. National Library of Medicine. National Institutes of Health, June 3, 2015.  
[https://cfmedicine.nlm.nih.gov/physicians/biography\\_316.html](https://cfmedicine.nlm.nih.gov/physicians/biography_316.html).

The source is an article that was used to learn about her entire life story. I learned that she may have been influenced to become a doctor because of her grandfather, a doctor. Also, she was the first woman to become the president of the American Heart Association. Taussig was a champion tennis player in her years at Radcliffe, and she used fluoroscopy to figure out that the babies with “blue baby syndrome” have a leaking septum and an underdeveloped artery. I also learned that she received the Lasker Award, a full professorship at Johns Hopkins, and the Medal of Freedom from President Lyndon B. Johnson in 1964. This information helped me understand how impactful her work was and how important she was.

Daily, Investor's Business. “Dr. Helen Taussig Beat The Odds To Become A Giant In Pediatric Cardiology.” *Investor's Business Daily*, 10 Aug. 2018,

<https://www.investors.com/news/management/leaders-and-success/dr-helen-taussig-beat-the-odds-to-become-a-giant-in-pediatric-cardiology/>.

This source is an article that was used to learn about her teaching career. She graduated from Johns Hopkins University School of Medicine with a medical degree in 1927, and she started teaching at Johns Hopkins later in her life and trained the first generation of pediatric cardiologists. I also learned that she published the first textbook that was solely about congenital heart defects in 1947, and it was the “bible” of pediatric cardiology for years. This information helped me understand what she did in her life before the operation was developed and how she used her knowledge to teach others about cardiology.

DeBakcsy, Dale. “The Pediatric Cardiology of Helen Taussig (1898-1986).” *Women You Should Know*®, 21 June 2017, <https://womenshouldknow.net/the-pediatric-cardiology-of-helen-taussig-1898-1986-2/>.

This source is an article that was used to learn about the details of her life. I learned that she was infuriated by the administration’s decision to not allow women to obtain a degree. I also learned that when she lost her hearing, she learned to use her fingers to feel the heartbeat and use fluoroscope technology to reveal what she could not feel with her fingers. This showed me how much she persevered through her barriers.

Dunn, Rob. *Man Who Touched His Own Heart - True Tales of Science, Surgery, and Mystery*. Little, Brown & Company, 2015.

This source is a book that was used to learn about Taussig’s work researching the malformed hearts of animals, particularly birds. I learned that Taussig noticed that the rare congenital disorders of the valves or the left atrium or ventricle are found in essentially all vertebrates. The rarer deformities of the atria are found in land animals that have an added a second atrium. She also discovered that the common deformities all related to the right ventricle and the parts of the heart on that side. The right evolved in mammals and birds, but Taussig did not fully understand this; even so, she knew it was important. It turned out that it happened because of a single gene, and as Taussig anticipated adding a second chamber would not be as difficult as they had initially thought. The information from this source helped me understand how accomplished and ahead of her time Taussig was, which helped me write about her life.

Elliott, Ellen. “Women in Science: Helen Taussig (1898-1986).” The Jackson Laboratory, October 10, 2017. <https://www.jax.org/news-and-insights/jax-blog/2017/october/women-in-science-helen-taussig>.

This source is an article that was used to learn more about the impact her family had on her and how they helped her. I learned that her mother was one of the first women to

study at Radcliffe College and that she died of tuberculosis when Helen Taussig was 11. I also learned that her father supported her education and helped her read and write despite her trouble with it due to her dyslexia; he served as a chair of the US Tariff Commission towards the end of World War I. Another thing I learned about Taussig's life was that, at that time, there were no ready treatments available for dyslexia, as it was not well understood at that time. This source helped me understand how impactful dyslexia was in her childhood and how her parents impacted her life.

Engle, M. A. "Dr. Helen Brooke Taussig, Living Legend in Cardiology." *Wiley Online Library*, John Wiley & Sons, Ltd, 5 Feb. 2009, [onlinelibrary.wiley.com/doi/pdf/10.1002/clc.4960080614](https://onlinelibrary.wiley.com/doi/pdf/10.1002/clc.4960080614).

This source is an article that was used to learn more about her life. I learned about how she "contaminated" her male peers while at Harvard Medical School. She was forced to sit in the corner of the room while listening to lectures in class and had to go into another room to observe slides. This was because the males thought that being near a female would somehow "stain" them or impact them in a bad way.

The Editors of Encyclopaedia Britannica. "Frank William Taussig." *Encyclopædia Britannica*. Encyclopædia Britannica, inc., December 24, 2019. <https://www.britannica.com/biography/Frank-William-Taussig>.

This source is an article that was used to learn about Helen Taussig's father, Frank William Taussig. I learned that he was a professor of economics at Harvard and he retired in 1935. I also learned that he was the chairman of the U.S. Tariff Commission in 1917-1919. This information helped me understand how he influenced her life and that his philanthropy probably molded Helen into being the caring person she was.

Forde, Richard James. "Helen Brooke Taussig." *Jewish Women: A Comprehensive Historical Encyclopedia*. 27 February 2009. Jewish Women's Archive. <https://jwa.org/encyclopedia/article/taussig-helen-brooke>.

This source is an article that was used to learn about her family and her struggles with having dyslexia and being deaf. I learned that Helen Taussig had three siblings named William Guild, Mary Guild, and Catherine Crombie and that she was seen by her teachers as being "retarded" because of her dyslexia. I also learned that she started to go deaf when she was 31 years old and needed a hearing aid and an amplified stethoscope by the age of 35 and that her hearing got better when she got an otologic surgery in the 1960s. Another thing I learned was that she worked on the clinical and anatomic manifestations of rheumatic fever in the 1920s, which was her earlier work, before her contributions to the blue baby operation. This information showed me how her dyslexia and deafness affected her life and what she did before developing the Blalock-Taussig shunt to help babies with blue baby syndrome.

Goodman, Gerri Lynn, "A gentle heart: the life of Helen Taussig" (1983). *Yale Medicine Thesis Digital Library*. 2658. <https://elischolar.library.yale.edu/ymtdl/2658>

This source is a medicine thesis that was used to learn about the details of her life. I learned about her family life and why she wanted to transfer colleges. I learned about what she had to do to get into the different colleges and the struggles she faced because of her dyslexia, deafness, and gender discrimination. This information helped me fill in the gaps of her life story and helped me get a better understanding of why she did what she did.

*Helen Brooke Taussig*. <https://www.whonamedit.com/doctor.cfm/2034.html>. Accessed 10 March 2020

This source is an article that was used to learn more about how she discovered her groundbreaking idea. I learned that after studying "blue babies," she realized something that no one had ever thought of before. She wondered why some blue babies lived longer than others. Her research led her to the conclusion that most cyanotic babies had an enlarged right ventricle, which prevented the normal circulation of blood to the lungs. This realization led her to suspect the *ductus*. This information helped me understand how Taussig got her idea.

"Helen B Taussig Memorial Lecture - Professional Heart Daily." Professional Heart Daily. American Heart Association. Accessed May 01, 2020. [https://professional.heart.org/professional/MembershipCouncils/AwardsLectures/UCM\\_460901\\_Helen-B-Taussig-Memorial-Lecture.jsp](https://professional.heart.org/professional/MembershipCouncils/AwardsLectures/UCM_460901_Helen-B-Taussig-Memorial-Lecture.jsp).

This source is an article that was used to learn about a couple of Taussig's achievements. I learned a lecture was established in honor of her work, which showed me her immense impact. I also learned that she was the first woman to become a full professor at Johns Hopkins, and that she was the founder and the first president of the American Heart Association's Maryland Affiliate. This information helped me write about her accomplishments and impact.

"Helen Taussig: Warrior of the Heart | About the Hero." *Lowell Milken Center*, 5 Apr. 2018, </projects/view/warrior-of-the-heart>.

This source is an article that was used to learn more about her life. I learned that she was often discouraged from pursuing her dreams because of her gender. I also learned that she had whooping cough as a child, which left her with a hearing impairment and that she had a severe case of dyslexia. She studied histology, bacteriology, and anatomy at Harvard Medical School and Boston University, but was not given a degree in either of these schools. She could not talk to the males in her histology class because if she did, she would "contaminate" them. This information helped me understand her barriers better and how significant they were in her life. Another thing I learned was that she published a paper with Begg, which helped her get into Johns Hopkins Medical School.

“Home.” UAB. Reynolds Finley Historical Library, 2020.

<https://library.uab.edu/locations/reynolds/collections/medical-greats/helen-brooke-taussig>

This source is an article that was used to learn about her earlier years. I learned that she came from an academic and scientific background, and that her grandfather had been a physician specializing in the treatment of children with defective eyesight. I also learned that she discovered that “blue babies” had both a leaky septum and an extra artery bridging the heart and lungs. This information helped me write about “blue babies.”

Keeley, Jim. “Homing In On a Cause of Blue Baby Syndrome.” HHMI.org. Howard Hughes Medical Institute, July 13, 2009.

<https://www.hhmi.org/news/homing-cause-blue-baby-syndrome>.

This source is an article that was used to learn about blue baby syndrome. I learned that the most common cause for blue baby syndrome is tetralogy of Fallot, which causes malformed hearts that cannot fully oxygenate the blood. The deoxygenated hemoglobin can cause the cyanotic hue that gives blue baby syndrome its name. I also learned that it occurs in one in three thousand live births, which showed me how many people are affected with blue baby syndrome and how much Dr. Taussig’s idea helped children all around the world.

Kalamangalam, Giridhar P. “A Memorable Patient: Living History.” *BMJ: British Medical Journal*, vol. 329, no. 7458, 2004, pp. 169–169. *JSTOR*, [www.jstor.org/stable/25468684](http://www.jstor.org/stable/25468684).

This source is a journal article that was used to learn about the result of another operation, and Taussig’s impact on another doctor. A man in his 60s came in with a problem. The doctor who was examining his medical record noticed that he had tetralogy of Fallot, the most common cause of “blue baby syndrome.” The doctor had been taught about the Blalock-Taussig shunt in medical school, which showed me how far Taussig’s idea had advanced and how many people it influenced. The patient would have died if Dr. Taussig and Dr. Blalock had not operated on him and inserted the Blalok-Taussig shunt. The doctor was also awed by Taussig’s perseverance through sexual prejudice, and by the fact that she did not quit a field that would require hearing to be impeccable. This source helped me write about Taussig’s perseverance and impact.

McDermott, Annette. “How World War II Empowered Women.” History.com. A&E Television Networks, July 2, 2018.

<https://www.history.com/news/how-world-war-ii-empowered-women>.

This source is an article that was used to learn more about women during and after World War II. Prior to World War II, most women were homemakers, and those women who were employed served as secretaries, receptionists, nannies, or department store clerks. This showed me how Taussig defied the stereotypes and strove to become a doctor. She fought through years of prejudice and gender discrimination to do what she loved. This



source helped me better understand Taussig's struggle with sexism and gender discrimination.

McLaren, Karen. "Helen Brooke Taussig." *Encyclopædia Britannica*. Encyclopædia Britannica, inc., May 20, 2020. <https://www.britannica.com/biography/Helen-Brooke-Taussig>.

This source is an article that was used to learn about her education and her struggle with sexism. I learned that she was denied admission when she applied to Harvard because the university did not accept women. Instead she went to the Boston School of Medicine and graduated from the Johns Hopkins School of Medicine in 1927. I also learned that she went deaf in her 30s and she used her hands to feel the human heartbeat. She noticed that all the blue babies' (or infants with cyanotic hue) heartbeat displayed a common pattern, which helped her diagnose them and figure out a way to help them. Another thing I learned was that, like her mom, she got tuberculosis later in her life. The information about how she made up for her hearing loss with her hands showed me how she never gave up and would do anything to help others.

Meisol, Patricia. "The Changing Face of a Strong Woman." *The New York Times*, 14 Aug. 2013. *NYTimes.com*, <https://www.nytimes.com/2013/08/18/arts/design/a-showing-for-jamie-wyeths-portrait-of-a-cardiac-pioneer.html>.

This source is an article that was used to learn more about Taussig's personality. It was about an artist named Jamie Wyeth who set out to paint a portrait of Taussig because a group of doctors who worked under Taussig wanted a portrait to hang next to a wall full of Hopkins luminaries, all of them men. This helped me to understand how great her accomplishments were and how she broke the gender barrier. The picture turned out interesting; Taussig looked almost like a witch, but she graciously accepted it, later placing it out of sight in her attic. Female doctors did not find this portrait flattering because it lined up with the old stereotype that female healers were old witches. Meanwhile, the male doctors who had studied under Taussig secretly admired the portrait because of its powerful depiction of their mentor. All of the information found from this source helped reinforce my ideas about her unique personality, how her friends and students viewed her, and how she persevered despite working in a sexist field.

Moore, Levi. "Helen Taussig: Founder and Mother of Pediatric Cardiology." Hektoen International, January 27, 2017. <https://hekint.org/2017/01/27/helen-taussig-founder-and-mother-of-pediatric-cardiology/>.

This source is an article that was used to learn about certain details of her life. I learned that Blalock, Taussig, and Thomas performed the surgery at a time when heart surgery was relatively new, which helped me understand how difficult it was for them. I also learned that Taussig's father nurtured her, helping her overcome her dyslexia. Also, rheumatic fever formed the major part of clinical cardiology work, while congenital malformations were considered merely curiosities that were hopeless. The information

from this source helped me understand Taussig's struggle to research congenital malformations of the heart, which helped me write about her struggle.

Murphy, Jim, *Breakthrough!: How Three People Saved Blue Babies and Changed Medicine Forever*. HOUGHTON MIFFLIN HARCOURT, 2019.

This source is a book that was used to learn more about Helen Taussig's life. I learned that she first expressed an interest in medical school when she started getting good grades, due to her father's patient tutoring and her strong will to learn. I also learned that she felt that the surgeons should connect with the patients, rather than only tell them what procedure they needed, which helped me understand her caring, compassionate nature. She had a strong emotional connection with her patients, unlike the other surgeons. This showed me that even though she had struggled all throughout her life, she did not let her obstacles weigh her down, and she never gave up. I also learned about the contributions of Vivien Thomas, which helped me understand how much work went into developing this complex procedure. This information helped me understand how Taussig was in the workplace and the types of relationships she had with her patients.

Rathore, Yogita. Text Interview. 21 May 2020.

This interview, done over text, was conducted with my aunt who is an obstetrician/gynecologist in India. When I asked her if she had heard of Helen Taussig before, she replied no, and after she did some research, she told me that she had never known that there was a female who had been involved in the cure for tetralogy of Fallot (which my aunt had learned about while earning her MBBS). This showed me how Taussig was not, and is not, well known, even though she had a crucial role in the field of cardiology.

Sargent, Joseph, et al. *Something the Lord Made*. New York, NY: HBO Video, 2004.

This film showed me how Taussig was not given credit because of her gender, even today. This movie gave me a basic timeline of the events that led up to the creation of the shunt and the actual operation, but it failed to convey Dr. Taussig's importance in the development of the life-saving procedure. For one, on the movie cover, Helen Taussig was not displayed, which showed me how they wanted to omit her from the storyline. Also, the movie made it seem like she did not do anything but sit around and watch the children, and that the men were the brilliant people who devised the entire thing and came up with the idea. All her roles, including coming up with the idea, are transferred over to the men, making her seem inferior. This movie showed me how she was not taken seriously back then and even now, which helped me understand her struggle even more.

Sherman, Max. "Helen Brooke Taussig: An Often Overlooked Advocate for Drug Safety." Regulatory Affairs Professionals Society (RAPS), October 11, 2019. <https://www.raps.org/news-and-articles/news-articles/2019/10/helen-brooke-taussig-an-of-ten-overlooked-advocate>.

This source is an article that was used to learn more about her impact on the banning of the drug, thalidomide. I learned that the drug was synthesized in Germany, but since there were no pharmacological effects on animals, the company got rid of the drug and another company started experimenting with it. They figured out that it could be used as a sedative because of its unique structure, so West Germany began selling this dangerous drug. One of the companies took the drug to the FDA to get it approved and this is when Dr. Kelsey, a medical officer working for the FDA, saw some troubling information in the safety data. The company ended up withdrawing the submission. This information helped me understand why Dr. Taussig's contributions to the banning of this drug were so important and what the consequences would have been if she hadn't stepped in.

Smith, Orla. "Nota Bene: Spellbound." *Science*, vol. 302, no. 5650, 2003, pp. 1508–1508. *JSTOR*, [www.jstor.org/stable/3835764](http://www.jstor.org/stable/3835764).

This source is a journal article that was used to learn about women honored in the medical field. Helen Taussig was mentioned as well as other women who have had an instrumental role in history. Taussig refused to let her hearing impairment deter her from doing what she loved. Instead, she pioneered a surgery with Blalock, which aimed to repair the defective heart septum of "blue babies." This source helped me write about Taussig's perseverance.

Stuber, Irene. "The Liz Library Presents: Irene Stuber's Women of Achievement and Herstory." The Liz Library presents Irene Stuber's Women of Achievement, May 24, 2006.

This source is an article that was used to learn about her thoughts on her achievements and the recognition she received for it. I learned that she was disappointed when she didn't get recognition for her idea and when she didn't get promoted, but Dr. Blalock did. This showed me how unfairly women were treated back then and how men were seen as superior to them, which helped me understand what Dr. Taussig went through in her life.

"Taussig, Helen Brooke." National Women's Hall of Fame. Accessed March 23, 2020. <https://www.womenofthehall.org/inductee/helen-brooke-taussig/>.

This source is an article that was used to learn about a few details of her life. The article covers that "blue babies" were condemned to individualism and early death before Taussig began to analyze different anatomical defects and possible different ways to surgically correct the heart malformations. This helped me write about how she developed the operation. I also learned that after the first operation, the child turned pink, which gave Taussig a thrill. This helped me write about her caring nature.

Timmermans, Stefan. "A Black Technician and Blue Babies." *Social Studies of Science*, vol. 33, no. 2, 2003, pp. 197–229. *JSTOR*, [www.jstor.org/stable/3183077](http://www.jstor.org/stable/3183077).

This source is a journal article that was used to learn more about Taussig's journey as well as Vivien Thomas's. Taussig was one of the first female pediatric cardiologists during a time when Dr. Edward Park was asked to recommend a pediatrician for a vacant position. This helped me further understand how hard it was for her to succeed in her field when people constantly denigrate women and did not allow them to have sustainable careers. Fortunately, Dr. Park refused to follow Johns Hopkins rule, and he appointed Taussig as the director. I also learned about Taussig's ponderings concerning the operation, and about the experimentation and research that went into the development of this shunt. The information from this source helped me understand how complex this surgery was, what went into developing the shunt, and how things were so much more different back then.

“The Underdog Doctors Who Saved America’s ‘Blue Babies.’” *Narratively*, 31 Jan. 2018, <https://narratively.com/underdog-doctors-saved-americas-blue-babies/>.

This source is an article that was used to learn about the first few operations and the science behind why they did things the way that they did. I learned about the different blood vessels and how hard it was to identify them, which helped me understand how difficult the operation was. I also learned about how the surgeons went about doing the first surgery, which helped me understand how easy it was to make a small mistake and risk killing the baby.

Van Robays, J. “Helen B. Taussig (1898-1986).” *Facts, Views & Vision in ObGyn*, vol. 8, no. 3, pp. 183–87.

This source was a book. Using this source, I learned that she got to the bottom of the problem that was causing newborns to be born with phocomelia and started a campaign to end the use of thalidomide. I also learned that she figured out how to help blue babies survive by realizing that when the *ductus arteriosus* of blue babies closed spontaneously, they did not survive as long as the blue babies whose *ductus* remained patent. This helped her devise the famous Blue Baby Operation and make sure it went successfully. Other things I learned were that she was the youngest of four children, her grandfather had taught at a school for blind children, and what her father thought about her education and career. This information helped me understand other things she did in her life and what her family life was like. It also showed me how strong of an influence her dad had on her.

“Vivien T. Thomas.” *Vanderbilt University*, <https://medschool.vanderbilt.edu/mstp/person/vivien-t-thomas/>.

This source is an article that was used to learn about Vivien Thomas's background. I learned that he was born in 1910, and he was the grandson of a slave. I also learned that he was extremely talented in doing surgery and researching. His role in developing the “blue baby” operation was inducing cyanosis in the dogs and proving that the surgery would not be fatal to “blue babies.” This helped me understand his indispensable role in the operation.

“What Is Dyslexia?” *WebMD*, <https://www.webmd.com/children/understanding-dyslexia-basics>.

This source is an article that was used to learn about dyslexia. I learned that dyslexia is a disorder that affects the way you learn. It makes it hard for people who have it to learn how to read, write, spell, and speak. I also learned that people who have dyslexia struggle more in school and that some people have more trouble overcoming dyslexia than others. This information helped me understand how much of a struggle having dyslexia was for Helen in school and how hard it was to overcome for her.

*Women in the 1940s and 1950s...possibly Forgotten? | Kentucky Women in the Civil Rights Era.*  
<http://www.kywcrh.org/archives/69>.

This source is an article that was used to learn about Taussig's gender and sexism struggles in the 1940-50s. I learned that many women during this time and before were underappreciated. This time period was extremely difficult for women because those who were employed were working in factories and underpaid. The fact that men were afraid of women becoming like them (independent and having an identity) made it even harder for women to be taken seriously or be valued. This source helped me make inferences about possible reasons Taussig's ideas were overlooked, and I further understood that, at the time, men felt superior to women.