

The 1918 Flu: Lessons Learned from Seattle

A Senior Paper

Presented in Partial Fulfillment of the Requirements for Graduation
Undergraduate History Program of the University of Washington Tacoma

By

Heather Somers

University of Washington Tacoma

March 2021

Advisor: Dr. Julie Nicoletta

Acknowledgements

I would like to thank Professor Michael Kucher and Professor Julie Nicoletta for their support, encouragement and feedback on my research and writing. I would also like to thank my writing tutors, Cassie Bundrick and James Hannes, for their constructive feedback and encouragement. I want to also thank my classmates, who offered their advice and support. I would also like to thank UWT's wonderful history research librarians, Suzanne Klinger and Erika Bailey. And, finally, I would like to thank my son, Sam, for all of his support and encouragement.

Abstract

The 1918 “Spanish influenza” was the worst influenza pandemic in recorded history. This paper traces advancements made in medicine and public health, especially those made during the latter half of the nineteenth century through the early twentieth century, leading up to the 1918 pandemic, by examining primary source materials and scholarly secondary sources. Unfortunately, the viral cause of influenza would not begin to be understood until the early 1930s. In 1918, the lack of scientific understanding of viruses led to many theories on the nature of influenza, including how to best treat it, and, ultimately, to a feeling of failure among many in the medical community. Fragmentation between state and federal public health organizations at the beginning of the pandemic resulted in a lack of preparation and preventative measures, such as social distancing, in many east coast cities. The impacts of the 1918 influenza in cities like Boston during September 1918, were eye-opening for public health and government officials in Seattle. Seattle escaped the fate of many east coast cities through preparation, unified messaging between national and local public health and government officials, and the implementation of proactive preventative measures. The lessons learned from Seattle’s handling of the 1918 flu can be applied today in our efforts to combat diseases like COVID-19 and future strains of novel viruses.

Introduction

The 1918 “Spanish influenza” pandemic was the deadliest infectious disease outbreak in history. The virus infected approximately one-third of the world’s population and was responsible for the deaths of between fifty and one-hundred million people worldwide.¹ Traveling with an ease and speed made possible through the twin threat of globalization and war, the disease wreaked havoc across the globe. Though World War I (WWI) was drawing to a close, the movement of troops greatly contributed to the spread of the influenza virus as America joined in the fighting. A series of three influenza infections, or “waves,” traveled across the globe between 1918 and 1919. The first wave is generally believed to have appeared in the United States in March of 1918. The second wave arrived in the fall and ran its course from September through November of 1918 and the third wave arrived in January of 1919. The first of these waves remained mild enough to escape the notice of most Americans, as death rates were only slightly elevated.² Reports from Europe in the summer of 1918, between the first and second waves in the United States, indicated a change in the virus’ pathogenicity, and described it as a severe “plague.”³ Unfortunately, many health officials in the U.S. failed to grasp the serious threat posed by this virulent strain of influenza. As a result, when the flu reappeared in the U.S. for the second wave in the fall of 1918, officials in many east coast cities were seemingly taken by surprise at the high levels of morbidity and mortality experienced as its

¹ Daniel Sledge, *Health Divided: Public Health and Individual Medicine in the Making of the Modern American State* (Lawrence: University Press of Kansas, 2017), 23, <https://muse-jhu-edu.offcampus.lib.washington.edu/book/51883>; Jeffery K. Taubenberger and David M. Morens, “1918 Influenza: The Mother of All Pandemics,” CDC, *Emerging Infectious Diseases* 12, no. 1 (2006): 15, https://wwwnc.cdc.gov/eid/article/12/1/05-0979_article.

² Taubenberger and Morens, 17.

³ “700 Spaniards Die,” *Seattle Star*, June 3, 1918, 3.

result. By the time the third wave hit, there was no longer any doubt as to the deadly consequences of this disease.

A look at history leaves one to ponder how it was that leaders in public health and the government were caught so off guard by the arrival and severity of the 1918 flu. The “Russian influenza,” or the flu of 1889, had struck the United States only thirty years prior. The emergence of this strain of influenza led public health officials to call for increased funding for research and education and provided many lessons on the unpredictable nature of influenza.⁴ That many public health and government officials, not to mention the general public, seemed to have collectively forgotten the lessons learned from the “Russian flu” may point to a more widespread socio-cultural phenomenon surrounding collective trauma. This cultural forgetting again seems to have occurred after the 1918 flu. After experiencing an unprecedented three waves of influenza within a year’s time, the collective cultural desire to get back to “normal” was prioritized, especially by those in the media and the government, over the need for a collective healing.⁵ This desire to forget and move on from a traumatic experience is, in many ways, a natural response. But, as a result, very little was written about the 1918 flu in the years following it, and, like the “Russian flu,” it too would be left in the past until the emergence of a new and deadly virus would lead us back in history, searching for answers.

It is a very human trait to relate our current situation to past experiences; indeed, this is what has led to my research on the 1918 flu. It is not a coincidence that we are in the midst of the COVID-19 pandemic while I write this paper. I am continually struck by the similarities

⁴ Sledge, 23.

⁵ Sandra Opdycke, *The Flu Epidemic of 1918: America’s Experience in the Global Health Crisis*, Critical Moments in American History (New York: Routledge, 2014), 129, <https://www-taylorfrancis-com.offcampus.lib.washington.edu/books/9780203077726>.

between the 1918 flu and COVID-19. Today, globalization continues to play an important role in the transmission of disease. Unlike in 1918, when the journey from the United States to Europe entailed a week's travel across the ocean, the speed at which humans can go from one side of the globe to the other has rapidly increased. Travel and trade continue to aid in the spread of disease, but today our interconnectedness is exponentially greater than it was one-hundred years ago. In addition to globalization, climate change has also produced favorable environments for the transmission of disease and an increasing proximity between humans and the animals that serve as either natural reservoirs or intermediary hosts for novel viral strains. These circumstances have increased the likelihood of novel viruses being introduced and spread among human populations and have increased the need for investments in medicine and public health research, education, and outreach. Because the 1918 influenza virus hit the east coast first, Seattle had time to prepare for the oncoming flu. The actions of Seattle public health officials and government leaders resulted in lower morbidity and mortality rates for the citizens of Seattle. In studying the 1918 flu in Seattle we can learn valuable lessons on the importance of public health preparedness and the necessity of cooperation and unified messaging among public health and government leaders.

Methodology

For this paper, I chose to focus my research on two historical Seattle newspapers: *The Seattle Star* and *Seattle Post-Intelligencer*. I first consulted the Library of Congress' "Chronicling America" newspaper database. I searched for Seattle newspaper articles that captured mentions of the "flu" and "influenza" and were printed between May 1918 and February 1919. I began my research with the *Seattle Star* newspaper based on the database's

preferential returns, which favored articles from this newspaper over articles from other newspapers. I utilized the University of Washington's historical newspaper database to access *Seattle Post-Intelligencer* articles. Again, I searched for articles that mentioned the "flu," with a beginning date of May 1918 and an ending date of January of 1919. I chose the *Seattle Post-Intelligencer* specifically based on its ease of access on the database. This search is limited, as there are a number of other local Seattle newspapers from 1918-1919 that would be of interest for continued research. I further limited the historical articles I chose to cite in my research to articles ranging from June 1918 to October 1918 for the express purpose of highlighting Seattle city officials' efforts in preparation, public health and government messaging, and preventative measures leading up to the arrival of the second wave of influenza in Seattle. I also relied on death rate statistics from the Seattle-King County Department of Health and Department of Annual Reports for the years 1918-1919. In addition to historical newspaper articles, I used contemporary articles from the *New York Times* to draw parallels between the 1918 pandemic and the COVID-19 pandemic.

The desire to forget traumatic experiences, such as the 1918 influenza, is evident in the lack of writing that can be found directly following the pandemic of 1918-1919. One of the earliest works I found that addresses the 1918 pandemic is the 1939 novella, *Pale Horse, Pale Rider*, by Katherine Anne Porter. This novella offers a fictionalized, yet semi-autobiographical account of the 1918 influenza. Porter's work offers a lens into the traumatic impacts of illness and loss resulting from the "Spanish influenza." The story recounts Porter's near-death experience as the result of contracting influenza, and the loss of a loved one from the same illness. Porter's characters make the experiences of the 1918 flu almost tangible for the reader. This work left me with a greater understanding of how the trauma experienced during the 1918

pandemic was a trauma which many people desired to forget. Though I did not cite this book in my paper, the underlying lessons found in its pages did factor into my research.⁶

In the podcast, *Going Viral*, Mark Honigsbaum and Hannah Mawdsley present multiple theories on the origin of the 1918 influenza. My research relies on information presented in two of the episodes from this series: “Some New Kind of Plague” and “The Blue Death.” John Barry, who introduced the American origin theory, is interviewed by Honigsbaum and Mawdsley in “Some New Kind of Plague” and discusses his research methods for tracing the origin of the 1918 influenza to Haskell County, Kansas. This episode also presents the Chinese origin theory and a theory that the virus originated with the movement of American horses to the Western Front at the beginning of WWI. The French origin theory is presented in “The Blue Death” by its leading proponent, and world-renowned virologist, John Oxford.

Literature Review

There was little written about the 1918 influenza until the beginning of the twenty-first century. Renewed interest in the subject occurred after scientists began work in the 1990s on sequencing RNA fragments from tissue samples that had been collected from 1918. One of the first books written after this research is Alfred Crosby’s *America’s Forgotten Pandemic: The Influenza of 1918* (2003). Crosby traces the arrival of America’s second wave of influenza in 1918 to Camp Devens, Massachusetts. He argues that the virus’ emergence as a worldwide pandemic at the end of WWI was met with a lack of organization and preparation in the United States, which he attributes to the financial and political strains caused by America’s involvement in the war, as well as a lack of medical and scientific knowledge related to viruses. Crosby’s

⁶ Katherine A. Porter, *Pale Horse, Pale Rider* (New York: Harcourt Brace and Company, 1939).

evidence relies on a number of government reports that show a lack of reporting on the flu. He also relies on medical journals to illustrate the limited scientific understanding of the disease during the 1918-1919 influenza outbreak. Crosby's argument that there was little reporting on the 1918 influenza is contested through the works of other secondary source authors such as John Barry, Sandra Opdycke, and Tom Dicke. While it is true that after the pandemic receded there was little written about the 1918 influenza and reporting may have been limited in certain government agencies as the result of political pressure to deemphasize the impacts of the virus, it was reported on extensively in newspaper articles at the time.

In his book, *The Great Influenza: The Story of the Deadliest Pandemic in History* (2005), John Barry provides a well-researched reconstruction of the 1918 influenza, which includes tracing the first recorded cases of the virus to Haskell County, Kansas. From there, Barry follows the virus' movement via American troops to the Western Front as the United States joined the Allies in WWI. From there, Barry follows the virus' mutation in Europe to a new, more deadly strain and its reintroduction into the United States, which marked the beginning of the "second wave." Barry argues that high viral morbidity and mortality rates during the 1918 pandemic were due to WWI conditions in which soldiers were placed in crowded and stressful environments and in which the transportation of soldiers across the globe led to an increase in the spread of the disease. Barry's work also presents information on medical and scientific advancements leading up to the 1918 influenza pandemic and the ways in which these advancements were applied to public health mobilization efforts.

The quest to better understand the flu of 1918 continues to shape scientific research today. In the 2006 article, "1918 Influenza: The Mother of All Pandemics," Jeffery Taubenberger and David Morens discuss some of the scientific advances that have helped us answer a number

of questions about the 1918 flu. It was not until the 1930s that scientists were able to isolate the first H1N1 viruses from pigs. Then in 1995, genetic RNA fragments from the 1918 influenza were discovered in archived tissue samples from soldiers who had died during WWI. This led to scientists successfully completing the genetic sequencing of the virus. These genetic sequences show that the virus was derived from an avian-like influenza that infected both humans and pigs during 1918. They also show that all subsequent influenza pandemics are descendants of the “Spanish flu.” Further studies are necessary to understand the high morbidity and mortality rates of the “Spanish influenza” compared to other flu viruses and to understand the patterns of infection that occurred in 1918-1919 over a relatively short period of time.

Sandra Opdycke’s 2014 book, *The Flu Epidemic of 1918: America’s Experience in the Global Health Crisis*, presents many of the same findings as John Barry’s *The Great Influenza*, including his research on the 1918 influenza’s origins in Haskell County, Kansas. Opdycke also discusses important medical advances in epidemiology and bacteriology prior to the 1918 pandemic and their public health applications during the 1918-1919 influenza outbreak. Additionally, Opdycke includes an analysis of how race and gender shaped the experiences of different groups during the 1918 influenza.

While Porter’s novella shaped my understanding of cultural responses to traumatic events, Tom Dicke’s 2015 article, titled “Waiting for the Flu: Cognitive Inertia and the Spanish Influenza Pandemic of 1918-19,” helped in my understanding of the cultural responses leading up to the second wave of the 1918 pandemic. Dicke includes information from numerous newspaper articles, specifically June 1918 through September 1918, to demonstrate that there was an awareness of, and factual reporting on, the “Spanish flu” during this time. However, he argues that the contextual framework necessary for understanding the increased threat posed by

the novel influenza was lacking. This article provides information that helps us understand how new information about emerging health threats is processed and understood by people at the outset of pandemics from a socio-psychological perspective.

In *Health Divided: Public Health and Individual Medicine in the Making of the Modern American State* (2017), Daniel Sledge provides a wealth of information on the formation and structuring of the United States public health system. Sledge chronicles the formation of public health organizations in the United States as well as the jurisdictional divisions between federal public health and local public health agencies. Divisions between individual medicine and public health are also discussed by Sledge, and are important for analyzing our current health crisis. Sledge illustrates how fractured organizational structures in the United States public health system present challenges during times of crisis, especially in the context of infectious disease outbreaks.

Public Health and Medicine Leading up to 1918

Globalization has played a role in the spread of disease in America since the arrival of the first colonists. Health care in early America was a local matter; state and local government officials would hire physicians to oversee the health concerns of their residents.⁷ As populations grew, so too did the need for health care and public health. Trade and commerce supported population growth and were important drivers of the economy, but ships coming in and out of U.S. ports brought more than trading goods; they also brought disease.

The Marine Hospital Service (MHS) was created by Congress in 1798 to provide sailors with hospitals and compulsory insurance and was operated under the supervision of the Treasury

⁷ Sledge, 14.

Department. The healthcare provided by the Service was funded through the taxing of sailors.⁸ The MHS was the first public health service in the United States, but at the time its services were quite limited. The demand for a more comprehensive public health service would spark debates about how public health services would be provided, who would provide them, and how they would be paid for. This debate about health care fit squarely in with debates about the role of the government and how much power the federal government should have.

The importance of states' sovereignty, local decision-making, and individual rights in terms of health care were weighed against the need for the collective oversight and organization of the federal government in limiting the spread of disease. In many ways, these debates have been with us as a country since the very founding of the United States and continue to be with us today. In 1824, Supreme Court Chief Justice John Marshall wrote his opinion that the powers inherent in "health laws of every description" should "not [be] surrendered to the general government."⁹ This was a strong endorsement of states' rights to oversee all health care matters, including public health.

Public health was often overseen by local city and county boards of health. However, the federal government had a strong incentive for providing public health oversight, as diseases do not respect state borders. In an effort to implement more efficient oversight and organization to the MHS, legislation was passed to create the position of supervising surgeon general in 1870. Former Union Army medical officer John Maynard Woodworth reorganized the Service in the

⁸ Ibid., 13-15.

⁹ Ibid., 13.

early 1870s along military lines, promoting officers of rank to physician positions. This practice was eventually enacted into law through statute.¹⁰

In 1878, as the Caribbean exploded with yellow fever, the MHS was strategically positioned in major ports, and Congress passed legislation which granted it the power to oversee local quarantines. The MHS, however, had a difficult time controlling the spread of the disease when the lower Mississippi Valley suffered a major outbreak of yellow fever that killed upwards of 20,000 people. This outbreak motivated politicians in the south, who had been hesitant up until that point, to support a federal response. With their support, the National Board of Health was created in 1879 “to advise state and local boards of health, to obtain and publish pertinent health information, to inquire into public health questions, and to plan for a permanent national health organization.”¹¹ However, as there were no further yellow fever outbreaks over the next four years, Southern politicians grew wary of federal control; Congress halted its funding, and the MHS returned to its limited role in overseeing quarantines in ports.¹² The MHS’s role was expanded in the 1890s to include the medical inspection of all immigrants for the stated purpose of stopping the spread of cholera, yellow fever, smallpox and plague. Quarantine remained a local and state prerogative through the early twentieth century, with New York being the last state to hand quarantine responsibilities over to the federal government in 1921.¹³

In 1889, a new strain of influenza arrived in the United States, first in Hawaii and then in California. Earlier reports of the “Russian flu” and its circulation in Europe were received prior

¹⁰ Ibid., 15.

¹¹ Ibid., 15.

¹² Ibid., 15-16.

¹³ Ibid., 16.

to its arrival in the U.S. On December 19, 1889, the *New York Times* reported an outbreak in Charles Street Jail in Boston; however, the article was quick to point out that this flu was not likely to be serious and that it was “very slightly, if at all, contagious.”¹⁴ While American authorities downplayed the risk of the virus, papers in Europe were reporting an increasingly dire situation. A quotation from a Paris newspaper read “[t]he influenza is spreading and is very fatal. The large number of deaths is exciting grave apprehensions.”¹⁵ By January 1, 1890, health officials in New York issued “An Official Warning” asking that anyone exhibiting cold or influenza symptoms seek medical treatment immediately.¹⁶ The dangers presented by this disease led many in the MHS to petition Congress to approve funding for research. Congress agreed, and in 1902 passed legislation. The MHS became the Public Health and Marine Hospital Service and received funding for a Hygienic Laboratory, which today is located in Maryland and has become the National Institutes of Health.¹⁷

The lack of authority and limited jurisdiction of the Public Health and Marine Hospital inhibited its ability to confront many pressing public health concerns. For instance, in the 1890’s, Rocky Mountain spotted fever had been identified but remained a poorly understood and deadly disease. When the Public Health and Marine Hospital Service received a request from the secretary of North Carolina’s State Board of Health to send “an officer to cooperate and assist his board in efforts to eradicate the disease from the State,” they found that though they would have

¹⁴ Nancy K. Bristow, *American Pandemic: The Lost Worlds of the 1918 Influenza Epidemic* (New York: Oxford University Press, 2012), 14, <https://ebookcentral-proquest-com.offcampus.lib.washington.edu/lib/washington/detail.action?docID=886515>.

¹⁵ *Ibid.*, 15.

¹⁶ *Ibid.*, 15.

¹⁷ Sledge, 23.

liked to send someone, they were unable to as there was no legal mechanism that allowed an officer to be paid to work in cooperation with state and local officials.¹⁸ Clearly this lack of cooperation between local and federal health officials presented a problem.

In order for public health measures to be effective, a scientific understanding of the disease in question is necessary. A scientist by the name of Jacob Henle was the first to formulate an understanding of modern germ theory. He wrote about this theory in an 1840 article titled “On Miasma and Contagia” in which he provided evidence for the germ theory.¹⁹ This theory stated that “minute living organisms invaded the body, multiplied, and caused disease, and that a specific germ caused a specific disease.”²⁰ At the time, there were three other theories: the miasma theory which postulated that diseases came from unclean or putrid air, atmospheric disturbances or climate related phenomenon; the theory of filth which argued that disease was caused by “swamp gas,” a term used to describe the stench emanating from human waste; and the chemical theory which argued that chemicals, or “zymes,” could cause disease by triggering chemical reactions which would result in fermentation, or infection.²¹ Interestingly, as Barry writes, “chemicals, radiation, and environmental factors can cause disease, although usually only through long-term or massive exposure” and this “sophisticated version of the zymote theory essentially describes what is today called a virus.”²²

¹⁸ Ibid., 27.

¹⁹ Barry, John M., *The Great Influenza: The Story of the Deadliest Pandemic in History* (New York: Penguin Books, 2005), 51, <https://ebookcentral-proquest-com.offcampus.lib.washington.edu/lib/washington/detail.action?docID=4642941>.

²⁰ Ibid., 49.

²¹ Ibid., 49-50.

²² Ibid., 50-51.

The 1840s and 1850s showed particular promise for the advancement of public health. During this time, John Snow used math and epidemiology to trace and locate the origins of a deadly outbreak of cholera in London. With careful notes and skillful detective work, he narrowed the source of the outbreak to a well, the contaminated water of which was causing the disease.²³ Though germ theory had yet to be proven, and the treatment and cure for cholera would have to wait, being able to trace the origin of a disease was a huge leap forward in fighting the spread of disease and also in disease prevention.

Major gains in the study of bacteriology furthered our scientific understanding of disease and offered evidence that confirmed the germ theory. In 1882, after achieving fame as the first to demonstrate the life cycle of the anthrax bacillus, Robert Koch discovered the tubercle bacillus, the bacteria that causes tuberculosis.²⁴ The following year, Koch would build on Snow's earlier work by using epidemiology to isolate the cholera bacillus. Koch's discoveries legitimized germ theory and led the scientific and medical communities to accept it as a theory that had been put to the test and validated.²⁵

Once germ theory had been proven, and epidemiology had successfully been used to trace the origin of disease, the next step was the development of treatments. In 1890, Emil Behring and Shibasaburo Kitasato proved that serum, the fluid remaining after all solids drawn from the blood of an infected animal (tetanus in this case) had been removed, could be used to protect against the disease. By 1891, this method had been used to not only prevent disease, but also to successfully cure a patient suffering from diphtheria. Science now had the capability to

²³ Ibid., 27.

²⁴ Ibid., 51-52.

²⁵ Ibid., 53.

not only protect against, but also cure disease.²⁶ This was a major accomplishment for the medical and scientific community and provided additional capabilities for the advancement of public health. As 1918 grew near, there was a feeling of optimism that scientific discoveries were on the verge of unlocking and mastering the mysteries of disease.

1918 Flu: From Kansas to Seattle

Camp Funston, a U.S. army training camp in Kansas, was the second largest cantonment in the country, with an average population of 56,000 troops. On March 4, 1918, a private, one of the cooks, reported to sick call with influenza. Over the next three weeks, more than 1,100 soldiers would report to the camp's hospital with similar symptoms.²⁷ Once the virus began to spread at Camp Funston, it was only a matter of weeks before it had spread to at least a dozen other military camps across the country.²⁸ In April, thirty of the country's fifty largest cities, many of which were located near military bases, reported "excess mortality" from what was in retrospect the "Spanish flu."²⁹ An unseasonably high number of influenza cases was reported in Camp Lewis, near Seattle, Washington, in the summer of 1918, with 327 reported for the camp on July 21.³⁰ This first wave of the virus produced relatively mild symptoms and typically ran its course within a local population within a matter of weeks after its arrival. Though many people were infected with the disease during the spring of 1918, a lack of reporting both in the medical

²⁶ Ibid., 70.

²⁷ Ibid., 96.

²⁸ Opdycke, 3.

²⁹ Barry, 169.

³⁰ "Six Warehouses Added to Plant at Camp Lewis: Epidemic of Influenza," *Seattle Post-Intelligencer*, July 21, 1918, 5.

and public health communities, its relatively mild symptoms, and a lack of media attention resulted in the vast majority of the population having no idea they were in the midst of an epidemic.³¹

The influenza virus is believed to have traveled to Europe with American soldiers. The 1918 viral strain of influenza disproportionately affected young adults, aged fifteen to thirty-four.³² In fact, people under forty-five years of age accounted for ninety-three percent of influenza-related deaths during the fall and winter of 1918-1919. In a typical flu season, people under forty-five make up twenty-five to thirty-four percent of influenza related deaths.³³ This age signature was particularly devastating for the young men that were fighting in the war. The virus spread easily among soldiers given the war conditions in which large concentrations of young men were crowded together in highly stressful situations.

As of May 1918, the presence of the virus in both the United States and Europe was “prevalent;” however, because of the politics of war, there remained a lack of reporting. It was not until the virus reached Spain that it was first reported on by the newspapers.³⁴ Influenza was widespread in Spain in May of 1918, and because Spain was not at war, it was one of the few countries where the reporting of the disease was not censored in the newspapers. As a result, the 1918 flu became known as the “Spanish influenza.”³⁵ Yet it was on the Western Front that the

³¹ Opdycke, 3-4.

³² Taubenberger and Morens, 19.

³³ Lone Simonsen, Gerardo Chowell, Viggo Andreasen, Robert Gaffey, John Barry, Don Olson, and Cécile Viboud, “A Review of the 1918 Herald Pandemic Wave: Importance for Contemporary Pandemic Response Strategies,” *Annals of Epidemiology* 28, no. 5 (2018): 282, <https://www-clinicalkey-com.offcampus.lib.washington.edu/#!/content/playContent/1-s2.0-S1047279717307263?returnurl=null&referrer=null>.

³⁴ Opdycke, 4.

³⁵ Simonsen, et al., 283.

virus is believed to have mutated into a more virulent strain before being transported back to the United States, once again with the movement of soldiers.

The second wave of the 1918 influenza began on the East Coast when two or three sailors arrived sick at Commonwealth Pier in Boston.³⁶ Reports coming out of Boston and other east coast cities served as a warning to the rest of the country and may have sufficiently scared those on the West Coast into forming battle plans, so to speak, in preparation for the influenza's eventual arrival. Health officials on the East Coast had balked at the idea that the "Spanish flu," which had been devastating Europe, would reach the U.S. When it did arrive, they continued to underestimate both the speed at which it would travel and its lethality, chalking it up to being just another flu. Officials in Boston had likened the "Spanish flu" to a "bad cold."³⁷

In 1918, scientists as well as public health and government officials were not the only ones trying to understand the "Spanish influenza;" everyone was trying to make sense of this new disease. People wanted to know where the disease came from, and a convergence of fears about the war and fears about contagion led to theories about its origin. Reports that German soldiers were responsible for the contagion did not take long to surface. A headline from the *Seattle Star* on September 19 reads, "Believe Huns From U-Boats Scattered Influenza in U.S." Lieutenant Colonel P.S. Doane, head of the health section of the shipping board, was quoted in this article as saying, "[i]t is quite possible the epidemic was started by Huns sent ashore by boche submarine commanders. We know that men have been sent ashore from German submarines and it would be quite easy for these agents to turn loose the germs in theatres and

³⁶ Bristow, 44.

³⁷ "Spanish Flu Has Boston In Tragic Grip," *Seattle Star*, September 26, 1918, 8.

other places where large numbers of people are assembled.”³⁸ The article reports that just prior to the outbreak, German submarine commanders carrying the disease were captured by U.S. navy personnel. The author points out the intentionality of the Germans in that the Germans had inoculated themselves against the disease and were spreading it as a form of warfare. The story goes on to argue that the influenza was also first detected in Spain after the arrival of U-boats in Spanish ports. This theory was repeated in newspaper articles during September and offered an explanation as to why soldiers in army and navy camps, as well as those living in cities near these camps, were the first to be stricken with the illness.³⁹

A warning was sent out to the country by Surgeon General Rupert Blue on September 14, 1918, about the “grave” nature of the pandemic posed by the “Spanish flu.” He states that “[p]eople are stricken on the streets, while at work in factories, shipyards, offices or elsewhere. First there is a chill, then fever with temperature from 101 to 103, headache, backache, reddening and running of the eyes, pains and aches all over the body and general prostration.”⁴⁰ Under the same headline, a report from Boston states that the influenza outbreak, which began there three weeks prior, has resulted in a total of 1,693 cases and thirty-four deaths.⁴¹ The following day, a *Seattle Post-Intelligencer* article reported 1,000 cases of influenza at Camp Devens, Massachusetts.⁴² By September 26, there were reports of Boston being “panic stricken” by the

³⁸ Believe Huns From U-Boats Scattered Influenza in U.S.,” *Seattle Star*, September 19, 1918, 1.

³⁹ “Whole City on Guard Against Spread of Strange New Malady That Takes Huge Death Toll,” *Seattle Star*, September 26, 1918, 8.

⁴⁰ “Country Warned Spanish “Flu” is Grave Pandemic,” *Seattle Post-Intelligencer*, September 14, 1918, 7.

⁴¹ Ibid.

⁴² “Influenza Spreading In War Cantonments,” *Seattle Post-Intelligencer*, September 15, 1918, 13.

disease, which was “sweeping toward the west and south like a medieval plague...threaten[ing] to overwhelm the whole country.”⁴³

In addition to reports coming out of Boston and other east coast cities, the United States Public Health Service provided information on the influenza in local newspapers. An article titled “All About Spanish ‘Flu,’” was printed in the *Seattle Star* on September 26, 1918, and is one example of national public health messaging and efforts to warn the public about the dangers of influenza. This announcement detailed the symptoms of the flu, from its sudden onset, to weakness and pains experienced, sore throats and, sometimes, bronchitis. High fevers were said to usually fall within three to four days, followed by rapid recovery.⁴⁴ The Public Health Service (PHS) also reported that few deaths were occurring, but those that did were usually the result of bronchitis, heart failure, or a combination of the two. The PHS listed sources of infection as “secretions of the throat and nose passages, conveyed on handkerchiefs, towels, cups and messgear or other methods.”⁴⁵

The nature of the disease and the manner in which it spread remained somewhat of a mystery, though germ theory by this time was the widely accepted theory for disease transmission. Some medical personnel and leaders of public health, including the city of Seattle’s Health Commissioner, Dr. J.S. McBride, argued that dirt and dust could also spread diseases, including the flu. In an article appearing in the *Seattle Star* on September 21, 1918, McBride states that Seattle had no reported cases of influenza, yet, and that a “fall of rain would make its

⁴³ “Whole City On Guard,” *Seattle Star*, September 26, 1918, 8.

⁴⁴ “All About Spanish ‘Flu,’” *The Seattle Star*, September 26, 1918, 8.

⁴⁵ “Spanish Flu Has Boston in Tragic Grip,” *Seattle Star*, September 26, 1918, 8.

presence impossible.”⁴⁶ Over the following weeks, McBride continued to make the argument that rain could stop the spread of influenza. In an October 5 article he elaborates on his point that the rain would “aid in the fight against the spread of Spanish influenza” in Seattle since “the germs are freely distributed in the dust in the streets.”⁴⁷ This theory made it even more important for people to abstain from spitting. The same article informed the public that the police had been granted additional powers to combat the spread of influenza and that “persons spitting on sidewalks or street cars are to be immediately placed under arrest.”⁴⁸ Public health authorities had been pushing anti-spitting education since the end of the nineteenth century as a way to stop the spread of tuberculosis.⁴⁹ New York was the first city to enact anti-spitting legislation in 1896, with cities and towns across the United States following suit. By 1916, 195 of the 213 cities in the United States with populations over 25,000 had enacted anti-spitting legislation.⁵⁰ Absent a definitive treatment or cure, public health officials set out on a massive campaign to educate the public, both in the late nineteenth and early twentieth centuries to combat tuberculosis and again in 1918 to stop the spread of “Spanish flu” during the height of the influenza pandemic.

Public health and government officials implored everyone to do their part to stop the spread of the influenza in 1918. In addition to anti-spitting legislation, Health Commissioner McBride urged people to, “Keep away from people with colds; Eat plenty of nourishing food and

⁴⁶ “‘Investigation’ is Mild Affair,” *Seattle Star*, September 21, 1918, 2.

⁴⁷ “25 ‘Flu’ Cases Reported in Seattle,” *Seattle Star*, October 5, 1918, 1.

⁴⁸ *Ibid.*

⁴⁹ Jeanne E. Abrams, “‘Spitting Is Dangerous, Indecent, and Against the Law!’ Legislating Health Behavior During the American Tuberculosis Crusade,” *Journal of the History of Medicine and Allied Sciences* 68, no. 3 (2013): 416, <https://www-jstor-org.offcampus.lib.washington.edu/stable/pdf/24672117.pdf?refreqid=excelsior%3Aa423f632db0631f38d37565722640cb>.

⁵⁰ *Ibid.*, 434.

keep your system in good shape with plenty of sleep and regular living; If you have any symptoms of grip, go to a physician immediately.”⁵¹ These preventative measures and the cooperation of the public were requested as acts of patriotism so as not to spread the disease, especially to the shipyard workers whose health and labor was needed for the war effort.⁵²

Health authorities in Seattle had the advantage of advanced warnings from east coast cities as reports of the virus’ spread became increasingly concerning. By mid-September, there was a general consensus among leaders in public health, nationally and in the greater Seattle area, as to the serious dangers posed by this new strain of influenza as well as the important role that public health would need to play in order to limit its spread. On September 26, an article reported the number of infected soldiers at Camp Devens had risen to 6,000. There were at least 10,000 cases of influenza reported among civilians in Boston, and as many as one-hundred people had died from the disease in one night alone.⁵³ Near Seattle, on September 23, 173 cases had been reported at Camp Lewis, mostly “among new draft men.”⁵⁴ Then, on September 29, the University of Washington’s naval training center reported 400 cases.⁵⁵ The influenza pandemic was spreading fast.

On October 5, 1918, the frontpage headline in the *Seattle Post-Intelligencer* reads, “Seattle is Ready to Fight Spread of the Influenza.” This article announces the arrival of the

⁵¹ “City Prepares to Fight “Flu,” *Seattle Star*, 4.

⁵² *Ibid.*

⁵³ *Ibid.*

⁵⁴ “173 Influenza Cases,” *Seattle Star*, September 23, 1918, 5.

⁵⁵ “85,000 Have Influenza In New England State: Pandemic Continues to Spread and Four Hundred Cases Reported In Seattle Camp,” *Seattle Post-Intelligencer*, September 29, 1918, 9.

influenza in Seattle, as Health Commissioner McBride confirms receiving reports of the first case the previous day. State Commissioner of Health, T.D. Tuttle, states that the only way for Seattle to escape the same fate as that of the east coast cities is to take “drastic steps.” The article also states that there has been a ban issued against “all dances, public and private, [s]treet cars and theaters were ordered [to be] well ventilated” and “all policemen were instructed to rigidly enforce the anti-spitting ordinance.”⁵⁶ The frontpage headline in the *Seattle Star* on October 5, reads, “25 ‘Flu’ Cases Reported in Seattle.”⁵⁷ A proclamation issued by Mayor Hanson, closing “all churches, schools, theaters and places of assemblage,” is printed in this article.⁵⁸

Seattle proactively enacted measures to limit the spread of influenza immediately following the first reported cases of the disease in the city. Public health and government officials’ knowledge and preparedness led to swift and decisive actions and a much more aggressive approach to handling the virus than what had been seen on the East Coast. Seattle’s death rate from the flu remained comparatively low as a result of these actions. There were a total of 1,003 deaths in Seattle from influenza alone in the months of October, November and December of 1918.⁵⁹ Seattle’s excess death rate from influenza, from September 1918 to June 1919, was 4.9 percent per 1,000 people, whereas the city of Boston’s excess death rate for the same time period was 8.7 percent per 1,000 people.⁶⁰ These numbers show Seattle officials’

⁵⁶ “Seattle Is Ready to Fight Spread Of the Influenza,” *Seattle Post-Intelligencer*, October 5, 1918, 1.

⁵⁷ “25 ‘Flu’ Cases Reported in Seattle,” *Seattle Star*, October 5, 1918, 1.

⁵⁸ Ibid.

⁵⁹ Seattle-King County Department of Health and Department of Health Annual Reports, *Report of the Department of Health and Sanitation, Seattle, 1918-1919* (Seattle: Lowman & Hanford Co., c. 1920), accessed March 3, 2021, <http://archives.seattle.gov/digital-collections/index.php/Detail/objects/181718>.

⁶⁰ Opdycke, 92-93.

success in limiting the toll influenza took on the city.

Seattle had a month to prepare, between the time the mutated influenza virus was first identified in Boston and the first case was reported in Seattle. This gave public health and government leaders time to recognize the serious threat the virus presented and time to prepare for its arrival. Reports from east coast cities, as well as reports from the surgeon general and the PHS served as a wake-up call for Seattle officials. As the virus made its way across the country, arriving first in Camp Lewis and then the University of Washington's naval training center, it became clear that Seattle would not escape contact with the virus. Seattle's mayor and health commissioner recognized the serious threat influenza posed to those living in Seattle and worked with other state and federal leaders to develop and implement plans which would limit the spread of the disease. Their decisions to proactively ban dances, advocate for the proper ventilation of gathering spaces, and enforce public health measures such as anti-spitting ordinances (and later mask mandates) ultimately resulted in fewer influenza cases and in lower death rates in Seattle than were seen in most of the country.

What We Know Now

In 1918, scientists and public health officials did not understand the viral nature of influenza. The mysteries presented by the virus, including its origin, would not begin to be solved until the 1930s when the H1N1 virus was isolated, first in pigs and then in humans. Shortly after these discoveries, both viruses were linked to the 1918 influenza. The usual annual circulation of flu is due to what is called viral antigenic drift, or a gradual mutation of the influenza virus. In 1995, scientists set to work sequencing viral RNA fragments from archived influenza autopsy materials that had been collected in the fall of 1918 in an effort to better

understand the genomic structure and causes of the virus. A genomic sequence for the virus has now been completed and scientists have concluded that the 1918 flu was a novel virus, meaning that it had not been in circulation previously. After its appearance in 1918, the H1N1 viral strain continued to circulate annually until a new H2N2 pandemic influenza (“Asian flu”) emerged in 1957. Interestingly, at that point, the H1N1 strain disappeared from human circulation until it “reemerged’ from a laboratory freezer” in 1977.⁶¹ Scientists believe that “all 4 of the human and swine H1N1 and H3N2 lineages” in circulation today are the descendants of the 1918 flu.⁶²

Today, we know that birds such as geese and ducks are a natural reservoir species for the flu virus; however, the flu virus is very rarely contracted by humans directly from birds. This is due to the virus’ preferential binding sites, which differ between and are dependent on the species they infect. Pigs and horses are two intermediate hosts; because of this, they are referred to as “mixing vessels.” Intermediate hosts have receptors that are preferred by both avian and human influenza viruses and host animals can contract the flu from both birds and humans. In the case of the 1918 influenza, an intermediate host likely contracted the avian influenza virus and then passed the virus on to humans. This is one of the reasons that flu epidemics tend to originate in Southeast Asia, “where agricultural practices put ducks, swine and humans in close contact.”⁶³

We now know quite a bit about viruses; however, mysteries surrounding the exact origin of the 1918 flu persist and continue to be debated by historians. The Chinese origin theory is one

⁶¹ Taubenberger and Morens, 15.

⁶² Ibid., 15-16.

⁶³ Robin M. Bush, “Influenza as a Model System for Studying the Cross Species Transfer and Evolution of the SARS Coronavirus,” *Philosophical Transactions of the Royal Society: Biological Sciences* 359, no. 1447 (2004): 1068, https://www-jstor-org.offcampus.lib.washington.edu/stable/4142238?seq=1#metadata_info_tab_contents.

that has been debated by many. During the war, first the French and then the British made arrangements with the Chinese government which provided indentured laborers from the Chinese labor corps to assist in the war effort. These laborers most often worked behind the lines. In 1917, 100,000 laborers embarked by ship from China and sailed across the Pacific Ocean, arriving in Vancouver, Canada. From Vancouver, they traveled by train across Canada to Halifax, and then continued their journey across the Atlantic to the Western Front by ship. It was reported that many in the group were sick as they began their journey from China to North America. China, at the time, was in the midst of what they were calling a pneumonic plague outbreak. In a year's time, they would no longer be calling it the plague, but instead, the “Spanish flu.”⁶⁴

The Chinese origin theory remains mainly anecdotal. Another interesting, though anecdotal theory, places the origin of the flu with the movement of North American horses to Europe. Evolutionary biologist Michael Woroby explains that the British Remount Service bought a large number of American horses for the war effort, contributing to “the largest movement of horses that has ever occurred and will ever occur on the face of the planet.”⁶⁵ Millions of horses were transported from North America to the Western Front between 1914 and 1916. Based on genetic analysis and reports detailing a large horse flu outbreak at the time, Woroby believes that horses could have acted as intermediary hosts in transferring the virus

⁶⁴ Mark Honigsbaum and Hannah Mawdsley, “Some New Kind of Plague,” July 10, 2018, in *Going Viral*, produced by Melissa FitzGerald, podcast, 32:05, <https://podcastrepublic.net/podcast/1396018157>.

⁶⁵ *Ibid.*, 18:20.

between birds and humans.⁶⁶ However, there are two other origin theories that are more widely accepted by historians; the French origin theory and the American origin theory.

World-renowned virologist Professor John Oxford has been arguing for more than ten years that the 1918 flu originated in Northern France at Etaples, Britain's main military base during the war. In addition to the military base, there was a hospital at this site which held up to 100,000 hospital beds. Oxford bases his theory, in part, on reports from 1916 which showed an increase in the number of soldiers suffering from a mysterious bronchial, pneumonia-like illness. Medical officer J.A.B Hammond and pathologist William Roland authored a 1917 article in the *Lancet* describing autopsies they conducted during this time among soldiers who had died in Northern France which noted a blue discoloration, or cyanosis of the face.⁶⁷ The blue discoloration of the skin would come to be a telltale sign of the "Spanish flu." The autopsies also revealed bulky lungs, the bronchi of which were filled with yellow pus, which was a clear indication of infection. Damage to the lungs of this nature had only ever been seen in soldiers who had been exposed to mustard gas, which indicates the severity of the damage caused by this influenza. In addition to medical reports, Oxford argues that the overcrowded and stressful conditions found on the military base, combined with its location along a bird migratory route, offered the perfect set of conditions for the influenza pandemic to ignite. The H1N1 influenza variant seen in the 1918 influenza outbreak comes from birds. Bird flus spread from migratory birds, such as geese and ducks, to local geese and ducks, as well as domesticated chickens. Oxford cites photographic evidence of soldiers in 1917 plucking geese for Christmas dinner.

⁶⁶ Honigsbaum and Mawdsley, "Some New Kind of Plague."

⁶⁷ J.A.B Hammond, William Rolland and T.H.G. Shore, "Purulent Bronchitis.: A Study of Cases Occurring Amongst the British Troops at a Base in France," *Lancet* 190, no. 4898 (1917): 41-46, <https://www.sciencedirect.com/science/article/abs/pii/S0140673601562297>.

Additionally, the military base had a piggery, which is important since pigs act as intermediary hosts in passing influenza from birds to humans.⁶⁸

The American origin theory was first introduced by John Barry in his 2005 book *The Great Influenza*. The earliest known report of the virus in the United States was at Camp Funston, Kansas. Because influenza was not a reportable disease at the time, military records offer one of the best and only sources for detailed reports to track the disease during the 1918 pandemic. With Camp Funston as a starting point, Barry used epidemiological evidence from early 1918 to trace the influenza outbreak to a group of soldiers who had come into contact with the virus while visiting nearby Haskell County, Kansas and brought it back with them when they returned to Camp Funston.⁶⁹ Interestingly, Haskell, like Etaples, also sits on a bird migration route.⁷⁰ Haskell was cattle country, where farmers also lived in close proximity to pigs and fowl. Barry argues that this is where the first wave of the 1918 influenza began. Though the origin of the “Spanish flu” continues to be debated, and may never be known conclusively, many historians have accepted Barry’s conclusion that the virus’ origin was in Haskell County, Kansas in February 1918.

Conclusion

With the arrival of COVID-19, it became clear that for many people the lessons of the 1918 flu had been lost to time. Perhaps one of the most important lessons learned during the 1918 pandemic is the importance of preparedness and of continued funding for emergent disease

⁶⁸ Mark Honigsbaum and Hannah Mawdsley, “The Blue Death,” July 5, 2018, in *Going Viral*, produced by Melissa FitzGerald, podcast, 33:25, <https://podcastrepublic.net/podcast/1396018157>.

⁶⁹ Barry, 92; Honigsbaum and Mawdsley, “Some New Kind of Plague.”

⁷⁰ Honigsbaum and Mawdsley, “Some New Kind of Plague.”

surveillance, monitoring and appropriate countermeasures. In his 2018 article “Better Prepare than React: Reordering Public Health Priorities 100 Years After the Spanish Influenza,” Michael Greenberger argues that despite advances in technology and pharmaceuticals, decreased public health funding has left the United States, and the world, vulnerable to emerging viruses. He states that thirty-one states cut funding for local health departments between fiscal year 2015-2016 and fiscal year 2016-2017.⁷¹ Additionally, at the time that Greenberger’s article was written, Congress and the Trump administration had cut \$1.35 billion from the Prevention and Public Health fund for the following 10-year period. This funding cut was projected to affect the CDC’s ability to carry out public health efforts; it is particularly troublesome to note that these cuts included public health efforts in China. At the time, public health organizations cautioned that “critical momentum will be lost if epidemic prevention funding is reduced, leaving the world unprepared for the next outbreak.”⁷² The defunding of public health immediately prior to the emergence of the novel coronavirus could not have come at a worse time.

Another lesson from the 1918 flu that seems to have been forgotten is the importance of accurate and consistent public health messaging and education. Information on public health since the emergence of COVID-19 has been disjointed and contradictory among leaders in government. Former President Trump publicly dismissed the novel coronavirus as a “hoax” and

⁷¹ Michael Greenberger, "Better Prepare than React: Reordering Public Health Priorities 100 Years After the Spanish Flu Epidemic," *American Journal of Public Health* 108, no. 11 (2018): 1466, <https://search-proquest-com.offcampus.lib.washington.edu/docview/2124046702/fulltextPDF/63F25B5459524959PQ/1?accountid=14784>.

⁷² *Ibid.*, 1467.

compared it to the seasonal “flu.”⁷³ This statement echoes those made by officials in cities like Boston at the beginning of the second wave of “Spanish influenza.” Both then and now, the comparison of a pandemic-causing virus with a virus that is perceived by many as familiar and less threatening adds to what Tom Dicke terms “cognitive inertia;” this is the inability or unwillingness to accept a new reality. Politicians who contradict scientists and public health officials add to the public’s confusion about how to respond to a viral threat and foster an environment in which a lack of knowledge leads to higher transmission rates and deaths from emerging viruses.

Politicians are not alone in having contributed to contradictory public messaging. In 1918, Rupert Blue, the United States surgeon general, warned the public of the “grave” danger posed by the “Spanish influenza” and offered advice as to how to limit disease transmission. In contrast, at the beginning of the COVID-19 outbreak, Surgeon General Jerome M. Adams, demanded Americans “STOP BUYING FACE MASKS!... [t]hey are NOT effective in preventing general public from catching #Coronavirus,” in a tweet from February 29, 2020.⁷⁴ While this statement was made in the context of a shortage of masks for health care workers, the repercussions were long lasting, leading many Americans to believe that masks are indeed ineffective for stopping the spread of the coronavirus. Non-pharmaceutical interventions, like practicing social distancing and wearing masks, are the most effective ways to limit viral transmission in the absence of vaccines. The public relies on consistent messaging in order to

⁷³ Lauren Egan, “Trump Calls Coronavirus Democrats’ ‘New Hoax,’” *NBC News*, February 28, 2020, <https://www.nbcnews.com/politics/donald-trump/trump-calls-coronavirus-democrats-new-hoax-n1145721>.

⁷⁴ Maria Cramer and Knvul Sheikh, “Surgeon General Urges the Public to Stop Buying Face Masks,” *New York Times*, February 29, 2020, <https://www.nytimes.com/2020/02/29/health/coronavirus-n95-face-masks.html>.

make sense of national disasters such as pandemics, and this has not occurred with COVID-19 messaging.

In 1918, preparation, cooperation between leaders at the federal and state level, unified and consistent public health messaging, and the implementation of proactive preventative measures led to Seattle's successes in limiting the spread of influenza and resulted in Seattle having one of the lowest death rates from the disease in the country. The actions of Seattle public health and government officials can serve as an example for leaders today. The lessons learned from Seattle's handling of the 1918 influenza can be applied today in our efforts to combat diseases like COVID-19 and novel viral strains that may arise in the future.

Bibliography

Primary Sources

- Cramer, Maria, and Knvul Sheikh. "Surgeon General Urges the Public to Stop Buying Face Masks." *New York Times*. February 29, 2020.
<https://www.nytimes.com/2020/02/29/health/coronavirus-n95-face-masks.html>.
- "Coronavirus Global Map: Tracking the Outbreak." *New York Times*. Accessed updated February 27, 2021 version on February 27, 2021.
<https://www.nytimes.com/interactive/2020/world/coronavirus-maps.html>. (2.5 million + deaths)
- "Coronavirus in the U.S.: Latest Map and Case Count." *New York Times*. Accessed updated February 27, 2021 version on February 27, 2021.
<https://www.nytimes.com/interactive/2020/us/coronavirus-us-cases.html>. (511,619 deaths)
- Egan, Lauren. "Trump Calls Coronavirus Democrats' 'New Hoax.'" *NBC News*. February 28, 2020. <https://www.nbcnews.com/politics/donald-trump/trump-calls-coronavirus-democrats-new-hoax-n1145721>.
- Hammond, J.A.B, William Rolland and T.H.G. Shore. "Purulent Bronchitis.: A Study of Cases Occurring Amongst the British Troops at a Base in France." *Lancet* 190, no. 4898 (1917): 41-46. <https://www.sciencedirect.com/science/article/abs/pii/S0140673601562297>.
- Honigsbaum, Mark, and Hannah Mawdsley. "The Blue Death." July 5, 2018. In *Going Viral*. Produced by Melissa FitzGerald. Podcast. 33:25.
<https://podcastrepublic.net/podcast/1396018157>.
- Honigsbaum, Mark, and Hannah Mawdsley. "Some New Kind of Plague." July 10, 2018. In *Going Viral*. Produced by Melissa FitzGerald. Podcast. 32:05.
<https://podcastrepublic.net/podcast/1396018157>.
- Porter, Katherine A. *Pale Horse, Pale Rider*. New York: Harcourt Brace and Company, 1939.
- Seattle-King County Department of Health and Department of Health Annual Reports. *Report of the Department of Health and Sanitation, Seattle, 1918-1919*. Seattle: Lowman & Hanford Co., c. 1920. Accessed March 3, 2021. <http://archives.seattle.gov/digital-collections/index.php/Detail/objects/181718>.
- Seattle Star*. May 1918 – February 1919.
- Seattle Post-Intelligencer*. May 1918 – January 1919.

Secondary Sources

- Abrams, Jeanne E. “‘Spitting Is Dangerous, Indecent, and Against the Law!’ Legislating Health Behavior During the American Tuberculosis Crusade.” *Journal of the History of Medicine and Allied Sciences* 68, no. 3 (2013): 416-50. <https://www-jstor-org.offcampus.lib.washington.edu/stable/pdf/24672117.pdf?refreqid=excelsior%3Aa423f632db0631f38dd37565722640cb>.
- Barry, John M. *The Great Influenza: The Story of the Deadliest Pandemic in History*. New York: Penguin Books, 2005. <https://ebookcentral-proquest-com.offcampus.lib.washington.edu/lib/washington/detail.action?docID=4642941>.
- Bristow, Nancy K. *American Pandemic: The Lost Worlds of the 1918 Influenza Epidemic*. New York: Oxford University Press, 2012. <https://ebookcentral-proquest-com.offcampus.lib.washington.edu/lib/washington/detail.action?docID=886515>.
- Bush, Robin M. “Influenza as a Model System for Studying the Cross Species Transfer and Evolution of the SARS Coronavirus.” *Philosophical Transactions of the Royal Society: Biological Sciences* 359, no. 1447 (2004): 1067-073. https://www-jstor-org.offcampus.lib.washington.edu/stable/4142238?seq=1#metadata_info_tab_contents
- Osby, Alfred W. *America's Forgotten Pandemic: The Influenza of 1918*. 2nd ed. Cambridge; New York: Cambridge University Press, 2003. <https://www-fulcrum-org.offcampus.lib.washington.edu/concern/monographs/2j62s512v>.
- Dicke, Tom. “Waiting for the Flu: Cognitive Inertia and the Spanish Influenza Pandemic of 1918-19.” *Journal of the History of Medicine and Allied Sciences* 70, no. 2 (2015): 195-217. <https://academic-oup-com.offcampus.lib.washington.edu/jhmas/article/70/2/195/776261>.
- Greenberger, Michael. "Better Prepare than React: Reordering Public Health Priorities 100 Years After the Spanish Flu Epidemic." *American Journal of Public Health* 108, no. 11 (2018): 1465-1468. <https://search-proquest-com.offcampus.lib.washington.edu/docview/2124046702/fulltextPDF/63F25B5459524959PQ/1?accountid=14784>.
- Opdycke, Sandra. *The Flu Epidemic of 1918: America's Experience in the Global Health Crisis. Critical Moments in American History*. New York: Routledge, 2014. <https://www-taylorfrancis-com.offcampus.lib.washington.edu/books/9780203077726>.

Simonsen, Lone, Gerardo Chowell, Viggo Andreasen, Robert Gaffey, John Barry, Don Olson, and Cécile Viboud. "A Review of the 1918 Herald Pandemic Wave: Importance for Contemporary Pandemic Response Strategies." *Annals of Epidemiology* 28, no. 5 (2018): 281-88. <https://www-clinicalkey-com.offcampus.lib.washington.edu/#!/content/playContent/1-s2.0-S1047279717307263?returnurl=null&referrer=null>.

Sledge, Daniel. *Health Divided: Public Health and Individual Medicine in the Making of the Modern American State*. Lawrence, Kansas: University Press of Kansas, 2017. <https://muse-jhu-edu.offcampus.lib.washington.edu/book/51883>.

Taubenberger, Jeffery K., and David M. Morens. "1918 Influenza: The Mother of All Pandemics." CDC. *Emerging Infectious Diseases* 12, no. 1 (2006): 15-22. https://wwwnc.cdc.gov/eid/article/12/1/05-0979_article.