Municipal Public Health Failures and Socioeconomic Differentiation during Pandemic Influenza in Philadelphia

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Honors Thesis
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Graduation- May 17, 2008
Submitted May 15, 2008
“The Yanks are coming!” Spectators, numbering in the thousands, excitedly repeated this phrase upon glimpsing the twenty-thousand strong procession down Philadelphia’s Broad Street.¹ Comprising an eighth of Philadelphia’s population, approximately 200,000 residents came out on this brisk autumn Sunday to support Allied war efforts, buying government issued Liberty Bonds and enjoying spectacles ranging from church choir performances to political speeches.² Military divisions, the Boy Scouts, ship workers, and farmers were just a few of many groups that marched through downtown Philadelphia.³ The general atmosphere of September 28, 1918 was filled with optimism, as World War I was winding down; Bulgaria signed an armistice the next day and the remaining Central Powers followed soon after.³ This diverse crowd, however, was devoid of any concern regarding any impending public health disaster.

The Spanish Influenza pandemic caused more deaths than combat during World War I, killing over 30 million people worldwide.⁴ Mortality rates were high both on the war front and back in the United States. Urban areas were hit the hardest; experiencing an initial outbreak in September of 1918, Philadelphia led American cities with over 8,000 deaths.⁵ This paper examines how factors such as gender, class, ethnicity, age and physical location within the city functioned to determine one’s susceptibility to influenza and access to healthcare. This paper also directly implicates the Philadelphia Board of

¹ “‘Yanks are coming!’ Times 20,000 feet in liberty pageant,” The Philadelphia Inquirer, 29 September 1918, 1, 15.
Health’s sluggish response as the major contributor to the city’s elevated death toll. Philadelphia Board of Health Director Wilmer Krusen’s reluctance to act provided citizens with a false sense of security; a key example of this was his refusal to postpone the aforementioned Liberty Loan parade despite rising influenza rates.\(^6\) The city agency did little to educate the public or control the spread of influenza until thousands had already died. This lack of preparedness is a prime example of public health strategies cities should avoid; findings from this research can potentially be employed by present-day city health agencies to prepare for future disease outbreaks in densely populated areas.

*The Impact of Previous Yellow Fever and Cholera Epidemics on Philadelphia*

Several municipal public health mechanisms present in Philadelphia during pandemic influenza’s appearance in the fall of 1918 directly resulted from a previous local outbreak of Yellow Fever in 1793. A merchant ship traveling from what is present-day Haiti had introduced this earlier disease anywhere from late July to early August of that year, and local physicians attributed nearly 120 deaths to the Yellow Fever by the third week of August. The population of 1920 Philadelphia (~1.8 million) was approximately 40 times larger than that of 1790’s Philadelphia (about 50,000 residents), meaning this mortality rate would translate to about 5,000 deaths in 1920 Philadelphia

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\(^6\) “Influenza Here Believed to be Checked,” [ca. October 1918], Uncited Collection of Philadelphia Newspapers, Cage/Z10d7, College of Physicians of Philadelphia, Philadelphia, PA
(and over 3,000 deaths per week); this figure does not even take into account demographic characteristics, like an increased population density.\(^7\)

Dr. Benjamin Rush, one of America’s founding fathers and a prominent Philadelphia physician, played an important role during this epidemic that I will detail in the section titled “medical mobilization.” His observations concerning its causes were compiled into a memoir published by Mathew Carey after the epidemic’s conclusion. This memoir provides important insights into contemporary epidemiological methodologies. Dr. Rush and other members of the local medical establishment recognized that the disease was most likely “imported,” as afflicted merchants arrived in August on several ships including the *Flora*.\(^8\) Ongoing disagreements, however, existed concerning Yellow Fever’s pathology. Dr. Rush blamed unusual weather conditions for promoting an “infectious miasmata” as the epidemic’s primary cause, stating that Yellow Fever was “always generated by vegetable putrefaction.”\(^9\) Other physicians disagreed, proposing alternatives (such as fermentation) that would appear just as preposterous to contemporary scientists. Rush observed a 5-day incubation period in his patients, also arguing that the Yellow Fever did not spread throughout the rest of the country (like Influenza later would) because the disease was “deprived of the aid of miasmata from the putrid matter which first produced it in our city.”\(^10\)

Yellow Fever mortality rates continued to rise into September 1793 despite a decision on August 22\(^{nd}\) by city authorities to increase resources devoted towards street

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\(^9\) Carey, 6-7.

\(^10\) Carey, 16.
cleaning and waste removal, and by September 1st more than a third of residents had fled Philadelphia. Additional municipal measures like the establishment of several makeshift hospitals, closings of churches, and discouragement of handshaking were aimed at lowering infectious rates and treating sufferers. October 11th was recorded as the deadliest day during the outbreak, with 120 Yellow Fever-related deaths. The epidemic drastically died down during the coming weeks with the onset of cold weather, and epidemic Yellow Fever was eliminated by the latter part of November.11

Several important reforms resulted from Yellow Fever's appearance in Philadelphia. After the epidemic, municipal officials met and unanimously agreed on the need for an augmented sanitary system, upon which construction began soon after the end of the epidemic. Another change resulting from the wide-reaching effects of the outbreak was the creation of a municipal public health agency dedicated to the prevention and treatment of future outbreaks, the Board of Health, during the first decade of the 19th century. This agency continued to play an important role in shaping Philadelphia's epidemic preparedness and public health strategies during the remainder of the century and up through the 1918 Influenza Pandemic.12

British Physician John Snow's labors during London's 1854 cholera epidemic offered the first illustration invalidating the "miasmata" explanation held by the medical community for centuries and championed by Dr. Rush and his colleagues during the 1793 yellow fever epidemic. Dr. Rush's findings disproved proponents of the miasma theory (outbreaks caused by "bad air") and further identified cholera's mechanism of spread as a

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* Interestingly, October 11th was also the deadliest day during the 1918 Influenza Pandemic.
11 Young, 399.
12 IBID.
waterborne pathogen (although microbiology was not advanced enough to account for the nature of the transmissible agent at this point). This shifted the focus of medical sciences and initiated the modern field of epidemiology.\textsuperscript{13}

London’s cholera epidemic afflicted hundreds of residents in 1854, and there were few signs of abatement during its first month. By conducting statistical analyses and collecting locations where incidences of cholera occurred, Dr. Snow narrowed down the disease source to the working-class Soho district, where most of cholera’s victims resided. The outbreak was further narrowed down to patrons of the Broad Street Water Pump, which supplied the neighborhood with its water. Dr. Snow's now famous map depicting where most of the cases occurred was instrumental in changing long held paradigms establishing miasmas as the cause of such epidemics, and he eventually extended his findings to connect water contamination to higher incidences of cholera.\textsuperscript{14}

During the summer of 1866, a cholera outbreak struck Philadelphia. The Board of Health, created as a result of the previous Yellow Fever epidemic, attempted to deal with this outbreak in several ways. Unable to locate cholera’s specific source, its epidemic plan centered around mobilizing unused public buildings as hospitals for Cholera victims; this plan ultimately failed, causing mass hysteria and even the burning of one such building, Moyanensing Hall, by an angry crowd.\textsuperscript{15}

While John Snow struck a blow to the miasma theory by making the connection between water pollution and Cholera infections, German scientist Robert Koch confirmed this relationship and took it one step further, identifying the specific bacteriological agent

\textsuperscript{14} Johnson, 30-31.
that caused Hamburg's 1892 Cholera Epidemic.\textsuperscript{16} Hamburg had long embraced international trade, and as a result there were few government regulations and social welfare programs. This resulted in poor sanitary conditions and very few sewers. Hamburg was the only European city afflicted by a cholera epidemic in 1892, and Koch proved that this was a direct result of cholera bacteria prevalent in polluted city water, as Hamburg was the only German city without a water filtration system.\textsuperscript{17}

\textit{How Influenza Works}

Influenza is an RNA-based virus, pathogenic to humans. Upon introduction to the body, flu virus particles typically infect respiratory structures like the throat and lungs.\textsuperscript{18} Back and leg pains accompanied by a high fever usually occur one to three days after infection in symptomatic individuals.\textsuperscript{19} To transmit influenza, originally airborne virus particles mobilized when sick people cough and sneeze first bind to specific sites on the outer membrane of cells in the especially susceptible respiratory tract. Each particle’s genetic machinery, packaged inside a spherical protein-envelope, is transferred from the virus to the attached cell. Once inside the cell the transferred RNA utilizes the “host” cell’s replication equipment, creating up to thousands of new identical virus particles. After making enough new viruses, the “host” cell ruptures, releasing the particles, which proceed to infect other cells in the same manner.\textsuperscript{20}

\begin{thebibliography}{9}
\bibitem{17} Evans, 289-290.
\bibitem{18} Kuby, 8.
\bibitem{19} W. Beveridge, \textit{Influenza: the last great plague}, (New York: Prodist, 1978), 12.
\end{thebibliography}
Influenza viruses mutate each year, resulting in slightly different strains. Most modifications result in relatively non-lethal forms, causing deaths only in vulnerable populations like young children, who have still developing immune systems, or the elderly, with deteriorating immunological defenses. The 1918 Spanish Influenza pandemic was a rare instance of when minor viral genetic alterations instigated increased virulence, causing widespread mortality.

Several genetic features contributed to the 1918 Influenza strain’s increased virulence. A pathogen that successfully evades the body’s first line of defense (the skin) activates a response from the adaptive immune system. Adaptive immune responses are acquired responses to antigens, a general term covering any substance foreign to the body. One type of white blood cells, lymphocytes, carry pathogen-specific antigen recognition sites. Upon contact with an appropriate antigen (or an infected cell), a subtype of lymphocytes, (B-cells) produce antibodies specific to the antigen. These antibodies bind to specific receptors on the pathogen, often glycoproteins, mediating a response in which T-cells (another lymphocyte) release chemicals toxic to the infected cell or invader.

There are relatively few mutations from year to year in Influenza strains, and the alterations that do occur are often structurally insignificant. Cross-reacting antibodies from previous infections are often able to recognize and bind to pathogenic receptor sites and are thus sufficient to protect against new strains. The Influenza virus in particular has

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24 Kuby, *Immunology*
many copies of two surface glycoproteins (haemagglutin and neuraminidase). From year to year, more and more mutations accumulate in these sites in a phenomenon termed “antigenic shift”, lowering B-cell recognition and consequently immunity. Continuing mutations along with fewer antibodies present from each previous year make periodic epidemics inevitable. The appearance of an entirely new virus subtype, which is not a direct result of a single mutation but of years of antigenic shift, directly resulted in the Spanish Flu’s severely virulent strain against which humans had little protection.\(^{25}\)

Influenza’s spread by droplets from speaking, coughing, and sneezing, made it very troublesome in densely populated areas.\(^{26}\) The specific mutations observed in the 1918 Influenza epidemic had mutations that greatly increased virulence towards a usually unsusceptible demographic group, namely young adults between the ages of 25 and 45.\(^{27}\)

The first cases at Philadelphia’s Naval yard appeared among sailors in mid-September.\(^ {28}\) These cases indicated an exceptionally virulent influenza strain; navy employees were young, strong individuals, not typically susceptible (in the numbers sickened) like children and the elderly. After several dozen servicemen contracted this illness in mid-September, Director Krusen made Influenza a reportable disease and put the municipal hospital at the disposal of naval authorities.\(^ {29}\) Beyond this symbolic gesture, the city undertook few public health measures to isolate the disease until early October. Director Krusen repeatedly insisted the outbreak was just a normal strain of flu,

\(^{26}\) Rice and Palmer, 392.

and that there was little to worry about.\textsuperscript{30} The city Influenza mortality rate was slowly rising, from a modest 10 deaths per day on September 20\textsuperscript{th} to 60 by September 28\textsuperscript{th}; flu death rates skyrocketed after the Liberty Loan parade.

![Graph showing daily admissions and deaths at Philadelphia General Hospital from September 10\textsuperscript{th} 1918 to October 31\textsuperscript{st}. The peak death total occurs approximately 4 days after the peak admissions total, consistent with the generally 72-96 hours elapsed between initial symptoms and death.]

After three weeks, a statewide edict closing nonessential businesses, and thousands of deaths, the municipal Board of Health finally issued its own closing orders.

\textsuperscript{30} “Influenza Here Believed to be Checked,” [ca. October 1918], Uncited Collection of Philadelphia Newspapers, Cage/Z10d7, College of Physicians of Philadelphia, Philadelphia, PA
for all shops (except food stores and pharmacies) soon followed by similar decrees for schools and churches.\textsuperscript{31} Public health agencies employed this mechanism in an effort to slow Spanish Influenza’s spread.\textsuperscript{32} This was too little too late: by the second week of October, Influenza was claiming roughly 400 victims per day.\textsuperscript{33} Philadelphia did not allow churches, saloons, and schools to reopen until epidemic tapered off by the beginning of November.\textsuperscript{34}

![Weekly Admissions of Naval Personnel at the Pine Street Hospital during the Influenza Epidemic.](image)

Weekly Admissions of Naval Personnel at the Pine Street Hospital during the Influenza Epidemic. Admissions were rising until the Navy’s decision to transfer infected personnel from the Pine Street Hospital to a specialized Naval facility on the last day of September. Sailors appeared to be affected most by the epidemic. In statistics organized by occupations, this profession had the largest increases in patient admissions to Pennsylvania and Pine Street Hospitals between 1917 and 1918. While only 133 sailors were

\textsuperscript{31} “Pennsylvania closes all meeting places,” \textit{The New York Times}, 4 October 1918, 24; “Closing order issued to check influenza,” \textit{The Philadelphia Record}, 4 October 1918, 8.

\textsuperscript{32} “Drastic Steps Taken to Fight Influenza Here,” \textit{The New York Times}, 5 October 1918, 1.


\textsuperscript{34} Coroner Knight asks for Lifting of Bans on Saloons,” [ca. October 1918], Uncited Collection of Philadelphia Newspapers, Cage Z10d7, College of Physicians of Philadelphia, Philadelphia, PA
admitted in the former year, this figure more than doubled to 341 in 1918. This phenomena was obviously
due to the initial outbreak point at the Philadelphia Naval Yard.  

Despite the fact that public health officials had a rudimentary understanding of
epidemiology, lack of scientific knowledge is not the primary reason why Philadelphia
had such a bad epidemic.

*Philadelphia, 1860-1918: A City in Flux*

Across the Atlantic, the city of Philadelphia was experiencing profound
demographic, socioeconomic, and political transformations from the 1890’s up through
the Progressive Era concluding three decades later. A city of 565,529 citizens in 1860,
Philadelphia had the second largest population in the United States. While native whites
comprised approximately 65% to 70% of the population between 1860 and 1920,
profound demographic changes were taking place. African Americans migrated from the
South, while Europeans moved across the Atlantic to cities within New England and the
Mid-Atlantic. With the exception of the Civil War years, immigration from both within
the country and elsewhere reshaped neighborhoods.

Philadelphia’s African-American population rose, with many of its 22,000
members concentrated in Central Philadelphia’s Old City. While these neighborhoods
remained African-American strongholds, more African-Americans migrating away from
the instability and chaos resulting from the Civil War and reconstruction in the south

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35 Pennsylvania Hospital, *Board of Managers Annual Meeting (1918)*, 36-37, 47-49.


37 Wolf, 212.
started settling in Philadelphia’s northern and central neighborhoods. During the 1910’s, the traditionally diverse 47th ward’s (See Appendix 1) African-American population increased from 3,800 to over 9,200, and by 1920 Philadelphia’s African-American population reached 135,000.\textsuperscript{38}

Immigration patterns continued to change with more concentrated arrivals coming from Southern and Eastern Europe by the turn of the century; Philadelphia’s Russian, Italian, Hungarian populations in particular experienced significant increases. Political establishments tried to both take advantage of these vulnerable populations and exploit nativist sentiments among white citizens. New citizens with common European roots often lived and worked together, creating tightly knit communities that overtook whole blocks of neighborhoods and often resisted nativist exploitation of their newly-arrived status.\textsuperscript{39}

\textit{Machine Politics in Philadelphia}

Machine politics undeniably shaped an environment conducive to influenza’s spread through Philadelphia during this time period. Administrative positions attained out of patronage rather than merit may have contributed to an inept pool of public officials, and distractions caused when media outlets exposed these excesses definitely affected


\textsuperscript{39} Wolf, 266.
politicians’ priorities. The evidence in this paper, however, indicates politics only peripherally affected the city’s response to Influenza. City officials’ priorities centered around meeting the immediate economic needs related to the war effort and satisfying local constituencies and interest groups. While these pragmatic concerns may seem intertwined with politics, limited epidemiological knowledge, unique demographic characteristics, and Philadelphia’s central point of entry for returning servicemen from the war front had more extensive public health effects than political issues.

The Republican Party gained control of Philadelphia after the 15th amendment allowed blacks to vote. Republicans developed a close relationship with the rapidly expanding gas and electricity companies, benefiting so-called “utility barons”, who in turn exerted great influence over municipal policies and held significant positions. Matthew Quay was one important figure in charge of the Republican political machine during this period. During his time as the Republican National Committee Chairman and an ensuing career as a Senator, this York County native essentially chose several Philadelphia Mayors and other powerful officials. One measure that he supported that eventually would have direct consequences for Philadelphia during pandemic Influenza’s appearance during 1918 was a drastic increase in the number of liquor licenses issued to retailers. This policy, passed in 1887, arguably had profound impacts on both Philadelphia’s social and economic landscape, leading to the “corner saloon. Its effects during 1918 will be discussed in further detail in the “Education Campaign for Influenza Prevention section.”

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40 Wolf, 235-236.
Quay’s contribution to the culture of corruption controlling Philadelphia’s municipal government was an important one. Nevertheless, his political machine initiated many constructive reforms. Progressive Era Philadelphia featured a state of the art public transportation system.\textsuperscript{41} Unused farmland and open spaces within the city were converted to row homes, drastically increasing the city’s population density. Along with Philadelphia’s burgeoning economy came a rapidly increasing population, and by 1900 there were 1.3 million residents.\textsuperscript{42} Philadelphia experienced profound demographic, infrastructural, fiscal, and political changes in the era through the First World War.

The Great War’s onset was a significant event that had a unifying effect on Philadelphians. Besides military contribution from many of its citizens, Philadelphia was under great pressure, as were many other cities, to raise funds needed to fight this war. This political pressure was partly responsible for elevated mortality rates experienced during pandemic Influenza’s appearance in Philadelphia near the conclusion of the Great War.

During the early 20\textsuperscript{th} century up through World War I, the Vare brothers were among the most influential party leaders. George, William, and Edwin Vare started as waste disposal contractors in South Philadelphia during the 1890’s, eventually branching out into street cleaning and sewer maintenance.\textsuperscript{43} Paralleling their business gains was their rising political influence, as each brother took an active role in Republican Party machine politics in Philadelphia. By the 1910’s, only officials supported by the Vares

\textsuperscript{41} Executive Committee of Founders’ Week: 225\textsuperscript{th} Anniversary of the City of Philadelphia, \textit{Philadelphia: Its founding and development, 1683 to 1908}, (Philadelphia: Joseph and Sefton, 1908).
received exclusive contracts with the City of Philadelphia; moreover, each Vare held influential municipal and state political offices. At the height of their influence in the early 1920s, each of the brothers earned tens of millions of dollars annually, and William Vare even won election to the United States Senate.44

The Vares promoted public works in Philadelphia, helping their South Philly constituents by sponsoring legislative reforms in areas such as child labor and social welfare. Critics argue that Matthew Quay, the Vares, and other party machine politicians of this time period superficially supported these reforms to help the Republican Party’s reputation; their biggest contributions involved bolstering party organization and patronage.

Supported by Edwin Vare, Mayor Thomas B. Smith was an example of a loyal party politician. Inaugurated in 1916, Philadelphia native Thomas B. Smith was no stranger to the workings of the Philadelphia political machine. Within a year of taking office, Smith was formally charged with inappropriately influencing local elections.45 Smith’s administration was embroiled in yet another political scandal and faced more legal consequences when pandemic influenza first reached Philadelphia. Smith was arrested on September 30, 1918, and charged with “misdemeanor and malfeasance in office.”46 These charges stemmed from political pressure and threats that he exerted upon members of the Philadelphia Board of Recreation, after Smith demanded that Edward R. Gudenhus, an associate of State Senator Edwin H. Vare, be appointed Supervisor of Playgrounds despite his lack of any pertinent qualifications. Gudenhus had previous

44 McCafferey, 128-129.
45 “Warrant is issued for mayor’s arrest in playground row,” Philadelphia Intelligencer, 27 September 1918, 1.
46 “Mayor is arrested; freed in $2,000 bail,” The Evening Bulletin, 30 September 1918, 1.
political and business dealings with Smith, and critics viewed this appointment to a $3,000 a year job as a reward.\textsuperscript{47}

The mayor initially denied legal courtesies provided to him by city officials, declining his arrest by “mere invitation” and insisting on “all usual formalities.” This ordeal went on for several days until an arresting party that included a magistrate, prosecutor, and policemen showed up at his office during business hours. After his arrest, he was released on bail, and public hearings began. The height of this scandal occurred in late September, extending beyond the influenza epidemic and through the rest of the year.\textsuperscript{48}

As a result of his diverted priorities, the mayor made few official statements about the city’s response to influenza and no statements to the media, while simultaneously planning his legal defense strategy and commenting on his case through newspaper outlets nearly every day.\textsuperscript{49} Corruption charges and other political issues restrained Mayor Smith and several of his subordinates, who should have been orchestrating a municipal response to the flu epidemic. The absence of the top executive commenting on the disease ravaging his city was a significant, though largely symbolic, finding in this study. The corrupt nature of city politics diverted attention from the epidemic, epitomized by City Hall’s relationship with the liquor industry discussed later in the section titled “Epidemiological Strategies.”

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\textsuperscript{47} “Warrant is Issued for mayor’s arrest in playground row,” 2.
\textsuperscript{49} “Mayor under arrest- hints he may hit back,” \textit{Philadelphia Republic}. 1 October 1918, 4.
\end{flushright}
Epidemiological Strategies

The Philadelphia Board of Health’s inaction at key moments during early epidemic stages exposed an inefficient decision-making process that often contradicted state mandates and thus prevented effective disease-control implementation. When Director Krusen finally adopted reliable epidemiological strategies in early October, infection and mortality rates had already rapidly risen. Many municipal measures taken by public health officials were the right moves; the flawed timing of such directions was what contributed to an elevated death toll.

Influenza infection rates continued to rise after Director Krusen provided beds at the Municipal Hospital for Contagious Diseases to sick navy personnel in mid-September. Concerned about a disease that killed only a handful of sailors but had infected dozens more, the Board of Health convened a meeting to make Influenza a reportable disease on September 21st. Forcing doctors to contact city authorities would help track influenza’s spread through the city. Despite increasing sickness rates, respected Philadelphia physicians and Board of Health members Dr. A. A. Cairns, Dr. Frank Hammond, and Dr. James M. Anders announced that the disease’s spread had been checked; they predicted very few additional future cases in South Philadelphia neighborhoods (near the naval yard) that already had sick residents.

Authorities took no additional steps and issued few other public warnings as citywide flu mortality rose considerably over the next week. Health Director Krusen, under pressure from the Mayor’s office, even encouraged attendance at the September

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28th Liberty Loan parade, as the city was struggling to meet its quota of Liberty Bond sales. By September 29th, nearly 100 residents, both naval personnel and civilians, were dying per day. On that day, state health officials came together to discuss flu issues with Director Krusen at the Academy of Natural Sciences on Logan Square, while federal health officers met with Captain George Pickerel, commandant of the Naval Hospital, to share ideas on how best to contain further spread to the civilian population. Director Krusen issued several suggestions, published in the next day’s newspapers, including a plea to “avoid congregating in crowded places.” His decision to wait until after the Liberty Loan parade played a role in the mortality rate’s subsequent exponential increase.

Acting Pennsylvania Health Commissioner Dr. B.F. Royer issued a sweeping mandate closing theaters, saloons, and other public meeting places on October 4th. Dr. Royer left church and school closing decisions up to local officials, since many smaller Pennsylvania communities had not been as affected by Influenza to that any community suffering from a severe outbreak would exercise sound judgment and close schools and churches. Later that afternoon, Dr. Krusen issued closing orders for schools, theaters, and churches. Public funerals for Influenza victims were also banned. However, in direct contrast to the state mandate, saloons were not closed by the order. The Philadelphia Board of Health order was also unclear as to how hotels and restaurants were affected, simply advising employees to stay away from work if sick. The city closing order’s ambiguity and inconsistencies with state rules caused hundreds of business owners to

53 “To Confer on Influenza.” The Philadelphia Record. 29 September 1918. p.15.
54 “State mandate closes public meeting places.” The Philadelphia Record. 4 October 1918. p.1.
55 “Closing order issued to check influenza.” The Philadelphia Record. 4 October 1918. p.8.
crowd Director Krusen’s City Hall office, inquiring whether their organizations came under the ban.

*Education Campaign for Influenza Prevention*

Since there were no largely effective antidotes, public health officials focused on disease prevention. While supporting vaccination efforts was impossible since effective vaccines were not developed until the 1950’s, city officials promoted other methods. Medical practitioners and media outlets, such as newspapers and the radio, utilized a public education campaign intended to teach citizens infection control strategies. Such tips were typically science-based but ineffective due to their timing. Health authorities frequently recommended handwashing before and after meals, cough and sneeze control, and mask use especially at well attended public events. Masked audiences were common at church services, weddings, and other early-October public gatherings.

Some other present-day universally accepted measures directed at stemming disease spread were ignored. City public health authorities did not promote proper waste disposal or post-mortem care, playing a role in increased germ transmission. The city’s lack of epidemic preparedness led to a system where municipal hospital morgues were full and undertakers were unable to deal with daily mortality rates reaching into the thousands. An examination of present-day public health beliefs indicates these tactics

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58 “Medical Men are Told of Influenza’s Spread.” *The Philadelphia Record*. 27 September 1918. p.6.
62 *Influenza Fact Sheet*. Center for Disease Control. 15 November 2006.
http://www.cdc.gov/flu/symptoms.htm
could have greatly reduced the Philadelphia death toll had they been encouraged sooner.⁶³

**Flu Antidotes**

With no effective Influenza “cures” recommended by health agencies and most mainstream physicians, many companies exploited individuals’ anxieties by advertising flu remedies. Most of these “medicines” were completely ineffective in treating Influenza, with a few successful in treating some symptoms.

Advertisements for *Father John’s Medicine* contended it was a “commonsense way to avoid threatening public danger” and an alternative to alcohol consumption,⁶⁴ “healing” influenza by targeting nose and throat germs.⁶⁵ *Munyon’s Cold & Grippe Remedies* was touted as “removing symptoms” and making “Influenza disappear within a few days.”⁶⁶ *Vick’s VapoRub* was advertised as opening up air passages and “stimulating the mucous membrane to throw off germs.”⁶⁷ These remedies did little to combat the actual influenza virus; only a recently discovered antiviral drugs are capable of interfering with viral machinery, thus “curing” diseases. Antibody production and other immunological defenses function in removing virus particles with time. Natural defenses working over a few-day span (how long normal strains of influenza affect victims) were responsible for the “improvement in symptoms” of which the advertisers boasted.⁶⁸

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⁶⁵ *The Philadelphia Record*. 26 September 1918, 11.
⁶⁶ *The Philadelphia Record*. 7 October 1918, 6.
Several companies advertising products aimed at preventing influenza transmission had legitimate claims. Soap businesses promoted their goods, citing specific public health recommendations for handwashing. Bacterial infections can divert body resources from fighting viruses; dental companies publicized products, like tooth paste, that prevented such infections.

Bowing to industry pressure, Director Krusen allowed doctors to prescribe whiskey as a treatment. Alcohol is currently not used to alleviate flu symptoms, though in 1918 there were no effective pain medications like Tylenol, and there is no scientific evidence suggesting it cures influenza. What Dr. Krusen did was effectively open saloons for business to fill prescriptions, causing alcohol-deprived Philadelphians to travel to bars. This worked against state health directives that aimed to slowing the citywide spread and ordered nonessential public places’ closing. Municipal authorities also approved controversial therapies that ended up jeopardizing the public rather than helping the sick. Neil Bonner, President of the Retail Liquor Dealers’ Association promoted whiskey as a “prime necessity” and antidote to Influenza, while in reality “well-informed physicians thought very little of the therapeutic value of whisky.” The local liquor establishments’ manipulation of public closing mandates could have potentially increased disease transmission. In addition to private consumption from city

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73 Preventing the Flu. Center for Disease Control. 15 November 2006. [http://www.cdc.gov/flu/protect/habits.htm](http://www.cdc.gov/flu/protect/habits.htm)
75 “Drug Store Whisky Not in Demand.” Philadelphia Record, 10 October 1918, p.8.
residents, the Board of Health spent a considerable amount of municipal money on liquor supplies. Thousands of dollars were squandered on alcohol use for hospitals, even though the therapeutic value of alcohol was questionable at best.76

One possible example of how moneys used for liquors also may have supported locally influential businessman is transactions between the Board of Health and Edward Trainer. Mr. Trainer, a Cornell Alumnus (Class of ’13) was a well-connected Philadelphian, related to wealthy oil and gas contractors. While some aspects concerning the extent of his personal involvement in dealings with the city government remain unclear, Trainer was involved with retail sales and bottling of whiskey in the Philadelphia area during this time period.77

The fact that the city directly purchased as much alcohol from Trainer as other retailers combined suggests a possible patronage relationship. Between the end of September and through the month of October, municipal expenditures on liquor purchased from Edward Trainer amounted to nearly $1,500. Purchases from other liquor sources were nowhere near this figure.78 The municipal Board of Health made these questionable expenditures during the epidemic without any accountability from the public. It is difficult to declare with confidence whether these inconsistencies were a


78 Untitled List of Epidemic-Related Expenditures (1919).
result of patronage, biomedical misunderstandings and ambiguities, or simply poor management; the most likely explanation includes a combination of these factors. ⁷⁹

Whiskey Label bottled by Edward Trainer circa. 1918.

(https://cgi.ebay.com/Pre-pro-Queen-Whiskey-Label-Philadelphia-PA_W0QQitemZ150081743129QQihZ005QQcategoryZ568QQcmdZViewItem)

It appears that municipal patronage and favoritism was not limited to the liquor industry. Several medical supply companies benefited far more than their competitors from increased demand (specifically from the Board of Health) during the epidemic. Although the city used more than a dozen medical supply companies during the epidemic, over $7,000 went to the Bernstein Manufacturing Company (for hospital

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supplies) alone. In contrast, the next closest medical supplier, the Victor V. Clad Company, received only $971 from the city for epidemic-related supplies.\textsuperscript{80}

In addition to potential corruption on the part of city officials, several expenditures seem to have been completely wasteful and inappropriate. The most glaring instance encountered in Board of Health expenditure documents is the expenditure of city funds for the use of a Billiards table (paid to Brunswick-Blake-Collender Company).\textsuperscript{81}

\textit{The Church Controversy}

Public health officials realized that restricting only some public gatherings and not others would not effectively reverse rising mortality rates. On October 6\textsuperscript{th}, Director Krusen lifted the Board of Health’s church exemption, banning all religious services.\textsuperscript{82} City authorities were treading a dangerous line by angering church officials, as religious organizations worked together with public officials and charitable organizations during the epidemic, providing necessary supplies and relief to Influenza victims. As a result, police did not enforce these restrictions rigidly, only interfering when they observed obvious overcrowding or inadequate ventilation. Still, clergymen and churchgoers were livid, circumventing these rules by preparing outdoor “open air” ceremonies that did not violate restrictions. Municipal officials eased church limitations a few days later, “reinterpreting” their order and allowing privately administered communion but still prohibiting public services.\textsuperscript{83}

\textsuperscript{80} IBID
\textsuperscript{81} IBID
\textsuperscript{82} “City has passed worst week in its history.” The Philadelphia Record. 6 October 1918. p.1.
\textsuperscript{83} “Ban on churches modified.” The Philadelphia Record. 10 October 1918. p.2.
On October 12th, Director Krusen made even more church concessions, allowing public services but limiting attendance to 25 people at a time. Most ministers and priests had complied with Krusen’s previous changes, rededicating themselves to helping the suffering. The newest “compromise” further agitated rather than pleased church officials. Allowing 25 worshippers only confused matters; most churches had congregations numbering in the hundreds, while some Catholic churches had thousands of members. This new problem forced churches to figure out how to choose only 25 members without alienating the rest of their congregation.84

Even as they complied with closing orders, angry clergymen organized meetings discussing strategies for convincing city officials to allow full church services. Protestant Episcopal Diocese members met with health authorities, determined to change their minds. Reverend Archibald Campbell Knowles of St. Alban’s church pleaded with director Krusen:

The irreligious, irrational, hysterical and frightened ruling of the Board of Health. We have had epidemics before, smallpox, yellow fever, influenza, just like this, but never did our authorities try to make men turn away from God! Mills, shops, offices, even the City Hall rooms may be crowded, as may be railway trains and trolley, but churches—oh, no! For as Father Ward sarcastically quotes the Board of Health, ‘they are sources of infection.’ I have heard not one word in the commendation of the closing of churches.85

Respected Philadelphia doctors remained steadfast in their support for continuing the church ban through mid-October. Prominent city surgeon Dr. W. W. Keen was disappointed at church clergymen’s anger towards the ban. “The prevailing epidemic of influenza is carried by contact from one person to another, by sneezing, coughing, speaking etc., especially in large assemblies,” Keen argued. “The order issued is not

against churches specifically, but is against all places where multitudes of people are gathered together.” 

While the public was largely divided on the church issue, Director Krusen eventually issued an order lifting church restrictions (contingent on declining death rates) along with the school ban by October 28th.

Failure to Restrict Public Transportation System

Philadelphia’s 2006 Influenza Pandemic Preparedness Plan stresses the importance of closing public transportation systems. This is one of the single most effective strategies for preventing disease spread in urban areas. Backup modes of transportation for emergency medical personnel and other essential workers are still needed.

88 years earlier, the Philadelphia Board of Health wasted an opportunity to restrict the city’s extensive transport network in the closing mandate. Since 1907, a city subway and elevated line had been running along Market Street between 15th and 69th streets, all the way down to the South Street Ferry, which is situated in the heart of Philadelphia. Director Krusen probably let Philadelphia’s transit system stay open to prevent the considerable negative economic impact expected by what would have essentially amounted to a shutdown of the city. However, had the city adopted this

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86 “Dr. Keen for shut churches,” The Evening Bulletin, 16 October 1918, 2.
87 “Influenza wanes; fifty less deaths,” The Philadelphia Inquirer, 18 October 1918, 15.
measure in early October along with other closings, influenza mortality rates would have declined much sooner, possibly saving hundreds of lives.

Public School Closings during the Epidemic

School-age children between the ages of 6 and 18 had Philadelphia’s lowest mortality rates. Fourteen-year-old adolescents had Philadelphia’s lowest death rate about 12 deaths per 10,000, while Influenza vulnerability peaked among children younger than four and adults older than sixty.90 Despite their strong immune systems, students congregating in crowded schools were prime disease carriers. Pressured by parents to close schools in late September, Director Krusen replied that “today we have decided the wise course is to keep the schools open: tomorrow it might be necessary to close them.”91 The Philadelphia Board of Health order closing schools was issued less than a week later.

Schools stayed closed through the epidemic’s climax a week later. Despite Philadelphia’s peak mortality rate nearing 1,000 on October 10th, Dr. Krusen ordered teachers to keep in touch with city superintendents, instructing them to be ready for an immediate return to work.92 Similar “false alarms” continued up through mid-October, when a declining death rate allowed Dr. Wilmer Krusen to announce schools could reopen on October 28th.93

91 “City plans to combat influenza epidemic,” The Philadelphia Record, 3 October 1918, 6.
93 “Influenza wanes; fifty less deaths,” The Philadelphia Inquirer, 18 October 1918, 15.
Philadelphia's school closing order, just like other city actions, would have been more effective had it been implemented earlier on in the pandemic. Present day disease control protocols advocate immediate closure of office buildings, shopping malls, and schools. Specifically, closing schools early in an epidemic is important; students transmit influenza more efficiently than other age groups. Studies show decreasing an entire age group's movement throughout the city would stem disease proliferation.94

Why the Influenza Epidemic Started at the Naval Yard

Philadelphia public health authorities had not required doctors to report infections prior to the epidemic; flu mortality had been very low since the last outbreak in the early 19th century. Influenza’s spread beginning in 1918 can be directly attributed to afflicted servicemen returning from the war theater in Europe to Philadelphia and other American bases. Combining the 1918 strain’s increased virulence with military personnel’s dense living conditions, these men were ideal carriers of the Influenza virus. With dozens of sailors becoming sick, Philadelphia Department of Public Health Director Wilmer Krusen granted the navy’s requests for help; on September 17, he allowed the navy to use the Philadelphia Hospital for Contagious Diseases.95

Director Krusen feared that increased sickness rates among the Naval population would rapidly spread to the thousands of workers at the neighboring Hog Island shipbuilding facilities. While he had good intentions, Krusen’s hospital offer eventually contributed to the virus’s spread. The Contagious Diseases Hospital, located in North Philadelphia, was over 10 miles away from the naval yard. 6 Even when sailors traveled

via the Delaware River, they were still going through the streets of North and South Philadelphia at the beginning and end of their journeys. Rather than quarantining naval yard personnel, providing additional medical assistance, and encouraging on-site care, Krusen’s decision regarding city hospital access promoted influenza’s spread. Naval personnel comprised nearly half of Influenza cases treated at the Hospital for Contagious diseases by the time the last sailor had been released in mid-October. 96

*The Role of Spatial Organization in Influenza Transmission: Philadelphia*

Philadelphia mortality rates were higher for many immigrant and ethnic groups than for American-born whites. White citizens had more political rights, better economic opportunities, and superior social mobility. With such advantages often came better access to healthcare and less densely-populated living conditions. 97 Upon further examination, however, it is more likely that Influenza’s effects had more to do with Philadelphia’s spatial organization and population density than the socioeconomic and racial status of its victims.

1918 Philadelphia was divided into 48 neighborhoods called “wards.” 98 Ethnicities that were concentrated in wards further away from the naval yard had some of the lowest mortality rates, while populations established around Hog’s Island, the naval

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yard’s location, were severely affected. Comparing Philadelphia’s population patterns from the 1920 United States census to Influenza death rates (by ethnicity) in the 1918 Philadelphia Board of Health report illustrates how and why certain ethnicities were more adversely affected than other groups. The groups with the highest mortality rates were also the populations most likely to live near and work at Hog’s Island, where the Naval yard was located.

Philadelphia’s Influenza mortality rate during 1918 was approximately 46 deaths per 10,000 people. The native white population was over 70% of more than 1.8 million residents; this group disproportionately influenced the city’s flu death rates with a population so high. Their death rate was very close to that of the entire city, with 44 deaths per 10,000 people. The sheer fact that the Black community had the lowest mortality rates is inconsistent with a hypothesis stating social-status, and thus access to healthcare, dictated Influenza’s effects.

Austrians and Hungarians, whom the Board of Health Report lumped together had a far higher flu death rate than any other group. An observer might attribute that their high mortality rate, which amounted to 80 deaths per 10,000 people, was attributable to the low socioeconomic status of these Central and Eastern European immigrants, which prevented them from having access to adequate healthcare. This, however, was not the case. Geography, and not class, had a profoundly larger role on their infection rates. The 39th ward, which had one of the highest Austrian populations, was also, coincidentally, where the Philadelphia naval yard was located. All of the five most Austrian/Hungarian-


\[\text{\textsuperscript{v}}\] The highest immigrant death rates belonged to (in order) Austrian/Hungarians, Italians, Irishmen, and Russians, while the lowest mortality was found in the Black, English, and Polish communities.
populated wards were within 5 miles of this site, which constituted the pandemics epicenter.\textsuperscript{100} It would be safe to assume that this spatial proximity to the initial outbreak was the most important factor contributing to this immigrant group’s disproportionately high mortality rate.


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\caption{Philadelphia Influenza Mortality Rates by Ethnic group. Values based on 1918 Public Health figures and 1920 Census Populations.}
\end{figure}

Geographical factors also explained influenza’s spread through the Italian community. With mortality figures of 66 per 10,000, Italians were the second hardest hit ethnic group.\textsuperscript{101} The 26\textsuperscript{th} ward, as the most populous Italian community, bordered Hog’s Island. The 1\textsuperscript{st}, 2\textsuperscript{nd}, and 3\textsuperscript{rd} wards, which were all home to large Italian populations, were

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\item \textsuperscript{101} Philadelphia Bureau of Health, 1918, 99
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also within 2 miles of the naval yard;\textsuperscript{102} these were also among the most densely populated wards in the entire city of Philadelphia. The 39\textsuperscript{th} ward, where Hog’s Island was located, had the fifth highest Italian population in Philadelphia.\textsuperscript{103} Also contributing to Italian mortality rates was that this ethnic group comprised a sizable portion of the shipyard work force during the early 20\textsuperscript{th} century (See Appendix).

Although the two most populated wards for the African-American community were 3 miles away from the Philadelphia naval yard, four of the six most populated black communities were more than 5 miles away from the 39\textsuperscript{th} ward.\textsuperscript{104} With higher absolute numbers in Central and North Philadelphia, African-Americans were relatively insulated from Influenza’s effects compared to other groups that were more spread out or more centered in South Philadelphia. The African-American community illustrated these trends, experiencing the lowest mortality rate, with 34 deaths per 10,000 people.\textsuperscript{105}

It is clear that the spatial organization of Philadelphia outweighed any effects of socioeconomic status. North Philadelphians were far less likely to die from Influenza than South Philadelphians (Figure 1), who lived and worked in and near the site of the initial outbreak. Although North Philadelphia was not necessarily a better place to live, groups of low social status like African-Americans and Poles had far lower death rates from the 1918 pandemic than native whites as a function of their location. Therefore, socioeconomic status was not correlated with proximity to the Naval yard while, susceptibility to influenza depended on how far one lived from South Philadelphia.

\textsuperscript{102} Philadelphia Ward Map, 1914.
\textsuperscript{103} Bureau of the Census, 1920
\textsuperscript{104} Philadelphia Ward Map 1914.
\textsuperscript{105} Philadelphia Bureau of Health Report, 1918.
Gender and Influenza

Philadelphia’s population of 1.8 million was evenly split between men and women (50.2% to 49.8%).\textsuperscript{106} Influenza-related deaths during the fall of 1918 were also divided evenly, with 4,290 men and 4,105 women dying.\textsuperscript{107} This originally might come as a surprise, given the greater likelihood that men spent more time in the public sphere and had greater mobility under contemporary gender norms due to men’s more mobile lifestyle. Early 20th-century urban men were more likely to be in the labor force, and thus travel to and from work, while women usually stayed at home and took care of the family; this meant men should have had higher exposure rates.\textsuperscript{108}

Two features of 1918 Philadelphia worked to even out mortality rates between men and women. Director Krusen did not order schools closed until October 4th,\textsuperscript{109} this meant that children were exposed to and carrying Influenza up through the epidemic’s height. Sick children usually stayed home and were taken care of by non-employed members of the household in 1918, largely their mothers. Women also responded as nurses and volunteers to medical personnel shortages and subsequent municipal appeals for help. Charities such as the Red Cross employed women, setting up hospitals and quarantine zones while treating the sick. This increased contact was partly responsible for raising women’s mortality rates to levels similar to their male counterparts.

\textsuperscript{108} Alice Reid, "The Effects of the 1918-1919 Influenza Pandemic on Infant and Child Health in Derbyshire," Med. History 49(1) 2005: 29.
\textsuperscript{109} “Closing order issued to check influenza,” The Philadelphia Record, 4 October 1918, 8.
Comparison of Simple Influenza and Pneumonia-complicated Influenza Cases at the Pennsylvania Hospital during the Epidemic. The vertical axis represents the number of patients.
Charities and Medical Aid

As Philadelphia’s largest and most influential epidemic relief agency, the American Red Cross operated in conjunction with city agencies like the Philadelphia Community Council and the Board of Health to treat influenza’s sufferers. Private organizations frequently advertised in Philadelphia’s major newspapers, calling for both unskilled and medically trained volunteers, while local authorities created free publicity by pleading for hospital workers during interviews.110

On September 25th, the Southeast Pennsylvania Chapter of the Red Cross appropriated $2500 for converting a United Service Club room located in the Philadelphia Naval Yard into an emergency hospital dedicated to sick naval personnel. Within 48 hours, Red Cross director E.T. Stotesbury supervised this club’s transformation into a health clinic, equipped with supplies and ready to accept patients.111 Working with the municipal Board of Health and U.S. Department of Public Health, the Red Cross set up 66 other supplemental hospitals in this fashion in and around Philadelphia.112 Additionally, the Red Cross was integral in staffing already existing medical institutions. Volunteers descended upon Jefferson Hospital, University Hospital, and Hahnemann Hospital to aid flu victims.113

Many volunteers distributed masks, sheets, towels, blankets, and medicine to the sick, aiding charities like the Red Cross without any formal medical training. Some functioned as support crew on the Motor Corps (ambulances), others cooked meals, while

110 “Helping fight the influenza: Red Cross [advertisement],” Philadelphia Record, 11 October 1918, 3.; “Influenza epidemic gradually grows less,” Philadelphia Record, 12 October 1918, 1.
111 The American Red Cross, Southeastern Pennsylvania Chapter of the American Red Cross in the Influenza Epidemic: September-October 1918, (Philadelphia: 1918), 2.
112 Ibid, 3
the Home Services Section visited those too ill or who refused to travel to the hospital. In all, nearly 500 Red Cross personnel cared for 480 patients, with total epidemic operating costs reaching $26,000.\textsuperscript{114}

Support staff was needed to accomplish many administrative tasks associated with a large-scale mobilization. Originally formed two years earlier to aid municipal Liberty Loan fundraising drives, the Philadelphia Council on National Defense worked closely with Red Cross officials, helping city authorities during the epidemic. Eight operators manned telephone lines intended for contacting physicians and nurses, and locating available hospital beds and ambulances. They also performed important clerical functions, deciding how many and which supplies were needed, as well as how these stocks were transferred to the appropriate venues. Working with local authorities, administrative staff also organized a public awareness campaign, using fliers and pamphlets to educate citizens on effective prevention and treatment techniques.\textsuperscript{115}

Medical Mobilization

Physicians’ actions in epidemics throughout history have always been a result of several professional and personal factors. Behavior towards those afflicted with contagious diseases profoundly shifted during the nineteenth and twentieth centuries. Before the twentieth century, many physicians fled cities or refused to evaluate very ill patients during infectious outbreaks. The remaining medical professionals often charged higher fees due to the risks associated with staying behind and treating the victims of

\textsuperscript{114} The American Red Cross, \textit{Southeastern Pennsylvania Chapter of the American Red Cross in the Influenza Epidemic: September-October 1918}, (Philadelphia: 1918), 3, 10.

epidemics. This is not to say that all doctors avoided their duties; many brave physicians understood the challenges associated with epidemics and continued treating patients solely for ethical reasons.\textsuperscript{116}

Numerous scholars have argued that physicians’ experiences during outbreaks are confrontations with mortality; in addition to the pledges they had taken to serve their communities, factors such as a fear of condemnation and potential impact on reputation convinced some to stay behind.\textsuperscript{117} In 1793, a yellow fever outbreak crippled what was then the national capital, the previously mentioned Dr. Rush received much acclaim for his work during the epidemic. Observers reported he was seen “racing about Philadelphia, trying to bleed patients back to health, while many of his colleagues in the distinguished College of Physicians fled the city.”\textsuperscript{73}

The transformation of public health mechanisms from committees comprised of influential political figures into permanent governmental health organizations around the turn of the twentieth century represented a change from previous epidemic dynamics. Physicians became more accountable to the public through such government agencies, and although many physicians still viewed epidemics as opportunities, albeit ones that still posed mortal danger to them, and as a result, the medical community’s participation increased. Also contributing to the higher confidence in epidemic involvement was the development of greater scientific understanding of the spread of disease, minimizing transmission with the use of proper body substance isolation techniques.\textsuperscript{118}

\textsuperscript{118} Fox, 7-9.
During the 1918 Influenza Pandemic, the main limiting factors regarding physician access in American urban areas were direct results of the medical community’s mobilization and service to the war effort in Europe. The need for both doctors and nurses for World War I had already stretched thin the city’s medical force. 26% of the city’s 3,500 Physicians were serving the military in World War I at the moment the epidemic reached Philadelphia.\textsuperscript{119} The Medical Society of Pennsylvania met at its Walnut Street headquarters to address Philadelphia’s growing influenza rates and medical personnel shortage. Meeting on September 26\textsuperscript{th}, at a point when the daily death toll was around 120 people, influential medical community members recognized the epidemic’s dangers much earlier than did municipal officials. Organizational leaders Dr. James M. Anders and Dr. A.E. Blackburn advocated prevention techniques aimed at slowing Influenza’s spread, including controlling sneezing and coughing, and avoiding crowded public gatherings.\textsuperscript{120} City Board of Health Director Wilmer Krusen blatantly ignored the latter recommendation, encouraging Philadelphians to attend the Liberty Loan parade two days later to support the war effort.

Returning military personnel spread the disease through military institutions prior to its appearance in the civilian population. As early as September 25\textsuperscript{th}, installations like Camp Dix (30 miles outside away) appealed to Philadelphia for medical personnel. The

\textsuperscript{120} “Medical men are told of Influenza’s spread,” The Philadelphia Record, 27 September 1918, 6.
Board of Health responded in the same fashion as their aid to the Navy, setting aside beds in the Municipal Hospital for Contagious Diseases.\textsuperscript{121} 

Both the military and civilian populations became increasingly sick, leading to overly crowded hospitals. By October 1\textsuperscript{st}, residents were often encouraged to stay home to stem disease spread, while available Doctors or volunteers from charities went out into the city for house calls.\textsuperscript{122} Director Krusen made several desperate public appeals for doctors and nurses to assist in the crowded hospitals and house calls. By October 3\textsuperscript{rd}, medical officials estimated 20,000 Influenza cases in the city.\textsuperscript{123} 

The dire situation got even worse, as the city influenza mortality rates nearly doubled to 600 deaths per day in the three-day span from October 3\textsuperscript{rd} to October 6\textsuperscript{th}\textsuperscript{124}. At this point, the University of Pennsylvania medical school and the Woman’s Medical College, currently Drexel’s medical school, provided third and fourth year medical students to help treat patients in an effort to fill medical shortages.\textsuperscript{125} The city’s renewed calls for trained medical personnel continued throughout the duration of the epidemic. 

Conditions at overcrowded urban hospitals throughout the country were dangerous. In treating dying patients, medical personnel risked contracting Influenza themselves. 

Regarding patient symptoms, nursing student Dorothy Deming wrote:

Those first symptoms became all too familiar: sneezing, coughing, headache, bone and joint aches, often a chill, followed by fever mounting to 104 degrees or higher within a few hours. These symptoms

\textsuperscript{121} “Mobilizing Nurses to Fight Influenza,” \textit{The Evening Bulletin (Philadelphia)}, 26 September 1918, 2. 
\textsuperscript{122} “Spread of Influenza grows serious in city,” \textit{The Philadelphia Record}, 2 October 1918, 14. 
\textsuperscript{123} “Pennsylvania closes all meeting places,” \textit{The New York Times}, 4 October 1918, 24. 
\textsuperscript{125} “City has passed worst week in its history,” \textit{Philadelphia Record}, 6 October 1918, 1.
were accompanied by depression, difficult and painful breathing, and a typical harsh cough. Patients were often quite prostrated for a few days, then either recovered or developed pneumonia.\textsuperscript{126}

Dorothy Deming was a nursing student at New York’s Presbyterian Hospital during the fall of 1918. Within weeks of New York’s first reported Influenza fatality that fall, Presbyterian responded to city pleas for those with medical training (much like in Philadelphia) by canceling nursing classes and assigning students to hospital wards. The city’s healthcare system was already strained from the military deployment of medical professionals. In an experience typical for nursing students during the epidemic, Ms. Deming and a nursing classmate were responsible for an entire ward in the hospital. The ward, which normally held up to 24 patients, was nearly a dozen patients above capacity due to the rapidly escalating epidemic. Very little supervision was provided; during Deming’s night shift, doctors and graduated nurses, in high demand during the epidemic, stopped by only once every few hours.\textsuperscript{127}

Nearly 100 medical personnel (including students) contracted influenza at Presbyterian Hospital during the epidemic. Disease prevention became an obsession. Ms. Deming and her fellow students constantly practiced handwashing, proper nutrition, and attempted extra sleep during their 6 weeks of epidemic work.

There were no effective influenza treatments at these nurses’ disposal without any of the “miracle drugs,” antibiotics, or influenza vaccines available to present-day hospitals. Patient care typically involved pain management, distributing sedatives to patients in extreme pain, or cardiac stimulants like atropine. Nursing students also provided cough medicine, caffeine, and fluids, thereby attempting to alleviate symptoms

\textsuperscript{126} Dorothy Deming, “Influenza- 1918,” \textit{The American Journal of Nursing} 57 (1957): 1308-1309.

\textsuperscript{127} Deming, 1308-1809.
and raise low blood pressures. Sometimes the treatments administered backfired, causing patient conditions to deteriorate further. Forcing fluid intake increased incidences of lung and kidney edema (fluid buildup), resulting in congestive heart failure. This often depended upon the patient’s condition during hospital admission; because of compromised fluid uptake and an inability to digest food, patients that had already been sick for a few days often were malnourished.

Although Ms. Deming had been in nursing school for months, she was unprepared for the emotional toll that patient deaths would take. Barely a night passed by, she wrote, without any deaths. Recounting both her and her partner’s (also named Dorothy) experience, she stated:

Many a morning after working hard over a patient, Dorothy and I bore the grim task of trying to find words of comfort for dazed parents, husbands, and children. One dawn—a glorious morning with rose-colored clouds above the gray buildings across the street—after a particularly sad death, I knew the tears I had been shedding inwardly must find outlet. I rushed to the linen closet, always our place of refuge, and there ahead of me, was Dorothy, sobbing her heart out. We really let go. I wonder about this sometimes when I hear people say nurses are hard-boiled…For me, nursing came alive…in the preceding months at the school, we had been steeped in theory, classes, and the meticulous practice of nursing techniques under close supervision. Technical proficiency had seemed all-important. Now, patients came first. Reassure them, ease them, help them, watch them, carry out every order, and comfort them.128

Although Ms. Deming’s testimonials originate from her role as a nurse in New York City, Philadelphia’s medical professionals encountered similar conditions.

Medical students often participated in roles similar to those of nurses during the epidemic. University of Pennsylvania School of Medicine administrators cancelled classes for third and fourth year students following Director Krusen’s pleas for trained personnel. Fourth-year students took on duties traditionally performed by first-year interns, while third-year students became “nurses.” Isaac Starr was a third-year medical

student at the University of Pennsylvania during the fall of 1918. He was assigned “head nurse” of a floor at a makeshift hospital prepared in early October. Patients that were admitted during his evening shift sometimes came in with symptoms as mild as a fever. By his next shift, most patients exhibited symptoms similar to those described by Ms. Deming above, including fluid-filled lungs resulting in shortness of breath, poor oxygen uptake, and incontinence. Blood and other fluids also compromised the airways of most of these patients. Poor tissue oxygenation and decreasing breathing capabilities, with no oxygen or suctioning equipment to treat either caused organ failure and death within a few days. 129

Starr also reported that there were relatively few experienced medical professionals present in his hospital, and the ones that were available had been brought out of retirement:

The doctors who put in an occasional appearance were drawn chiefly from among specialists long retired. They did their best. I recall a laryngologist who seeing herpes labialis on a gasping cyanotic patient was much more interested in it and prescribed application of guaiac. Another old physician showed me how to do “cupping,” and I became expert in lighting a wisp of cotton in a tumbler and applying its rim to the skin without burning the patient. Another ordered digitalis for a dying patient in dosage many times that which I had been taught was maximal…

Because he received few orders and there were no formal protocols for dealing with Influenza, Starr came up with his own treatments. Using skills learned from his pharmacology course, Starr administered atropine to raise heart and respiratory rates in dying patients. His other main treatment was camphor injections, also intended to raise a

patient’s pulse. He believed that both treatments only delayed the sickest patients’ inevitable deaths.  

Two affiliated hospitals, the Pennsylvania Hospital and The Pine Street Hospital, existed near the makeshift medical facility where Isaac Starr worked. Located at the intersection of 8th and Spruce streets, the Pennsylvania Hospital was a private institution, which meant that it served a higher socioeconomic class than its public counterparts. These privately owned institutions still faced many of the same problems that plagued community-funded hospitals. The medical staff at Pennsylvania hospital was severely depleted by the deployment of physicians and nurses to France in May of 1917. Nearly 15 months later, there were only a handful regular physicians specializing in internal medicine or surgery available when the epidemic struck Philadelphia. High prices due to wartime conditions made many necessary medical supplies scarce, slowing down hospital operations.  

\[130\] Starr, 138-140.  
Monthly Comparison of Admissions and Deaths at the Philadelphia General Hospital (a public facility) during the Fall of 1918. Both measures are considerably higher during October, the height of the epidemic, than either September or November.

Despite these adverse conditions, during the epidemic, remaining hospital staff working side by side with volunteers put in long hours to treat the vast number of patients seeking admission to the hospital. Charities like the Red Cross, and the Hospital Ladies’ Auxiliary Association contributed manpower to the overwhelmed Social Services department. By the end of October, four nurses and numerous volunteers had contracted influenza and died. 132

Affiliated with Pennsylvania Hospital, the Pine Street Hospital also suffered losses during the epidemic. Two nurses and an ambulance driver died from Influenza-related pneumonia complications during the last week of September. Dozens of staff members became ill, and the hospital administration was able to secure only seven outside nurses for assistance. The level of patient care at this facility was obviously

132 Pennsylvania Hospital, Board of Managers Annual Meeting 1918, 10-11, 21-24.
impacted by the nursing shortage, but additional help was sought from nurses’ aids and nursing students. On the last day of September, the Navy decided to evacuate remove all afflicted sailors from the Pine Street Hospital and send them to a special naval facility. This eased the situation and provided extra space for infected civilians.\footnote{133 Pine Street Hospital, \textit{Board of Managers, Minutes} 14, (1916-1919)}

Although Public Health Officials like Dr. Krusen encouraged private efforts to treat patients afflicted with Influenza, municipal authorities offered very little material support beyond pleas through media outlets. Health and charitable organizations like the Pennsylvania Hospital and the Red Cross took it upon themselves to organize volunteers and mobilize all available medical personnel, sharing the goals of alleviating symptoms experienced by the sick and slowing disease transmission. The lack of domestic contingency plans associated with the exodus of medical personnel to Europe’s battlegrounds illustrate a poor public health strategy that is specifically addressed in current pandemic protocols, detailed in the following section.

\textit{The Future}

There is a general consensus among scientists and public health officials that a worldwide pandemic, similar in magnitude and severity to the 1918 outbreak, is inevitable due to previously discussed disease features associated with antigenic drift. Infections from subtypes of the Influenza A virus in particular (discussed in \textit{How Influenza Works}) are not limited to typically susceptible age cohorts, potentially affecting
groups like young adults. Unlike 1918, however, governmental agencies at all levels, local, state, and federal, have formalized protocols for treating individuals and avoiding exposure in the process.

Preventing influenza infections by administering vaccines and distributing antiviral medications to those afflicted would be the centerpiece of most community-based public health initiatives during an outbreak. Both of these strategies have had mixed success at best. Producing mass quantities of vaccines takes months, meaning predictions of the particular virus strain’s properties need to be accurate for any effectiveness. Antiviral medications are relatively new and have been shown to have only limited success thus far.

In addition preventing and treating the actual virus, local authorities actively promote several key infection control guidelines. For example, Indiana Department of Health Protocols recommend augmenting isolation of infected patients, which involves limiting their contact with non-health care personnel, by mandating the use of surgical masks and other airborne precautions by healthcare workers. Healthcare guidelines also specifically address frequent hand-washing and proper disposal of infectious wastes, like tissue samples, for prevention. Such procedures are by no means unique to Indiana or New York City; every other set of influenza outbreak procedures reviewed contained similar instructions.

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137 New York City Department of Health and Mental Hygiene, *NYC DOHMH Pandemic Influenza Preparedness and Response Plan*, (New York City: July 2006), 51.
Philadelphians received similar instructions for dealing with individual cases during the 1918 epidemic. As mentioned earlier, both handwashing and even use of medical masks were promoted by municipal officials, including Director Krusen. However, these pieces of advice trickled down through the dominant media outlets of the day rather than being advertised through more official channels (press releases, government documents). In other words, there was little dissemination of consistent information to the public in 1918, as compared to the present day protocols that have been established by nearly all state and large city health agencies. Contemporary protocols for dealing with upcoming outbreaks have many of the same directives, and widespread dissemination in 1918 would have almost surely cut down on mortality and infection rates, not to mention the panic that these induced. The major additions to prevention and treatment of individual cases are the use of vaccinations and antiviral medications, neither of which existed in 1918. Most contemporary protocols also include greatly expanded epidemiological and population-based strategies for minimizing the impact of any future pandemic.

The goal of any pandemic preparedness plan would be to save as many lives as possible, often overlooking practices in civil liberties and medical standards of care that would reduce efficiency. To ensure local governments know the extent of an outbreak (or whether one is even occurring), stringent reporting guidelines need to be followed. Philadelphia did not even make influenza a reportable disease until late September 1918, by which the naval yard was already experiencing a surge in influenza cases.

Estimates predict that as much as 30% of the population could become infected

139 Indiana Department of Health, 28; New York City Department of Health and Mental Hygiene, 65.
during a future influenza pandemic. Several states have invested heavily in their public health infrastructure, increasing residual capacity along with emergency capabilities by adding more beds, staff, and equipment.\textsuperscript{141} Many measures, however, would not be undertaken until the start of a severe outbreak. One strategy for managing a sudden surge in the number of influenza cases would be the opening of alternate care sites. Several makeshift medical facilities were opened in Philadelphia during the 1918 epidemic, including the aforementioned Pennsylvania Hospital facilities that had been under construction and clinics established under the auspices of the Red Cross. Although both public organizations and private structures pursued such strategies, present day protocols have instituted guidelines that are quickly deployed for rapidly assembling and transforming venues into alternate care sites dedicated to treating infected populations.\textsuperscript{142} The orderly planning of such a complicated process has numerous advantages over chaotic organization of these facilities witnessed by the 1918 pandemic, and hopefully would result in a higher quality of care.\textsuperscript{143}

In both traditional healthcare studies and other public areas, proper use of isolation and quarantine techniques by municipal officials would insure a slower spread of disease. Patients exhibiting symptoms of influenza are kept away from uninfected persons when isolation is used, while a quarantine separates individuals that are infected and those who have come in contact with them with groups that have yet to be exposed. The distinction between isolation and quarantine is important, as there is generally a 1-2 day period after initial infection where patients are asymptomatic. Both of these strategies bring up

\textsuperscript{141} Indiana Department of Health, 22.
\textsuperscript{143} Indiana Department of Health, 22-23.
obvious complicated legal issues, even though many states have laws allowing local authorities to use their discretion in executing either of these. Additionally, although quarantine would have the most success stemming disease spread early in a pandemic, most people would not accept involuntary seclusion until an outbreak is widespread and they feel threatened personally.\(^{144}\) Although quarantining exposed populations would theoretically yield the best results, it is often impractical and thus limited to the healthcare environment. Nonetheless, imposing strict isolation and quarantine areas within hospital settings is considered paramount in the management of any future pandemic. In 1918 Philadelphia, as this paper has shown, quarantine and isolation techniques were often arbitrarily applied and authorities had failed to develop formal protocols for situations such as the one that they encountered in the influenza pandemic that took hold of the city that year.

Another effective strategy that could cause potential legal challenges would be a limitation on public gatherings. School closings and official events would immediately be cancelled upon a surge in diseases, however controlling private organizations, such as churches, would be difficult. As previously mentioned in “The Church Controversy” section, many civil liberties issues could come up. Public resistance would only increase with the adverse economic impacts any widespread restrictions would entail. The U.S. Department of Health and Human Services recommends that all organizations evaluate any activities that facilitate the spread of influenza, and modify accordingly during an epidemic. Such measures, however, are purely voluntary and formal local closing orders, like those imposed belatedly in 1918 Philadelphia, would be required. Yet, I would argue, these need to be imposed more quickly and more consistently if they are to work

\(^{144}\) Indiana Department of Health, 36.
to stem the tide of infection during any future epidemic.\textsuperscript{145}

Concern for the economic impact of any pandemic is a competing problem for government officials. It can potentially have an influence on the execution of public health protocols similar to how it did in 1918. One way to minimize the economic impact of an outbreak of the flu, however, would be to vaccinate the entire population. Assuming the appropriate vaccine is employed, which cannot be taken for granted, Meltzer et al. (1999) predicts that the costs of vaccinating an entire population for an outbreak that would severely affect as much as a third of the population could outweigh the economic impacts of various problems, such as slowing economic activity in an affected region and the physical loss of labor that a shut down of a city would entail.\textsuperscript{146}

Spreading essential information to the public about disease outbreaks is an important part of present day protocols, and almost certainly easier to currently accomplish than it was 90 years ago. One major failure of municipal authorities during the 1918 Pandemic was their inability spread news about the outbreak. Director Krusen and other city officials' main conduit for disseminating advice and information were occasional quotes through local newspapers. To make matters worse, they were often exaggerated or inaccurate, such as his claims in early October that the epidemic was winding down.\textsuperscript{147} in the 90 years that have elapsed since that pandemic, technological innovations have made rapid dissemination feasible. In addition to television, the world wide web has recently made plenty of information easily accessible. Both of these will

\textsuperscript{145} Faith-Based and Community Organizations Pandemic Influenza Preparedness Checklist, U.S. Department of Health and Human Services, 4 January 2008, \url{http://www.pandemicflu.gov/plan/pdf/faithbasedcommunitychecklist.pdf}
\textsuperscript{147} “Influenza Here Believed to Be Checked,” [ca. October 1918], Uncited Collection of Philadelphia Newspapers, Cage/Z10d7, College of Physicians of Philadelphia, Philadelphia, PA
allow for spread of important isolation and quarantine procedures, medical advice, and the state of any outbreak to be widespread knowledge within hours rather than days.\footnote{Pandemic Flu, U.S. Department of Health and Human Services, http://www.pandemicflu.gov; Indiana Department of Health, 39.}

Lessons learned from 1918 remain important as a starting point for planning for the next pandemic, made apparent upon examination of modern public health protocols. Avian bird flu’s emergence as a threat to poultry in Asia and the danger of it mutating into a virus lethal to humans spurred a flurry of new influenza protocols within the past decade. Advances in antiviral medications and vaccines promote interest in this subject, and a increasing public consciousness of terrorism since the attacks of September 11\textsuperscript{th} and subsequent anthrax scares have also played an important role. Public officials have used these events to promote this issue:

“

\textit{Disease has long been the deadliest enemy of mankind. Infectious diseases make no distinctions among people and recognize no borders. We have fought the causes and consequences of disease throughout history and must continue to do so with every available means. All civilized nations reject as intolerable the use of disease and biological weapons as instruments of war and terror.}” - \textbf{President George W. Bush} \textit{November 1, 2001}

Fears of biological terrorism have spurred research by the U.S. government focusing on our domestic vulnerabilities regarding biological agents, containing much overlap with the study of possible future pandemics. As recently as 2002, the Department of Homeland Security has explicitly stated that improvements to our infrastructure have to be made in the case of a biological attack or pandemic. In other words, the United States is not properly prepared for both the healthcare management and the economic and security consequences of such an incident.\footnote{Defending Against Biological Terrorism (Press Release), Department of Homeland Security, 5 February, 2002, http://www.dhs.gov/xnews/releases/press_release_0050.shtm} In 2005, Philadelphia released a local
pandemic preparedness plan, including protocols for early detection, medical care, and reducing disease transmission.\textsuperscript{150} Such a document might have helped prevent influenza’s citywide spread ninety years earlier; the only way to know for sure is by observing how well such plans work during the next epidemic.

\textit{Reflection}

Philadelphia’s death toll could have been substantially reduced had municipal health officials acted vigilantly. Many public health mistakes were due to uncontrollable factors, like a paucity of scientific influenza knowledge and primitive technology such as scientists’ lack of flu vaccines, which had yet to be invented in 1918. Pressured by opposing political and public health viewpoints, the Board of Health often seemed reluctant to impose rules necessary to slow disease spread. Delays of even a few days, however, induced widespread panic and greatly increased city mortality rates.

Despite inefficient city leadership, private citizens responded forcefully to the epidemic. Widespread relief efforts aimed at combating influenza illustrated Philadelphians’ civic conscience. Volunteers from the city’s charities, churches, and medical community contributed valuable resources and expertise, often risking their lives in the process.

Influenza did not discriminate; neither gender nor socioeconomic status substantially affected how residents were affected by the Spanish flu in Philadelphia. Only immunologically-vulnerable populations such as very young children and the

elderly had greater risks associated with sickness than those of the average Philadelphian. Access to healthcare did not determine infection and treatment patterns nearly as much as how close to the epicenter of the disease one resided. This was the single greatest factor promoting Influenza’s spread. Both residential and commercial areas in densely populated South Philadelphia were simply starting points as the epidemic moved North from the naval yard through the fall of 1918.
Appendix 3: Methods and Sources

I picked this topic and started my research during the Spring 2006 semester while in the History 360 workshop. My work on Philadelphia during the 1918 Influenza Pandemic continued through the summer of 2007. My sources included (but were not limited to) primary documents in the form of records and memoirs from several archives in the Philadelphia area, microfilm from newspapers and magazines published during the epidemic, and secondary literature ranging from scholarly articles to books about the worldwide pandemic. My trips to Philadelphia, funded by a Coutros Grant, varied in frequency from approximately once every two weeks in the Fall 2006 semester to once a week in the spring of 2007.

The Philadelphia City Archives was a valuable source for primary documents. City council minutes detailed emergency appropriation bills passed by the municipal government. Another source I located at these archives found here was the annual Philadelphia Board of Health report for 1918. Infection and mortality statistics, temporal progression of Influenza, the municipal response to the outbreak, a passage describing city collaboration with the U.S. military, and a general summary of the epidemic were included within this document. A list of Board of Health expenditures related to Influenza, including copies of receipts, and Philadelphia General Hospital’s admissions and death mortality data were also contained in these archives. These allowed for a complete analysis of the city’s public health apparatus during the epidemic. Annual reports for other city agencies, like those of the Police and Sanitation departments, were also kept at the PCA.
I compared The Philadelphia General Hospital data from the city archives to Pennsylvania Hospital’s statistics, which I found in its research library. Pennsylvania Hospital’s data provided great detail about patient demographics and described which populations were most affected by Influenza. In addition to this data, minutes from meetings of Pennsylvania Hospital Board of Directors and individual nurses’ logs offered qualitative descriptions of hospital staff’s work during the epidemic months of September and October.

The 1920 federal census, which was the one closest in proximity to 1918, was obtained from Franklin & Marshall College’s Shadek-Fackenthal Library. Included in these records were pertinent Philadelphia population characteristics, such as total population, population by age, gender, race, and ward. I compared These demographics to mortality figures by age, gender, and race provided by the Board of Health annual report to determine death rates for all of these groups. A Philadelphia ward map, acquired from the Historical Society of Pennsylvania, was used to determine ward proximity from the initial point of disease outbreak, the naval yard in South Philadelphia.

Influenza scrapbooks compiled by Philadelphia residents during the epidemic were found at the College of Physicians of Philadelphia and the Urban Archives at Temple University. These sources both provided information about daily events, which allowed me to construct a timeline detailing major epidemic milestones. Articles, editorials, letters, cartoons, personal testimonies, and official city statements from these sources, along with newspaper accounts from microfilm reels of The Evening Bulletin, The New York Times, The Philadelphia Inquirer, The Philadelphia Record and The
Philadelphia Tribune, were all used to paint a more accurate and interesting picture as to the epidemic’s impact on the city.

In addition to the primary sources I employed, there was a wealth of secondary publications and scholarly articles that provided background essential to understanding how Philadelphia differed from other areas. John Barry’s The Great Influenza was the most useful nonfiction book I employed. It described in detail how the 1918 influenza epidemic spread across the world and the levels of medical preparedness in these societies. Scholarly analyses of such public health responses in two vastly different societies, like Rice and Palmer’s examination of Japanese mortality patterns, and Howard Philipps’s essay on public health reforms in South Africa, also helped distinguish the types of factors affecting disease transmission.

Genetic and immunological characterizations of the 1918 Influenza were also ubiquitous among scientific scholarly journals. C.W. Potter examined the history of worldwide pandemics and genetic alterations termed “antigenic shift,” describing how such ideas can actually be used to predict the [inevitable] future worldwide pandemics of Influenza. Thumpey et al.’s analysis of the particular virus strain at the molecular level from carefully preserved lung tissue of an Influenza victim complements Potter’s findings, helping further understand viral features that made this version excessively lethal.

All of these sources allowed me to come to an understanding of how scientific and political mechanisms interacted in a public health context and the extent to which they dictated epidemiological outcomes for the City of Philadelphia during this
pandemic. While conclusions from this paper are by no means all-inclusive, there are still abundant amounts of information that have yet to even be researched. My topic, examining how city-specific factors affected Philadelphia during this epidemic, only adds to an already enormous and growing field of ongoing research of what many term the first “modern” worldwide disease outbreak.
Acknowledgements

I would like to thank Dr. Abby Schrader for the opportunity to conduct research under her mentorship over the past two years. In addition to her guidance towards appropriate sources of information and a tremendous knowledge about urban history, she was always eager to help me with any problems that came up throughout the research and writing process. Dr. Schrader’s accessibility, criticisms, and general support enriched this research experience and the quality of the final product. I would also like to thank the F&M Library’s research staff, who assisted my search for government data (mainly Federal Censuses); this includes Scott Vine in particular, who compiled a list of newspapers publishing in 1918 Philadelphia and provided advice concerning the best methods of attaining these sources.
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