

Comparison of Responses to COVID-19 and Historical Epidemics and Pandemics

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Introduction

Covid-19 has explosively impacted the world today, one that surely will not be forgotten, but this is not the first pandemic nor large-scale outbreak of disease. In fact, epidemics and pandemics have ravaged the world many times throughout history. A number of these cases, like Covid-19, have left their own mark on the world. The Covid-19 outbreak is not the first time and most likely will not be the last time that outbreaks and public responses like social distancing, quarantine, and mandatory mask sanctions have occurred. There were many diseases with impacts and responses similar to that of the Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) that causes Covid-19. A closer look into these past pandemics and epidemics reveals that similar responses have been enforced multiple times in history. After a brief glimpse into a few notable epidemics and pandemics, such as the Bubonic Plague, Smallpox, the Spanish Flu, and the Poliovirus, I challenge the claim that the Covid-19 pandemic is an unprecedented event, and instead contextualize contemporary responses in a series of responses across public health history.

SARS Covid-19

Overview

The SARS-CoV-2 coronavirus is a viral disease that is transmitted through droplets spread by an infected individual. The virus is prevalent throughout the world, classifying the current outbreak as a pandemic. Current estimates for the United States suggest that there have been a total of about 30,000,000 Covid-19 cases and approximately 550,000 deaths related to the virus. (1. CDC). Symptoms associated with Covid-19 are coughing, vomiting, fever, difficulty breathing, sore throat, headache and diarrhea. This disease can be transmitted by humans to each other as well as animals to humans and vice versa. In the Journal of Pure and Applied Microbiology (JPAM), researchers state "Several animal species such as cats, dogs, tiger, and minks have been confirmed to get SARS-CoV-2 infections from Covid-19 infected persons. Laboratory investigations point out those cats are the most susceptible species for SARS-CoV-2." (2. Vinodh). It is important to understand that this virus is not just something that can only be spread between people, but can be spread to animals as well, which means that we can only take measures to control Covid-19, not completely eradicate it.

Responses

Public responses to this global pandemic have varied around the world as well as within the states in the US. Overall, most areas have adopted social distancing policies, quarantines, closing of public areas, and mandatory mask wearing in order to limit the spread of the Coronavirus. Citizens were advised to practice good hygiene as a public health measure. Notably, most public schools closed in most states in the US with schools and governments pushing for online learning. Most Americans seem to abide by the new restrictions to wearing masks and socially distance themselves, however there have been dissenters who disregard these sanctions. At first, the American public seemed to fear Covid-19 to the point of panic. Recently, that fear has seemed to dissipate with the recent introduction of vaccines.

Bubonic Plague

Overview

The Bubonic Plague or Black Death was a disease caused by the bacterium known as *Yersinia pestis*, which was the scourge of medieval Europe and Asia primarily during the 14th to 15th century. The Bubonic Plague has appeared both earlier and later on across history. Symptoms included fever, headaches, vomiting and swollen lymph nodes. The plague was caused by fleas that hitched rides on rats which rapidly spread throughout the country, which would eventually die off and lead to fleas looking for new hosts to feed on, thus helping spread the disease. However, rats were not the only known carriers of these infected fleas; other small mammals such as squirrels, rabbits, cats, dogs and even prairie dogs were known to help with the spread of the disease. (citation) Animals were not the only way the plague was transmitted but through droplets as well. The Bubonic Plague had technically three different stages or forms. There were the Bubonic Plague which was transmitted to humans through fleas that had a lack of a host, the Pneumonic Plague which was when the plague reached the lungs of an infected person thus leading the disease to be transmitted through droplets, and finally there is the septic version of the plague which occurred when the infection reached an individual's bloodstream and lead to death in most cases. (3. Howard). The Black Death was responsible for the deaths of close to the mid-to-upper millions of people, killing off about 30-60% of the European population. (4. DeWitte).

outbreaks throughout the 6th to 18th centuries. The disease was caused by two viruses, Variola major and Variola minor. Symptoms of smallpox were an initial fever, vomiting, and mouth sores which would progress to fluid filled blisters that would eventually scab over. Smallpox was transmitted through droplets either from coughing, sneezing, or the puss from the pox. Smallpox had an incubation period of about 10-14 days before an infected individual would start showing symptoms, making it easier for the disease to spread. (citation) The disease has killed an estimate of about 300-500 million people within its known existence in this world. (citation) On average, smallpox would kill about 30% of those infected with it, and permanently scar the rest. Most notably, the smallpox outbreak in North America during 1775-1782 saw the most rapid spread of disease through the continent, and even made its way into South America as well. Since this disease was only transmitted from human to human, communities could isolate and eradicate it. In 1980, the CDC officially declared smallpox eradicated, thanks to the vaccine created by Edward Jenner. (9. Ochmann).

Responses

Public responses to smallpox were not nearly as rash as with the Bubonic Plague. Fear and panic spread, but nowhere near as chaotically during the plague. In colonial America, most colonies slowly enacted quarantines to infected persons. The pest or plague houses came back to use in order to isolate infected individuals away from the healthy public population. A historical study about North Carolina states "In addition to isolating infected persons, government authorities in the colonies embraced the practice of inoculation or variolation. Inoculation consisted of making an incision in the arm and transplanting live smallpox virus to the subject." (10. Watson pg 32). Variolation was a method to build an immunity to smallpox before the person was exposed to a more severe, potentially life-threatening, case. Benjamin Franklin was a strong advocate for variolation, since he had lost his daughter to the virus. Likewise, George Washington was a supporter of the practice. He strongly urged that his troops all get exposed to mild cases of smallpox to build up immunity to prevent armies numbers from dwindling. Variolation continued until Edward Jenner formulated a vaccine to help build immunity to smallpox. The vaccine was a life-saver and played an important role in helping to eradicate the smallpox virus. (11. Najera).

Covid-19 Comparison

Similar to Covid-19, smallpox was a virus that was able to be transmitted through droplets. Both viruses would take a number of days before infected

individuals would display any symptoms of infection which allowed the viruses to spread like a wildfire through the populace. Just like today, the governments of the colonies established a quarantine policy for any infected persons in order to help contain the spread of the virus. Similar to campaigns we have seen against Covid-19, public figures like George Washington and Benjamin Franklin advocated for the public to build an immunity to the virus. Obviously, variolation is not a full vaccine, but public officials still pushed for their citizens and troops to be vaccinated to stop further infections and deaths.

The Spanish Flu

Overview

The Spanish Flu, otherwise known as the 1918 influenza pandemic, was a catastrophic disease caused by the H1N1 influenza A virus. It spread rapidly around the world and infected nearly 500 million people, resulting in approximately 20-50 million deaths, and in some estimates even up to 100 million. In America, it was responsible for the deaths of about 675,000 citizens. This variant of the flu was transmitted through droplets from person-to-person. It came in multiple waves throughout 1918 and 1919. The first wave was relatively weak and would have symptoms of fever, fatigue, and chills which resulted in fewer deaths. However, the second wave would wreak havoc on an individual's immune system, and was consequently more deadly. Doctors struggled to find an effective vaccine to combat the virus, as it took until the 1940's to make the first flu vaccine. (12. History).

Responses

This pandemic caused a state of fear to spread among the public. Consequently, safety precautions were implemented, and states across the country started to close down public areas like pools, theaters, schools, parks, etc. Businesses around the country were hit hard economically. Governments even set laws to keep people from coughing, sneezing, or spitting openly in public so the flu would be less easily transmitted. To prevent this flu virus from running rampant, mask-wearing was mandated when out in public. Citizens did not enjoy having to wear masks, and some would refuse to comply. However, states were able to sway their citizens' opinion of wearing masks by framing mask-wearing as patriotic. During that time, the U.S. was nearing the end of World War I, and these safety measures to prevent the spread of the flu were seen as means to protect troops from the unforgiving illness. Wearing masks as a patriotic act to protect troops certainly helped keep the public compliant with new

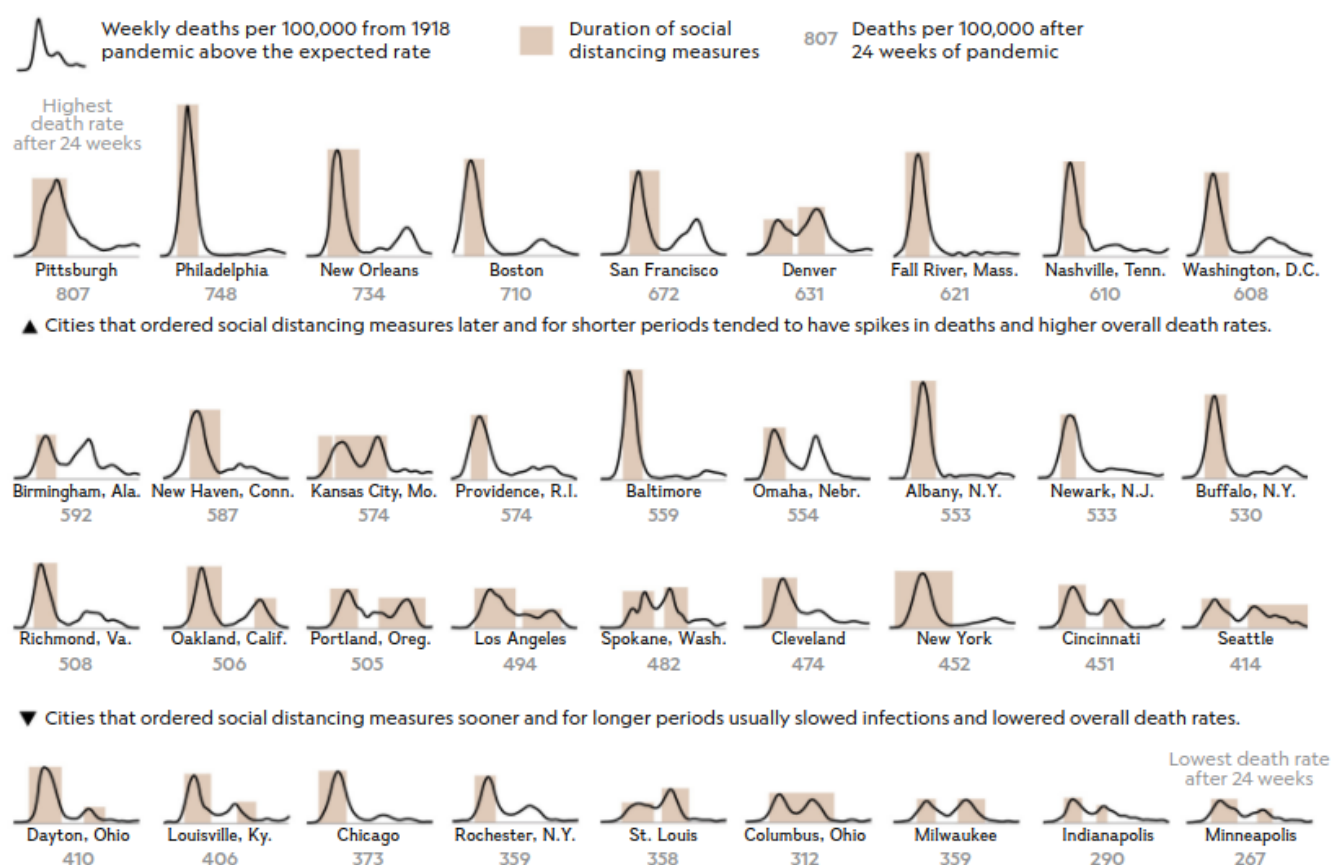
restrictions, with people refusing to wear proper masks labelled as “slackers.”

Unfortunately, after the war ended some citizens started to turn to a sense of unrest and wanted restrictions lifted. In a history article, the author states, “Yet even though compliance was high, some complained that the masks were uncomfortable, ineffective or bad for business. Officials were caught in public without masks. And after the war ended, and there was no longer a sense that people should wear masks to keep the troops safe, some dissenters even formed an ‘Anti-Mask League’ in San Francisco.” (13. Little). Some people started to wear masks that provided no protection whatsoever. For example, people would wear mesh veils surrounded with chiffon in hopes warding off the flu, and others even cut holes in their masks to smoke.

With public pushback and a number of dissenters refusing to wear masks, the states had to take measures to enforce their policies for public benefit. States started to fine and even demand prison time for those who refused to wear masks. Eventually, there was an incident where a special officer in San Francisco shot a man who was refusing to wear a mask, as well as two bystanders. (13. Little). Some states had not taken heed of the government’s warnings, and a number of states were slow to enforcing the closing of public areas and implementing a mandatory mask wearing policy. Due to significant delays in enforcing these policies, states saw increasing rates of influenza cases. Figure 2 illustrates a series of charts which represent the case differences in cities that waited to enact social-distancing measures for rather short periods of time with cities that acted early in enforcing social distancing for longer periods. The figure makes it clear that areas which failed to act quickly suffered more deaths due to influenza than cities that took the virus seriously. The article explains, “After implementing a multitude of strict closures and controls on public gatherings, St. Louis, San Francisco, Milwaukee, and Kansas City responded fastest and most effectively: Interventions there were credited with cutting transmission rates by 30 to 50 percent.” (14. Storchlic). This shows that with effective social-distancing measures, setting them in motion early enough is integral to slowing down the spread of viruses. If all the cities and states were quicker enacting their health measures, then the Spanish Flu would possibly have not claimed the lives of as many citizens.

The Spanish Flu seems very similar to Covid-19, though this variant of influenza was much deadlier than the Coronavirus. Similar to today, there had been a number of restrictions set on the public during the 1918’s Influenza Pandemic, such as mandatory mask wearing, closure of public areas, quarantines, and social distancing. Those precautions look largely like the actions cities are taking now to try and halt the spread of the current virus. Moreover, citizens during both pandemics tried to push back against the restrictions set by our government, evident through the acts of anti-maskers. States have also enforced punishments for failure to comply with the sanctions. However, there may be more direct public hostilities against individuals failing to follow the policies. Additionally, instead of a single incident where a public official shot noncompliant citizens, multiple incidents during the Covid-19 crisis between citizens and law enforcement have led to conflicts. Frequently, on news and social media platforms, one can catch glimpses of the chaos and aggression that citizens deal with and display against each other. Another comparison includes how states that initially implemented rather relaxed restrictions experienced more explosive outbreaks of Covid-19 than other states that enacted restrictions earlier.

Covid-19 Comparison



RILEY D. CHAMPINE, NG STAFF. SOURCE: MARKEL H, LIPMAN HB, NAVARRO JA, ET AL. NONPHARMACEUTICAL INTERVENTIONS IMPLEMENTED BY US CITIES DURING THE 1918-1919 INFLUENZA PANDEMIC. JAMA.

Figure 2: The chart above compares the death rates in US cities that enforced social distancing measures later than advised and for shorter periods with cities that took measures for social distancing sooner and for longer a duration of time. (14. Storchlic).

Poliovirus

Overview

Poliomyelitis or 'polio' caused by the poliovirus had multiple epidemic-like outbreaks throughout history, even during the 1918 Spanish Flu and more notably the 1940's Polio Outbreak in the US. Symptoms of polio typically included flu-like symptoms such as fever, chills, sore throat, headache and vomiting, but in worst-case scenarios, the virus could make its way to the nervous system and cause meningitis, leading to paralysis and possibly death. Polio was a virus not known for causing a staggering number of deaths, but most deaths and cases of paralysis were seen in young children, which would lead to them needing the iron lung to live. Most polio cases were asymptomatic, as few actually had mild symptoms, and even fewer

would become paralyzed, though some individuals could recover after a while. The poliovirus was only transmitted from person-to-person either through droplets or by trace amounts of feces. (15. CDC). Another cause of increasing cases was that people practiced better hygiene. An article on polio states, "But the unforeseen consequence of better hygiene and sanitation at the end of the 1800s was that babies in clean surroundings stopped encountering the infection while they still had maternal immunity." (16. Polio). Typically, polio would be present in low income areas and children living built immunity to the disease. Consequently, when areas started to increase hygiene standards, resulting in cleaner environments, children would not develop immunity and thus become more susceptible to the poliovirus. Thanks to vaccines made by Jonas Salk and Albert Sabin, cases started to dwindle to the point where there are only a handful of polio outbreaks in few

countries, now opening the opportunity to eradicate the virus. (15. CDC).

Responses

Responses to polio typically included closing all public areas, including schools. There were no mandatory mask ordinances during this time, but social distancing practices took place, as parents feared that their children would catch the poliovirus and end up paralyzed. All parks, beaches, schools, and other public areas were desolate. With little to do besides isolate themselves and wait for the virus to die down, citizens used radios for entertainment. Churches even held sermons over the radio, and occasionally educational classes for children (17. Greenburg).

With mounting fear about the polio epidemic, there was a pressing need to produce a vaccine. This process sped up after President Franklin D. Roosevelt was paralyzed from polio and he started the fundraiser known as the "March of Dimes." With help from the funding brought in from the "March of Dimes," Dr. Jonas Salk created the first polio vaccine in 1954. (18. Polio). Originally, citizens were reluctant to get vaccinated. To try and sway the public to get their vaccinations, CBS had Elvis Presley receive the polio vaccine on television (see Figure 3). According to an article by the NCBS news, "It worked. And playing to Presley's demographic apparently helped. About 75 percent of Americans under 20 had received at least one polio shot by August 1957, when the first national survey was taken; this rose to nearly 90 percent by September 1961, according to a 1962 public health report." (19. Roberts). Using "The King" to try and convince citizens to get vaccinated worked effectively. With an increase in vaccinated citizens, polio was put under control and slowly dwindled away in most areas of the world.

Covid-19 Comparison

The polio epidemic had a number of similarities that we see today with the Coronavirus pandemic. Both periods closed down public areas and schools. Moreover, citizens were urged to stay in their homes, socially distance, and keep good hygiene. Another notable similarity was how the radio was utilized during the polio epidemic. In a PBS article, the author notes,

To counteract the isolation, radio became the center of public life, today's TikTok, Twitter, and Spotify, rolled into one. Local station KUOM attempted to fill the 'fun' void with 150 hours of children's programming, including a popular show called

'Drawing to music,' after which kids all over the state sent in art inspired by the tracks played. When the epidemic lingered through September, delaying school, the KUOM producers also offered 'School by Air,' with 'classes' on topics like hygiene and geography." (17. Greenberg).

This comparison draws on the many attributes that the radio was used for that we see in the various apps we use now. There were also educational classes held over the radio, which is similar to how we have been using Zoom to hold online classes during the current pandemic.

Moreover, another comparison can be drawn from the use of celebrities taking the vaccine to help motivate more citizens to get their vaccine and promote public health. In an article, the author states that "Many other celebrities have also gone public with their COVID vaccines, from Joan Collins to Willie Nelson to Samuel L. Jackson. Politicians, too, have sought to lead by example by receiving their jabs on live television." (20. O'Shea). While the current pandemic does not feature broadcasts of celebrities receiving the vaccines, celebrity support of vaccination helps convince citizens, especially their fans, to trust the vaccine will work.



Figure 3. Elvis Presley receives a polio vaccination from Dr. Leona Baumgartner and Dr. Harold Fuerst at CBS studio 50 in New York City on Oct. 28, 1956. (19. Roberts).

Conclusion

Based on the responses and similarities between the novel coronavirus and other viral and bacterial outbreaks throughout history, the Covid-19 pandemic appears more historically precedented

than expected. Our current pandemic may be new to more recent generations, but the scope and impact of this virus is similar to previous epidemics and pandemics. There have been other highly infectious diseases transmitted similarly. The Bubonic plague was transmitted from animals-to-people and later progressed passing on from person-to-person, just like Covid-19. Smallpox, the Spanish Flu, and polio could likewise pass through droplets, just like this current virus.

Public responses to Covid-19 and other diseases were similar. When outbreaks of the Bubonic Plague and Spanish Flu occurred, people would take precautions like wearing masks, closing public areas, quarantining infected persons, and social distancing. These precautions and responses are not new to the Covid-19 pandemic. Similar to the 1918 Influenza Outbreak, masks were mandatory, yet there were still a number of citizens that disliked the masks and would defy the established policies. Moreover, during the poliovirus epidemic, radios were utilized similar to the music and social media apps we use today to keep us entertained and caught up with news. The radio establishes precedent for Zoom with classes held over it. Celebrities and public figures were called upon to advocate vaccines for improving public health, perhaps not to the extent of Elvis Presley going on CBS to promote the polio vaccine, but celebrity endorsement still helps to encourage citizens to get vaccinated.

Overall, we can find a surprising degree of historical precedent for the impacts of and responses to the Covid-19 pandemic. Throughout history, we have encountered and learned from past epidemics and pandemics, building upon health and safety practices to help control the spread of disease. Once this current pandemic ends, there will be plenty of experience and data to learn from. Similar to how communities have learned from previous outbreaks of disease, we can better determine where to improve our actions to avoid future spread of Covid-19 and other potential epidemics and pandemics bound to occur in the future.

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