

DISCUSSION
PAPER:
RESEARCH
ON THE
SECOND
WAVE

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EXECUTIVE SUMMARY

The purpose of this paper is to compare the three modern pandemics in order to gain a better understanding of what resources and tools we will need in place for the COVID-19 second wave, as well as providing us with a general idea of the impacts the second wave will have locally, regionally and nationally. In this paper we are going to compare the Spanish Flu of 1918, SARS and H1N1.

In the table below is a comparison of the Spanish Flu, H1N1 and COVID-19.

| Global Pandemic Comparison Chart | | |
|--|--|--|
| Global Pandemic Cases and Deaths | | |
| 1918 Spanish Flu | H1N1 – Swine Flu | COVID-19 |
| Total # of cases: 500 million* Total # of deaths: 50 million* | Total # of cases: 43-89 million* (U.S. only) Total # of deaths: between 150,000 to 575,000 in year 1 | Total # of cases: 33.4 Million*** Total # of deaths: >1 million*** |
| Canadian Totals | | |
| Total # of cases: 2 million* Total # of deaths: 50,000* | Total # of cases: 3.5 million* Total # of deaths: 428 | Total # of cases: 155,000*** Total # of deaths: 9,270*** |
| Ontario Case Totals | | |
| Total # of cases: 300,000 Total # of deaths: 10,000 | Total # of cases: 4,037** Total # of deaths: 23 | Total # of cases: 48,496*** Total # of deaths: 2,836*** |

*estimate **confirmed lab cases; number is likely higher ***as of September 28, 2020

The first wave of the Spanish Flu started in March 1918. In Canada, the second wave of this pandemic reached its peak in October 1918. A third wave of the Spanish flu occurred in the winter and spring of 1919.

The first wave of SARS lasted from February to April 2003. The second wave began 4 weeks later. Lessons learned from SARS include the need for protection and preventative measures for health care workers. Also discovered, was evidence of what are called “super spreaders.”

The first wave of H1N1 occurred from May to June 2009 and the second wave occurred from October to November 2009. The first wave appeared to impact Indigenous peoples the worst and accounted for 27.8% of all hospitalizations.

THE SPANISH FLU OF 1918

GLOBAL IMPACTS DURING FIRST, SECOND, AND THIRD WAVES

Although this flu was dubbed “the Spanish Flu”, the flu did not originate in Spain, it actually originated in the United States. This flu was detected in March 1918 and spread throughout the U.S. and Europe over the next six months. The flu virus spread through France, Great Britain, Italy, and Spain in the spring of 1918, then spread through North Africa and India by May, China in June, and Australia in July.



Influenza victims crowd into an emergency hospital near Fort Dix, Kansas in the 1918 flu pandemic.

(Photo taken from CTV News, Montreal. Retrieved from <https://montreal.ctvnews.ca/history-shows-quebec-reacted-late-to-the-cholera-and-the-spanish-flu-epidemics-1.4873130> and accessed on September 22 2020 – used without permission)

The **second wave** for this pandemic **occurred in August in Europe and from September to November 1918 in the United States**. During the second wave in the U.S., an estimated 195,000 Americans were killed from the outbreak in October alone. The second wave of the Spanish flu of 1918 was the deadliest of the three waves.

This perfectly mirrors what is currently taking place during the COVID-19 pandemic.

Nursing and doctor shortages due to the war created further challenges to responding to the Spanish Flu. The vulnerability of the public and a lack of vaccines for the pandemic resulted in an estimated 500 million infections and 50 million deaths worldwide, with 675,000 deaths in the United States alone. We see history repeating itself with COVID-19.

In November 1918, celebrations from the war ending caused the virus to spike again. By December, public health officials began awareness campaigns on proper hygiene, the dangers of coughing and sneezing. Businesses were encouraged to reduce their hours of service so that overcrowding on public transit did not occur. In February 1919, the state of Illinois passed a bill to create a nursing program which could be completed in 1 year to address the nursing shortages.

A **third wave** of the Spanish flu **occurred in the winter and spring of 1919 for the U.S., in the summer for Australia, and in the winter of 1920 for Japan.** The U.S. believes that the third wave resulted from unreported new cases. There is speculation that the third wave was just as deadly as the second despite affecting less people.

IMPACTS IN CANADA

The Spanish Flu pandemic erupted during the first world war where the war conditions, overcrowding and the global movement of troops allowed for easier spread. Troop mobilization by rail was to blame for the spread of the virus across Canada. In Ontario, the virus spread to the northern and remote parts of the province through the newly created railway system.

In Canada, the virus reached its peak in October 1918. The flu hit different age-groups with children and the elderly among the most impacted as well as healthy young adults. The belief from scientists is that the young adults were impacted because they lacked pre-existing antibodies and cellular immunity with the virus having devastating impacts on the lungs of the afflicted. Many children and young people died after the virus brought on pneumonia.

The Canadian government implemented even stricter measures than the United States and closed schools and businesses as well as limited gathering sizes.

IMPACTS ON REMOTE, ISOLATED, AND INDIGENOUS COMMUNITIES

Smaller and isolated communities were more vulnerable to the virus, as there was little that could be done to prevent the spread once it reached these types of communities. The impacts were thought to be more severe for Indigenous peoples. The virus also existed in residential schools, but due to the lack of mortality reports from these institutions, there are no estimations on the death toll.

IMPACTS ON CANADIAN HEALTH AND HEALTH CARE WORKERS

Canada experienced nurse and doctor shortages for the same reasons as the United States due to the war effort. Some of the more serious symptoms of the virus included nasal hemorrhage, pneumonia and coma. In Canada, the death toll was difficult to calculate as many people died from secondary infections after the virus weakened their immune systems.

COMMUNICATION AND GOVERNMENT TRANSPARENCY

Throughout this pandemic, countries knowingly withheld information on the severity of the virus to prevent panic among their citizens. The misinformation and lack of information caused impediments on the tracking of the severity and impacts of the Spanish flu. This pandemic led to the development of improvements with health education, isolation, sanitation, and surveillance as well as improving our knowledge of influenza spread.

In Canada, 2 million of the 8 million people were infected by the virus. It is believed that this number was much higher because it likely did not include the numbers for the Indigenous

populations on reserve. 10,000 deaths from the virus were reported for Ontario. The virus impacted Canadians socially and economically as well as orphaning thousands of children. The News about the pandemic was underreported because of the *War Measures Act* of 1914. In Canada, health care priorities shifted from disease management to disease prevention. The Spanish flu remained active in Canada until 1920 and has resurfaced as the H1N1 virus.

SEVERE ACUTE RESPIRATORY SYNDROM (SARS)

SARS OUTBREAK IN CANADA

The first case was reported in Toronto in February 2003 from an individual who returned from Hong Kong. 257 individuals were infected during the **first wave** which lasted from **February to April 2003**. The **second wave began 4 weeks later** after an undiagnosed patient was admitted to a hospital in Toronto and spread the virus. It is also believed that the second wave was attributed to the relaxing of the strict health measures that had been in place during the first wave.

IMPACT ON HEALTH CARE WORKERS

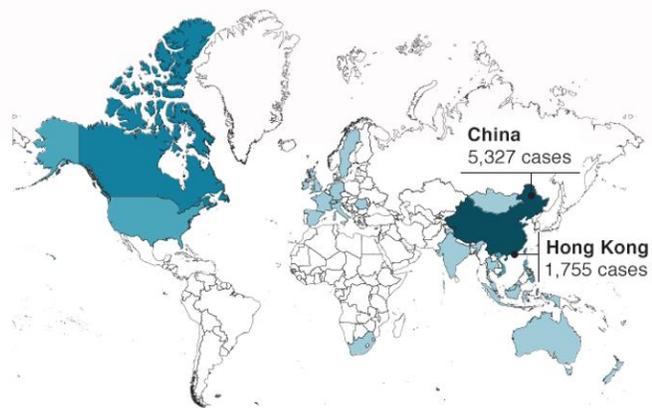
42% of infected individuals were hospital workers and 69% of those cases were females. 5 out of 7 nurses who cared for SARS patients contracted the virus. The virus lasted from February 2003 until June 2003 with 361 cases, 225 probable cases and a death rate of 33%. The cases resulted from relaxing of strict prevention measures, changed the infection control practices in Ontario and Canada.

Many health care workers were infected by assisting SARS patients by putting

Spread of Sars epidemic in 2002-3

Number of probable cases Nov 2002-Jul 2003

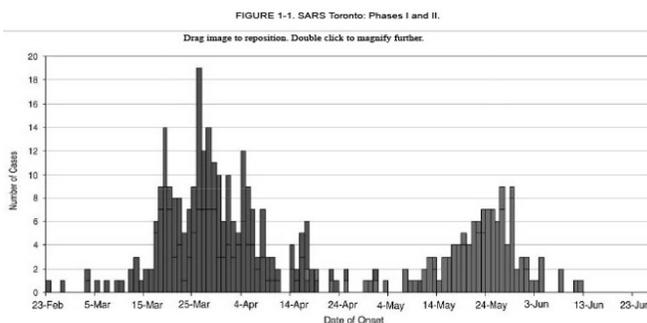
0-9 10-99 100-999 1,000-5,327



Source: WHO

BBC

(Image taken from the British Broadcasting Corporation on September 23, 2020. Retrieved from: <https://www.bbc.com/news/world-asia-china-51221394> - used without permission)



(This chart was taken from the Centre for Disease Control and Prevention website on September 23, 2020. It was retrieved from: <https://www.cdc.gov/mmwr/preview/mmwrhtml/mm5223a4.htm> - it is used without permission)

them on ventilators. This is one of the lessons learned from SARS and the need for protection and preventative measures for health care workers. Also discovered, was evidence of “super spreaders.” Super spreaders were a small group of patients which were highly infectious although the rationale behind what was called their “enhanced infectivity” was unclear. A lack of infection controls measures, higher

concentrations of the virus, or larger amounts of respiratory secretions were all listed as possible causes of super spreaders.

COMPARISON BETWEEN FIRST AND SECOND WAVE

The chart by the Centre for Disease Control and Prevention in the United States illustrates the difference in case numbers for the first and second wave. The number of first wave cases were significantly higher.

H1N1 (SWINE FLU)

ORIGINS

The H1N1 pandemic originated in Mexico in mid-March 2009. By April 25, 2009, the World Health Organization (WHO) declared a public health emergency. The virus was officially named Influenza A H1N1 on April 30, 2009 and was renamed the H1N1 pandemic by July 2009.

GLOBAL IMPACTS

The United States declared a public health emergency on April 26, 2009. On June 6, 2009, WHO declared a global pandemic. It only took a few weeks to determine and decode the genetic makeup of the H1N1 virus. The vaccine was unavailable in large doses to the United States until after they had undergone the peak of the second wave in November 2009.

H1N1 primarily infected healthy young adults between the ages of 25 to 44. The Centre for Disease Control in the United States estimated that 80 percent of virus-related deaths globally occurred in people younger than 65 years of age. This differed from the deaths of typical influenza which mainly affected the elderly. Individuals with asthma, diabetes, heart disease, and children under five were particularly susceptible to the virus and had a higher hospitalization rate. Pregnant women were more likely to suffer complications such as pneumonia or severe respiratory distress and complications from the virus could also lead to early delivery or miscarriage.

During this pandemic, there was a lot of information shared with the public on the spread from droplets, increased risk of spread indoors, and that infection can be transmitted through touching your face. The information on best practices during H1N1, was a significant change from previous pandemics. This advice has been mirrored throughout the COVID-19 pandemic.

After the WHO lifted the alert and declared an end to the pandemic in August 2010, H1N1 continued to circulate as a seasonal flu virus and cause hospitalizations and deaths worldwide every year.

IMPACTS ON CANADA

H1N1 had cases confirmed in all provinces and territories and had a mortality rate of 1.3 per every 100,000 people. Like the previous two pandemics, this virus occurred in two waves with

the peak of the **first wave occurring from May to June 2009** and the peak of **the second wave occurring from October to November 2009**. The second wave occurred despite the roll out of the vaccine which began on September 2009. The second wave did not end until January 2010. Additionally, the virus presented itself in the Canadian population again in 2013/2014. Despite the second wave ending at the end of January 2010, the WHO did not decrease the pandemic alert level until August 2010.

There is Canadian pandemic guidance from the H1N1 virus on post-secondary school closures and openings, limiting mass gatherings, communal living settings and rural and remote settings. The Public Health Agency of Canada also issued a health warning for travelers and encouraged them to postpone travel or non-essential travel to Mexico. The travel warning was lifted three weeks later on May 18, 2009.

IMPACTS ON FIRST NATIONS AND INDIGENOUS PEOPLES

The National Collaborating Centre for Indigenous Health released a report on the impacts of H1N1 on Indigenous peoples. The report found that Indigenous peoples were disproportionately impacted by H1N1 during both waves of the pandemic. The first wave appeared to impact Indigenous peoples more as there were a higher number of cases during the first wave as well as more hospitalizations reported. At the time, Indigenous peoples represented 4.3% of Canada's population and accounted for 27.8% of hospitalizations during the first wave, but only 6.1% during the second wave. Indigenous pregnant women were listed as one of the more vulnerable groups.

The research in this report also stated that Indigenous peoples were more likely to suffer severe impacts of the virus. They were more likely to be admitted to ICU and they had a higher number of fatalities. Isolation and remoteness factors also impacted the severity of the virus as research showed that remote and isolated cases were more likely to have "severe manifestations" of the virus. Fatality rates among children, however, was low. The main finding for this report was that research on pandemic impacts in First Nations was limited and that more efforts needed to be made for this type of research going forward.

IMPACTS ON HEALTH AND HEALTH CARE WORKERS

In November 2010, the Canadian Institute for Health Information released a report on the impacts to Canadian hospitals. In this document, they stated that H1N1 virus was the leading cause for hospitalizations during the peak of the second wave. They also stated that patients with flu-like symptoms significantly impacted emergency departments in Ontario during the fall of 2009. It was estimated that the virus cost \$200 million for the health care sector alone.

REFERENCES:

SOURCES FOR THE SPANISH FLU, H1N1, AND COVID-19 COMPARISON CHART:

Centre for Disease Control and Prevention: <https://www.cebm.net/covid-19/covid-19-deaths-compared-with-swine-flu/> and <https://www.cdc.gov/h1n1flu/yearinreview/yir5.htm>

Statistics Canada: www.statcan.gc.ca

The Canadian Encyclopedia: https://www.thecanadianencyclopedia.ca/en/article/1918-spanish-flu-in-canada?gclid=CjwKCAjwh7H7BRBBEiwAPXjadjoWtgVqQUB4pqV8GL8JW-NDPIUS1Wc_DEwSI5P8hgxr9g6H1EorQhoCKNAQAvD_BwE

TVO: <https://www.tvO.org/article/when-the-spanish-flu-came-to-ontario>

The H1N1 Flu in Ontario, a Report by Ontario's Chief Medical Officer of Health: <https://eportal.mountsinai.ca/Microbiology/avian/downloads/090915%20%20MOHLTC%20-%20MOH%20report%20on%20H1N1.pdf>

John Hopkins University: <https://coronavirus.jhu.edu/map.html>

Coronavirus disease (COVID-19): Outbreak update: <https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection.html>

SOURCES FOR THE SPANISH FLU OF 1918:

The information in this section was taken from the Center for Disease Control and Prevention *1918 Pandemic Influenza Historic Timeline*, the Journal of Preventative Medicine and Hygiene Spanish Influenza Pandemic Article by Martini et al., and the Archives of Ontario *Spanish Flu in Ontario* document. These three documents and articles can be found here:

1918 Pandemic Influenza Historic Timeline: <https://www.cdc.gov/flu/pandemic-resources/1918-commemoration/pandemic-timeline-1918.htm>

The Spanish Influenza Pandemic: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6477554/>

The Spanish Flu in Ontario: http://www.archives.gov.on.ca/en/education/pdf/Spanish_Flu_in_Ontario_Lesson_Kit.pdf

SOURCES FOR SARS:

The information in this section was taken from these sources:

The Centre for Disease Control and Prevention's Update on Severe Acute Respiratory Syndrome: <https://www.cdc.gov/mmwr/preview/mmwrhtml/mm5223a4.htm>

Ofner-Agostini et al's article in the National Library of Medicine on their *Investigation of the second wave of severe acute respiratory syndrome*:

<https://pubmed.ncbi.nlm.nih.gov/18404809/>

Dr. Donald Low's article on SARS: LESSONS FROM TORONTO:

<https://www.ncbi.nlm.nih.gov/books/NBK92467/>

Please see the above articles for more information.

SOURCES FOR H1N1:

The information in this section was taken from the *Pandemic H1N1 2009 Virus* information on the Infection Prevention and Control Canada's website, the 2009 H1N1 influenza pandemic among First Nations document, the Canadian Institute on Health Information's report on H1N1 impacts on Canadian hospitals, and the Centre for Disease Control and Preventions *2009 H1N1 Pandemic* information.

Please see the following links for additional information:

The 2009 H1N1 influenza pandemic among First Nations, Inuit and Metis peoples in Canada: Epidemiology and gaps in knowledge: <https://www.cnsa-nccah.ca/docs/other/FS-InfluenzaEpidemiology-EN.pdf>

Infection Prevention and Control Canada's information on the H1N1 Pandemic: <https://ipac-canada.org/pandemic-h1n1-resources.php>

Canadian Institute for Health Information's report on the H1N1 impacts on Canadian hospitals: https://secure.cihi.ca/free_products/H1N1_AIB_final_EN.pdf

The Centre for Disease Control and Prevention's 2009 H1N1 Pandemic information: <https://www.cdc.gov/flu/pandemic-resources/2009-h1n1-pandemic.html>