SPANISH FLU TO COVID-19
LESSONS LEARNED OVER 100 YEARS?

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OBJECTIVES:

1. Discuss the terms epidemic, pandemic, and plague and describe their meanings.
2. Discuss the historic epidemiology of the 1918 Influenza Pandemic and the context in which it emerged and spread.
3. Describe the evolution of COVID-19 and its appearance on the world stage.
4. Identify the similarities and differences between the 1918 flu pandemic and COVID-19.
5. Discuss the lessons we have learned from the 1918 virus and the lessons we should learn from COVID-19.

SOME MAJOR EPIDEMICS, PLAGUES & PANDEMICS THROUGHOUT HISTORY

- The Antonine Plague (165-180) – Smallpox (viral) – Roman Empire
- Plague of Justinian (541-549) – Bubonic Plague (bacterial) – Europe
- Black Death (1346-1353) – Bubonic Plague (bacterial) – Europe
- American Poliomyelitis (1916-1960) – Viral – United States
- 1918-1920 Influenza Pandemic (1918-1920) – Influenza (viral) – Worldwide
- 1957-1958 Influenza – (viral) – Worldwide
- Hong Kong Flu (1968-1969) – Influenza (viral) – Worldwide
A FEW DEFINITIONS...

**Plague** is a term used in the vernacular, generally referring to any infectious disease within a population that attacks a large number of people in a given time.

**Epidemic** refers to an infectious disease that emerges over a short period of time and affects a large number of people in a given geography.

**Pandemic** refers to an infectious disease that emerges over a short period of time and affects a large number of people across many nations at the same time or within a short period.

**Endemic** is a term used to describe an infectious agent that is a permanent part of the circulating infectious agents in a given population.

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**THE 1918 INFLUENZA**

- Began in 1918; continued through 1919 in 3 waves
- In the US, first identified among military personnel in Kansas
- Origin is unclear, but it was not Spain
- Occurred worldwide, and co-existed with WWI, propelling its spread.
- Estimated that 1/3 of the world population was affected

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**THE DEADLIEST FLU PANDEMIC IN HUMAN HISTORY**

- Referred to as the "Spanish Flu" because Spain was neutral in WWI and reported the emergence and growth of the disease, while nations involved in the war suppressed information.
- Infected 1/3 of the world’s population
- Caused 50 Million Deaths worldwide
- Highest Death rate among those 15-34 years
- Reduced average US life expectancy by 12 years
- Public health restrictions were put into place, but the nature and extent of infectious leadership was highly variable.
THE 1918 FLU KILLED YOUNG PEOPLE

- 99% of deaths were among those younger than age 65
- 50% of deaths were among people aged 20-40
- Onset of symptoms to time of death was typically < 5 days
- Providers noted blue lips and ears as signs of impending death
- Autopsies revealed lungs filled with serous fluid and exudate

THE STATE OF MEDICINE & PUBLIC HEALTH IN 1918

- The agent causing disease was a mystery and there was no firm knowledge of viruses at the time
- There were few proven, scientific resources and treatments: no antibiotics, no antivirals, no N95 masks, no disposable gloves, no electron microscopes, no ventilators, no monoclonal antibodies, no vaccines
- There were limited public health mitigation measures: cloth masks, closure of public spaces, quarantine, hand washing

SHORTAGE OF HEALTHCARE PERSONNEL – WE WERE AT WAR

- Medical Students were conscripted as care providers
- US supported women becoming nurses to meet the demand for providers
- Visiting Nurses cared for large populations of people in their homes... hospitals were overwhelmed
- Nurse training programs of all kinds, were launched; preceding common state licensing of nurses
AND THEN, IT DISAPPEARED IN 1919

- The 1918 flu circulated from February 1918 to summer of 1919 – 20 months
- In the US, there were 3 waves of infection, and the first was the least lethal
- Why it disappeared (and has not reappeared) is a mystery; one major hypothesis is that it simply ran out of victims
- It disappeared without us knowing what organism caused it (originally thought to be caused by H flu – a bacterium)

THE CAUSE OF THE 1918 PANDEMIC WAS FINALLY IDENTIFIED IN THE LATE 1990S –

- Dr. J Taubenberger and team at the US Armed Forces Institute of Pathology isolated the virus from two samples: a US soldier who died of the flu in 1918 and an Alaskan Inuit woman who also died of the flu in early 1919 and was buried in permafrost.
- Identified as a novel, H1N1 Influenza A virus (the first known H1N1 to affect humans).
- Virus is of Avian origin, transmitted to swine and from there to humans
- Still under study: were subsequent waves variants of the first?

SARS COV-2 AND COVID-19

- First appeared in Wuhan China in December 2019 as a mysterious illness, causative agent was then unknown.
- First diagnosed in the US in January 2020
- Subsequent studies of blood specimens demonstrate antibodies to COVID appeared in US specimens in early January 2020, indicating infection was already here in December 2019.
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NOVEL VIRUS, IDENTIFIED

• By early January, 2020, WHO identified that the infection, cause unknown, was likely spread via respiratory transmission.
• By mid-January, China identified the agent as a coronavirus and identified the genetic sequence of the virus.
• Mitigation efforts similar to SARS and MERS were put in place worldwide by late February/early March.

COMMON FEATURES OF BOTH PANDEMICS

• Both are caused by novel viral agents, and the both are zoonotic transfer
• Both had waves of infection, with subsequent waves more deadly than the first.
• Both are transmitted by respiratory droplets, with aerosols as a secondary transmission mode.
• Transmission of both agents is deterred by masking, social distancing, quarantine and avoidance of crowded places.
• Both have a significant mortality rate, although the 1918 flu death rate was higher than COVID-19.
• In both pandemics, the response of local health and public officials either hindered transmission or facilitated it.
• Early responses were containment/quarantine/isolation.
WHAT ARE THE DIFFERENCES BETWEEN THE TWO PANDEMICS?

• In 1918, death was concentrated among the young, while SARS-CoV-2 has largely taken older adults and those with comorbid conditions.
• Mortality rate for pregnant women with 1918 flu was 20–30%, whereas it is less than 0.1% for COVID-19.
• 1918 flu deaths were largely due to severe pneumonia; COVID-19 deaths are largely due to inflammatory storm.
• In 1918, few individuals were overweight; underweight was more common. In 2019, obesity was a major factor associated with serious illness and death from COVID-19.
• In 1918, we had no clear knowledge of viruses; by 2019, we were able to quickly identify the causative agent as a novel coronavirus.
• In 1918, we had no vaccine. In 2020, we were able to swiftly develop safe and effective vaccines.

MORE DIFFERENCES...

• The 1918 flu seems to have decreased on its own in 20 months. SARS-CoV-2 continues to evolve and infects waves after waves with no noticeable end in sight.
• In 1918, information about the scope of disease and infection was deliberately suppressed. In COVID-19, it is a mixed bag of early underestimates (or misinformation) followed by increasing transparency.
• Scientific discovery has allowed rapid learning about what works and what does not work to control and treat illness.
• The American public have become amateur epidemiologists.

WHAT DID WE LEARN?

• We effectively used science to identify viruses, understand them, and build defenses, especially testing and vaccine.
• We learned to deploy technology fast to impact transmission.
• We used technology to develop ways to protect healthcare providers from disease transmission.
• We developed pandemic plans and stockpiles of supplies.
• We learned the value of masking and social distancing.
• We developed mass communication techniques to communicate essential information to the public (and we learned the tragedy of misinformation).
We learned that technology alone cannot eliminate disease; each person plays a role.

Pandemics exist in a world of competing interests.

We learned that masking and social distancing are difficult to sustain over time.

It’s your turn.

What do you think society has learned?
What did you learn from the pandemic?
What are your takeaways?

What do you do differently as a consequence?

What new behaviors, values, actions have you acquired that you will now do?
THE GREATEST DANGER IS NOT LEARNING FROM EXPERIENCE.

Will we probe the lessons as a profession, a field, a nation?

What will we do differently as a consequence?