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GUEST COMMENTARY

1918: What Can We Learn?

AUTHOR:

Miklos P. Salgo, PhD, MD

AFFILIATION:

Infectious diseases and internal medicine (retired), Hillsborough, California

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The author discloses having been previously employed at Hoffman-LaRoche and at Genentech.

CORRESPONDENCE:

Miklos Salgo, MD (miklossalgo@aol.com)

A key question for our present coronavirus pandemic is how long will this last? Although the 1918 influenza pandemic was a different virus, and worldwide spread occurred without the help of international jet travel, many of the factors affecting the 1918 pandemic are still relevant to coronavirus in 2020. The 1918 influenza pandemic is considered a worst-case scenario for the coronavirus pandemic.[1] The 1918 pandemic had the fourth largest negative impact on the world economy, after World War II, the great depression and World War I.[1] Will the lifting of social distancing measures too soon lead to or exacerbate a second wave, perhaps worse than the first, as occurred in 1918?

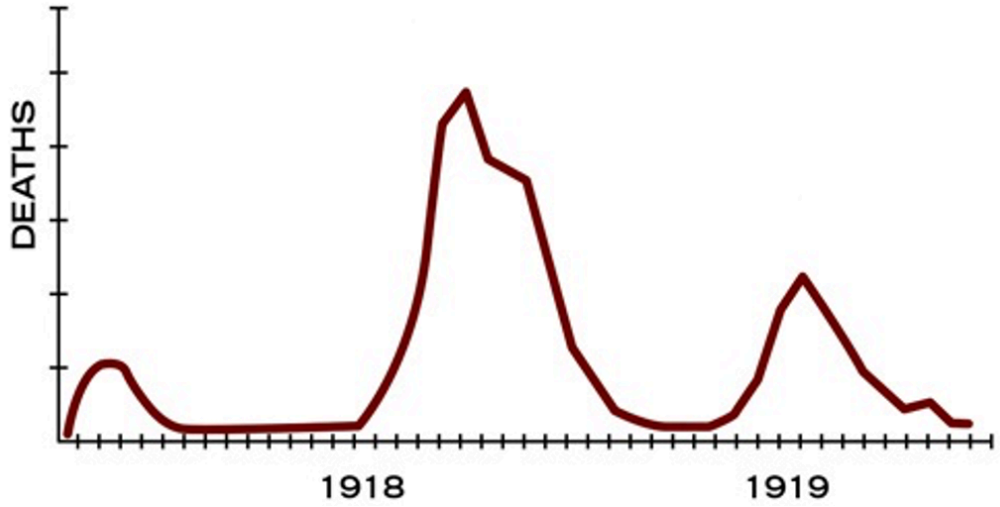
PANDEMIC WAVES

The 1918 pandemic manifested as 3 distinct “waves,” with the first in the spring of 1918, the second in the fall of 1918, and the third in the winter of 1918–1919 (**Table and Figure**).[2,3]

Table. 1918 Pandemic Waves

Wave	1	2	3
Dates	Spring 1918	Fall 1918	Winter 1918–1919
Severity	Mild	Virulent	Less virulent
Deaths	50 million to 100 million, mainly young adults and pregnant women		
Mortality Rate	5%, up to 33% of isolated populations		

Figure. 1918 Pandemic Waves[3]



The second wave was thought to be caused by a mutant more-virulent virus and to be spread by troop movements across Europe during World War I.[4] There was reluctance to impose control measures, since they would interfere with the war effort. Most of the deaths occurred with the second wave.

Those infected with mild symptoms in first wave were protected from more-severe disease in wave 2 or wave 3, thus proving that it was the same virus in wave 1, and that exposure led to protection (immunity). Those infected early in a wave had lower mortality rates than those infected late in that wave; the mechanism for this is unknown, but it was not due to differences in health care or inherent vulnerability.

(As an aside, Frederick Trump, grandfather of the president, died of influenza on May 30, 1918, in the early days of the pandemic.[1,5] According to the family, he had felt suddenly sick the day before while

walking with his son, Fred.[5])

Factors that will limit a wave include the following: a decreased number of susceptible individuals (via deaths or immunity or adequate social isolation if implemented early); a decrease in virulence or transmissibility of the virus over time (mutations or genetic drift implies selective advantage); and a decrease in the susceptibility of individuals at risk (eg, vaccine) and disease progression with exposure (eg, antiviral).

SOCIAL DISTANCING

Most of the social distancing measures used today were well known and implemented with mixed severity and mixed outcomes in 1918. Total isolation, if implemented early, is effective. For example, American Samoa was totally isolated, and there were no cases there, while in Western Samoa, 22% of the population died.[6]

The effectiveness of social distancing (also referred to as nonpharmaceutical interventions, or NPIs) is considered to depend on how well and how soon it implemented. In 1918, St Louis implemented these early and well, but Philadelphia did not, including allowing a WWI parade. Philadelphia had a greater rate of infection. However, when St Louis later started cutting back on social distancing restrictions, influenza cases spiked, and the city had to reinstate the measures.[7]

With masks over their faces, members of the American Red Cross remove a victim of the 1918 influenza pandemic from a house at Etzel and Page Avenues, St. Louis, Missouri. (Uncredited photographer for St. Louis Post Dispatch)

Yu and colleagues have modeled what they refer to as “reactive social distancing,” wherein individuals avoid potentially infectious contacts based on available information.[8] A simple model including reactive social distancing, temperature, and school term predicted the waves of the epidemic seen, thus supporting the importance of considering these factors.

CONSEQUENCES OF LIFTING SOCIAL DISTANCING MEASURES TOO SOON

Lifting control measures when a population is still in the exponential part of the curve, and before any external factors that can limit a wave take effect (eg, a vaccine or antiviral), allows that population to regress to the point before controls were implemented. However, by that time, a much higher number of individuals will be infected. If doubling time reaches 3 days early in the wave, 10 infected persons will increase to 20 in 3 days. If the doubling time when controls are lifted is still 3 days, but the number of infected persons is 1000, then the number will go from 1000 to 2000 infected persons in 3 days, and then to 4000 in another 3 days.

Travel bans work, and models show that if implemented earlier, they would work better. However, they must be implemented in a spirit of trust.[9]

Public Health experts and world leaders have come out against the premature lifting of social distancing measures. The head of the World Health Organization has called for continuing social distancing beyond the April 13 date proposed by President Trump.[10]

IS A SECOND WAVE POSSIBLE?

In Canada, there is already discussion of a second wave.[11] Hong Kong is also concerned after having eased restrictions.[12] Iran is also concerned about a second wave.[13]

POLITICAL INTERFERENCE

The 1918 pandemic was not lacking in politicians downplaying the risks. As Vaughn wrote in 1980 (as quoted by Barry[6]):

> The U.S. government passed a law that made it punishable by 20 years in jail to “utter, print, write or publish any disloyal, profane, scurrilous, or abusive language about the government of the United States.” One could go to jail for cursing or criticizing the government, even if what one said was true. A Congressman was jailed. Simultaneously, the government mounted a massive propaganda effort. An architect of that effort said, “Truth and falsehood are arbitrary terms. … There is nothing in experience to tell us that one is always preferable to the other. … The force of an idea lies in its inspirational value. It matters very little if it is true or false.”

Later, Vaughn continued, “One lesson is clear from this experience: In handling any crisis, it is absolutely crucial to retain credibility. Giving false reassurance is the worst thing one can do.”[6]

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