

The Enigma of the 1918 Influenza Pandemic

By Alfred W. Crosby

The disease we call *influenza* or *flu* or *grippe* is not one the general public particularly fears. That is odd because the only event in history that compares with the world wars of this century as a killer in terms of absolute numbers and exceeds them in the swiftness and universality of its deadly effect is the influenza pandemic of 1918 and 1919. It killed millions of people, and it did so in less than a year. The "Spanish flu," as it was nicknamed in 1918, killed a large number of people more rapidly than the deadliest war, not because it was as lethal to the individual sufferer as a bullet or bomb, but because it spread rapidly and affected millions of people. By a conservative estimate, a fifth of the human species suffered the fever and aches of influenza in 1918 and 1919, and serological evidence indicates that the great majority of those who did not suffer the discomforts of flu had subclinical forms of the disease.

WHAT WAS KNOWN AND NOT KNOWN

Why was the Spanish flu pandemic so catastrophic? Explanations abound. Perhaps World War I starved and debilitated so many that they were especially susceptible to infection. That seems plausible if you are referring to Europeans, but why was the flu in well-fed America and in faraway New Zealand as deadly as it was on the continent where the war was being fought?

Maybe the flu mortality was so high because the political attitudes of the time, as well as the state of communication technologies available to governments, hampered efficient mobilization, such as the use of quarantine, the stockpiling of medical supplies, and the conscription of doctors and nurses. That might or might not be true in parts of the world, but the governments and citizens of the belligerents, including the United States, already had mobilized against their human enemies. Unfortunately, there were no magic bullets to shoot at the flu virus.

Perhaps medical science was simply unequal to the challenge of the 1918 flu. There were neither cures nor vaccines, although varieties of both were conjured up during the pandemic. The modern germ theory of infection that Louis Pasteur and Robert Koch had demonstrated again and again was not much more than a half-century old and only widely accepted by the American medical profession for half

that amount of time. Anyway, germ theory was not immediately useful because the most advanced technological aid of the bacteriologist was still the optical microscope. No one would see the incredibly tiny flu virus until the invention of the electron microscope years later.

A greater disadvantage was the fact that the experts thought they already knew what caused influenza. In the pandemic of the disease at the beginning of the 1800s, Richard Friedrich Johann Pfeiffer, a colleague of the great Robert Koch and head of Berlin's Institute for Infectious Diseases, had found a bacillus, known ever since as *Pfeiffer's bacillus*, in the sputum of influenza sufferers. He identified this as the cause of the disease. It was not. It proved to be, so to speak, a germ without a disease, and its misidentification as the cause of influenza hampered research for decades to come.

In 1918, however, scientists began by not knowing that they did not know the identity of the causative organism of influenza. When they lost faith in Pfeiffer's discovery, they began to look for what amounted to a needle in a haystack. They did not know yet that the needle was too small for them to see. No wonder scientists fumbled in 1918.

But perhaps we have too much confidence in the power of knowledge in and of itself. If scientists had known about the flu virus in 1918, had they even been able to photograph it

through electron microscopes, would that actually have empowered them to halt the pandemic?

There was no cure for the disease then, or now. Vaccines? Another generation would pass before even partially effective vaccines against influenza were developed. Even if all the knowledge and technology to produce flu vaccine had been at hand in 1918, would it have been possible to produce it in sufficient quantity and to distribute it across oceans and continents in time to stop the swiftly spreading breath-borne pandemic? Even today, when similar questions are asked each time a new strain of the virus appears, the answer falls short of being a confident "yes."

The influenza of the 1900s is still something of an enigma, but the influenza that was sweeping around the world at the time of the Armistice ending World War I remains profoundly so. It killed tens of millions, usually by opening the way for secondary bacterial infections, such as those of Pfeiffer's bacillus. Today, we presume that such infections can be controlled with antibiotics. But a significant fraction of those who died in the pandemic of 1918-19 did not live long enough after the onset of illness to contract a secondary infection. They turned slate blue in a couple of days and died of viral pneumonia. Even more disturbing was the fact that the Spanish flu was especially dangerous to young adults for reasons that have been plausibly, but never definitely, explained.

Although influenza did not significantly affect mortality in the United States until September 1918, its impact was so tremendous during the fall and early winter of that year that it skewed the distribution of age-specific deaths into unprecedented proportions. Ever since the U.S. Office of Vital Statistics started publishing statistics on the age incidence of influenza deaths, the distribution has been high at the extremes of infancy and old age and very low in between. In 1918, however, age-specific death rates were high for the very young, higher yet for 20-to-40-year-olds, and lower

than normal for the elderly. The common explanation is that this strain of influenza was so new that it startled its victims' immune systems into overreaction, and the more vigorous the victim, the greater and deadlier the overreaction. The defensive swelling of membranes and increased secretion of fluids of the respiratory system went to extremes in young adults, filling their lungs with liquid until they drowned. Overstimulation of the immune system is a plausible theory, but we could subject it to rigorous testing only if something like the 1918 virus returned.

This distinctive influenza epidemic swept over the world in three major waves during 1918 and 1919. We cannot be sure where and when the initial wave in the spring of 1918 started, but the earliest scientific and statistical evidence points to the United States in March 1918. It attracted very little attention because pneumonic complications were rare and deaths even rarer. Initially, the flu seemed no more than just another respiratory disease of the kind that so often circulates at that time of year. Only later did the statisticians notice that an unusually large proportion of the relatively few victims of the spring of 1918 had been young adults.

THE FIRST WAVE

The first wave that spread across North America in March and April temporarily disrupted the operation of some military camps and a few factories and then disappeared. However, as it waned in North America, it rose to greater heights in the Old World than had been experienced at any time since the previous influenza pandemics of 1889 and 1890.

According to the record (by no means as complete in 1918 as today), the disease in Europe first reached epidemic proportions in April in France. It swept across Europe in the spring and summer, attacking troops indiscriminately on both sides and interfering with military operations. (General Erich von Ludendorff blamed the flu, among other factors, for the

halting of Germany's last victory drive in July 1918.) The number of Europeans not at war that were laid low by the flu that summer was impressive: 53,000 in July alone in tiny Switzerland and so many in Spain that the rest of the world began to call the malady "Spanish" flu.

The new flu showed up in North Africa in May 1918, in Bombay and Calcutta in June, and by the end of July half of Chungking was sick with it. By then, it had already reached New Zealand, the Philippines, and Hawaii. Even in the age before air travel, influenza had circled the world in less than five months.

But the pandemic still seemed no more dangerous than similar experiences. Multitudes of people were ill. Offices, factories, armies, navies were often disrupted, but only a few of the stricken were sick for more than a week and very few were dying. Still, the number with flu was so great that even the small percentage who proceeded to develop pneumonia and die was becoming impressive. Some health professionals pointed to the strangely large proportion of young adults among the dead, but, all in all, the pandemic was looked upon only as a hindrance and a distraction, not a disaster.

At the end of summer 1918, the world health picture was encouraging, though a little perplexing. A pandemic due to a new strain of flu had rolled over humanity, but in August it was in decline for lack of fresh populations to infect. The odd feature was that the United States (where the new strain may have originated) was almost without influenza, although the country was in daily contact by steamer with islands and continents where the pandemic was raging more fiercely than it had in America in the spring. Nevertheless, the outlook was rosy.

THE SECOND WAVE

If there was a threat worthy of attention, it was that the war might enhance the propagation and diversification of influenza organisms. Millions of people of the ages most susceptible

to severe influenza infection were jammed together in industrial cities, military camps, and ships, and were shifting about the world in immense numbers. Americans were moving at a rate of 200,000 to 300,000 a month from influenza-free America to a European continent rife with the disease.

In the latter days of August, the influenza virus changed into the most dangerous strain or strains ever recorded. It appeared to do so almost simultaneously (although this would seem impossible) in three major ports of the North Atlantic thousands of miles apart. One was Freetown, Sierra Leone, where local West Africans mixed with British, South African, East African, Australian, and New Zealand soldiers and sailors bound to and from the front in Europe. Another was Brest, France, the chief disembarkation port for Americans and others from all over the world who had come to fight *le Boche*. The third was Boston, Massachusetts, one of America's chief embarkation ports and a crossroads for soldiers, sailors, and citizens of every nation involved directly or indirectly in the allied war effort.

*Le Boche =
The Germans*

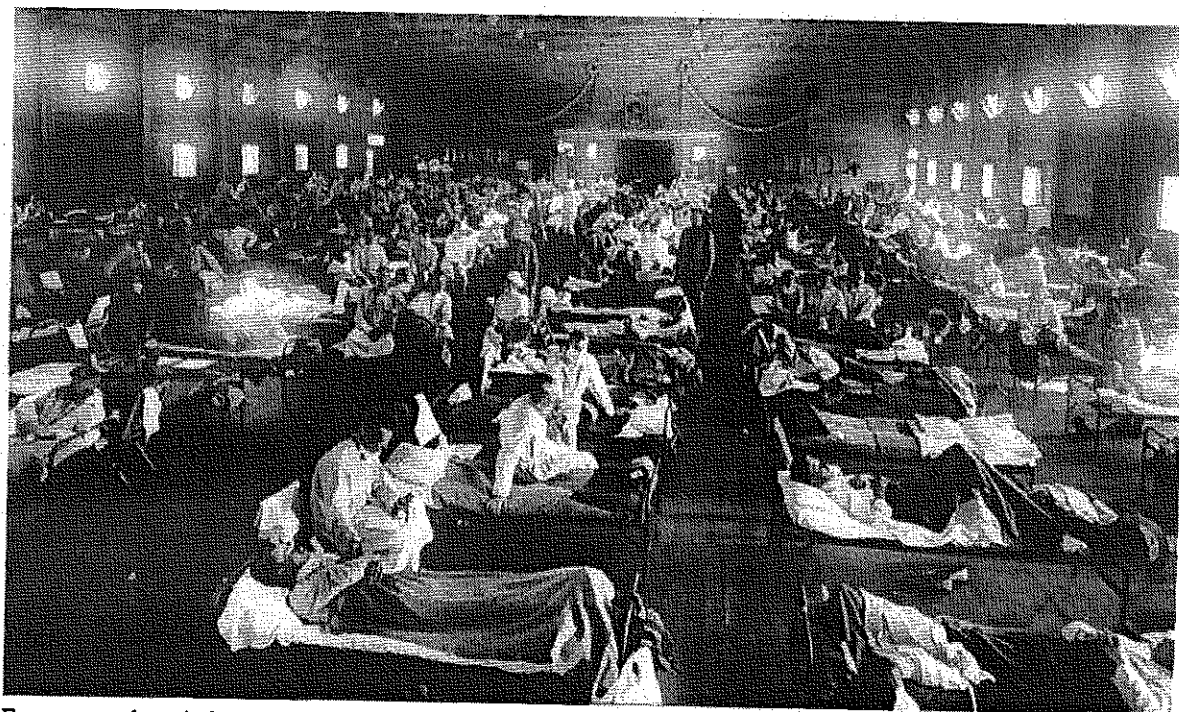
The renewed malady had three appalling characteristics: it often opened the way for dangerous secondary bacterial infections, it was more dangerous for young adults than for any other cohort, and it killed more often than any flu before it.

Beginning at the end of August, the second wave of the newly virulent disease rolled out from these three cities to strike nations, cities, villages, families, and individuals. Three percent of the entire native population of Sierra Leone died in September. The new wave peaked in Boston and Bombay in the first week of October. The mortality in India that month was, according to official reports, "without parallel in the history of disease." In Western Samoa the disease struck an isolated and immunologically almost defenseless people in November and killed 7,500 of a total population of 38,000 in less than two months. Many thousands of soldiers on both sides of the

*est.
20 million*

Western Front were stricken, and the American Expeditionary Force's only full-scale drive of the war, the Meuse-Argonne Offensive, sputtered and stalled as 69,000 medical cases, most of them of flu and its complications, swamped an evacuation and hospital system already overtaxed with 93,000 wounded and gassed.

The German Revolution and the establishment of the German Republic stalled as Prime Minister Prince Max von Baden fought his own case of flu. Seemingly all the important figures of the era had, were having, or were to have a bout with the Spanish flu or at least some sort of respiratory illness. Prince Max, Lloyd George, Clemenceau, Woodrow Wilson and his chief adviser Colonel House were among the sufferers. Wilson came close to dying of influenza in April 1919 at the tag end of the pandemic's third wave, an event that would have twisted the peace conference into an even more appalling snarl than was attained with the American president healthy.



Emergency hospital during the Spanish flu epidemic of 1918-19, Camp Funston, Kansas. Patients' beds are reversed alternately so that the breath of one patient will not be directed toward the face of another.