

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.

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

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.

THE STORY OF ONE CITY

Because the full history of the pandemic is too broad to relate here, let us focus on the story of one city, San Francisco. The spring wave of the 1918 flu passed over the city and sickened a few without any unusual interest. The second wave could never have been so benign and retiring, no matter what the circumstances, but it might have been less lethal if forewarned had truly meant forearmed. The startling news of the September morbidity and mortality rates in Boston reached the West Coast several weeks before the full brunt of the pandemic, but the skepticism and confusion of public health officials and political leaders and the ignorance and apathy of the general population stalled preparations to combat the Spanish flu.

As the pandemic rolled westward, San Francisco, typical of nearly all American cities, concentrated on the marches and other public gatherings of the Fourth Liberty Loan Drive. The crowds enhanced the rapid spread of communicable diseases. When the first flu victim

(a traveler from Chicago) appeared in late September, barely a month after the first cases occurred in Boston, Brest, and Freetown, the city of the Golden Gate was just beginning to focus on the threat to its well-being.

Full preparations (dividing the city into districts, each with its own medical personnel, telephones, transportation, and supplies; creating emergency hospitals in schools and churches; recruiting hundreds of drivers and other volunteers) were not completed until November, after the worst days were over. Should San Francisco's leaders be condemned because they moved too slowly? Perhaps, but the situation was unprecedented and a little incomprehensible even to health professionals. Public inertia precluded any preparations involving inconvenience to large numbers of people.

The factors that overruled all others during the pandemic were its velocity and virulence. To illustrate, the San Francisco Hospital, which was rated as the finest in the state, earned the dreadful honor of being the city's isolation ward for pneumonia patients during the pandemic, and it came within a hair of failing. Seventy-eight percent of its nurses fell ill and it is a safe guess, considering their known devotion to duty, that many of the "healthy" nurses should have gone to bed as well.

At the end of October, the San Francisco Hospital had 1,100 cases of pneumonia, not just flu. Patients were packed under its roof, and the superintendent announced that there was not room in the wards or the halls or porches for one more patient. Luckily, the number of new flu and pneumonia patients began to drop precisely at the end of October. During the course of the pandemic, the San Francisco Hospital admitted 3,509 cases of respiratory disease and 26 percent of them died.

In that October the city tried every remedy that had been used on the East Coast to cure the flu or, at least, slow its advance. Literature on how to avoid or survive influenza and its jackal, pneumonia, was widely distributed. All schools and places of public entertainment

were closed. Thousands of citizens were inoculated with totally useless and possibly dangerous anti-flu vaccines imported from the East Coast or whipped up locally.

Like several other cities in the West, San Francisco devoted much of its anti-flu effort to persuading its populace to wear gauze masks. The city Board of Supervisors passed a law making the wearing of masks obligatory in all public places, and on October 22 the Mayor, the Board of Health, the Red Cross, and other organizations announced in the *San Francisco Chronicle*, "WEAR A MASK and Save Your Life! A mask is 99% Proof Against Influenza."

For the next month, the great majority of San Franciscans obeyed, and hundreds who did not paid fines and went to jail. On Armistice Day, a wildly enthusiastic crowd swirled up and down Market Street and spilled over into the rest of the city, the ecstatic celebrants surrealistically swathed in white masks. Happily, the masks seemed to work. So did the vaccines and all the other amulets that San Franciscans were clutching to shield themselves from sickness and death.

In November, for unknown reasons, the flu slackened and the number of cases declined dramatically. On November 21, every siren in the city shrieked the message that the moment for unveiling had come and the masks came off amid general scenes of hilarity and triumph. Not bad—a war won and a deadly disease defeated in the same month. As of that day, the total number of flu cases and deaths in San Francisco was far below what had been predicted on the basis of the experience in eastern cities. Authorities and the public credited the city's success to the mask.

Although not universally true, communities on the East Coast characteristically had one terrific wave of Spanish flu and only ripples thereafter. In contrast, communities in the West often had two major waves.

Barely two weeks after San Franciscans removed their masks from round two, the

number of new flu cases began to ease upward. The chief of the Board of Health expressed the hope that they were mostly misdiagnosed colds, but soon an avalanche of new cases—5,000 in December alone—confirmed the fear that the Spanish flu was back for round three.

THE THIRD WAVE

The third wave, in San Francisco and elsewhere in the world, was less virulent and deadly than the second. Although round three sent hordes more to their sickbeds and a considerable number to their graves before it took its final leave in the spring of 1919, the death rate was about half that of the peak weeks of round two.

The most memorable features of round three in San Francisco were what one normally expects of an anticlimax: apathy and foolish antics. Medical authorities again trotted out their vaccines, but this time the audience showed little interest. The city government again made masks compulsory, but this time against the stiff opposition of Christian Scientists, civil libertarians, and merchants who were worried about what masks were doing to Christmas shopping. People were simply fed up with masks, flu, and everything else. Some disgruntled soul sent the head of the Board of Health a bomb. It didn't go off.

The most effective opponents to the masks were experts from various public health departments. They pointed out that there seemed to be no consistent difference in morbidity and mortality of communities that adopted the mask and those that did not. The San Francisco politicians noted, as one supervisor put it, that 99.5 percent of the city's citizens opposed the compulsory mask law. On February 1, 1919, the masks came off officially. They had come off in fact some days before.

San Francisco, a city of 550,000, had made widespread use of all known preventives and remedies for influenza and pneumonia. It had enforced ordinances for the control of the pan-

demic that were as stringent as any implemented in any of the larger cities of the United States. Still, thousands of her citizens had fallen ill and 3,500 had died. San Francisco's record was not very different from that of the city of Boston, the first city in America to be struck by the fall wave.

In San Francisco, as elsewhere, nearly two-thirds of those who died of flu and pneumonia were between the ages of 20 and 40.

By mid-spring in 1919, the third wave was over everywhere except in the remotest reaches of such places as Alaska and Melanesia. The virus of Spanish flu declined in virulence in the 1920s and ceased to circulate among human beings sometime around the end of the decade. Serological evidence indicates that it may have been holed up ever since in the pigs of the Midwest and other areas of the world with a heavy swine population.

Three-quarters of a century ago, Spanish flu put a fifth or more of humanity to bed and killed 20 to 30 million people, or more. (We know little of its impact in the heavily populated interior of China, but we may be sure the disease killed many there.)

Despite all these appalling statistics accepted as true by medical professionals everywhere, one of the chronic problems that the public health community faces is the general lack of fear or even respect for influenza. A rapidly diminishing minority of humanity actually remembers 1918 and rarely mentions it to younger generations. History books contain little or nothing about the World War I pandemic. Most college-educated people know more about the fourteenth-century's Black Death than the twentieth-century's Spanish flu.

Why? One can only speculate. The World War and the Armistice were more fascinating than the flu, and the pandemic did not have much, if any, effect on who won the war. The virus played no favorites among the belligerents, though we might note that the starving Germans often blamed the naval blockade for

their flu deaths, which helped to poison international relations after the war. The Bolshevik Revolution was making Americans hypersensitive to ideological matters, and influenza had no relation to ideology whatsoever. The flu virus infected all groups and classes, thus damping that stimulus to memory, the sense of injustice encouraged by, for instance, the tuberculosis germ, with its preference for the poorly fed and poorly housed. There are no obvious sequelae to influenza. Encephalitis lethargica may follow upon its heels, but tardily, months (even years) later. Unlike polio, it leaves behind no permanently injured victims, such as Franklin Delano Roosevelt, to remind the healthy of what could have or could yet happen to them. Unlike smallpox, it leaves no one permanently scarred, like George Washington, to remind the lucky of what they had escaped by mere chance and might not escape the next time.

Above all, it is influenza's insidiously low profile as a killer that has enabled it to kill so many and not be adequately feared. If I may quote myself:

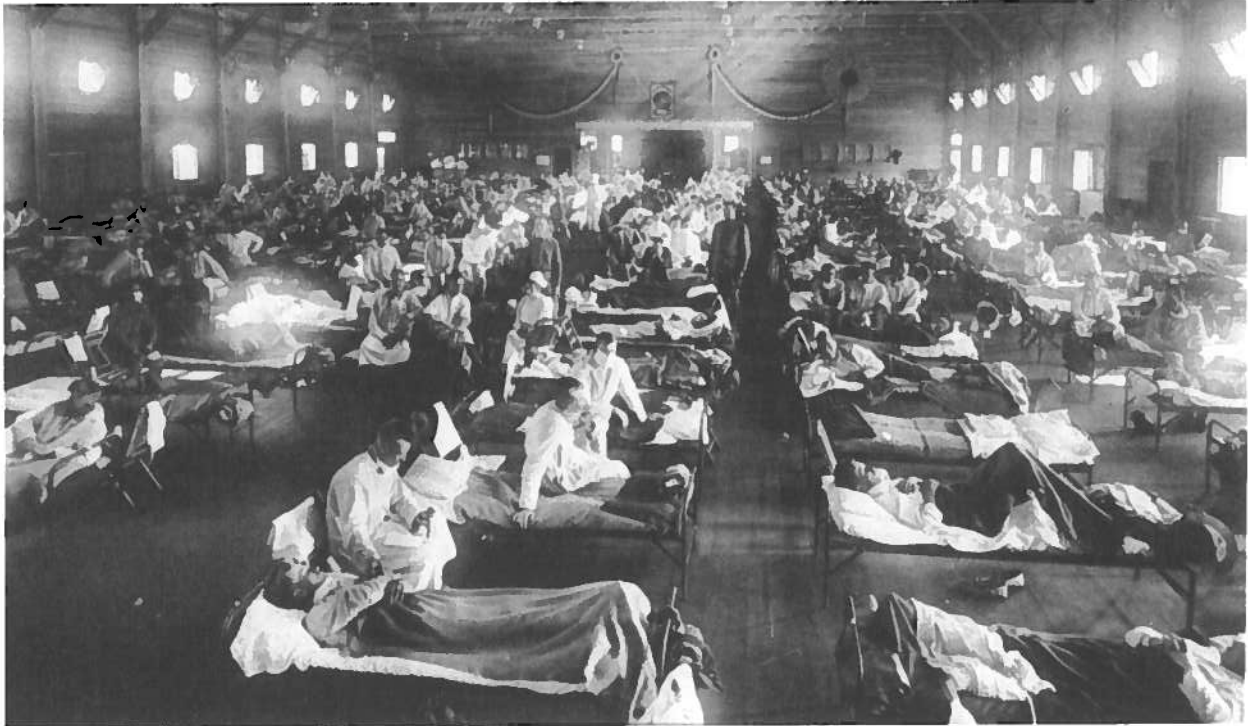
If yellow fever afflicts 10,000 people in New Orleans, 5,000 of whom die, panic sweeps the continent, and people in Labrador stare into mirrors and stick out their tongues, looking for telltale yellow traces. If influenza afflicts ten million people across this land, 50,000 of whom die, few outside the health professions take much notice. On the whole we humans are more frightened of diseases with high mortality rates, which we are not apt to get, than diseases with low but quite real mortality rates, which we are almost certain to get eventually.¹

The American comic poet, Ogden Nash, was a typical American of the twentieth century in his attitude toward influenza. He was 16 years old in 1918 and an inhabitant of Providence, Rhode Island, a city where thousands fell sick in the great pandemic and more than 1,500 died. His published work contains but one piece devoted even indirectly to influenza, a small chuckler of

a poem entitled “Song for a Temperature of a Hundred and One.” It compares flu favorably to

distemper, pip, hookworm, and hoof-and-mouth disease, and ends ecstatically:

**So let man meet his Maker, a smile on his lip,
Singing hey, double hey, for the goodly la grippe.²**



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.

Notes

1. Alfred W. Crosby, Preface to *America's Forgotten Pandemic: The Influenza of 1918* (New York: Cambridge University Press, 1989), xii.
2. Ogden Nash, “Song for a Temperature of a Hundred and One,” from *Bed Riddance: A Posy for the Indisposed* (Boston: Little, Brown, 1971), 56.