Learn From History

It was cold in St. Louis on that December day. The first snowfall of the year had not appeared yet, so at least they were lucky in that respect. Collars upturned and hands thrust deep in pockets, they shivered as they smiled bravely for the camera. A company photograph was still a novelty, and having it taken outside in December was even more of a rarity. But the temper of the times demanded it. It was 1918 in St. Louis, and the dreaded “Spanish Flu” was sweeping through the country killing thousands. Fear of influenza made taking a company picture outdoors safer, and therefore a necessity, as citizens, officials, and politicians braced themselves for the next wave, not knowing that it would be even more deadly. In St. Louis, more people would die from influenza in December 1918 than in any other month.

Looking back to previous pandemics helps put the current risk for pandemic influenza into perspective. In 1918, influenza caused a pandemic that killed more people than any infection in the history of the world. Estimates vary on the exact number of deaths. Record keeping was abandoned in some places due to the large number of influenza deaths. In other areas, recording the cause of death had yet to become standard practice. However, most experts agree that around 40 million people were fatally infected worldwide. Although estimates vary, the pandemic of 1918 killed more individuals in three months than the AIDS epidemic has in its 25-year history.

Influenza pandemics usually occur several times each century. Last century influenza pandemics occurred in 1918, 1957 and 1968. Most public health experts agree that the question is not “if” influenza A virus will cause another pandemic, but only “when.”

Understand the virus

There are three types of influenza viruses that infect humans – A, B, and C. Only influenza A causes pandemics. Understanding the tendency of influenza A to change its structure over time is pivotal to understanding both seasonal and pandemic flu. On the outside of the influenza A virus there are two proteins, hemagglutinin and neuraminidase. Each virus carries one of 16 different hemagglutinins and one of nine neuraminidases, and is labeled accordingly. For the sake of simplicity, “H” is used for hemagglutinin and “N” for neuraminidase. For example, in 1918 the influenza pandemic that killed half of a million people in the United States was caused by influenza A (H1N1), and the avian flu that is now infecting birds across Asia, Africa, and Europe is influenza A (H5N1).

It is normal for the H and N structures on the outside of the virus to change each year. In seasonal flu this change is called “Antigenic Drift,” and is somewhat like the change in appearance that occurs when a document is copied over and over again. The basic format of the document remains the same, but the fine detail changes slightly each time it is copied. Similarly, with influenza A virus, “Antigenic Drift” results in minor but significant year-to-year changes. This reduces the effectiveness of immunity gained from prior-year infection or vaccination and, makes it necessary for people to get a different flu shot every year. Since the virus changes just enough for the human immune system not to recognize it, individuals have reduced immunity to the “drifted” version of the virus, and require a new vaccine to be fully protected. Although we
anticipate “Antigenic Drift” each year and prepare for it with a new vaccine, seasonal influenza still causes millions of infections and an average of 36,000 influenza-related deaths in the United States annually.

In contrast to the gradual annual structural changes of seasonal influenza, a pandemic occurs when a completely new subtype suddenly appears, replacing the previously circulating seasonal influenza virus. This dramatic change is known as “Antigenic Shift.” The significant structural change in the circulating virus means that no one in the world is immune and there is no vaccine.

Avian influenza (H5N1) is completely new to humans. As a result, it represents a candidate virus with the potential to cause the next pandemic. Currently, H5N1 has the ability to infect humans but it does not have the ability to efficiently spread from person to person. If this new virus, to which no one has immunity, acquires the ability to easily spread among humans, “Antigenic Shift” to H5N1 will occur leading to a pandemic.

Plan And Respond

Because antigenic shift happens suddenly, and vaccines take a substantial amount of time to develop, optimistic estimates point to full-scale vaccine production and distribution no sooner than six to eight months after the pandemic strain of influenza has been identified. Relying on vaccine as the sole control measure will not be feasible. Additionally, antiviral medicines will be in short supply to treat the disease and will most likely not be available for preventive therapy. Therefore, combating pandemic influenza will require a two-pronged effort with responsibilities for both public health officials and the community.

For the community, the responsibility lies with each person or organization to make it more difficult for the flu to infect them or impair their ability to function. For individuals, this means preparing a family or personal emergency preparedness plan and kit, as well as using common sense precautions like hand washing, cough covering, and maintaining physical distance when interacting with
others. For organizations, reinforcing institutional infrastructure should include continuity planning for the inevitable staff shortages associated with pandemic influenza. Assuring that appropriate personal protective equipment and infection control practices are in place also will play a key role in strengthening organizations.

While individuals and organizations make themselves more resilient and resistant to the impact of a pandemic, public health officials will focus on three cornerstone strategies: communication, containment, and control. These three “C’s” combine effective 21st century crisis communication with lessons learned in 1918 that emphasize the role of classic public health containment measures and biological control measures in the form of vaccines and antiviral medicines.

The communication phase has already begun. Health departments are preparing plans, distributing written materials, educating businesses and medical professionals, organizing community events, and keeping key decision makers informed. All of these activities are currently focused on mitigating a possible future influenza pandemic. However, once a pandemic begins, effective crisis communication will be essential in order to inform and direct the public in a manner that assures community cooperation with public health goals.

Containment entails using a wealth of traditional public health measures such as isolating the sick, quarantining the exposed, promoting social distancing, closing schools and other public events, protectively sequestering the well, and discouraging punitive absence policies. Many of these measures were used effectively in 1918 and that experience provides important guidance today. In the absence of a vaccine and with antiviral medicines in short supply, community containment will stand for many months as the centerpiece of the public health response to a pandemic.

Approximately six months into the pandemic, public health priorities will shift and begin to focus on pharmaceutical control measures in the form of vaccine and antiviral medicines. As supplies begin to reach each community, protocols will be established to prioritize who receives the vaccine or antiviral first, and how best to communicate those priorities in order to achieve maximal community support.

Predicting where and when a pandemic will begin is not possible. History tells us that they occur two to three times a century and can be devastating in scope. With careful thought and well-crafted plans, individuals and organizations can protect themselves from being overwhelmed by pandemic influenza, and can assure their ability to function during a crisis. The first step is becoming informed and the second step is planning. Begin working with your local health department today to protect yourself, your organization, and your community.}

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