The Great Pandemic 1918–1919

Throughout history, influenza viruses have mutated and caused pandemics or global epidemics

http://1918.pandemicflu.gov/the_pandemic/01.htm

INFLUENZA STRIKES

In early March of 1918, officials in Haskell County in Kansas sent a worrisome report to the Public Health Service. Eighteen cases of influenza of a severe type had been reported there. By May, reports of severe influenza trickled in from Europe. Young soldiers, men in the prime of life, were becoming ill in large numbers. Most of these men recovered quickly but some developed a secondary pneumonia of "a most virulent and deadly type."

As the bodies accumulated, funeral parlors ran out of caskets and bodies went uncollected in morgues.

Within two months, influenza had spread from the military to the civilian population in Europe. From there, the disease spread outward—to Asia, Africa, South America, and back again to North America. In Boston, dockworkers at Commonwealth Pier reported sick in massive numbers during the last week in August. Suffering from fevers as high as 105 degrees, these workers had severe muscle and joint pains. For most of these men, recovery quickly followed. But 5% to 10% of these patients developed severe and massive pneumonia. Death often followed.

Public health experts had little time to register their shock at the severity of this outbreak. Within days, the disease had spread outward to the city of Boston itself. By mid-September, the epidemic had spread even further with states as far away as California, North Dakota, Florida and Texas reporting severe epidemics.

The pandemic of 1918–1919 occurred in three waves. The first wave had occurred when mild influenza erupted in the late spring and summer of 1918. The second wave occurred with an outbreak of severe influenza in the fall of 1918 and the final wave occurred in the spring of 1919.

Entire families became ill. In Philadelphia, a city especially hard hit, so many children were orphaned that the Bureau of Child Hygiene found itself overwhelmed and unable to care for them. As the bodies accumulated, funeral parlors ran out of caskets and bodies went uncollected in morgues.

As the disease spread, schools and businesses emptied. Telegraph and telephone services collapsed as operators took to their beds. Garbage went uncollected as garbage men reported sick. The mail piled up as postal carriers failed to come to work.

Public health officials sought to stem the rising panic by censoring newspapers and issuing simple directives. Posters and cartoons were also printed, warning people of the dangers of influenza.

In November, two months after the pandemic had erupted, the Public Health Service began reporting that influenza cases were declining.

By the time the pandemic had ended, in the summer of 1919, nearly 675,000 Americans were dead from influenza. Hundreds of thousands more were orphaned and widowed.

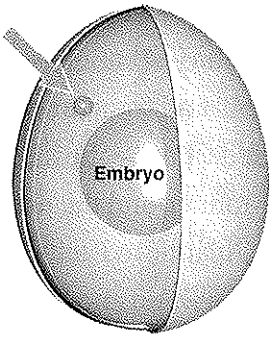
Expediting production of a vaccine

Drugmakers around the world have received or are awaiting strains of the H1N1 swine flu virus to begin making a vaccine. The urgency of the situation provides an opportunity for companies to further develop a relatively new cell-based method of creating vaccines, which can potentially reduce the amount of time it takes to bring the product to market.

Egg-based

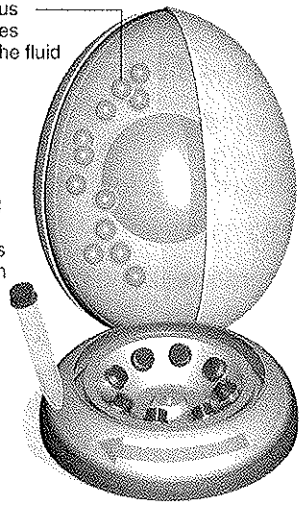
Production time: 20-28 weeks

1 About a week after chicken eggs are fertilized, the virus is injected into the fluid surrounding the embryo of the eggs



2 The virus multiplies within the fluid

3 After several weeks, the fluid is removed from the eggs and is spun in centrifuges to separate and concentrate the virus



4 It is analyzed, tested for quality and prepared to become a vaccine; it is then packaged and distributed

Advantages

- A well-established method for vaccine production
- Relatively inexpensive

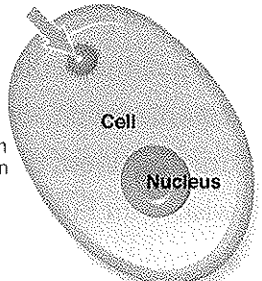
Disadvantages

- Requires large amounts of eggs that are not produced on demand (a single vaccine dose requires 1-2 eggs)
- Extensive planning and preparation can limit the effectiveness on quickly-developing viruses

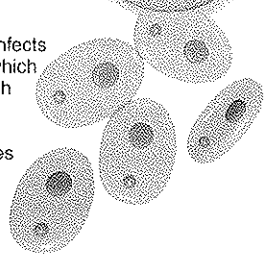
Cell-based

Production time: 12-15 weeks

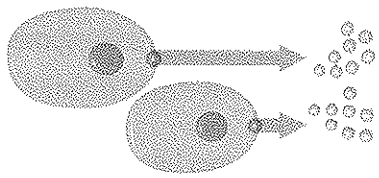
1 The virus is injected into kidney cell cultures from the African green monkey



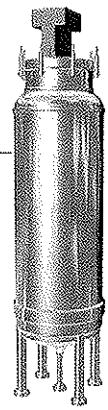
2 The virus infects the cells, which multiply with the virus inside them, producing additional samples of the virus



3 The initial cells are harvested and the virus particles are separated into pools



4 The pools are injected into large fermenters containing more cells and the process is repeated on a much larger scale



5 The virus is removed and prepared to become a vaccine; it is then packaged and distributed

Advantages

- Faster method, which could result in creating vaccines in time to prevent the spread of the virus
- Avoids potential impurities that can occur in the egg-based method

Disadvantages

- High initial costs to set up the process
- Still unestablished; no cell-based vaccine has been approved by U.S. regulators for commercial use

Source: Baxter, New England Journal of Medicine, GlaxoSmithKline
Graphic: Max Rust and Phil Geib, Tribune Newspapers