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### The Silent Killer

It was 2009; I woke up at 8 o'clock to the sound of my screaming mother. She was waking me up to go to school. I did not feel very well, so I told her I was sick, and I wanted to stay in bed. I had cried wolf so many times before that she did not believe me, so she told me to wake up and get ready for school.

When I got home from school that day, I felt much worse. Because school was already over, my mom knew that I must not be faking it. She grabbed the thermometer and checked my temperature. I had a mild fever and a cough, so she told me to go rest. After several hours, she came over to recheck my temperature, and my fever had gone up to 104°F. I was having trouble breathing. A nursing assistant, my mother knew the gravity of the situation and rushed me to the hospital. When I arrived at the hospital, the doctors recognized the symptoms immediately and told my mother that I had a severe case of the flu.

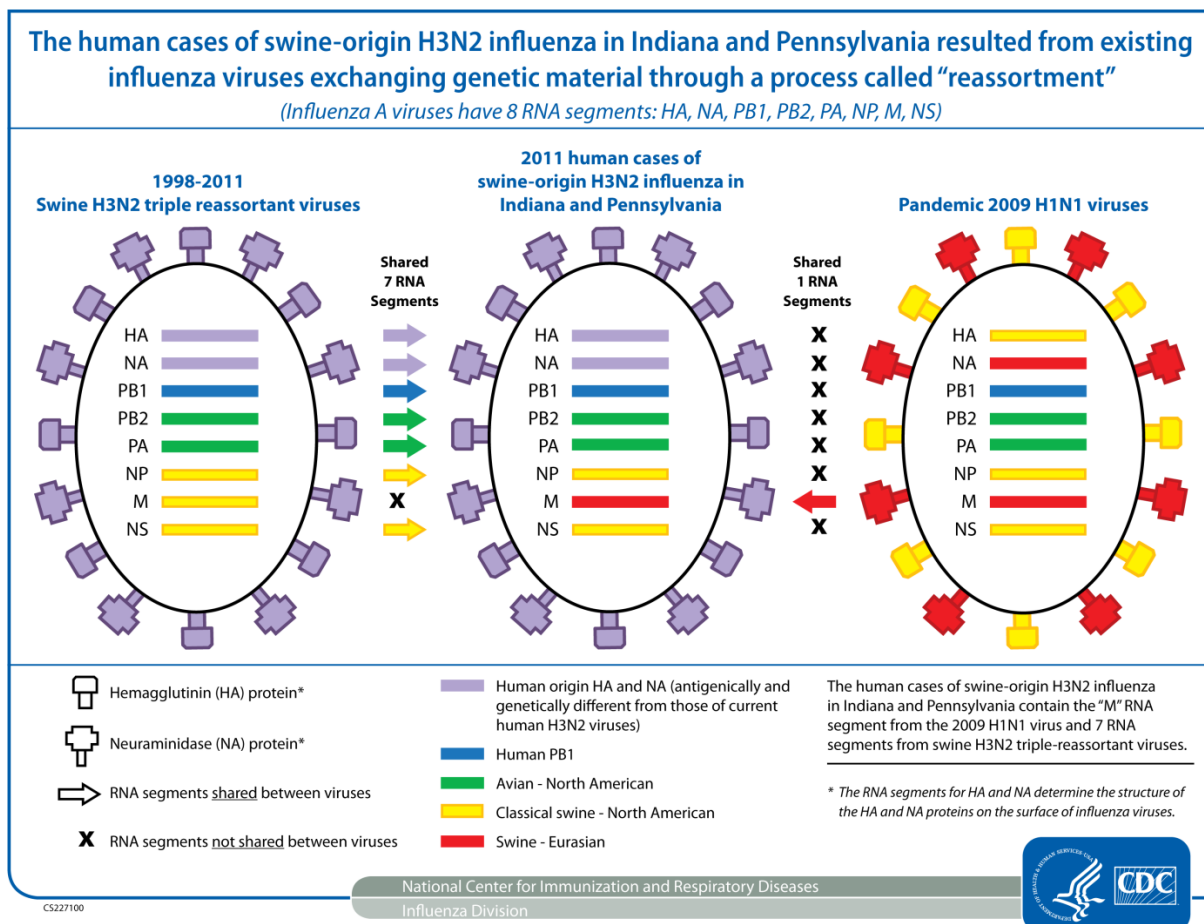
The flu, or influenza, is an acute infection of the influenza virus in the upper and lower respiratory tract that is accompanied weakness, fever, myalgia, headache and weakness (Cohen and Dolin 1). The flu is a mild ailment to the average adult, but people who have compromised or weak immune systems can often be hospitalized. Treatment for the flu is usually bed rest; in severe cases, intravenous fluids and nonsteroidal anti-inflammatory drugs (NSAIDs) are given as supportive care. A common myth is that the flu is just a bad cold, but the flu virus can be severe

and kills 36,000 people every year in the United States, and it should be taken seriously (“10 Flu Myths”).

Currently, there is no cure for the flu, so the best way to deal with the flu is not to get it in the first place. Vaccinations are available yearly to help prevent infections. Vaccinations work by infecting a person with a dormant or dead virus so that their immune system can develop antibodies. Antibodies help the immune system identify pathogens. Every year, the flu becomes resistant to the antibodies your body developed last year; therefore, you need a new flu vaccination every year. According to the CDC, only 50% of adults get a flu vaccination every flu season (Santibanez et al.). This statistic means that a large percentage of flu cases are indeed preventable.

Those unfortunate enough to catch the flu are generally just miserable for a couple of days, but complications can occur. The most significant complication that occurs in flu patients is pneumonia (Cohen and Dolin 11). Pneumonia was a very common complication during the 2009-2010 swine flu outbreak. According to *Harrison's Principles of Internal Medicine*, three types of pneumonia can result from the flu: "primary influenza viral pneumonia, secondary bacterial pneumonia, or mixed viral and bacterial pneumonia" (Cohen and Dolin 11). Extremely severe primary viral pneumonia is caused by the rapid progression of the virus and can result in a violent, bloody discharge when coughing (Cohen and Dolin 11). Less severe secondary bacterial pneumonia is caused by a secondary infection caused by bacteria, which can take advantage of the patient's weakened lungs and immune system. Mixed viral and bacterial pneumonia is the least severe and is a mixture of both viral and bacterial pneumonia. Both bacterial and mixed viral and bacterial pneumonia generally only occur in elderly adults with pulmonary issues. Viral pneumonia is the least common and has been known to appear in otherwise healthy adults.

Major complications such as pneumonia are usually caused by a form of the flu known as influenza A. The influenza virus can be categorized into three different types: influenza A, B, and C (Cohen and Dolin 1). Influenza A, the most severe of the three, is categorized into several different subtypes. Influenza A subtypes are identified by two surface proteins called hemagglutinin and neuraminidase, which can be denoted H and N (see fig. 1) (Cohen and Dolin 1). For example, the Spanish flu, the most severe flu pandemic in history, was the flu strain influenza A/H1N1. Influenza B and C types have similar H and N proteins, but they are not identified in the same manner (Cohen and Dolin 1). The swine flu in 2009 was an example of influenza A/H1N1v; influenza viruses that originate in pigs are denoted by “v” in the subtype.



**Figure 1.** How the Human Cases of A/H3N2v occur due to reassortment of genes in human and swine viruses from “13649”; *Center for Disease Control Public Health Image Library*, 2011. Image credit: <https://phil.cdc.gov/Details.aspx?pid=13469>

Humans are not the only species affected by the flu. Different strains affect different animals in the same way that the flu affects humans. Often, the flu virus can jump from one species to another. Avian and Swine influenza A viruses are capable of infecting humans by swapping gene segments with human influenza A viruses. For example, a strain of influenza A/H3N2v originated from a human virus and a swine virus that swapped gene segments (see fig. 1). Aquatic birds are the most common source of influenza A (Cohen and Dolin 6). Pigs also carry influenza A, but they are not as likely to pass them onto humans (Cohen and Dolin 6). On the other hand, swine also can more easily catch influenza A from birds and humans, so pigs can act as a bridge between human and avian forms of Influenza A (Cohen and Dolin 7). Surprisingly, the swine flu outbreak in 2009 did not exclusively come from pigs. The swine flu was an example of a quadruple gene swap between human, avian, and swine influenza A/H1N1 viruses, with the swine acting as a bridge between humans and birds.

When I arrived at the hospital with my flu virus, I was not told what type I had contracted, only that the infection had traveled from my upper respiratory tract to my lower respiratory tract, causing pneumonia. The doctors were concerned because if the virus continued to spread, I might lose the ability to breathe on my own. The physicians told my mother that I would have to stay at the hospital until they could get the infection under control. Although a nursing assistant herself, my mother was in shock because she did not think that the flu could be so severe, especially for someone as healthy as I was. I had to stay at the hospital for several days. During that time, I received several ice baths to control my fever, and I was given an IV to rehydrate me. After the virus passed, I was able to return home and go back to school.

I discovered much later that I had been a victim of the swine flu, a severe form of influenza A/H1N1v that had surfaced in 2009. If my mom had not taken me to the hospital soon enough, it is not unrealistic to say that I could have died. I learned that day that I need to get my flu shot every year, and when I have kids, to make sure they get their flu shots. The flu is not like the common cold; it can cause severe health issues and even death. Thousands of people die from the flu every year, and some of those deaths could be prevented just by getting a flu shot.

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