Introduction to Influenza

Influenza basics

Influenza, also called the flu, is an illness caused by a virus. The influenza virus infects lung cells and causes respiratory problems. The flu can be mild, severe, or even deadly, and it has a large impact on human health. For example, on average each year,

- 5 to 20 percent of Americans suffer from the flu,
- complications from the flu result in hospital stays for over 200,000 Americans, and
- flu-related effects cause the death of tens of thousands of Americans and about 500,000 people worldwide.

Symptoms of a flu infection include a high fever, extreme tiredness, muscle aches, a dry cough, a sore throat, and a stuffy nose. In people who are otherwise healthy, symptoms from the flu are usually gone after four to seven days, but they can last longer.

Occasionally, new strains of influenza emerge that cause global pandemics. A pandemic is a large-scale outbreak of an infectious disease that spreads throughout the world. In the “Spanish flu” pandemic of 1918–1919, hundreds of millions of people were infected and tens of millions of people died.

Structure of the virus

The influenza virus is simply genetic material surrounded by a membrane. Inserted like spikes in the membrane are two main proteins, hemagglutinin (H) and neuraminidase (N) (Figure 1). Influenza has eight segments of RNA that contain 11 genes. Importantly, the genetic material is RNA, not DNA. RNA is more prone to mutations than DNA.

Figure 1. Influenza virus.

Source: National Institute of Allergy and Infectious Diseases.
Types of influenza viruses

Three main types of influenza viruses exist: A, B, and C. The forms of specific proteins found in influenza determine the type. Types A and B cause the seasonal flu that sweeps across the globe every year. Type A causes some of the flu outbreaks that result in a larger number of deaths than normal. Type C causes only a mild illness and does not cause epidemics.

Each type of the virus can be further broken down into specific groups:
- Type A: Subtypes are based on forms of hemagglutinin (abbreviated H or HA; 16 forms, named H1–H16) and neuraminidase (abbreviated N or NA; 9 forms, named N1–N9). H3N2 and H1N1 are examples of subtypes. Within each subtype, different strains exist.
- Type B: There are no subtypes, but different strains exist.
- Type C: There are no subtypes, but different strains exist.

Influenza A (H1N1 and H3N2) and influenza B strains are included in each year's seasonal flu vaccine. The specific strains in the vaccine change over time, however.

Though influenza infects many humans and pigs each year, it's considered a bird disease. This is because many more subtypes and strains of influenza are found in birds than in other animals.

How do you get the flu?

The common way to get the flu is to inhale a virus from another infected person. Infected people release viruses when they cough and sneeze. You can also get the flu by touching your mouth or nose after touching something with flu viruses on it. You can start infecting other people one day before you show symptoms and continue to infect people five to seven days after you get sick. As you can imagine, this makes it very difficult to control the spread of the flu.