Fact Sheet

# Influenza:

## Influenza Virus Types

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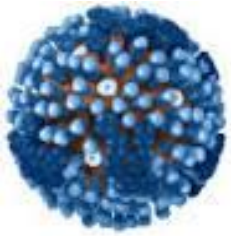

Influenza (commonly called "the flu") is a contagious respiratory illness caused by influenza viruses. Infection with influenza viruses can cause severe illness and life-threatening complications. About 5% to 20% of Americans get influenza each year, about 36,000 Americans die from it each year, and more than 200,000 Americans are hospitalized from flu-related complications each year.

There are three types of influenza viruses: A, B and C. Human influenza A and B viruses cause seasonal epidemics of disease almost every winter in the United States.

**Type A Flu Virus -**Type A flu or influenza A viruses are capable of infecting humans and animals. Wild birds commonly act as the hosts for this flu virus. The Type A flu virus is constantly changing and is generally responsible for the large flu epidemics. The influenza A2 virus (and other variants of influenza) is spread by people who are already infected.

**Type B Flu Virus -** Unlike type A flu viruses, type B flu is found only in humans. Type B flu may cause a less severe reaction than type A flu virus, but occasionally, type B flu can still be extremely harmful. Influenza type B viruses are not classified by subtype and do not cause pandemics.

**Type C Flu Virus -** Influenza C viruses are found in people. They are, however, milder than either type A or B. People generally do not become very ill from the influenza type C viruses. Type C flu viruses do not cause epidemics.

Getting a flu shot can help prevent influenza A and B, but not C.

Swine (pigs) can be infected with both human and avian (bird) influenza viruses in addition to swine influenza viruses. Infected pigs can get symptoms similar to humans, such as cough, fever, and runny nose. Because pigs are susceptible to avian, human, and swine influenza viruses, they potentially may be infected with influenza viruses from different species at the same time. If this happens, it is possible for the genes of these viruses to mix and create a new virus. For example, if a pig were infected with a human influenza and an avian influenza virus at the same time, the viruses could mix and produce a new virus. The resulting new virus could infect humans and spread from person-to-person. This type of major change in the influenza A virus is known as antigenic shift.

## Antigenic Drift and Shift

Influenza viruses are constantly changing. They can change in two different ways:

- **Antigenic Drift -** These are small changes in the genes of influenza viruses that happen continually over time as the virus replicates. These small genetic changes usually produce viruses that are pretty closely related to one another, which can be illustrated by their location close together on a phylogenetic tree. Viruses that are closely related to each other usually share the same antigenic properties and an immune system exposed to a similar virus will usually recognize it and respond. This is sometimes called cross-protection.

  But, these small genetic changes can accumulate over time and result in viruses that are antigenically different (further away on the phylogenetic tree). When this happens, the body's immune system may not recognize those viruses.

This process works as follows: a person infected with a particular flu virus develops antibodies against that virus. As antigenic changes accumulate, the antibodies created against the older viruses no longer recognize the "newer" virus, and the person can get sick again. Genetic changes that result in a virus with different antigenic properties is the main reason why people can get the flu more than one time. This is also why the flu vaccine composition must be reviewed each year, and updated as needed to keep up with evolving viruses.

- **Antigenic Shift -** Antigenic shift is an abrupt, major change in the influenza A viruses, resulting in new hemagglutinin and/or new hemagglutinin and neuraminidase proteins in influenza viruses that infect humans. Shift results in a new influenza A subtype or a virus with a hemagglutinin or a hemagglutinin and neuraminidase combination that has emerged from an animal population that is so different from the same subtype in humans that most people do not have immunity to the new (e.g. novel) virus. Such a "shift" occurred in the spring of 2009, when an H1N1 virus with a new combination of genes emerged to infect people and quickly spread, causing a pandemic. When shift happens, most people have little or no protection against the new virus.

  While influenza viruses are changing by antigenic drift all the time, antigenic shift happens only occasionally. Type A viruses undergo both kinds of changes; influenza type B viruses change only by the more gradual process of antigenic drift.

***For more sources of information on this topic visit:***
ST. CLAIR COUNTY HEALTH DEPARTMENT www.scchealth.co
MICHIGAN DEPARTMENT OF HEALTH AND HUMAN SERVICES www.michigan.gov/mdhhs
CENTERS FOR DISEASE CONTROL AND PREVENTION www.cdc.gov