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## Seasonal Influenza Fact Sheet

### Seasonal Influenza

Seasonal influenza is a highly communicable, acute viral infection that predominantly attacks the respiratory tract and sometimes the lungs. It can cause mild to severe illness and can lead to death. Up to 5 to 15 percent of the worldwide population is infected each year and approximately 250,000 to 500,000 die. More than 90 percent of deaths associated with influenza in industrialized countries occur among those 65 years of age and over.

[Overview of Seasonal Influenza](#)

Despite the severity of the illness, many people mistakenly believe that influenza is merely a severe cold. While colds and influenza share many symptoms, they are caused by different viruses and can result in different consequences for patients. Influenza-related complications can include pneumonia and dehydration, and worsening of chronic conditions, such as congestive heart failure, asthma or diabetes.

Vaccination is one of the most significant public health interventions ever implemented, sparing millions of people from complications of infectious diseases. Use of currently available vaccines has been calculated to save more than 8 million lives annually, translating to one person saved every five seconds.

### Pathogen

Proper viral influenza is caused by influenza viruses of types A and B. These viruses are about 100 nm in size and possess eight gene segments, coding, for example, for various surface glycoproteins. Influenza viruses belong to the family of the orthomyxoviruses and have a characteristic spike-like surface. These structures are formed by the viral proteins hemagglutinin (HA) and neuraminidase (NA). There are 16 different forms of HA and nine different NAs. The subtypes of influenza A virus are named on this basis, e.g. A/H1N1. There are no subtypes of influenza B.

[Types of influenza virus](#)

### Antigen drift and antigen shift

Influenza viruses show great genetic variation. Frequent point mutations lead to new variants of the genes HA and NA (antigen drift). Therefore, slightly modified viruses lead to so-called drift variants in each influenza

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season. For this reason, new vaccines must be prepared every year which are adapted to the new circulating viruses. Moreover, drift variants may also occur within the period from the WHO recommendation to the actual influenza season (when the vaccine is actually used). The WHO announces the viral strains for the new composition of the vaccine nine to twelve months before the new influenza. This is partly because of the time needed to produce the vaccines.

New vaccines must be developed each year to account for variations in influenza virus

On the other hand, the expression antigen shift is used when a virus with a new gene combination (subtype; new combination of HA and NA) appears. This is caused by “reassortment”. As the individual gene segments of the virus can be freely combined, new types can arise when a cell is simultaneously infected with viruses of two different subtypes.

### Surveillance

The WHO Global Influenza Surveillance Network is responsible for epidemiological and virological surveillance, and for recommending twice annually the content of the influenza vaccine for the subsequent influenza season. More than 250 million doses of influenza vaccine are produced annually which contain the WHO recommended influenza strains.

At the international European level, the European Influenza Surveillance Scheme (EISS) and the European Center for Disease Control (ECDC) are responsible for virological and epidemiological surveillance. In collaboration with other organizations, such as the WHO, and the reference centers of different countries, they observe the international monitoring of influenza activity. On the basis of these data, it is decided, for example, which influenza variants should be used in the composition of the vaccine for the coming season.

### Infection

Influenza viruses are transferred from person to person by droplet infection, for example, by coughing or sneezing. Transmission is also possible if the hands pass over the mouth or nose after contact with a virus-contaminated surface, for example, after shaking hands.

Influenza virus is spread by droplet infection, and contact with any virus-contaminated surface may cause transmission

The viruses first infect the mucus membranes of the upper respiratory tract. The influenza virus then adheres through its surface protein hemagglutinin (HA) to specific receptors on the mucus membrane cell.

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In this way, the virus reaches the interior of the host cell, where it releases its genetic information, in order to initiate the reproduction of the virus components. The newly formed virus components are assembled to give many new viruses, which then leave the host cell, which is destroyed by the replication process. A second surface protein of the influenza virus, the neuraminidase (NA), is an enzyme which permits the release of the newly formed viruses from the host cell. In this way, a large number of additional mucus membrane cells in the respiratory tract can be attacked by many newly formed influenza viruses. There is then a risk that the viruses gradually pass through the trachea into the lungs and that lung tissue is inflamed (primary influenza pneumonia). Inflammation of the heart (myocarditis) or of the brain (encephalitis) is also possible. The damage to the mucus membranes favors the penetration of additional pathogens (bacteria) and this can often lead to serious secondary infection.

Influenza virus may also cause inflammation of the heart and brain

The incubation period for influenza is very brief, being one to three days. The patient is infectious even one to two days before he falls ill and for about a week afterwards. Small children eliminate the virus for up to two weeks and are therefore a long-term source of infection in their environment.

### Typical influenza symptoms

- Sudden high fever, often over 39° C, with chills
- Pain in the muscles, head and limbs, with tiredness, exhaustion and feeling of weakness
- Sore throat and difficulty in swallowing
- Dry cough, frequently with viscous phlegm

Despite the severity of the illness, many people mistakenly believe that influenza is merely a severe cold. While colds and influenza share many symptoms, they are caused by different viruses and can result in different consequences for patients. Influenza-related complications can include pneumonia and dehydration, and worsening of chronic conditions, such as congestive heart failure, asthma or diabetes.

Sudden fever, muscle pain, sore throat, and cough are typical symptoms of seasonal influenza

### Influenza therapy

Therapy is usually symptomatic. Antibiotics are used for the treatment of bacterial super-infections. Chemoprophylaxis (neuraminidase

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inhibitor) may, under some circumstances be desirable for subjects at high risk. Older people, the chronically ill and children with prior diseases or impaired immune systems are at risk from influenza or the frequent resulting complications.

While therapy is usually symptomatic, antibiotics are generally used for the treatment of infections

### **Influenza vaccination**

The annual influenza vaccination is the only preventive measure which can reduce the morbidity and mortality in all age groups. Autumn (September to November) is the ideal time for vaccination. Vaccination protection is built up over two weeks after vaccination.

Annual vaccination is the only preventative measure effective for all age groups

Vaccination is one of the most significant public health interventions ever implemented, sparing millions of people from complications of infectious diseases. Use of currently available vaccines has been calculated to save more than 8 million lives annually, translating to one person saved every five seconds.

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