

# INFLUENZA

- Influenza or 'flu' is a viral infection that mainly affects the nose, throat and lungs.
- Flu epidemics occur when the number of cases are in excess of normal expectancy. Epidemics on a global scale are termed pandemics.
- Good hygiene practices such as correct hand washing are essential to help prevent the spread of flu.

## AN OVERVIEW OF INFLUENZA

Birds and mammals are natural hosts of flu viruses. Different strains cause disease in humans, poultry and pigs; each type of virus is adapted to cause infection in its host. If flu viruses are passed back and forth between hosts (e.g. through close human contact with infected animals) the mixing can lead to development of a novel strain. There are three types of influenza virus: A, B and C, with A and B responsible for most human clinical infections. Influenza A is responsible for most cases of seasonal flu and epidemics that occur.

The flu virus infects the cells lining the respiratory tract and has an incubation period of 1–3 days following infection. Symptoms of disease include fever, chills, fatigue, coughing, and in some cases, vomiting and diarrhoea. Most, otherwise healthy, people recover from flu in less than 2 weeks. More serious illness, and even death, can result from secondary infections, e.g. bacterial pneumonia.

## TRANSMISSION

Flu viruses are transmitted from person to person by sneezing and coughing or by touching virus-contaminated surfaces such as door handles. The Health Protection Agency (HPA) advises the following steps to help reduce the spread of infection:

- sneezing into a tissue
- washing hands frequently
- putting dirty tissues in the bin quickly
- frequent cleaning of hard surfaces

Groups at risk of serious illness from influenza include older people, children under 6 months of age and those with chronic health conditions such as respiratory or cardiac disease or immunosuppression.

## IMPACT ON THE POPULATION

In the UK, most cases of seasonal flu occur over an 8–10 week period during the winter months. The timing, severity and number of cases are unpredictable and vary each year. The number of people susceptible to infection depends on what proportion of the population show immunity to the circulating flu strains through either previous exposure or vaccination.



Computer artwork of the avian influenza virus. iStockphoto.com

## TREATMENT

The recommended treatment for flu for healthy individuals is bed rest and a high fluid intake. Remedies containing paracetamol or ibuprofen will help ease symptoms such as a high temperature and muscle pain. Antibiotics are *NOT* effective against viruses such as influenza, but can be prescribed to treat secondary bacterial infections that arise as complications.

Patients in at-risk groups may be prescribed antiviral medication to reduce their risk of developing serious complications. Antiviral medications such as oseltamivir (Tamiflu™) and zanamivir (Relenza™) can reduce the length of symptoms by about a day and usually lessen their severity. Ideally, antivirals must be taken within 48 hours of the onset of symptoms to be effective.

## VACCINES

Vaccines comprise inactivated strains of influenza virus or their purified surface molecules. Vaccines stimulate the immune system to make antibodies that recognize and target specific flu viruses. Seasonal flu vaccines are produced each year for the UK by seven international manufacturers, and contain three flu strains predicted to be the most prevalent in the upcoming flu season. Seasonal flu vaccines offer up to 80% protection for one flu season. The level of protection depends on how well vaccine strains are matched to circulating strains. The seasonal flu vaccination programme usually begins in late September and currently (2011) targets the following at-risk groups:

- People aged 65 and over
- Pregnant women
- People with chronic health conditions such as asthma or diabetes
- People living in long-stay care facilities
- Front-line health and social care workers
- Carers

## VIRUS EVOLUTION

The influenza virus is prone to genetic mutation. If mutations change the shape of the virus's surface molecules, the virus will no longer be recognized by the host's immune system and may cause infection. This process is known as antigenic drift.

If more than one strain of influenza A infects the same cell, segments of their genetic material may recombine to produce viruses that have entirely new surface molecules. This is known as antigenic shift and results in novel influenza strains. Novel strains can spread rapidly and can cause widespread epidemics – or even a pandemic if populations have little or no immunity to that strain.

## GLOBAL SURVEILLANCE

The World Health Organization (WHO) Global Influenza Surveillance Network monitors changes in flu viruses around the world and recommends twice a year which strains should be included in upcoming seasonal flu vaccines for the northern and southern hemispheres. The Network also provides an alert system for the emergence of new flu strains that have the potential to cause a pandemic.

## CURRENT RESEARCH

Research is being undertaken to develop our understanding of flu viruses and their interactions with host organisms. Areas include:

- Developing a universal flu vaccine that will protect against all strains of flu.
- Establishing a global map of influenza A hot spots.
- Understanding the factors required for novel human virulent flu strains to arise.
- Identifying the viral and human factors that influence the severity and outcome of flu infection.
- Increasing the efficiency of influenza surveillance systems through advances in genome sequencing, mathematical modelling and communication systems.

## SGM BRIEFINGS

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