

# Influenza



Influenza is a virus that causes respiratory infection and infects five to 10 per cent of adults globally each year. This is called seasonal influenza and usually occurs in the winter months.

In older adults and people with certain pre-existing medical conditions, influenza infections can lead to serious and even life threatening complications. Pandemic influenza can arise if a new strain emerges that is easily transmissible from person to person in a population that has no immunity to the new pandemic influenza strain. The timing and severity of pandemic influenza is unpredictable. While annual vaccination protects most individuals, a one-shot, lifelong vaccine remains elusive due to the constant change in circulating strains. Seasonal influenza is a major economic burden due to healthcare costs, absenteeism and loss of productivity.

## Influenza prevention and treatment

### Prevention

- Annual vaccination protects most, but not all individuals
- The optimum time to be vaccinated is in late autumn so the body's immune response is strongest during the influenza season (winter months)
- Vaccination is required annually because circulating strains are continually changing

### Treatment

- Symptomatic (paracetamol/cough suppressants) or specific, influenza antiviral drugs
- Drugs that limit the replication of influenza A and B viruses and shorten the length of illness, known as 'neuraminidase inhibitors', are generally only available by prescription from a doctor e.g. Oseltamivir (Tamiflu) and Zanamivir (Relenza)

## The A, B and C of influenza

There are three main strains of influenza:

- A** There are many different subtypes of influenza A; two of these, A(H1N1) and A(H3N2), circulate each influenza season  
  
Other influenza A subtypes occasionally infect humans and animals e.g. bird flu A(H5N1)
- B** Influenza B viruses only infect humans, commonly children  
  
Two distinct but related B lineages are in circulation – B/Victoria and B/Yamagata
- C** Influenza C causes far fewer infections than influenza A or B and is not a major public health concern

## The Doherty Institute's expertise

Influenza is a major focus for the Peter Doherty Institute for Infection and Immunity (Doherty Institute), with a broad spectrum of activities spanning surveillance, epidemiology and discovery research.

### Surveillance

The Doherty Institute is home to the World Health Organization (WHO) Collaborating Centre for Reference and Research on Influenza, headed by Professor Kanta Subbarao, a world leading virologist who joined the Institute from the National Institutes of Health in the United States. Four other Collaborating Centres exist globally in London, Atlanta, Beijing and Tokyo. The

Approximately **five to 10 per cent of adults** and **20 to 30 per cent of children** affected worldwide annually

# Influenza



The WHO Collaborating Centre for Reference and Research on Influenza monitors circulating influenza viruses around the world.

**250,000**  
to  
**500,000**  
deaths each  
year globally

Institute is also home to a National Influenza Centre (NIC) and both centres are part of a WHO global system called Global Influenza Surveillance and Response System, which monitors circulating influenza viruses around the world. WHO collects all the data, and on a biannual basis makes a recommendation on which influenza strains should be included in the vaccine for the upcoming seasons in both the Northern and Southern Hemispheres.

## Epidemiological analysis

The Doherty Institute's Epidemiology unit is supported by the Victorian Government to operate a statewide, general practitioner sentinel surveillance program. The data are used to monitor influenza epidemiology in the community and assess influenza vaccine effectiveness annually.

## Research

The Doherty Institute has an extensive research program encompassing many different aspects of influenza, including the molecular mechanisms that underpin the

disease (virology and pathogenesis), how the body responds to influenza infection (immunology and vaccine development) and the impact of infection and vaccination on the human population (epidemiology).

Several staff members at the Doherty Institute are part of a National Health and Medical Research Council (NHMRC) Program Grant 2015 – 2019, *Limiting the impact of Influenza*, which addresses several broad themes including understanding immune system responses to influenza and developing novel influenza vaccine strategies.

A joint laboratory with Fudan University in Shanghai, headed by the University of Melbourne's Professor Katherine Kedzierska, has a strong interest in influenza and related complications of severe disease. Together with Associate Professor Steven Tong, a Royal Melbourne Hospital clinician researcher, Katherine also heads a program understanding influenza in Indigenous populations.

Statistics sources: World Health Organization

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