

Updated February 2011

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07

Influenza

NOTIFIABLE

Introduction

Influenza is an acute illness of the upper and/or lower respiratory tracts. It is usually self-limited, with recovery in 2-7 days, but it can be severe. It affects all age groups and is characterised by the abrupt onset of fever, headache, myalgia, cough, sore throat and malaise.

Epidemiology

Influenza is highly infectious, spreading rapidly especially in institutions. It is a segmented, single-stranded RNA virus of the family orthomyxoviridae. There are three types of influenza virus: A, B and C. The first two types are responsible for most clinical illnesses. Influenza A viruses can infect a wide range of animal and avian species. Two surface antigens make these viruses antigenically labile. These are haemagglutinin antigen (H: 15 different types) and neuraminidase (N: 9 different types), although only H1, H2, H3, N1 and N2 have been implicated in widespread human infection.

Influenza A undergoes two kinds of antigenic mutation due to changes in these surface antigens. Minor changes, due to point mutations in the haemagglutinin antigen, termed 'antigenic drift' are seen progressively from season to season, and this is the reason why the vaccine composition changes each year. Major changes, termed 'antigenic shift', occur periodically and can result in the introduction of virtually novel viruses, with a different haemagglutinin, into a population, facilitating pandemic spread with the potential for severe morbidity and high mortality. Mutations only rarely occur in influenza B.

Antigenic variation results in the circulation of viruses to which a given population may have little immunity, accounting for the high attack rates commonly seen in influenza outbreaks.

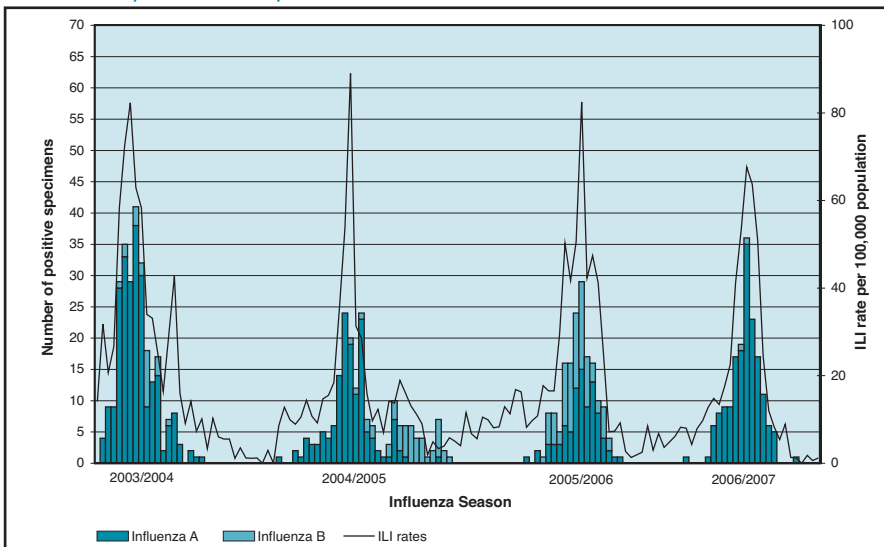
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Influenza outbreaks occur virtually every year (Fig 7.1), although the extent and severity of the outbreaks vary widely. Localised outbreaks occur at variable intervals, usually once every 1-3 years. In some outbreaks, influenza B viruses circulate simultaneously with influenza A viruses. Although pandemics provide the most dramatic evidence of the impact of influenza overall, outbreaks that occur between pandemics account for greater mortality and morbidity, although over a longer period of time. Since 1977 influenza A (H1N1), influenza A (H3N2) and influenza B viruses have been in circulation.

There is increasing concern regarding the emergence and distribution of the highly pathogenic avian influenza (H5N1) and the potential for the emergence of a new pandemic strain. Human infections have occurred but predominantly only in those in close contact with infected poultry. Efficient person-to-person transmission, a pre-requisite for a pandemic strain, has not yet been documented.

Influenza A epidemics begin abruptly, reach a peak over a 2-3 week period, generally last for 2-3 months and often subside as rapidly as they began. Epidemics begin almost exclusively during the winter months. A major determinant of the extent and severity of an outbreak is the level of immunity in the population, although all the factors that result in epidemics are not fully understood.

Figure 7.1 Influenza-like illness (ILI) rate per 100,000 population and the number of positive influenza specimens detected by the NVRL during the 2003/2004, 2004/2005, 2005/2006 & 2006/2007 seasons. Source: HPCS



Effects of Influenza

Influenza outbreaks result in significant morbidity in the general population. In those with chronic underlying disease, especially the elderly, complications are common and hospitalisation rates high. Eighty to 90% of reported deaths from influenza occur in the elderly, mainly from bacterial pneumonia, but also from the underlying disease.

Primary influenza A pneumonia is uncommon and is characterised by the abrupt onset of a rapidly progressive diffuse pneumonia with pulmonary haemorrhage which is often fatal. The frequency of overt pulmonary involvement in influenza A infection is age dependent: 4% in those 10-39 years, 36% in those aged 60-69 years and to 73% in those 70 years of age or older.

Severe influenza can be complicated also by encephalitis or meningoencephalitis.

Transmission

Influenza is spread from person to person by direct contact, by droplet infection or by contact with materials recently contaminated by nasopharyngeal secretions. Airborne spread can also occur. It is highly contagious, especially in close contact environments such as homes for the elderly. Virus can be detected in respiratory secretions from just before the onset of clinical illness to 4-5 days after symptom onset. Shedding can be more prolonged in young children and in the immunocompromised.

Influenza vaccine

A vaccine, recommended by WHO, is prepared each year, using virus strains similar to those considered most likely to circulate in the forthcoming season. Current vaccines are trivalent, containing antigens from two type A and one type B virus strains.

The virus is egg-grown, inactivated with formalin, and 'split-virus' or subvirion; preparations are made using solvents or detergents. 'Surface antigen' vaccines containing highly purified preparations of viral neuraminidase and haemagglutinin antigens are also available. Whole-virus, split-virus (subvirion), and surface-antigen vaccines are of equivalent efficacy but the latter two are less likely to induce febrile reactions in children. All are supplied in a prefilled syringe.

Currently available inactivated influenza vaccines provide 70-90% protection against influenza in persons under 65 years of age. Protective

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efficacy against infection is lower in the elderly. However, morbidity and mortality in the elderly are significantly reduced. Protection lasts about 1 year. Annual vaccination with the most recent strains is recommended. The vaccines should be stored at 2-8°C and protected from light. They should be allowed to reach room temperature and shaken well before they are given.

The World Health Organization monitors the strains of influenza circulating every year.

The Department of Health and Children and the HSE advise on the appropriate vaccine for annual use each year, based on WHO recommendations.

Remember annual immunisation is necessary. Ideally, give in September/October each year but can be given throughout the year. (Antibodies may take up to 10-14 days to reach protective levels so give early.)

Children under 9 years of age require two doses of vaccine, separated by 4-6 weeks, if receiving the vaccine for the first time.

Indications

Vaccination is recommended for:

1. Those older than 6 months of age who are at increased risk of influenza-related complications including the following groups:
 - a) **Persons aged 50 years or older**
 - b) Those with chronic illness requiring regular medical follow-up (e.g. chronic respiratory disease, including cystic fibrosis, moderate or severe asthma, chronic heart disease, bronchopulmonary dysplasia, diabetes mellitus, haemoglobinopathies, chronic renal failure, **chronic liver disease, chronic neurological disease including multiple sclerosis, hereditary and degenerative disorders of the central nervous system**)
 - c) Immunosuppression due to disease or treatment, including asplenia or splenic dysfunction
 - d) Children on long-term aspirin therapy (because of the risk of Reyes Syndrome)

- e) Children with any condition (e.g. cognitive dysfunction, spinal cord injury, seizure disorder, or other neuromuscular disorder) that can compromise respiratory function **especially those attending special schools/ day centres**
 - f) **Those with morbid obesity i.e. Body mass index equal to or over 40**
 - g) Residents of nursing homes, old people's homes, and other long-stay facilities where rapid spread is likely to follow introduction of infection
2. Those likely to transmit influenza to a person at high risk for influenza complications (including household contacts and out-of-home care givers)
 3. Health-care workers, both for their own protection – as these are a group likely to come in contact with influenza during outbreaks – and for the protection of their patients (see Chapter 18)
 4. **People who have close, regular contact with pigs, poultry or water fowl**
 5. **All pregnant women at any stage of pregnancy.** Studies indicate that pregnancy may increase the risk of complications from influenza (especially H1N1 disease) because of the alterations in heart rate, lung capacity, and immunological function. It is estimated that immunisation could prevent 1-2 hospitalisations per 1,000 pregnant women. Because influenza virus vaccine is not a live vaccine it is considered very safe in pregnancy.

Addition to indication 1 (b) and 1 (e). Addition of indication 1 (f). Change to indication 4. Updated February 2011 Change to indication 5 . Updated September 2011

Dose and route of administration

As dose recommendations for children can vary between products please consult the individual data sheets.

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Table 7.2 Dose and route of administration of influenza vaccine

Age group	Dose
Children 6 months to <9 years	A single injection of 0.5 ml IM. If receiving influenza vaccine for the first time, 2 doses are required; the second dose should be given 4 weeks after the first dose.
Adults and children ≥ 9 years	A single injection of 0.5 ml IM
Immunosuppressed people ≥ 6 months	A single injection of 0.5 ml IM If receiving influenza vaccine for the first time, 2 doses are required; the second dose should be given 4 weeks after the first dose.

Table 7.2 changed. Update September 2011

- The deltoid muscle is the recommended site for adults and older children.
- The anterolateral thigh may be used for infants and young children.
- Antibody levels take from 10-14 days to rise.
- The ideal time for immunisation is before the influenza season, i.e. from September to October. Note: if travelling to the southern hemisphere check Chapter 19.

Influenza vaccine may be given at the same time, but at a different site, as pneumococcal vaccine.

Anyone may choose to have the 'flu vaccine.

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Contraindications

Anaphylaxis following a previous dose of influenza vaccine or any of its constituents (other than ovalbumin – see precautions)

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Precautions

1. Acute severe febrile illness, defer until recovery
2. Egg allergy: Those with confirmed egg anaphylaxis and non-anaphylactic egg allergy can be given an influenza vaccine with an ovalbumin content $<0.06\mu\text{g}$ per dose-see Table 7.3. Vaccines with ovalbumin content equal to or more than $0.06\mu\text{g}$ per dose or where content is not stated should not be used in egg-allergic individuals

Table 7.3 Influenza vaccination for those with egg allergy

History	Recommendation
Non-anaphylactic egg allergy without severe asthma (BTS/SIGN <4)	Seasonal influenza vaccine with ovalbumin content $<0.06\mu\text{g}$ per dose, in primary care, with observation for 60 minutes
Egg anaphylaxis or egg allergy and severe asthma (BTS/SIGN >4)	Refer to hospital specialist for vaccination with seasonal influenza vaccine with ovalbumin content $<0.06\mu\text{g}$ per dose. Skin testing is <u>not</u> necessary and vaccine should be given as a single dose with observation for 60 minutes

NB: As for all vaccinations, facilities should be available and staff trained to recognise and treat anaphylaxis

3. Co administration with PCV 13: Vaccine safety data from the United States earlier in 2011 reported a small but increased risk of febrile convulsions among children aged 12-23 months who received PCV13 at the same time as inactivated influenza vaccine used in the 2010-2011 season (risk approximately 1 in 1,640 vaccinees).

Therefore, for the 2011-2012 influenza season for children aged 12-23 months of age who are recommended influenza vaccine, consideration may be given to separating PCV13 and seasonal influenza vaccines by an interval of at least one week to decrease the risk of febrile seizures occurring.

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Adverse reactions

Local: Soreness and redness around the vaccination site occurs in up to one-third of people.

General: Injectable influenza vaccines contain inactivated virus and cannot cause influenza.

- Fever, malaise and myalgia commencing 6-12 hours after immunisation and lasting for about 48 hours, occur rarely.
- Immediate reactions such as urticaria, angio-oedema, bronchospasm, and anaphylaxis occur very rarely. Such reactions are most likely due to hypersensitivity to the egg protein.
- Guillian Barré syndrome has on rare occasions been temporally associated with influenza vaccination.

Antiviral agents

If considering using antivirals check the HPSC website to discover whether influenza is circulating and only use antivirals if this is confirmed. Antivirals such as neuraminidase inhibitors can be used for treatment and prophylactic purposes during influenza epidemics. People who may be considered for prophylaxis include:

- Unimmunised patients in the 'at risk' groups, including health-care workers, for 2 weeks while the vaccine takes effect
- At-risk patients, who had an anaphylactic reaction to egg, for the duration of an outbreak
- Control of influenza outbreaks in a closed setting such as institutions with high-risk individuals
- Protection of immunocompromised children who may not respond to vaccine.

Antiviral agents are not a substitute for immunisation for the control and prevention of influenza.

Influenza surveillance

The Health Protection Surveillance Centre in partnership with the Irish College of General Practitioners (ICGP) and the National Virus Reference Laboratory (NVRL) have established a network of 52 computerised sentinel practices who report on a weekly basis the number of patients seen with influenza-like illness. Virological confirmation by the NVRL is required to identify that influenza is the causative virus, with classification of type and sub-type.

A weekly influenza report, including clinical and virological data, is compiled throughout the influenza season, from October to May. Since the 2005/2006 season there has been reporting during the inter-season period, of clinical data on a weekly basis, virological data on a fortnightly basis, and monthly surveillance reports are produced. Reports of worldwide influenza activity are also provided as part of the overall monitoring of influenza activity.

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