19

Influenza

The disease

Influenza is an acute viral infection of the respiratory tract. There are three types of influenza virus: A, B and C. Influenza A and influenza B are responsible for most clinical illness. Influenza is highly infectious with a usual incubation period of one to three days.

The disease is characterised by the sudden onset of fever, chills, headache, myalgia and extreme fatigue. Other common symptoms include a dry cough, sore throat and stuffy nose. For otherwise healthy individuals, influenza is an unpleasant but usually self-limiting disease with recovery usually within two to seven days. The illness may be complicated by (and may present as) bronchitis, secondary bacterial pneumonia or, in children, otitis media. Influenza can be complicated by meningitis, encephalitis or meningoencephalitis. The risk of serious illness from influenza is higher amongst children under six months of age (Poehling *et al*., 2006; Ampofo *et al*., 2006 and Coffin *et al*., 2007), older people (Thompson *et al*., 2003 and 2004) and those with underlying health conditions such as respiratory or cardiac disease or immunosuppression (O'Brien *et al*., 2004; Nicoll *et al*., 2008 and Pebody *et al*., 2010). Primary influenza pneumonia is a rare complication that may occur at any age and carries a high case fatality rate (Barker and Mullooly, 1982). Serological studies in healthcare professionals have shown that approximately 30 to 50% of influenza infections can be asymptomatic (Wilde *et al*., 1999) but the proportion of influenza infections that are asymptomatic may vary depending on the characteristics of the influenza strain.

Transmission is by aerosol, droplets or through direct contact with respiratory secretions of someone with the infection (Lau *et al*., 2010). Influenza spreads rapidly, especially in closed communities. Most cases in the UK tend to occur during an eight- to ten-week period during the winter. The timing, extent and severity of this ‘seasonal’ influenza can all vary. Influenza A viruses cause outbreaks most years and it is these viruses that are the usual cause of epidemics. Large epidemics occur intermittently. Influenza B tends to cause less severe disease and smaller outbreaks, although in children the severity of illness may be similar to that associated with influenza A.

Changes in the principal surface antigens of influenza A – haemagglutinin and neuraminidase – make these viruses antigenically labile. Minor changes (antigenic drifts) occur progressively from season to season. Major changes (antigenic shifts) occur periodically, resulting in the emergence of a new subtype with a different haemagglutinin protein. A new subtype of virus can cause widespread epidemics or even a pandemic if populations have little or no immunity to it.

Three influenza pandemics occurred in the last century (in 1918, 1957 and 1968). The first influenza pandemic of this century was declared by the World Health Organization (WHO) in June 2009. This was caused by an influenza A(H1N1)v virus. Characteristics of this influenza A(H1N1)v strain were high rates of illness in children and young adults and low rates of illness in adults aged 60 years and older (Writing Committee of the WHO Consultation on Clinical Aspects of Pandemic (H1N1) 2009 Influenza, 2010). For most, the disease was mild. Symptoms were similar to those of seasonal influenza, although gastrointestinal symptoms (vomiting and diarrhoea) were more commonly reported than is usual for seasonal influenza. There were fewer than 500 confirmed deaths from influenza A(H1N1)v in the UK with an overall estimated case fatality ratio of 0.4 per 1000 clinical cases (95% confidence limits 0.2 to 1 per 1000 clinical cases) (Pebody *et al*., 2010). Most of the serious complications arising from influenza A(H1N1)v infection occurred in people with underlying health conditions, with the highest mortality rates in those with chronic neurological disease, respiratory disease and immunosuppression (Pebody *et al*., 2010). Pregnant women were also at increased risk of complications (Jamison *et al*., 2009). However, a significant proportion of serious complications arose in people who had been healthy (Writing Committee of the WHO Consultation on Clinical Aspects of Pandemic (H1N1) 2009 Influenza, 2010). The influenza A(H1N1)v continued to cause widespread illness during the 2010/11 influenza season. Despite the recent emergence of the influenza A(H1N1)v strain, conditions still exist for the emergence of future influenza strains with potential to lead to another pandemic.

Influenza B viruses are also subject to antigenic drift but with less frequent changes.

History and epidemiology of the disease

Influenza activity is monitored in the UK through reports of new consultations for influenza-like illness from sentinel GP practices, combined with virological surveillance. Weekly reports are collated by the Health Protection Agency (HPA). Information for England is provided by the Royal College of General Practitioners, for Scotland by Health Protection Scotland, for Wales by the

National Public Health Service (Wales) and for Northern Ireland by the Northern Ireland Public Health Agency.

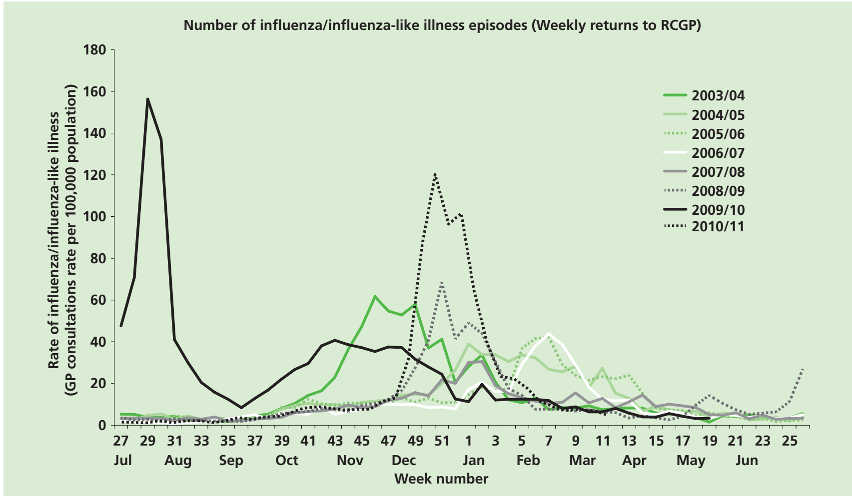


Figure 19.1 Rate of influenza/influenza-like illness episodes in England (weekly returns to Royal College of General Practitioners), 2003–04 to 2010–11. The data show that for seven of the last eight years the influenza season occurred between weeks 37 and 15 but the timing and shape of the peak of influenza activity varied within that time window between years. Much of the influenza A(H1N1)v pandemic activity was outside that time window, demonstrated by the non-seasonal peak at week 29 in 2009/10. Data for 2009/10 may underestimate the extent of influenza-like illness due to the introduction of the National Pandemic Flu Service in England during 2009.

Official estimates of the number of deaths from influenza are produced by the HPA. These are inferred from the number of all-cause death registrations in winter that are above an expected level. However, as the cause of deaths is not examined directly, deaths above the expected level may include causes other than influenza and, if the number of flu-attributable deaths is small, any excess may not be detected (ND). Estimates of excess winter deaths potentially attributable to influenza in recent years in England and Wales range from ND (in 2005-6 and 2006-7) to 10,351 (in 2008-9). The highest estimate in the past two decades was 21,497 for the 1999-2000 influenza season (Donaldson *et al*. 2010). The HPA also collects data on deaths of individuals with a laboratory confirmed influenza infection where influenza contributed to the death. Whilst it is not possible to ascertain all fatal cases where influenza was involved, investigation of such cases allows assessment of the characteristics of people most severely affected by influenza, including age, clinical risk factors and vaccination status.

Influenza immunisation has been recommended in the UK since the late 1960s, with the aim of directly protecting those in clinical risk groups who are at a higher risk of influenza associated morbidity and mortality. In 2000, the policy was extended to include all people aged 65 years or over. Uptake of seasonal influenza vaccination in those aged 65 years or over and in those aged under 65 years in a clinical risk group in the UK is shown in Table 19.1.

Table 19.1 Trivalent seasonal influenza vaccine uptake in the UK since the start of the influenza immunisation programme for people aged 65 years or over and, in brackets, aged under 65 years in a clinical risk group (end of influenza vaccination season estimates).

Year	England (%)	Scotland (%)	Wales (%)	Northern Ireland (%)
2000–01	65.4	65	39	68
2001–02	67.5	65	59	72
2002–03	68.6	69	54	72.1 (55.8)
2003–04	71.0	72.5	63	73.4 (63.8)
2004–05	71.5 (39.9)	71.7 (39.3)	63	72.7 (65.2)
2005–06	75.3 (48.0)	77.8 (46.3)	68	80.9 (80.9)
2006–07	73.9 (42.1)	75.2 (37.8)	/*	75.1 (71.2)
2007–08	73.5 (45.3)	74.3 (44.4)	64	75.7 (68.3)
2008–09	74.1 (47.1)	76.3 (47.8)	60 (41)	76.8 (74.0)
2009–10	72.4 (51.6)	75.0 (53.4)	64 (49)	77.0 (80.0)
2010–11	72.8 (50.4)	75.3 (56.1)	65.8 (48.6)	74.9 (78.7)

* Data not available.

The influenza vaccination

Because of the changing nature of influenza viruses, WHO monitors the epidemiology of influenza viruses throughout the world. Each year it makes recommendations about the three strains to be included in vaccines for the forthcoming winter for the northern and southern hemispheres (www.who.int/csr/disease/influenza).

Influenza vaccines are prepared using virus strains in line with the WHO recommendations. Current seasonal influenza vaccines are trivalent, containing two subtypes of influenza A and one type B virus. In recent years, these have closely matched viruses circulating during the subsequent influenza season.

If a new influenza A subtype were to emerge with epidemic or pandemic potential (as occurred in 2009 with influenza A(H1N1)v), it is unlikely that the seasonal influenza vaccine will be well matched to the emerging strain. This was clearly demonstrated in 2009/10 when the seasonal influenza vaccine was poorly

matched to the predominant influenza A(H1N1)v strain. In these circumstances, as in the 2009 pandemic, a monovalent vaccine against that strain will be developed and implemented.

All licensed seasonal influenza vaccines need to meet immunogenicity, safety and quality criteria set by the European Medicines Agency (EMA), with the assessment of efficacy based on meeting or exceeding indicated requirements in serological assessments of immunogenicity (EMA, 1997). Trivalent seasonal influenza vaccines have been found to give around 60-70% protection against infection when influenza virus strains in the vaccine are well matched with those in circulation (Fleming *et al*., 1995 and 2010). Protection afforded by the vaccine is known to last for at least one influenza season, although the level of protection provided in subsequent seasons is uncertain. In the elderly, protection produced by the vaccine may be less (Fleming *et al*., 2010), although immunisation has been shown to reduce the incidence of severe disease including bronchopneumonia, hospital admissions and mortality (Wright *et al*., 1977; Mangtani *et al*., 2004).

After immunisation, antibody levels may take up to 10 to 14 days to reach protective levels. Although influenza activity is not usually significant before the middle of November, the influenza season can start early (as it did in 2003–04), and therefore the ideal time for immunisation is between September and early November.

Manufacture of seasonal influenza vaccines is complex and conducted to a tight schedule, constrained by the period between the announcement of the WHO recommendations and the opportunity to vaccinate before the influenza season. Manufacturers may not be able to respond to unexpected demands for vaccine at short notice.

All the seasonal influenza vaccines available in the UK for the 2011/12 influenza season are inactivated, do not contain live viruses and therefore cannot cause influenza. Most are administered by intramuscular injection, although one vaccine (Intanza®) is administered by the intradermal route. Although a live attenuated intranasal vaccine (Fluenz®) has been licensed by the EMA recently, this vaccine will not be marketed in the UK for the 2011/12 influenza vaccination season. Most, if not all, of the vaccines are prepared from viruses grown in embryonated hens' eggs. The trivalent seasonal influenza vaccines available in the UK for the 2011/12 influenza vaccination season are listed in Table 19.4.

One influenza vaccine contains trace levels of thiomersal left over from the manufacturing process. Other than a risk of localised hypersensitivity, levels of thiomersal in vaccines are not associated with any harm, including in children,

pregnant women and their offspring. In 2003, the Committee on Safety of Medicines concluded that the balance of benefits and risks of thiomersal-containing vaccines remains overwhelmingly positive (CSM, 2003). In 2004, the European Agency for the Evaluation of Medicinal Products also concluded that studies showed no association between vaccination with thiomersal-containing vaccines and specific neurodevelopmental disorders (EMEA, 2004). A more recent study has also shown no association between neuropsychological functioning at the age of seven to ten years and exposure to mercury during the prenatal period, the neonatal period and the first seven months of life (Thompson *et al.*, 2007).

Storage (also refer to Chapter 3 on the storage, distribution and disposal of vaccines)

Vaccines should be stored in the original packaging at +2°C to +8°C and protected from light. All vaccines are sensitive to some extent to heat and cold. Heat speeds up the decline in potency of most vaccines, thus reducing their shelf life. Effectiveness cannot be guaranteed for vaccines unless they have been stored at the correct temperature. Freezing may cause increased reactogenicity and loss of potency for some vaccines. It can also cause hairline cracks in the container, leading to contamination of the contents.

Presentation

Trivalent seasonal influenza vaccines for intramuscular administration are supplied as suspensions of inactivated vaccines in pre-filled syringes. They should be shaken well before they are administered.

One of the trivalent seasonal influenza vaccines, Intanza®, is an intradermal vaccine supplied in a micro-needle injection system. It comes in two different formulations - Intanza® 15µg (for use in those aged 60 years and older) and Intanza® 9µg (for use in those aged 18 to under 60 years). Neither Intanza® formulation is licensed for use in those under the age of 18 years.

Dosage and schedule

The dosages and schedules for influenza vaccines are shown in Table 19.2 and should be given according to the recommendations for use of the vaccines (see later).

Table 19.2 Dosage for trivalent seasonal influenza vaccines

Age	Dose
Children aged from 6 months to under 13 years	Unless specified otherwise (see note below*), a single injection of 0.5ml repeated 4 to 6 weeks later if receiving seasonal influenza vaccine for the first time. Some seasonal influenza vaccines are not licensed for young children – see table 19.4.
Adults and children aged 13 years and over	A single injection of 0.5ml for intramuscular injected vaccines. For intradermal vaccine, Intanza® - a single injection of 0.1ml of Intanza® 15µg in those aged 60 years and older or 0.1ml of Intanza® 9µg in those aged 18 to under 60 years. Neither Intanza® formulation is licensed for use in those aged under 18 years.

* Some seasonal influenza vaccine summaries of product characteristics (SPCs) indicate that young children can be given either a 0.25ml or a 0.5ml dose. The Joint Committee on Vaccination and Immunisation has advised that unless a specific dose is indicated on the SPC, a 0.5ml dose should be given to infants aged six months or older and young children because there is evidence that this dose is effective in young children (Heinonen et al., 2010).

Administration

Vaccines given by intramuscular injection should be given preferably into the upper arm (or anterolateral thigh in infants). However, individuals with a bleeding disorder should be given vaccine by deep subcutaneous injection to reduce the risk of bleeding.

One of the trivalent seasonal influenza vaccines (Intanza®) is administered by the intradermal route. It is supplied in a micro-needle injection system that is held at right-angles to the skin. The device allows intradermal vaccination to be performed without the need for additional training. Intanza® is produced in two different formulations: Intanza® 15µg for use in those aged 60 years and older and Intanza® 9µg for those aged 18 to under 60 years. Intanza® is not licensed for use in children and adolescents aged under 18 years.

Influenza vaccine can be given at the same time as other vaccines. The vaccines should be given at separate sites, preferably in a different limb. If given in the same limb, they should be given at least 2.5cm apart (American Academy of Pediatrics,

2003). The site at which each vaccine is given and the batch numbers of the vaccines should be recorded in the individual's records. Where the vaccine is given for occupational reasons, it is recommended that the employer keep a vaccination record. It is important that vaccinations given either at a general practice or elsewhere (for example, at community pharmacies, or antenatal clinics) are recorded on appropriate health records for the individual (using the appropriate clinical code) in a timely manner.

Disposal

Equipment used for vaccination, including used vials, ampoules, or partially discharged vials and syringes should be disposed of at the end of a session by sealing in a proper, puncture-resistant 'sharps' box according to local authority regulations and guidance in the technical memorandum 07-01 (Department of Health, 2006).

Recommendations for the use of the vaccines

The objective of the seasonal influenza immunisation programme is to protect those who are most at risk of serious illness or death should they develop influenza. Other objectives include reducing transmission of the infection, thereby contributing to the protection of vulnerable patients who may have a suboptimal response to their own immunisations.

To facilitate this, general practitioners are required to compile a register of those patients for whom influenza immunisation is recommended. Sufficient vaccine can then be ordered in advance and patients can be invited to planned immunisation sessions or appointments. Given that some influenza vaccines are restricted for use in particular age groups, the SPC for individual products should always be referred to when ordering vaccines for particular patients.

Patients should be advised that many other organisms cause respiratory infections similar to influenza during the influenza season, e.g. the common cold and respiratory syncytial virus (RSV). Influenza vaccine will not protect against these diseases.

Trivalent seasonal influenza vaccine should be offered, ideally before the virus starts to circulate to:

- all those aged 65 years or older
- all those aged six months or older in the clinical risk groups shown in Table 19.3.

Table 19.3 Clinical risk groups who should receive the influenza immunisation. Influenza vaccine should be offered to people in the clinical risk categories set out below.

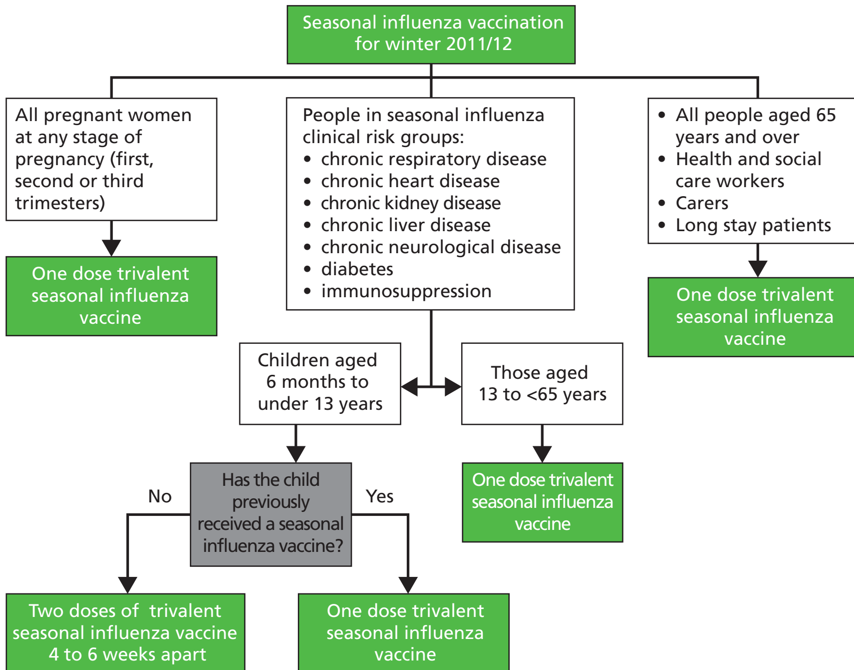
Clinical risk category	Examples (this list is not exhaustive and decisions should be based on clinical judgement)
Chronic respiratory disease	Asthma that requires continuous or repeated use of inhaled or systemic steroids or with previous exacerbations requiring hospital admission. Chronic obstructive pulmonary disease (COPD) including chronic bronchitis and emphysema; bronchiectasis, cystic fibrosis, interstitial lung fibrosis, pneumoconiosis and bronchopulmonary dysplasia (BPD). Children who have previously been admitted to hospital for lower respiratory tract disease.
Chronic heart disease	Congenital heart disease, hypertension with cardiac complications, chronic heart failure, individuals requiring regular medication and/or follow-up for ischaemic heart disease.
Chronic kidney disease	Chronic kidney disease at stage 3, 4 or 5, chronic kidney failure, nephrotic syndrome, kidney transplantation.
Chronic liver disease	Cirrhosis, biliary artesia, chronic hepatitis
Chronic neurological disease **(included in the DES directions for Wales)**	Stroke, transient ischaemic attack (TIA). Conditions in which respiratory function may be compromised (e.g. polio syndrome sufferers). Clinicians should consider on an individual basis the clinical needs of patients including individuals with cerebral palsy, multiple sclerosis and related or similar conditions; or hereditary and degenerative disease of the nervous system or muscles; or severe neurological disability.
Diabetes	Type 1 diabetes, type 2 diabetes requiring insulin or oral hypoglycaemic drugs, diet controlled diabetes.

Clinical risk category	Examples (this list is not exhaustive and decisions should be based on clinical judgement)
Immunosuppression	Immunosuppression due to disease or treatment. Patients undergoing chemotherapy leading to immunosuppression. Asplenia or splenic dysfunction, HIV infection at all stages. Individuals treated with or likely to be treated with systemic steroids for more than a month at a dose equivalent to prednisolone at 20mg or more per day (any age) or for children under 20kg a dose of 1mg or more per kg per day. It is difficult to define at what level of immunosuppression a patient could be considered to be at a greater risk of the serious consequences of influenza and should be offered seasonal influenza vaccination. This decision is best made on an individual basis and left to the patient's clinician. Some immunocompromised patients may have a suboptimal immunological response to the vaccine.
Pregnant women	Pregnant women at any stage of pregnancy (first, second or third trimesters).

The list above is not exhaustive, and the medical practitioner should apply clinical judgement to take into account the risk of influenza exacerbating any underlying disease that a patient may have, as well as the risk of serious illness from influenza itself. Trivalent seasonal influenza vaccine should be offered in such cases even if the individual is not in the clinical risk groups specified above. Consideration should also be given to the vaccination of household contacts of immunocompromised individuals, i.e. individuals who expect to share living accommodation on most days over the winter and therefore for whom continuing close contact is unavoidable. This may include carers (see below).

In addition to the above, immunisation is provided to reduce the transmission of influenza within health and social care premises, to contribute to the protection of individuals who may have a suboptimal response to their own immunisations, or to avoid disruption to services that provide their care. This would include:

- health and social care staff directly involved in the care of their patients or clients
- those living in long-stay residential care homes or other long-stay care facilities where rapid spread is likely to follow introduction of infection and cause high morbidity and mortality (this does not include prisons, young offender institutions, university halls of residence etc.)



- those who are in receipt of a carer's allowance, or those who are the main carer of an elderly or disabled person whose welfare may be at risk if the carer falls ill. Vaccination should be given on an individual basis at the GP's discretion in the context of other clinical risk groups in their practice
- others involved directly in delivering health care such that they and vulnerable patients are at increased risk of exposure to seasonal influenza (further information is provided in guidance from UK health departments).

Studies have shown that two doses of trivalent seasonal influenza vaccine are required to achieve adequate antibody levels in younger children as they may never have been exposed to influenza or been vaccinated (Allison *et al*., 2006; Ritzwoller *et al*., 2005; Shuler *et al*., 2007; Wright *et al*., 1977). Children aged under 13 years in clinical risk groups who have not previously received seasonal influenza vaccine should receive two doses of trivalent seasonal influenza vaccine. The intramuscular trivalent seasonal influenza vaccines are interchangeable; the second dose should be given four to six weeks after the first dose in accordance with the manufacturer's SPC for that vaccine.

A chart summarising the advice on influenza vaccination for the 2011/12 seasonal influenza vaccination programme is given above.

Contraindications

The SPC for individual products should always be referred to when deciding which vaccine to give. There are very few individuals who cannot receive influenza vaccine. When there is doubt, appropriate advice should be sought promptly from an immunisation co-ordinator, consultant in communicable disease control or consultant paediatrician, so that the period the individual is left unvaccinated is minimised.

The vaccines should not be given to those who have had:

- a confirmed anaphylactic reaction to a previous dose of the vaccine, or
- a confirmed anaphylactic reaction to any component of the vaccine (other than ovalbumin – see precautions).

Confirmed anaphylaxis is rare (see Chapter 8 for further information). Other allergic conditions such as rashes may occur more commonly and are not contraindications to further immunisation. A careful history of the event will often distinguish between true anaphylaxis and other events that are either not due to the vaccine or are not life threatening. In the latter circumstance, it may be possible to continue the immunisation course. Specialist advice must be sought on the vaccines and the circumstances in which they could be given (see Chapter 6 for further information). The risk to the individual of not being immunised must be taken into account.

Precautions

Minor illnesses without fever or systemic upset are not valid reasons to postpone immunisation. If an individual is acutely unwell, immunisation may be postponed until they have fully recovered. This is to avoid confusing the differential diagnosis of any acute illness by wrongly attributing any signs or symptoms to the adverse effects of the vaccine.

Pregnancy

Pregnant women should be offered seasonal influenza vaccine. A review of studies on the safety of influenza vaccine in pregnancy concluded that inactivated seasonal influenza vaccine can be safely and effectively administered during any trimester of pregnancy and that no study to date has demonstrated an increased risk of either maternal complications or adverse fetal outcomes associated with inactivated influenza vaccine (Tamma *et al*., 2009). A number of studies show that seasonal influenza vaccination during pregnancy provides passive immunity against influenza to infants in the first few months of life following birth (Benowitz *et al*, 2010; Eick *et al*, 2010; Zaman *et al*, 2008).

Preterm infants

It is important that preterm infants who have risk factors have their immunisations at the appropriate chronological age. Influenza immunisation should be considered after the child has reached six months of age.

Immunosuppression and HIV infection

Individuals who have immunosuppression and HIV infection (regardless of CD4 count) should be given influenza vaccine in accordance with the recommendations above. These individuals may not make a full antibody response. Consideration should also be given to the vaccination of household contacts of immunocompromised individuals, i.e. individuals who expect to share living accommodation on most days over the winter and therefore for whom continuing close contact is unavoidable. Further guidance is provided by the Royal College of Paediatrics and Child Health (www.rcpch.ac.uk), the British HIV Association (BHIVA) Immunisation guidelines for HIV-infected adults (BHIVA, 2008) (www.bhiva.org) and the Children's HIV Association of UK and Ireland (CHIVA) immunisation guidelines (www.chiva.org.uk).

Egg allergy

Individuals who have egg allergy may be at increased risk of reaction to influenza vaccines. In recent years, influenza vaccines that are egg-free or have a very low ovalbumin content (< 0.12 μg/ml) have become available. Influenza vaccines with an ovalbumin content < 0.12 μg/ml have been shown to be safe in patients with egg allergy (Gagnon *et al*, 2010).

Patients who have either confirmed anaphylaxis to egg or egg allergy with uncontrolled asthma (BTS SIGN step 4 or above) can be immunised with an egg-free influenza vaccine (if available) as a single dose (two doses in the case of children aged under 13 years that have not been previously vaccinated) in primary care. If no egg-free vaccine is available, they should be referred to specialists for vaccination in hospital using vaccine with an ovalbumin content less than 0.12 μg/ml. A split dose schedule may be required at the discretion of the supervising physician.

All other egg allergic individuals can be given egg-free vaccine or influenza vaccine with an ovalbumin content less than 0.12 μg/ml as a single dose (two doses in the case of children aged under 13 years that have not been previously vaccinated) in primary care. Facilities should be available and staff trained to recognise and treat anaphylaxis (see chapter 8).

Vaccines with ovalbumin content (more than 0.12 µg/ml) or where content is not stated should not be used in egg-allergic individuals. The ovalbumin content of seasonal influenza vaccines is given in Table 19.4.

Adverse reactions

Pain, swelling or redness at the injection site, low grade fever, malaise, shivering, fatigue, headache, myalgia and arthralgia are among the commonly reported symptoms after vaccination. A small painless nodule (induration) may also form at the injection site. These symptoms usually disappear within one to two days without treatment.

Immediate reactions such as urticaria, angio-oedema, bronchospasm and anaphylaxis can occur, most likely due to hypersensitivity to residual egg protein.

The following adverse events have been reported very rarely after seasonal influenza vaccination over the past 30 years but no causal association has been established: neuralgia, paraesthesiae, convulsions (see note below) and transient thrombocytopenia, vasculitis with transient renal involvement and neurological disorders such as encephalomyelitis.

A recent study in the UK found that there was no association between Guillain-Barré syndrome (GBS) and seasonal influenza vaccines although there was a strong association between GBS and influenza-like illness. The increased risk of GBS after influenza-like illness, if specific to infection with influenza virus, together with the absence of a causal association with influenza vaccine suggests that influenza vaccine should protect against GBS (Stowe *et al*., 2009). GBS has been reported very rarely after immunisation with influenza vaccine, one case per million people vaccinated in one US study (Laskey *et al*., 1998). However, this has not been found in other studies and a causal relationship has not been established (Hurwitz *et al*., 1981; Kaplan *et al*., 1982; Roscelli *et al*., 1991). All serious suspected reactions following influenza vaccines should be reported to the Commission on Human Medicines using the Yellow Card scheme at www.yellowcard.gov.uk

The trivalent seasonal influenza vaccines, Intanza® 15 µg and Intanza® 9 µg carry a black triangle symbol (▼). This is a standard symbol added to the product information of a vaccine during the earlier stages of its introduction, to encourage reporting of all suspected adverse reactions.

CSL influenza vaccine/Enzira®

Epidemiological information from Australia (TGA, 2010) has indicated a higher than expected increase in febrile convulsions in children under five years of age

related to the use of a seasonal influenza vaccine manufactured by CSL in Australia (Fluvax). The evidence from Australia suggested a rate of febrile convulsions of about one per 100 doses for children who were vaccinated with Fluvax. This risk appears to be a product specific reaction. This is the same product marketed in the UK by Pfizer as Enzira® or CSL Biotherapies generic influenza vaccine for the 2011/12 influenza vaccination season. Surveillance in Australia and from the UK following vaccination with other products has found no evidence that other influenza vaccines are associated with this level of risk in children.

Given the availability of other seasonal influenza vaccine products, use of Enzira® and CSL Biotherapies generic influenza vaccine marketed by Pfizer for children aged six months to below five years should be avoided. The licensed indication for this product no longer includes children aged under five years.

Management of suspected cases, contacts and outbreaks

There are antiviral drugs available that can be used under certain circumstances to either prevent or treat influenza. NICE has issued guidance on the use of antiviral drugs for the prevention of influenza at: http://guidance.nice.org.uk/TA168

It is always important to encourage and maintain good hand and respiratory hygiene which can help to reduce the spread of influenza. Information and resources on the 'Catch it, Bin it, Kill it', hand and respiratory hygiene campaign can be found on the Department of Health website. http://www.dh.gov.uk (enter Catch it, bin it, kill it in the search box)

Supplies

Seasonal influenza vaccines

Demand for trivalent seasonal influenza vaccine sometimes increases unpredictably in response to speculation about influenza illness in the community. Therefore, it is recommended that practices order sufficient vaccine for their needs, based on their 'at risk' registers, well in advance of the immunisation season.

Information on supplies and how to order vaccines will be given in guidance for the 2011/12 influenza vaccination programme provided by each of the four UK countries health departments – see four countries health departments' websites for details.

At the time of publication, seasonal influenza vaccines planned to be available for the 2011/12 influenza season are shown in Table 19.4.

Table 19.4 Trivalent seasonal influenza vaccines for the 2011/12 influenza season.

Supplier	Name of product	Vaccine type	Age indications	Ovalbumin content per 0.5ml dose	Contact details
Abbott Healthcare	Influvac®	Surface antigen, inactivated	From 6 months	No more than 0.1µg	0800 358 7468
Abbott Healthcare	Imuvac®	Surface antigen, inactivated	From 6 months	No more than 1µg	0800 358 7468
Baxter Healthcare	Preflucel®	Split virion, inactivated, prepared on Vero cells	From 18 years	No ovalbumin	01635 206 265
Crucell UK Ltd	Viroflu®	Surface antigen, inactivated	From 6 months	No more than 0.5µg	0844 800 3907
Glaxo SmithKline	Fluarix®	Split virion inactivated virus	From 6 months	No more than 0.1µg	0800 783 0470
MASTA	Imuvac®	Surface antigen, inactivated	From 6 months	No more than 1µg	0113 238 7500
Novartis Vaccines	Agrippal®	Surface antigen, inactivated	From 6 months	No more than 0.2µg	08457 451 500
Novartis Vaccines	Fluvirin®*	Surface antigen, inactivated	From 4 years	No more than 1µg	08457 451 500
Pfizer Vaccines	CSL Inactivated Influenza Vaccine	Split virion inactivated virus	From 5 years	No more than 0.02µg	0800 089 4033
Pfizer Vaccines	Enzira®	Split virion inactivated virus	From 5 years	No more than 0.02µg	0800 089 4033
Sanofi Pasteur MSD	Inactivated Influenza Vaccine (Split Virion) BP	Split virion inactivated virus	From 6 months	No more than 0.024µg	0800 085 5511

Supplier	Name of product	Vaccine type	Age indications	Ovalbumin content per 0.5ml dose	Contact details
Sanofi Pasteur MSD	Intanza® 9µg	Split virion inactivated virus	From 18 – 59 years	No more than 0.024µg (0.1ml dose)	0800 085 5511
Sanofi Pasteur MSD	Intanza® 15µg	Split virion inactivated virus	From 60 years	No more than 0.024µg (0.1ml dose)	0800 085 5511

None of the influenza vaccines for the 2011/12 season contains thiomersal as an added preservative.

* This vaccine states in its SPC that it contains traces of thiomersal that are left over from the manufacturing process.

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