

INFLUENZA VACCINES FOR AUSTRALIANS: INFORMATION FOR IMMUNISATION PROVIDERS

Disease and epidemiology

- Influenza is a contagious respiratory viral illness. Influenza viruses are classified into types A, B and C. Most cases of the flu are caused by strains of types A and B. Different strains dominate each year.
- The highest risk of complications from influenza is in the elderly, those with pre-existing medical conditions and pregnant women but even healthy people can get severe influenza. Aboriginal and Torres Strait Islander people are at higher risk of influenza and its complications than other Australians.
- In Australia, dozens of deaths and thousands of hospitalisations due to influenza are recorded each year. However, many influenza cases go unrecognised or unreported.

Who should be vaccinated

- Annual influenza vaccination is recommended for any person aged ≥ 6 months who wants to protect themselves from influenza.
- One brand of trivalent influenza vaccine, bioCSL Fluvax[®], is **not** registered for use in children aged 6 months to < 5 years and **must not** be given to children this age. Other brands of trivalent vaccine can be used in this age group.
- Annual influenza vaccination under the National Immunisation Program (NIP) is provided for people aged ≥ 6 months who are at increased risk of severe influenza including: adults aged ≥ 65 years; Aboriginal and Torres Strait Islander people aged 6 months to < 5 years and ≥ 15 years; pregnant women; and individuals with specified medical conditions (see [Table 1](#)).
- The majority of influenza vaccines used in Australia can be given to people with egg allergy.

Vaccines

- From 2015, there are two types of inactivated influenza vaccines in Australia – trivalent and quadrivalent. Trivalent influenza vaccines (TIV) have been used for many years and contain antigens of three virus strains (two influenza A strains and one influenza B strain). The newer quadrivalent influenza vaccines (QIV) contain the same strains as TIV plus a second B strain.
- The strains used in seasonal influenza vaccines can change from year to year depending on which virus strains are expected to predominate in each season.
- TIV typically provides protection against laboratory-confirmed influenza in approximately 60–85% of vaccine recipients. The level of protection from TIV is lower in the elderly and in people who are immunocompromised, and when there is a mismatch between the vaccine and circulating influenza virus strains. QIV is expected to be at least as effective as TIV and may offer additional benefit through protection against the additional B strain.
- Only TIV is funded under the NIP at present. QIV is available for purchase in the private market.

Clinical advice for immunisation providers regarding the administration of seasonal influenza vaccines is published each year by the Australian Technical Advisory Group on Immunisation (ATAGI).

Advice for 2015 is available at

www.immunise.health.gov.au/internet/immunise/Publishing.nsf/content/ATAGI-advice-TIV

The disease

Influenza, or 'the flu' as it is often called, is an acute viral illness caused by an influenza virus that mainly affects the respiratory system.

Causative agent

The influenza virus is an orthomyxovirus that is classified antigenically as type A, B or C.¹ Type A influenza virus is further subtyped according to two kinds of proteins on its surface: haemagglutinin (H) and neuraminidase (N).¹

Among the many subtypes of type A viruses, influenza A(H1N1) and A(H3N2) subtypes circulate among humans. Type B influenza virus is not categorised into subtypes, but lineages. There are two influenza B lineages which circulate, Yamagata and Victoria, and these can be further broken down into different strains. Influenza caused by type C virus occurs much less frequently than types A and B. That is why only influenza A and B viruses are included in seasonal influenza vaccines.

The genes for the two major surface proteins (H and N) mutate frequently and, in turn, antigens on influenza viruses are constantly changing. Relatively minor genetic changes to the H and N genes of both influenza A and B result in new virus subtypes. These changes are referred to as 'antigenic drift'. Antibody cross-protection against drifted strains is likely to be reduced. If a major change happens in the H or N of influenza A it is called 'antigenic shift'. Protection (from previous immunity to a different strain) is usually not adequate against disease from a 'shifted' strain. Thus, a pandemic may occur.

Clinical features

Flu symptoms usually start with sudden onset of chills, shakes, headache, muscle aches, fever and dry cough. The respiratory symptoms then become more prominent. Sometimes abdominal complaints (such as pain and diarrhoea) and involvement of other body systems occurs. In children, non-respiratory symptoms of flu occur more frequently, including gastrointestinal complaints (anorexia, abdominal pain, vomiting, nausea) and calf muscle pain.¹ Older people who have caught the flu may not have fever.

While most flu infections are symptomatically worse and more severe than other viral upper respiratory tract infections, some may be mild.¹⁻³ However, even people with mild flu illness could still potentially transmit the infection.

Serious complications from the flu occur in a small proportion of people who are infected.¹⁻⁴ People at highest risk of complications from influenza include those with pre-existing medical conditions, such as chronic lung or

heart disease. However, previously healthy people can also have severe complications. Pneumonia, myocarditis (inflammation of the heart muscle) and neurologic complications can all arise directly from infection by the influenza virus. Secondary bacterial infections, such as pneumonia, can also cause severe complications and death.⁴

Transmission

Influenza is spread easily, mainly through sneezing and coughing.^{1,3} Droplets containing the influenza virus also settle onto surfaces, such as telephones, door knobs, etc., and can then pass from hands to the nose, mouth or eyes. People with influenza infection can be infectious to others for the 24 hours before symptoms start, and continue to be infectious for about a week after the start of symptoms.

People of all ages are susceptible to the flu. In the general community, the percentage of people affected by flu each year is typically 5–10%, but may be up to 20% in some years. Influenza is more easily spread where large numbers of people gather together.¹ As such, in households and 'closed' populations (e.g. aged care facilities), infection rates may be 2–3 times higher.⁴ The flu is actually very common in healthy children, with 10–40% infected each year and approximately 1% of these infections resulting in hospitalisation.^{1,3}

Diagnosis

Laboratory tests are required to confirm an influenza infection. The virus can be detected in a nose or throat swab, or specific antibodies can be measured in the blood. These tests are more commonly performed in hospitalised patients who are suspected of having influenza, but are not often used in routine care, such as at the GP.

Treatment

Treatment of the flu generally aims to prevent or minimise symptoms. Treatment includes bed rest until the fever subsides, pain relief such as aspirin or paracetamol, and high fluid intake.¹⁻³ Children <16 years of age must not be given aspirin or aspirin-containing medications while sick with influenza. This is because of the increased risk of children who take aspirin developing Reye syndrome, a form of encephalitis and liver degeneration.

Antiviral medication can help reduce the severity and duration of symptoms of the flu. This medication requires a prescription and, to be effective, needs to be administered within 48 hours of symptom onset.¹

Prevention

There are two major ways of preventing influenza infection: (a) reducing the likelihood of contact with the virus, and (b) vaccination to provide immunity to it (see [Who should be vaccinated](#)).

Precautions against virus contact include cough etiquette, like covering the nose and mouth with a tissue when coughing or sneezing. Washing hands before eating or drinking can also help to further reduce exposure to influenza. Anyone who is unwell with the flu should stay home from work, school and social gatherings to prevent close contact with other people which could lead to transmission of the virus.¹⁻⁵

Annual administration of influenza vaccine is the most important measure in preventing or reducing complications from influenza infection and in preventing mortality. The frequent emergence of drifted virus strains necessitates the annual review and modification of influenza vaccines. This, together with the fact that immunity to vaccination wanes over time, is why annual influenza vaccination is recommended.⁶⁻⁸

Epidemiology

Influenza is a seasonal disease in temperate regions. Most cases in Australia occur during the winter months between June and September.⁹ In the northern hemisphere, influenza usually occurs between December and the next April, whereas in the tropics, flu can occur all year round. The number of affected people varies considerably from year to year depending on the characteristics of the circulating virus strains and immunity in the population.

Annual influenza epidemics are most often due to a single virus subtype or lineage. However, different influenza virus subtypes/lineages may appear sequentially or simultaneously in the season, and can be different from year to year.¹⁰ For example, in Australia, the proportion of circulating influenza strains each season that were influenza B ranged between 1% and 63% between 2000 and 2011. The predominant B lineage (Yamagata or Victoria) also varied between seasons, with both lineages often co-circulating in various proportions from year to year.¹¹ Variations in influenza strain epidemiology also occur by geographical location.

Influenza is an important cause of excess morbidity and mortality. In Australia, there are, on average, dozens of deaths and thousands of hospitalisations per year specifically recorded as being due to influenza.⁹ However, these figures are underestimates, as a substantial proportion of influenza disease is not recognised and/or

recorded by these means.⁵ For example, if a person who has influenza and then develops pneumonia dies, the cause of death may just be given as bacterial pneumonia. A study using mathematical modelling estimated that influenza is actually associated with more than 13,000 hospitalisations and 3,000 deaths each year in Australia, in people aged over 50 years alone.¹²

Occasionally a global outbreak of a new influenza A strain occurs resulting in an 'influenza pandemic'. There have been four influenza pandemics since 1918. The last one was in 2009–2010, due to a novel influenza A(H1N1) subtype, also denoted A(H1N1pdm09), which caused an estimated 290,000 deaths worldwide.¹³ In Australia, there were approximately 37,200 confirmed cases and around 190 associated deaths between May 2009 and November 2009.¹⁴

Who should be vaccinated

Unless there is a [contraindication](#) that precludes a person from receiving influenza vaccine, annual influenza vaccination is recommended for any person ≥ 6 months of age who wishes to reduce the likelihood of becoming ill with influenza.¹⁵

Most importantly, there are certain people who are strongly recommended to be vaccinated each year as outlined in the 10th edition of *The Australian Immunisation Handbook*.¹⁵

Influenza vaccine is funded via the National Immunisation Program (NIP) for certain groups who are at increased risk of influenza complications, including:¹⁶

- adults aged ≥ 65 years
- Aboriginal and Torres Strait Islander people aged ≥ 6 months to < 5 years and those aged ≥ 15 years
- pregnant women
- individuals aged ≥ 6 months with specified medical conditions that put them at increased risk of influenza complications (see [Table 1](#)).

Note: There are some medical conditions for which influenza vaccination is strongly recommended but not currently funded under the NIP (see [Table 1](#)).

For more information, refer to *The Australian Immunisation Handbook*¹⁵ and clinical advice from the Australian Technical Advisory Group on Immunisation regarding the administration of 2015 seasonal influenza vaccines.¹⁷

Babies and children

Children aged ≥ 6 months can receive influenza vaccine annually (unless they have a [contraindication](#) to vaccination).¹⁸

Infants and young children are at increased risk of hospitalisation and death following influenza.¹⁵ The influenza vaccine dosage and number of doses required for children varies with age (see [Table 2](#)).

One brand of seasonal trivalent influenza vaccine, bioCSL Fluvax[®], is no longer registered for use in children aged < 5 years and must **not** be given to children this age. This is due to an association between this vaccine and high fever and febrile convulsions in children aged < 5 years in the 2010 influenza season (see [Vaccine safety, fever and febrile convulsions](#)). The Australian Technical Advisory Group on Immunisation recommends that this brand of vaccine should **not** be used in children aged < 9 years (see also [Precautions](#)).¹⁷ **Immunisation providers can choose from one of the other eight brands of influenza vaccine** which are registered and recommended for use in young children (see [Vaccines](#)).

Pregnant women

It is recommended that all pregnant women should be immunised against influenza as early as possible in pregnancy.¹⁵ Pregnant women are at increased risk of

influenza-associated morbidity and mortality.¹⁹ In addition, influenza vaccination of pregnant women has been shown to protect their babies against influenza disease for the first 6 months after birth.²⁰⁻²²

The rate of adverse events after vaccinating pregnant or breastfeeding women is no different to the rate in other people. In addition, there is no evidence that influenza vaccine causes any harm to mother or baby when administered to a pregnant woman.²³

Who should not be vaccinated

Influenza vaccine is contraindicated in the following people:

- anyone who has experienced anaphylaxis (a severe form of a generalised allergic reaction) following a previous dose of any influenza vaccine
- anyone who has experienced anaphylaxis following exposure to any vaccine component (see also [Precautions, Egg allergy](#)).

Children aged < 6 months should not receive influenza vaccine because effectiveness has not been demonstrated in this age group.

Children aged < 5 years must **not** receive the bioCSL Fluvax[®] brand of influenza vaccine.¹⁷

Table 1: Medical conditions that are associated with an increased risk of influenza disease complications and for which individuals are eligible for vaccination under the NIP*¹⁷

Category	Vaccination strongly recommended but not limited to individuals with the following clinical conditions
Cardiac disease	Cyanotic congenital heart disease Congestive heart failure Coronary artery disease
Chronic respiratory conditions [†]	Severe asthma (for which frequent hospitalisation is required) Cystic fibrosis Bronchiectasis Suppurative lung disease Chronic obstructive pulmonary disease (COPD) Chronic emphysema
Chronic neurological conditions [†]	Hereditary and degenerative CNS diseases [†] (including multiple sclerosis) Seizure disorders Spinal cord injuries Neuromuscular disorders
Immunocompromising conditions [‡]	Immunocompromised due to disease or treatment (e.g. malignancy, transplantation and/or chronic steroid use) Asplenia or splenic dysfunction HIV infection
Diabetes and other metabolic disorders	Type 1 diabetes Type 2 diabetes Chronic metabolic disorders
Renal disease	Chronic renal failure
Haematological disorders	Haemoglobinopathies
Long-term aspirin therapy in children aged 6 months to 10 years	These children are at increased risk of Reye syndrome following influenza infection

[†] Persons who have any condition that compromises the management of respiratory secretions or is associated with an increased risk of aspiration should be vaccinated.

[‡] Persons with certain immunocompromising conditions (i.e. haematopoietic stem cell transplant, solid organ transplant) receiving influenza vaccine for the first time post transplant are recommended to receive 2 vaccine doses at least 4 weeks apart (irrespective of age) and 1 dose annually thereafter.

* **Note:** ATAGI strongly recommends influenza vaccination for persons who have the conditions listed below (but vaccination is **not funded** under the NIP for such persons unless they fall under one of the categories above):

- Down syndrome
- Obesity (class III), defined as body mass index (BMI) ≥ 40 kg/m²
- Chronic liver disease (defined as histological evidence of fibrosis or cirrhosis, or clinical evidence of chronic liver disease).

Refer to *The Australian Immunisation Handbook*, 10th edition, 2015 update, for more details.¹⁵

**Table 2: Recommended doses of influenza vaccine
(adapted from *The Australian Immunisation Handbook*, 10th edition, 2015 update)¹⁵**

Age	Dose	Number of doses (first vaccination)	Number of doses (subsequent years)
6 months–<3 years	0.25 mL	2*	1 [†]
3– <9 years	0.5 mL	2*	1 [†]
≥ 9 years	0.5 mL	1 [‡]	1

* Two doses at least 4 weeks apart are recommended for children aged <9 years who are receiving influenza vaccine for the first time. The same vial should not be re-used for the 2 doses.

[†] If a child aged 6 months to <9 years of age receiving influenza vaccine for the first time inadvertently does not receive the 2nd dose within the same year, he/she should have 2 doses administered the following year.

[‡] People with certain immunocompromising conditions (i.e. haematopoietic stem cell transplant, solid organ transplant) receiving influenza vaccine for the first time post transplant are recommended to receive 2 vaccine doses at least 4 weeks apart (irrespective of age) and 1 dose annually thereafter.

Precautions

Influenza vaccination should be delayed when a person has a high fever or other moderately severe illness, but can generally be given once the illness is resolved.

BioCSL Fluvax[®] for children aged 5 years to <9 years
ATAGI does **not** recommend the use of the bioCSL brand of influenza vaccine, Fluvax[®], in children aged 5 to <9 years of age as there are other brands of influenza vaccine available for children this age which are much less likely to cause fever in children. Because complications of fever, such as febrile convulsions, are rare in children aged 5 to <9 years, the bioCSL Fluvax[®] brand of vaccine may be considered for use in children in this age group when no alternative vaccine is available and the risks and benefits of vaccination have been carefully considered. If the bioCSL Fluvax[®] brand is administered to a child of this age, parents/carers should be informed of the potential increased risk of fever but reassured that febrile convulsions are rare in this age group. (See also [Vaccine safety, fever and febrile convulsions](#).)

Egg allergy

A person with egg allergy, including egg-induced anaphylaxis, can usually be safely vaccinated with influenza vaccines that have less than 1 µg of residual egg ovalbumin per dose.¹⁵ Even though the risk of anaphylaxis associated with influenza vaccination of a person with egg allergy is very low, it is essential that such patients are vaccinated in facilities with staff that are able to recognise and treat anaphylaxis.^{24,25}

Note: The amount of residual egg ovalbumin in influenza vaccines may vary from year to year. The Product Information of the vaccine to be given should be checked for the vaccine's ovalbumin content prior to vaccine administration. Additional information on influenza vaccination of individuals with an allergy to eggs, including risk, dosage and observation period, can be found in the Australasian Society of Clinical Immunology and Allergy (ASCIA) guidelines.²⁴

Guillain-Barré syndrome

A small increased risk of Guillain-Barré syndrome (GBS) was associated historically with one influenza vaccine in the United States in 1976. But, since then, close surveillance has shown that GBS has occurred at a very low rate of less than 1 in 1 million doses of influenza vaccine, if at all.^{15,26}

Vaccines

All the influenza vaccines currently available in Australia are either split virion or subunit vaccines prepared from purified inactivated influenza virus which has been cultivated in embryonated hens' eggs.¹⁵ Other forms of influenza vaccine, such as live attenuated intranasal vaccine, have not yet been registered in Australia.²⁷ More general information on vaccine ingredients can be found in the NCIRS [Vaccine components](#) fact sheet.

Circulating influenza virus strains can vary from year to year. The composition of vaccines for use in Australia is determined annually by the Australian Influenza Vaccine Committee (AIVC), so that the influenza strains predicted to predominate in the current influenza season are included in the vaccine.

Current influenza vaccines

From 2015, two types of inactivated seasonal influenza vaccines are available in Australia – trivalent influenza vaccine (TIV) and quadrivalent influenza vaccine (QIV).

TIVs have been used for decades and contain antigens of three strains of virus (two influenza A subtypes and one influenza B lineage). QIVs contain the same antigens as TIV plus antigens from the other B lineage that is not included in TIV. QIVs are expected to be at least as effective as TIV and may offer additional benefit through protection against the additional B strain. However, how much extra benefit QIV offers over TIV each year is unpredictable (see [Vaccine effectiveness](#)).

Only TIV is currently funded under the NIP; QIV is available for purchase in the private market.

Currently six TIVs and three QIVs are registered by the Therapeutic Goods Administration (TGA) for use in Australia during the 2015 southern hemisphere influenza season.²⁸ Details relating to the use of influenza vaccines by brand, recommended age and NIP availability are provided in [Table 3](#).

Table 3: Summary of seasonal influenza vaccines available for use in Australia in the 2015 southern hemisphere influenza season, by brand, recommended age and NIP availability¹⁷

Vaccine brand name	Company	Recommended age			Formulation	Route	Available through the NIP
		6 months to <5 years	5 years to <9 years	9 years and older			
Trivalent							
Agrippal®	Novartis	✓ See Note 1	✓	✓	0.5 mL pre-filled syringe	IM	No
Fluarix®	GSK	✓ See Note 1	✓	✓	0.5 mL pre-filled syringe	IM	Yes
Fluvax®	bioCSL	X Not registered	X See Note 2	✓	0.5 mL pre-filled syringe	IM	Yes
Influvac®	BGP Products	✓ See Note 1	✓	✓	0.5 mL pre-filled syringe	IM	No
Vaxigrip®	Sanofi Pasteur	✓ See Note 1	✓	✓	0.5 mL pre-filled syringe	IM	Yes
Vaxigrip® Junior	Sanofi Pasteur	6–35 months See Note 1	X Not registered	X Not registered	0.25 mL pre-filled syringe	IM	Yes
Quadrivalent							
Fluarix® Tetra	GSK	≥ 3 years See Note 3	✓	✓	0.5 mL pre-filled syringe	IM	No
FluQuadri®	Sanofi Pasteur	≥ 3 years See Note 3	✓	✓	0.5 mL pre-filled syringe	IM	No
FluQuadri® Junior	Sanofi Pasteur	6–35 months See Note 1	X Not registered	X Not registered	0.25 mL pre-filled syringe	IM	No

Abbreviations: NIP – National Immunisation Program; GSK – GlaxoSmithKline; IM – intramuscular.

Note 1: Children aged 6 to 35 months require a 0.25 mL dose of whichever vaccine is used. ‘Junior’ vaccine preparations (Vaxigrip® Junior and FluQuadri® Junior) contain 0.25 mL per dose and are specifically registered for use in children aged 6 to 35 months only.

Note 2: BioCSL Fluvax® is registered for use in persons 5 years of age and older; ATAGI does not recommend the use of this vaccine in children aged <9 years (see [BioCSL Fluvax® for children aged 5 years to <9 years](#)).

Note 3: Do not use in children aged <3 years. Registered for use in individuals aged ≥3 years only.

Administration

People should receive their annual influenza vaccination before the start of the influenza season. Generally, influenza vaccines are available in Australia from March of each year. In 2015, influenza vaccines were not available until April due to manufacturing delays caused by the need to incorporate two new strains into this year’s vaccines. Vaccination in March/April ensures people are protected during Australia’s peak influenza season which is usually between June and September. Generally it takes between 10 and 14 days for an immune response to the vaccine to develop and for a person to be protected from influenza. Getting the influenza vaccine will not stop a person from getting influenza if they are already infected at, or shortly after, the time of vaccination.^{5,15,27} The recommended dose of seasonal influenza vaccine varies by age and is summarised in [Table 2](#).

Influenza vaccines registered in Australia are administered by either intramuscular or subcutaneous injection. The intramuscular route causes fewer local

reactions and is preferred.¹⁵ Two intradermal influenza vaccines from the same manufacturer were registered for use in Australia in 2009 but are no longer available.

Vaccine effectiveness

Influenza vaccine provides varying levels of protection against influenza, depending on age, whether a person is immunocompromised, and how good the match is between vaccine and circulating strains.^{5,29}

The majority of effectiveness studies have been done on TIVs due to their widespread use. When there is a good match between the influenza strains in the vaccine and those circulating in the community TIV can prevent illness in about 60–85% of healthy children aged 6 months to <6 years³⁰ and about 60% of adults aged <65 years.³¹ In older people, TIV is 43% effective in preventing influenza-like illness in those aged ≥65 years.³² Among aged care facility residents aged ≥65 years, the vaccine is 45% effective in preventing hospitalisation or pneumonia, and 60% effective in

preventing death.³² Vaccination with TIV also appears to reduce the risk of heart attacks and strokes.⁵

In people who are immunocompromised, vaccination with TIV has been shown to afford some protection, but it is less effective than it is in healthy people.^{5,15,27,29} People with certain immunocompromising conditions (i.e. haematopoietic stem cell transplant, solid organ transplant) receiving influenza vaccine for the first time post transplant are recommended to receive 2 vaccine doses at least 4 weeks apart (irrespective of age) and 1 dose annually thereafter.¹⁵

QIV are expected to be at least as effective as TIV. This is based on clinical studies in children and adults which demonstrated QIV to be at least as immunogenic as TIV (an accepted surrogate for protection against influenza) for the three shared influenza virus strains.³³⁻³⁶ QIV may also offer additional benefit over TIV through inclusion of the additional influenza B strain. However, the magnitude of this incremental benefit will vary from year to year and is not predictable as it is influenced by factors such as influenza B epidemiology of that particular season, vaccine match with circulating strains, and an individual's immunity. For example, historically in Australia, the proportion of all circulating influenza strains that were of the alternative B lineage (to that included in that season's TIV) ranged from as little as 0% (in 2000 and 2001) up to a maximum of about 32% (in 2008).¹¹

Vaccine safety

For TIVs, local side effects, such as swelling, redness and pain at the injection site, are common after receiving influenza vaccine and occur in more than 10% of people. Fever, tiredness and myalgia (muscle aches) also occur commonly (1–10%).

These side effects may commence within a few hours of vaccination and can last for 1–2 days.^{5,15} In children aged <5 years, these adverse events may be more pronounced. Post-vaccination symptoms may mimic influenza infection, but none of the currently registered influenza vaccines contain live virus, so they cannot 'cause' influenza.

More severe immediate adverse effects, such as hives, angioedema or anaphylaxis, are very rare consequences of influenza vaccination. They probably represent an allergic response to a residual component of the manufacturing process, such as egg protein.^{5,15} However, due to changes in vaccine manufacturing, the amount of egg protein in the majority of influenza vaccines has been reduced. People with egg allergy, including egg-induced anaphylaxis, can be vaccinated with influenza vaccines

that have less than 1 µg of residual egg ovalbumin per dose (see [Precautions, Egg allergy](#)).

QIV has a higher antigenic load than TIV and theoretically has the potential to cause increased rates of adverse events. However, a range of controlled clinical trials of both manufacturers' QIVs have shown that the safety profile of QIV in adults and children is similar to that observed for TIV in the same age group.³³⁻³⁶

Fever and febrile convulsions

Febrile convulsions related to influenza vaccination are uncommon, occurring at a rate of less than 1 per 1,000 vaccinated individuals. The peak age of febrile convulsions, from any cause that triggers a fever (such as common childhood illnesses), is 12–23 months.³⁷

In Australia, during 2010, an increased rate of febrile convulsions, up to 1 per 100 (1%), was observed in children aged <5 years vaccinated with the 2010 bioCSL brand of TIV, Fluvax[®] or Fluvax[®] Junior.³⁷⁻³⁹ This brand of seasonal influenza vaccine is no longer registered for use in children <5 years of age.

However, extensive investigations indicated that there was no increase in the risk of fever or febrile convulsions following administration of alternative brands of TIV, either Vaxigrip[®] or Influvac[®], in children of the same age.³⁷

Co-administration with other vaccines

Influenza vaccine can be concurrently administered with other vaccines. However, parents/carers of infants or children should be advised that there is a slightly higher risk of febrile convulsions when TIV and 13-valent pneumococcal conjugate vaccine (13vPCV) are given at the same time, compared with them being given on separate days. Although there is no specific data on various safety outcome measures with the co-administration of QIV and 13vPCV, it is reasonable to assume that there may also be an increased risk of febrile convulsion if these two vaccines are given concurrently in young children.

Additional resources for primary medical care/vaccination providers

- *The Australian Immunisation Handbook*, 10th edition – the most up-to-date clinical recommendations are contained in the online version of the *Handbook* www.immunise.health.gov.au/internet/immunise/publishing.nsf/Content/Handbook10-home
- Immunise Australia website www.immunise.health.gov.au
- National Immunisation Program schedule www.immunise.health.gov.au/internet/immunise/publishing.nsf/Content/national-immunisation-program-schedule
- Influenza vaccine brands registered by the Therapeutic Goods Administration for use in Australia for 2015 www.tga.gov.au/media-release/2015-seasonal-influenza-vaccines
- Clinical advice for immunisation providers regarding the administration of 2015 seasonal influenza vaccines, from the Australian Technical Advisory Group on Immunisation (ATAGI) www.immunise.health.gov.au/internet/immunise/Publishing.nsf/content/ATAGI-advice-TIV
- World Health Organization (WHO). Influenza: Vaccines www.who.int/influenza/vaccines/en/

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