# Influenza vaccine

## Infant ≥6 months age use only

**2020**

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| **Alert** | Influenza vaccines can change from year to year with regard to which vaccines are registered by the Therapeutic Goods Administration and the indicated ages for each vaccine.<br>Always check annual seasonal influenza statements published by the Australian Technical Advisory Group on Immunisation on health.gov.au website and consult the product information for each vaccine.<br>All children aged 6 months to less than 5 years are now eligible to receive free annual influenza vaccines under the National Immunisation Program (NIP). [1]<br>The dose of influenza vaccines for all ages is 0.5 mL. The 0.25 mL dose for young children is no longer available. [1] |
| **Indication** | Infants ≥6 months of age are strongly recommended to receive annual influenza vaccine. [2]<br>Preterm infants: Provided they are medically stable and there are no contraindications to vaccination, preterm infants should receive vaccines according to the recommended schedule at their chronological age, without correction for prematurity. [3] |
| **Action** | Quadrivalent inactivated influenza virus vaccine. Active immunisation against influenza A, B virus strains (contained in vaccine). |
| **Drug type** | Vaccine |
| **Trade name** | Vaxigrip Tetra 0.5 mL: All people aged ≥6 months.<br>Fluarix Tetra 0.5 mL: All people aged ≥6 months.<br>FluQuadri 0.5 mL: All people aged ≥6 months. |
| **Presentation** | Vaxigrip Tetra 0.5 mL.<br>Fluarix Tetra 0.5 mL monodose pre-filled syringe: [All people aged ≥6 months].<br>FluQuadri 0.5 mL monodose pre-filled syringe: [All people aged ≥6 months]. |
| **Dose** | 2 doses at least 4 weeks apart are recommended for children aged 6 months to <9 years receiving influenza vaccine for the first time.[2] |
| **Dose adjustment** | Immunocompromised: All people ≥6 months of age that are immunocompromised are recommended to receive an influenza vaccine every year. |
| **Maximum dose** | |
| **Total cumulative dose** | |
| **Route** | The intramuscular route is preferred to the subcutaneous route because it causes fewer local adverse events. However, if given subcutaneously, the vaccine does not need to be readministered. [2] |
| **Preparation** | |
| **Administration** | For intramuscular injection, use a 25 gauge 25 mm long needle.<br>Position the limb to relax the muscle that the vaccine is being injected into.<br>Inject into the anterolateral thigh for infants not yet walking.<br>Pierce the skin at a 90° angle, so the needle can be safely inserted to the hub to reach the muscle layer.<br>Inject the vaccine slowly over a count of 5 seconds.<br>It is not necessary to draw back on the syringe plunger before injecting a vaccine. However, if you have done this and a flash of blood appears in the needle hub, withdraw the needle and select a new site for injection.<br>Document all vaccines administered to children in the child's clinical file and the individual child health record. The parent or carer keeps this record and presents it every time the child sees a health professional.<br>All immunisation encounters including influenza vaccinations need to be recorded by the immunisation provider on the Australian Immunisation Register (AIR). [2] |
| **Monitoring** | Hypersensitivity, including anaphylaxis |
| **Contraindications** | Anaphylaxis following a previous dose of any influenza vaccine. [2]<br>Anaphylaxis following any vaccine component. |
| **Precautions** | Persons with egg allergy, including anaphylaxis, can be safely vaccinated with influenza vaccines that have less than 1 microgram of residual egg ovalbumin per dose. Due to changes in influenza vaccine manufacturing, the majority of influenza vaccines currently used contain less than 1 microgram of ovalbumin per dose. If there is significant parental or health professional anxiety, the vaccine may be administered in primary care settings with a longer waiting period of 30 minutes. [2, 4]<br>Influenza vaccination is generally not recommended for people with a history of Guillain-Barré Syndrome whose first episode occurred within 6 weeks of receiving an influenza vaccine. [2] |
| **Drug interactions** | Co-administration of 13vPCV (13-valent pneumococcal conjugate vaccine) may increase risk of fever. |

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| **Adverse reactions** | Drowsiness or tiredness, muscle aches, localised pain, redness and swelling at injection site, occasionally, an injection-site nodule which may last many weeks (no treatment needed), fever and irritability and poor feeding in infants. |
| **Compatibility** | Should not be mixed with any other vaccine in the same syringe or vial. |
| **Incompatibility** | |
| **Stability** | Can remain stable at temperatures up to 12°C for 15 minutes. However, immediate administration is highly recommended.<br>Follow local cold chain guidelines and Department of Health National Vaccine Storage 'Strive for 5' Guidelines for management of vaccines during cold chain breaches. [5] |
| **Storage** | Store at 2°C to 8°C (Refrigerate, do not freeze). Protect from light. Discard if vaccine has been frozen. |
| **Excipients** | Vaxigrip Tetra: Each 0.5 mL contains ≤ 0.05 micrograms ovalbumin; ≤ 10.1 picograms neomycin; ≤30 micrograms formaldehyde; ≤ 222.5 micrograms octoxinol-9.<br>Fluarix Tetra: Each 0.5 mL contains ≤0.05 micrograms ovalbumin; ≤5 micrograms formaldehyde polysorbate 80; octoxinol 10.<br>FluQuadri: Each 0.5 mL contains ≤100 micrograms formaldehyde, ≤250 micrograms octoxinol 9, ≤1 micrograms ovalbumin |
| **Special comments** | Children can receive 13vPCV and inactivated influenza vaccine at the same visit if they need both vaccines. [2]<br>Doses of intramuscular 1:1000 adrenaline for anaphylaxis: [2]<br><1 year (approx. 5–10 kg) = 0.05 to 0.1 mL<br>1–2 years (approx. 10 kg) = 0.1 mL |
| **Evidence** | Influenza ('the flu') is an infectious disease caused by the influenza virus. Approximately 1 in 5 unvaccinated children and 1 in 10 unvaccinated adults are estimated to be infected by seasonal influenza annually, with rates of symptomatic influenza roughly half of these estimates. [6] The symptoms of influenza include sudden fever, headache, muscle aches and pains, fatigue, cough, sore throat, and stuffy or runny nose. The virus can cause a mild or severe illness depending on the type of influenza virus and general health of the affected person. Preterm infants have a high rate of underlying medical conditions – particularly respiratory, cardiac or neurological disease – that increase the risk of complications from influenza. [7]<br>The incidence of influenza-associated hospitalization in children, NSW 2001-2011, was markedly increased for infants 0 to 24 months of age with bronchopulmonary dysplasia at 41.6 (95%CI 15.7-67.5) per 1000 child-years, those with cystic fibrosis 44.5 (6.0-83.0) and other congenital and chronic lung conditions 42.9 (18.1-67.8) compared to all other children without chronic lung disease at 0 to 24 months age 9.3 (4.4-14.2), 2 to 5 years 0.6 (0.3-1.0) and 5 to 10 years 0.1 (0.0-0.1). [7] The cost/episode (95%CI) of influenza-associated hospitalisation was AUD$19704 (95%CI 11 715-27 693) for children with CLDs compared to $4557 (95%CI 4129-4984) for children without. [7]<br><br>**Efficacy**<br>**Influenza vaccination of infants and children for prevention of influenza infection in children:** Systematic review [8] found inactivated influenza vaccine in children aged 6 months to 16 years reduced influenza (RR 0.41, 95%CI 0.29 to 0.59; participants = 1628; studies = 7; $I^2$ = 36%; RD -20%, 95% CI -33 to -7; test for subgroup differences according to age p=0.04) and influenza like illness (ILI) (RR 0.64, 95%CI 0.54 to 0.76; participants = 19388; studies = 7; $I^2$ = 67%; RD -12%, 95%CI -16 to -8). In infants 6 months to 2 years age, inactivated influenza vaccine had a smaller effect on influenza (RR 0.55, 95%CI 0.18 to 1.69; participants = 786; studies = 2; RD -5%, 95%CI -17 to 8; participants = 786; studies = 2). Conclusion: In children aged between 3 and 16 years, live influenza vaccines reduce influenza and ILI over a single influenza season. However live influenza vaccine is not available in Australia. Inactivated vaccines also reduce influenza and ILI. There is limited data on efficacy for infants 6 months to 2 years. [8] [LOE I GOR B]<br>**Influenza vaccination of pregnant women for prevention of influenza infection in infants:** A systematic review [9] of maternal influenza vaccination in pregnancy found a 36% reduced risk of infants <6 months having laboratory-confirmed influenza infection (RR 0.64, 95%CI 0.52, 0.78; 4 RCTs, 1099 infants). [9] [LOE I GOR B]<br><br>**Safety** |

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| | Influenza vaccines are grown in eggs. Due to changes in influenza vaccine manufacturing, the majority of influenza vaccines currently used contain less than 1 microgram of ovalbumin per dose. [2, 4] Influenza vaccine can be safely given in most patients with egg allergy (including egg prophylaxis) following appropriate guidelines. [4]<br>Some studies that included a small number of patients reported that people receiving cancer immuno-oncology therapies (checkpoint inhibitors) may have a higher risk of immune-related adverse events following immunisation with influenza vaccine, but a more recent study on patients receiving treatment with a single checkpoint inhibitor did not. The clinical importance of this potential interaction is currently inconclusive. [2]<br>Children can receive 13vPCV and inactivated influenza vaccine at the same visit if they need both vaccines. One study found a slightly higher risk of fever and febrile convulsions in children aged 6 months to <5 years (especially those aged 12–24 months) when they received inactivated trivalent influenza vaccine and 13vPCV at the same time, compared with receiving the vaccines separately. The risk was about 18 more cases per 100,000 doses in children aged 6 months to <5 years. The highest risk was 45 per 100,000 doses in children aged 16 months. This increased risk is small. A later study did not show the same association between febrile seizures and co-administration of these 2 vaccines. [2] It is acceptable to administer these vaccines concurrently when both vaccines are indicated. [10] |
| **Practice points** | All people ≥6 months of age are strongly recommended to receive annual influenza vaccine. [2]<br>Two doses at least 4 weeks apart are recommended for children aged 6 months to <9 years receiving influenza vaccine for the first time. [2] |
| **References** | 1. Australian technical advisory group on immunisation (ATAGI) clinical advice. Statement on the administration of seasonal influenza vaccines in 2020. https://www.health.gov.au/sites/default/files/documents/2020/03/atagi-advice-on-seasonal-influenza-vaccines-in-2020.pdf. Accessed on 14 May 2020.<br>2. Australian Immunisation Handbook. https://immunisationhandbook.health.gov.au/contents . Accessed 26/03/2020.<br>3. Vaccination for preterm infants. Australian immunisation handbook. https://immunisationhandbook.health.gov.au/vaccination-for-special-risk-groups/vaccination-for-preterm-infants. Accessed on 7 May 2020.<br>4. ASCIA Guidelines - Vaccination of the egg-allergic individual. https://www.allergy.org.au/hp/papers/vaccination-of-the-egg-allergic-individual. 2017.<br>5. National Vaccine Storage Guidelines 'Strive for 5'. 3rd edition. https://www.health.gov.au/resources/publications/national-vaccine-storage-guidelines-strive-for-5.<br>6. Somes MP, Turner RM, Dwyer LJ, Newall AT. Estimating the annual attack rate of seasonal influenza among unvaccinated individuals: A systematic review and meta-analysis. Vaccine. 2018;36:3199-207.<br>7. Homaira N, Briggs N, Oei JL, Hilder L, Bajuk B, Snelling T, Chambers GM, Jaffe A. Impact of influenza on hospitalization rates in children with a range of chronic lung diseases. Influenza other respi. 2019;13:233-9.<br>8. Jefferson T, Rivetti A, Di Pietrantonj C, Demicheli V. Vaccines for preventing influenza in healthy children. Cochrane Database Syst Rev. 2018;2:CD004879.<br>9. Nunes MC, Madhi SA. Influenza vaccination during pregnancy for prevention of influenza confirmed illness in the infants: A systematic review and meta-analysis. Hum Vaccin Immunother. 2018;14:758-66.<br>10. National centre for immunisation research and surveillance. Influenza vaccines for Australians. http://ncirs.org.au/sites/default/files/2020-04/Influenza-fact-sheet_March%202020_Final.pdf. Accessed on 18 May 2020. |

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