



**Australian Government**  
**Department of Health and Ageing**

**Australian Technical Advisory Group on Immunisation (ATAGI)**  
**Updated advice on the use of pandemic and seasonal influenza vaccines**  
**in children <10 years of age**  
**Updated: 26 August 2010**

(This document replaces the ATAGI advice document 'Use of pandemic and seasonal influenza vaccines in children <10 years of age' published in March 2010.)

**Note:** On 30 July 2010 the Chief Medical Officer (CMO) announced the resumption of use of the 2010 trivalent seasonal influenza vaccines of either Influvac® (Abbott/Solvay) or Vaxigrip® (Sanofi Pasteur) in children less than 5 years of age. See latest CMO Advice for Health Professionals at [www.immunise.health.gov.au](http://www.immunise.health.gov.au)

## **Recommendations**

Updated: 26 August, 2010

- From 26 August 2010, Panvax® Junior 0.25mL pre-filled syringes will no longer be available for use. **The manufacturer has undertaken a voluntary withdrawal of remaining stock because of a reduction in vaccine antigen potency over time, related to a known issue with low dose monovalent H1N1 vaccines. This withdrawal is not related to any safety issues.**
- Revaccination of children who have already received doses of Panvax® Junior is not necessary.
- All influenza vaccines previously administered are considered to have adequate potency to induce an immune response.
- Currently, all other influenza vaccines, including Panvax® multi-dose vials and seasonal influenza vaccines continue to meet potency specifications.
- Children who have received two doses of Panvax® Junior do not require further influenza vaccination during the 2010 influenza season unless parents wish their children to be protected against influenza H3N2 and influenza B.
- If a child aged  $\geq 6$  months to <3 years of age is due to receive a second dose of H1N1 containing vaccine, this can be provided by using the age appropriate dose (0.25mL) obtained from a Panvax® multi-dose vial. Alternatively, the 2010 seasonal influenza vaccines (Vaxigrip® and Influvac®).

### Existing recommendations

- Two doses of the **pandemic H1N1 influenza vaccine** (Panvax®), administered  $\geq 28$  days apart, are still recommended for children aged 6 months to <10 years to achieve adequate longer term protection against the influenza A pandemic H1N1 2009 strain. This is irrespective of the child's seasonal influenza vaccination history in previous years. Where a child has received one previous dose of Panvax® Junior, this child requires a further dose of Panvax® to achieve adequate protection against the H1N1 influenza strain.

- Two doses of **seasonal influenza vaccine**, administered  $\geq 28$  days (1 month) apart, are recommended for children aged 6 months to <10 years who receive influenza vaccine for the first time, or who have not received two or more doses in previous seasons.
- The **2010 seasonal trivalent influenza vaccine contains three strains**: the influenza A pandemic H1N1 2009 strain, an influenza A (H3N2) strain, and an influenza B strain. In 2010, for children aged 6 months to <10 years who have not received two doses of seasonal influenza in previous years, two doses are required to achieve an adequate immune response to the other influenza A (H3N2) strain and the influenza B component of the seasonal trivalent influenza vaccine, irrespective of the number of doses of pandemic H1N1 influenza vaccine received.
- The dosage (volume/quantity) of H1N1 antigen in either of the two influenza vaccines is:
  - 0.25 mL (7.5  $\mu$ g)** per dose for children **aged  $\geq 6$  months to <3 years**; and
  - 0.50 mL (15  $\mu$ g)** per dose for children **aged  $\geq 3$  years to <10 years**.
- Recommendations for vaccinating children aged 6 months to <10 years with either the 2010 seasonal influenza vaccine or Panvax®, and the required **number of doses** depend, on:
  - a) whether the child has any medical conditions that increase their risk of complications from influenza infection;
  - b) the eligibility of the child to receive free seasonal influenza vaccine through the National Immunisation Program or the Western Australian pilot program;
  - c) the intention of parents/guardian for the child to receive the seasonal influenza vaccine (through private purchase) to achieve protection against all three seasonal strains, or to achieve protection against the pandemic strain alone (through vaccination with the free Panvax®); and
  - d) the number of doses of seasonal influenza vaccine received in previous seasons.

Please refer to Table 1 for specific recommendations.

## Background

### **Non-safety related, voluntary withdrawal of Panvax® Junior pre-filled syringes**

On the 26<sup>th</sup> August 2010, CSL Biotherapies, in consultation with the TGA, made the decision to undertake a voluntary, non safety-related withdrawal of all remaining stocks of Panvax® Junior 0.25mL pre-filled syringes. This withdrawal is being undertaken because routine testing of this formulation has shown a decline in potency over time leading to a reduction in shelf-life to 6 months (compared with 12 months as initially anticipated).

This decline in potency has also been observed in monovalent H1N1 influenza vaccine pre-filled syringes (without preservative) used in other countries, such as Canada and the United States. It is related to an inherent characteristic of the H1N1 viral strain that reduces the stability of the haemagglutinin, especially in low dose formulations that are preservative-free.

### **There are no safety problems with the Panvax® Junior pre-filled syringes**

The decline in potency does not affect Panvax® multi-dose vials or the 2010 trivalent seasonal influenza vaccines Fluvax®, Influvac®, Intanza® or Vaxigrip®.

Children who have already received Panvax® Junior do not require any follow-up or revaccination as the potency of previously administered vaccines is considered adequate to induce a protective response. All children under 10 years of age are recommended to receive 2 doses of Panvax® to obtain adequate protection against the pandemic H1N1 strain. The multi-dose vials of Panvax® continue to meet all regulatory requirements, and as a matter of routine, continue to undergo potency testing. If a child aged  $\geq 6$  months to <3 years of age is due to receive a second dose of H1N1

containing vaccine, this can be provided by using the age appropriate dose (0.25mL) obtained from a Panvax® multi-dose vial. Alternatively, the 2010 seasonal influenza vaccines (Vaxigrip® and Influvac®) are also suitable for use.

### **The pandemic influenza vaccine**

The pandemic influenza vaccine registered in Australia, Panvax® (CSL Biotherapies), is a monovalent unadjuvanted split virus vaccine. It contains 15 µg of the haemagglutinin antigen of the pandemic strain A/California/7/2009 (H1N1) per 0.5 mL dose. Panvax Junior® contains 7.5 µg of the haemagglutinin antigen of the pandemic strain A/California/7/2009 (H1N1) per 0.25 mL dose. Multi-dose vials of Panvax® are still available for use.

Panvax® was registered for use in persons aged ≥10 years in September 2009, and for children aged 6 months to <10 years in December 2009. It is recommended for any person aged 6 months and older who wishes to be protected against pandemic influenza. Panvax® Junior was registered in December 2009.

For children ≥6 months to <3 years the dose is 0.25 mL dose (7.5 µg HA); for adults and children from ≥3 years of age the dose is 0.5 mL (15 µg HA). Children aged from ≥6 months to less than 10 years receive two doses of vaccine; adults, adolescents and children 10 years of age and older receive a single dose.

### **The 2010 seasonal trivalent influenza vaccine**

The seasonal influenza vaccine is a trivalent unadjuvanted split virus vaccine containing 15 µg of haemagglutinin antigen for each of three influenza strains (A/H1N1, A/H3N2, and influenza B) per 0.5 mL dose. The strains selected for the vaccine are those predicted to be the dominant circulating subtype strains for the upcoming season.

The three strains included in the 2010 seasonal influenza vaccine are:

- A/California/7/2009 (H1N1)-like (the pandemic strain)
- A/Perth/16/2009 (H3N2)-like
- B/Brisbane/60/2008-like

Children (and adults) with medical conditions that increase their risk of complications from influenza infection are recommended to receive seasonal influenza vaccine. Children aged <5 years, especially those aged <2 years, with and without specific risk factors, have the highest incidence of hospitalisation from the pandemic H1N1 as well as other (seasonal) strains of influenza.

## **b. Eligibility for free influenza vaccines for children**

### **The seasonal trivalent influenza vaccine**

- From 2010, all Australians (including children aged ≥6 months) with specified medical conditions that put them at increased risk of complications from influenza (as set out in *The Australian Immunisation Handbook* (9th edition), pages 190–191) are eligible for free seasonal influenza vaccine under the National Immunisation Program (NIP). (Previously they were able to receive seasonal influenza vaccine through the Pharmaceutical Benefits Scheme.) For more information refer to the Immunise Australia Program website at <http://www.immunise.health.gov.au/internet/immunise/publishing.nsf/Content/immuniseinfluenza>
- In 2010, all children aged <5 years residing in Western Australia are eligible for free seasonal influenza vaccine through a pilot program in Western Australia.
- Children who are not eligible for free influenza vaccines but wish to be protected against all three influenza strains included in the 2010 seasonal vaccine can receive the seasonal influenza vaccine through private purchase.

## The pandemic influenza vaccine, Panvax®

- Pandemic H1N1 influenza vaccine is available free of charge for anyone who wishes to be protected against pandemic influenza, under the Australian Government Pandemic H1N1 (2009) Vaccination Program.

### c. Selection between the pandemic and the seasonal influenza vaccines

- Children who are eligible for seasonal influenza vaccine under the NIP or the Western Australia program are recommended to receive the 2010 seasonal influenza vaccine as soon as possible.
- Children who are not eligible for seasonal influenza vaccine under the NIP or the Western Australia program but wish to be protected against all three influenza strains during the 2010 influenza season can receive the seasonal influenza vaccine through private purchase.
- Children who are not eligible for free seasonal influenza vaccine can elect to receive Panvax®, which is available free to all Australians, to provide protection against the pandemic H1N1 influenza strain during the 2010 influenza season.

### d. Dosage schedule of pandemic influenza vaccine and/or seasonal influenza vaccine by age group

#### Dose volume/quantity per dose by age group and route of administration:

The dosage (volume/quantity) of H1N1 antigen in either of the two influenza vaccines is:

**0.25 mL (7.5 µg)** per dose for children **aged ≥6 months to <3 years**; and  
**0.50 mL (15 µg)** per dose for children **aged ≥3 years to <10 years**.

If drawing up from a multi-dose vial, the same volumes apply: 0.25 mL for children aged ≥6 months to <3 years, and 0.5 mL for those aged ≥3 years to <10 years.

(Note as of 26 August 2010 single Panvax® Junior pre-filled syringes with 0.25 mL (7.5 µg) per dose will no longer be available, however, the 0.25 mL dose can be obtained from a Panvax® multi-dose vial)

Both the seasonal influenza vaccine and Panvax® are administered intramuscularly (or by deep subcutaneous injection).

#### Number of doses required by age group – see *Table 1*:

Children aged ≥6 months to <10 years who are not immunologically primed, through previous infection or immunisation, generally have a lower immune response to inactivated non-adjuvanted influenza vaccines compared with older children. This is why two doses are required for children aged 6 months to <10 years in their first year of immunisation to achieve adequate immune protection.

#### **Children aged 6 months to <10 years who will receive the seasonal influenza vaccine in 2010**

- For those who are receiving a seasonal influenza vaccine for the first time, two doses of the seasonal influenza vaccine, given at least 28 days apart, are recommended.
- For those who have received less than two doses of seasonal influenza vaccine in total in previous seasons, two doses of the seasonal influenza vaccine, given at least 28 days apart, are recommended.
- For most children who have received two or more doses of seasonal influenza vaccine in

previous seasons, a single dose of the seasonal influenza vaccine is recommended; this is consistent with the current advice on the use of seasonal influenza vaccine for children aged  $\geq 6$  months to  $< 10$  years as set out in *The Australian Immunisation Handbook* (9th edition).

- For those who are immunocompromised (due to disease or medical treatment), even if they have received two or more doses of seasonal influenza vaccine in previous seasons, a second dose of H1N1-containing vaccine (Panvax®) may be advisable, as it is likely to provide an enhanced immune response in this vulnerable population; this dose can be given  $\geq 28$  days after the dose of 2010 seasonal influenza vaccine and is only advised if no previous Panvax® has been given.

**Children aged 6 months to  $< 10$  years who are not planning to receive the seasonal influenza vaccine but will receive the pandemic influenza vaccine**

For children aged 6 months to  $< 10$  years, two doses of Panvax®, administered  $\geq 28$  days apart, are recommended to achieve adequate longer term protection against the influenza A pandemic H1N1 2009 strain. This is irrespective of their vaccination history of seasonal influenza vaccines in previous years. For such children who have already received one dose of Panvax® Junior, do not require a repeat dose. Where a second dose is still required, Panvax® can be administered.

## Questions & answers

- 1. If a child has received any previous dose/s of Panvax® Junior do they need to have an additional dose, i.e. be revaccinated?**

No - these children do not need to be revaccinated as the potency of previously administered vaccine/s are considered adequate to induce a protective response, assuming they have had two age-appropriate doses as recommended (see 2 and 3 below).

- 2. If a previously unvaccinated child aged between  $\geq 6$  months and  $< 3$  years has received two doses of Panvax® Junior separated by  $\geq 28$  days, do they need to be revaccinated?**

No - these children do not need to be revaccinated as the potency of previously administered vaccines are considered adequate to induce a protective response.

- 3. If a previously unvaccinated child aged between  $\geq 6$  months and  $< 3$  years has received one age-appropriate, dose of Panvax® Junior, do they need to be revaccinated?**

No - these children do not need to be revaccinated as the potency of the previously administered vaccine is considered adequate to induce a protective response. However, such children, especially those who are immunocompromised, should still receive the recommended second dose of influenza vaccine, 4 weeks after the first, to achieve an optimal immune response (see 4 and 5 below).

- 4. If a previously unvaccinated child aged between  $\geq 6$  months and  $< 10$  years has received two age-appropriate, doses of Panvax® or Panvax® Junior, how many doses of the 2010 seasonal influenza vaccine do they need?**

The recommendations remain unchanged. If the child has never had any seasonal influenza vaccine administered previously, they require two doses of the 2010 seasonal influenza vaccine. This is important because the seasonal influenza vaccine contains two other influenza virus strains, a type A/H3N2 and a type B strain, in addition to the pandemic H1N1 strain. Two doses are required for effective protection of immunologically naïve children against H3N2 and B strains.

- 5. If a previously unvaccinated child aged between  $\geq 6$  months and  $< 3$  years has received one age-appropriate, dose of Panvax® Junior and is *not* planning to receive the seasonal influenza vaccine during the 2010 season, do they require a second dose of Panvax®?**

Yes – a second dose of Panvax® should be administered  $\geq 28$  days after the first dose. Adequate short-term protection is expected following only one dose of Panvax® but two doses will provide longer term protection. A second dose is particularly important for those children who have a chronic medical condition that places them at increased risk of complications following influenza. An age appropriate dose (a 0.25 mL) can be obtained from a Panvax® multi-dose vial. As previously stated, using a Panvax® multi-dose vial to provide a 0.25mL dose is acceptable in this age group (see also ATAGI advice on thiomersal and on use of 0.25mL dose from MDV).

<http://www.healthemergency.gov.au/internet/healthemergency/publishing.nsf/Content/national-vaccination-program#atagi>

- 6. If a previously unvaccinated child aged between  $\geq 6$  months and  $< 3$  years has received one age-appropriate, dose of Panvax® Junior and is planning to receive, or has received, the 2010 seasonal influenza vaccine:**

- **Do they require a second dose of Panvax®?**

No - the 2010 seasonal influenza vaccine contains the pandemic H1N1 strain.

- **How many doses of the seasonal influenza vaccine do these children need?**

Two doses of the seasonal influenza vaccine are required irrespective of the number of doses of Panvax® Junior administered. The seasonal influenza vaccine contains three strains, two type A (pandemic H1N1 and H3N2) and one type B. Two doses are required for the child to be protected against the H3N2 and B strains. A child who has received one dose of Panvax® Junior and then two doses of the 2010 seasonal influenza vaccine is fully vaccinated against pandemic H1N1 influenza.

- 7. If a previously unvaccinated child aged between  $\geq 6$  months and  $< 10$  years has one dose of Panvax® now and one dose of the 2010 seasonal influenza vaccine (containing pandemic 2009 H1N1 influenza antigen) this year, would they be considered adequately vaccinated against the pandemic H1N1 virus?**

Yes – this child would be considered adequately vaccinated against pandemic H1N1 influenza, as long as there was a minimum interval of 28 days between these two vaccines.

- **Would this child be adequately vaccinated against the H3N2 and/or B strains contained in the 2010 seasonal influenza vaccine?**

No – the immunologically naïve child requires a second dose of the seasonal influenza vaccine with a minimum interval of 28 days between these two doses for effective protection against the H3N2 and B strains.

- 8. If a child has received two doses of Panvax® previously, what should be the interval between the last Panvax® dose and the 2010 seasonal influenza vaccine?**

There is no restriction on the time interval between these two vaccine doses.

**9. If a child aged 6 months to <10 years has received two or more doses of seasonal influenza vaccine previously, how many doses of the seasonal influenza vaccine are required in 2010?**

Only one dose of the 2010 seasonal influenza vaccine is required for most children aged 6 months to <10 years who have received two or more doses of seasonal influenza vaccine in previous seasons. This is consistent with the current advice on the use of seasonal influenza vaccine for children aged  $\geq 6$  months to <10 years as set out in *The Australian Immunisation Handbook* (9th edition).

However, if they are immunocompromised due to either a medical condition or to medical treatment, a second dose of H1N1-containing vaccine (Panvax®) may be advisable, as it is likely to provide an enhanced immune response in this vulnerable population. This dose can be given  $\geq 28$  days after the dose of 2010 seasonal influenza vaccine and is only advised if no previous Panvax® has been given.

**10. What about co-administration of Panvax® concurrently with other vaccines?**

ATAGI recommends that Panvax® can be administered at the same time (but at a different site, via separate syringes) as other vaccines, including all vaccines on the NIP schedule. Immunisation providers should take advantage of scheduled visits for NIP funded vaccines to offer Panvax® to young children.

Since the 2010 seasonal influenza vaccine includes the pandemic H1N1 strain, there should not be any situation where concurrent administration of Panvax® with the seasonal influenza vaccine is necessary.

**11. What about the interval required between Panvax® and NIP scheduled vaccines not given on the same day?**

Panvax® is an inactivated vaccine and therefore can be administered at any time before or after other inactivated and/or live vaccines.

**12. According to the recommendations, some children aged 6 months to <10 years will receive altogether more than two doses of influenza vaccine that contain the pandemic H1N1 strain (i.e. one or two doses of the 2010 seasonal influenza vaccine following one or two previous doses of Panvax®). Is there any safety concern for them?**

These children required the dose(s) of Panvax® for timely protection against the pandemic H1N1 strain earlier on, and will need the dose(s) of the 2010 seasonal influenza vaccine for protection against the other influenza strains in 2010. Panvax® is an inactivated vaccine and is manufactured in the same way as the inactivated seasonal influenza vaccine. The expected adverse effects associated with each dose of the inactivated influenza vaccine may occur. However, there is no evidence to suggest that there will be additional safety risks because a child receives more than two doses of influenza vaccine that contain the pandemic H1N1 strain.

**13. What are the recommendations for older children (aged  $\geq 10$  years)?**

Children aged  $\geq 10$  years who have seasonal influenza vaccine in 2010 require one dose. If the child has already received a dose of Panvax®, there is no recommended time interval between these two vaccine doses. If the dose of the seasonal influenza vaccine is given  $\geq 28$  days after the dose of Panvax®, there may be an immunological booster effect against the pandemic H1N1 influenza strain, but this is not considered necessary.

**Table 1. Summary of ATAGI dosage recommendations for pandemic H1N1 2009 (Panvax®) and 2010 seasonal influenza vaccination for children aged ≥6 months to <10 years – updated advice effective from 30 July 2010**

See footnotes below for rationale for number of doses and for vaccine eligibility and dosage information.

≥6 months to <10 years of age	Seasonal influenza vaccine doses given in previous years*	Panvax® doses given previously	Seasonal influenza vaccine 2010*	Panvax®
			Number of doses	Number of doses
Child who will receive seasonal influenza vaccine in 2010†	≥2 valid doses	0 doses	1 dose	Not required#
	≥2 valid doses	1 or 2 doses	1 dose (≥28 days after 1 dose of Panvax® or anytime after 2 doses of Panvax®)	Not required
	0 or 1 dose	0, 1 or 2 doses	2 doses, separated by ≥28 days (first dose ≥28 days after 1 dose of Panvax® and anytime after 2 doses of Panvax®)	Not required
Child not planning to receive seasonal influenza vaccine in 2010	0, 1 or 2 doses	0 doses	Not applicable	2 doses, separated by ≥28 days
		1 dose	Not applicable	1 dose (≥28 days after 1st dose of Panvax®)
		2 doses	Not applicable	Not required

***Please turn over for reference to footnotes***

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\* Two doses of the seasonal influenza vaccine at least 28 days (1 month) apart are recommended for children aged <10 years who receive influenza vaccine for the first time. If a child ≥6 months to <10 years of age receiving the seasonal influenza vaccine for the first time does not receive the second dose in the same year, two doses are needed the following year.

The 2010 seasonal influenza vaccine contains three strains: the influenza A pandemic (H1N1) strain; an influenza A (H3N2) strain; and an influenza B strain.

Irrespective of the number of doses of pandemic H1N1 influenza vaccine received, two doses of the seasonal influenza vaccine are required to achieve an adequate immune response to the influenza A (H3N2) strain and the influenza B component of the seasonal trivalent influenza vaccine unless  $\geq 2$  doses of seasonal vaccine have been received in previous years.

† It is recommended that children with medical risk factors receive the seasonal trivalent influenza vaccine and this is provided free under the National Immunisation Program (see 'Eligibility for free vaccines' below). Any child without medical risk factors who wishes to be protected against the three influenza strains in the seasonal vaccine can receive it through private purchase.

# For most children, no additional doses of pandemic H1N1-containing vaccine are required; this is consistent with the current advice on the use of seasonal influenza vaccine for children aged  $\geq 6$  months to  $< 10$  years as set out in *The Australian Immunisation Handbook* (9th edition). However, for children aged  $\geq 6$  months to  $< 10$  years who are immunocompromised (due to disease or medical treatment), a second dose of H1N1-containing vaccine (Panvax<sup>®</sup>) may be advisable as it is likely to provide an enhanced immune response in this vulnerable population. This dose can be given  $\geq 28$  days after the dose of the 2010 seasonal influenza vaccine and is only advised if no previous Panvax<sup>®</sup> has been given.

**Dosage and presentation:** The dosage of both vaccines is **0.25 mL** for ages  $\geq 6$  months to  $< 3$  years and **0.5 mL** for ages  $\geq 3$  years to  $< 10$  years. The seasonal influenza vaccine is available in either 0.5 mL or 0.25 mL dosages in pre-filled syringes. Pandemic H1N1 2009 influenza vaccine (Panvax<sup>®</sup>) is available in multi-dose vials for use in the appropriate dosage at all ages and can be administered to children, including those aged  $\geq 6$  months to  $< 3$  years. From 26 August 2010, Panvax<sup>®</sup> Junior 0.25mL pre-filled syringes will no longer be available for use.

**Eligibility for free vaccines:** Seasonal influenza vaccine is funded under the National Immunisation Program (NIP) **only** for children at increased risk of complications from influenza infection as set out in *The Australian Immunisation Handbook* (9th edition), pages 190–191. In Western Australia, all children aged  $< 5$  years are eligible for free seasonal influenza vaccine through the Western Australia jurisdictional influenza program. Seasonal influenza vaccine is recommended for all other children aged  $\geq 6$  months who wish to reduce the risk of contracting seasonal influenza and is available via private prescription. Pandemic H1N1 influenza vaccine is funded for all children and adults through the Australian Government Pandemic H1N1 (2009) Vaccination Program.