Vaccine recommendations for children and youth for the 2017/2018 influenza season

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Abstract
The Canadian Paediatric Society continues to encourage annual influenza vaccination for ALL children and youth ≥ 6 months of age. Recommendations from the National Advisory Committee on Immunization (NACI) for the 2017/2018 influenza season are not substantially changed from those of last season. NACI has conducted a review of all available vaccine effectiveness data concerning live attenuated influenza vaccine (LAIV) and concludes that current evidence supports the continued use of LAIV in Canada, although use is not currently recommended in the United States because of concern about efficacy.

Key Words: Children; Influenza vaccine; Inactivated influenza vaccine; LAIV; NACI

Paediatricians and other health care providers caring for children and youth have important roles in promoting influenza vaccination. They can increase the uptake of influenza vaccine by helping families to recognize both the potential severity of influenza infection, and the efficacy and safety of vaccination.

Who should be vaccinated?
The Canadian Paediatric Society encourages annual influenza vaccinations for ALL children and youth ≥6 months of age, with a particular focus on individuals at high risk for influenza-related complications and people – including paediatricians and other health care providers – capable of transmitting influenza to those at high risk (Box 1). All children <5 years of age are considered to be at high risk for infection and, in addition, are efficient transmitters of influenza \(^1\)[2].

This practice point summarizes the most recent recommendations from the National Advisory Committee on Immunization (NACI) \(^2\). Beginning in the 2014/15 season, NACI recommended the vaccine for all individuals ≥6 months of age, with a particular focus on people at high risk for influenza-related complications or hospitalization, and individuals capable of transmitting influenza to those at high risk (Box 1) \(^2\).

Why vaccinate annually?
Although some vaccinated individuals retain immunity from one season to the next, this is less likely when the predominant circulating strain changes; therefore, annual revaccination is recommended. A high failure rate of the influenza vaccine was observed during the 2014/15 season because of the appearance of an important antigenic change in the predominant circulating A H3N2 strain, rendering that component of the vaccine ineffective. That component and one influenza B component were replaced in 2015/16 and again in 2016/17. For the 2017/18 season, the influenza A H1N1 component has been replaced \(^3\). Recent concerns about reduced vaccine efficacy after repeated vaccination are being investigated but data so far supports continuing annual revaccination \(^2\).

What vaccine should be used?
For several decades, influenza vaccines contained two subtypes of influenza A and one lineage of influenza B. Two lineages of influenza B have been in circulation simultaneously in recent years, and trivalent vaccines are now being replaced by quadrivalent vaccines containing two strains of influenza A and both lineages...
of influenza B. The NACI recommends preferential use of quadrivalent vaccines for children and adolescents because influenza B causes more mortality and morbidity in children than in adults [2].

Two types of influenza vaccines are available in Canada: inactivated influenza vaccines (IIV) for intramuscular injection and an intranasal, live attenuated influenza vaccine (LAIV).

IIV is available in quadrivalent (QIV) and trivalent (TIV) forms. An adjuvanted TIV (Fluad Pediatric, Novartis Pharmaceuticals, Canada) is available for children 6 to 23 months of age, and may be used for this age group when QIV is not available. While adjuvants are designed to enhance vaccine immunogenicity, there is insufficient evidence at the present time to make a preferential recommendation for adjuvanted or unadjuvanted TIV.

LAIV is now available only in the quadrivalent form. It is authorized for use in individuals 2 to 59 years of age [2], LAIV is not licensed for use in children <2 years of age because of a small, but significant, increased rate of wheezing two to four weeks following vaccination observed in this age group. LAIV can be used for children and youth, 2 to 17 years of age, who are not immunocompromised. In NACI statements up to 2015/16, LAIV was preferred over IIV for children because early studies had shown LAIV to have greater efficacy than IIV. However, more recent studies have not consistently shown LAIV to provide better protection than IIV. NACI no longer recommends LAIV preferentially for children; either LAIV or IIV may be used [2]. In adults, there is some evidence that IIV may be more efficacious than LAIV. Either IIV or LAIV may be used for healthy adults, but adults with chronic health conditions should receive IIV. The most common side effects of LAIV are transient nasal congestion and rhinorrhea.

In the United States, data from the U.S. Flu Vaccine Effectiveness Network (USFVEN) showed no protective effect of LAIV against circulating strains of influenza A H1N1 during the 2013/14, 2014/15 and 2015/16 seasons, prompting the American Advisory Committee on Immunization Practices to recommend that for 2016/17, LAIV not be used. That recommendation remains in effect for 2017/18 [4]. In contrast to the USFVEN results, LAIV was found to be effective in other studies in the U.S., as well as in the U.K., Finland and Canada, where LAIV continues to be used. After careful review of all available studies from the last several influenza seasons, NACI concluded that the current evidence suggests that LAIV provides comparable protection against influenza to that of IIV in several jurisdictions and continues to recommend it as an option [2]. The reasons for the discordant results in the U.S. are currently unknown, and NACI recognizes the need to continue to monitor LAIV effectiveness data [2].

In summary, quadrivalent influenza vaccine is recommended for all children. For non-immunocompromised children 2 years of age or older, either IIV or LAIV may be used. See Table 1 for vaccine options and NACI preferences for children and youth. It is recognized that programmatic considerations may affect vaccine availability in publicly funded programs.

**When to vaccinate**

For maximum benefit, influenza vaccine should be given as soon as it is available, before the onset of the influenza season. Nevertheless, it should be offered to individuals who have not received it earlier up until the end of the current season. Benefit may be less if exposure to influenza has already occurred.

**Are there any contraindications to influenza vaccine?**

An anaphylactic reaction to a previous dose of influenza vaccine or to any of the components of the vaccine with the exception of egg, or onset of Guillain-Barré syndrome within six weeks of influenza vaccination, are contraindications to further doses [2].

Since 2011/12, egg allergy has not been a contraindication to the use of IIV. More recently, several studies have shown that LAIV can also be given safely to egg-allergic individuals and since 2016/17, NACI no longer considers this condition a contraindication [4]. Either IIV or LAIV can be given to individuals with egg allergy. Like all other vaccines, influenza vaccine should be given in a setting where anaphylaxis can be managed [2][4].

LAIV, because it is a live vaccine, is contraindicated in individuals with immune-compromising conditions. LAIV is also contraindicated for individuals with severe asthma (defined as active wheezing, currently on oral or high-dose inhaled glucocorticosteroids or medically attended wheezing within the previous seven days) and during pregnancy. LAIV is also contraindicated in children and adolescents, 2 to 17 years of age, receiving chronic acetylsalicylic acid-containing therapy because of the association of Reye’s
syndrome with acetylsalicylic acid given during influenza infection.

LAIV should not be administered until 48 h after antiviral agents active against influenza have been discontinued. If an antiviral agent must be given within two weeks after the receipt of LAIV, another dose of vaccine should be given at least 48 h after discontinuation of therapy. For individuals experiencing nasal congestion sufficient to impede the appropriate delivery of LAIV, vaccination should be deferred until the congestion has resolved or IIV should be given.

Spread of the virus from patients immunized with LAIV can occur; however, the virus is cold-adapted and, therefore, not very pathogenic. As a precaution, it is recommended that contact with severely immunocompromised patients (such as recent hematopoietic stem cell transplant recipients who are still in hospital) be avoided for two weeks following LAIV.

What is the dosage?

The dose of IIV administered intramuscularly (IM) is 0.5 mL, regardless of age, except for paediatric adjuvanted TIV, for which the dose is 0.25 mL IM. The dose of LAIV is 0.2 mL (0.1 mL administered in each nostril as an intranasal spray) [1].

The first year that a child <9 years of age receives influenza vaccine (either IIV or LAIV), two doses at least four weeks apart are required. If a child <9 years of age has received at least one dose of any influenza vaccine in the past, only one dose is required this season. Children ≥9 years of age and adults require only one dose each year.
BOX 1

**National Advisory Committee on Immunization recommendations for the 2017/2018 influenza season**

**Influenza vaccination is particularly recommended for the following groups:**

People at high risk for influenza-related complications or hospitalization:

- All children 6 to 59 months of age
- All children ≥6 months of age, adolescents and adults with chronic health conditions (severe enough to require regular medical follow-up or hospital care), specifically:
  - Cardiac or pulmonary disorders including bronchopulmonary dysplasia, cystic fibrosis, asthma
  - Diabetes mellitus and other metabolic diseases
  - Renal disease
  - Anemia or hemoglobinopathy
  - Cancer or other immune-compromising conditions (due to disease or therapy)
  - Morbid obesity (body mass index ≥40 kg/m²)
  - Neurological or neurodevelopmental conditions*
    - Children and adolescents (6 months to 18 years of age) undergoing prolonged treatment with acetylsalicylic acid
- Indigenous peoples
- All residents of chronic care facilities
- All pregnant women, including adolescents, in all trimesters (for their own protection and to protect their infant after birth)
- All adults ≥65 years of age

People capable of transmitting influenza to individuals at high risk, specifically:

- Household contacts (adults and children) of individuals at high risk (listed above), regardless of whether the person at risk has been immunized
- Household contacts of infants <6 months of age (these infants are at high risk but too young to receive influenza vaccine)
- Members of a household expecting a newborn during influenza season
- Individuals providing regular child care to children ≤59 months of age, regardless of whether in or out of the home
- Health care and other care providers in facilities and community settings

Others who provide services to individuals at high risk in closed or relatively confined settings

*These include neuromuscular, neurovascular, neurodegenerative, neurodevelopmental conditions and seizure disorders, and for children, febrile seizures and isolated developmental delay, but excludes migraines and neuropsychiatric conditions without neurological abnormalities.
TABLE 1
Choice of influenza vaccine for selected age and risk groups*

<table>
<thead>
<tr>
<th>Age group, health profile</th>
<th>Vaccine types available</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children 6–23 months of age</td>
<td>• QIV</td>
<td>QIV preferred</td>
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<tr>
<td></td>
<td>• TIV</td>
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<td></td>
<td>• ATIV</td>
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<tr>
<td>Children 2–17 years of age: healthy or with chronic health conditions without immune suppression</td>
<td>• Q-LAIV</td>
<td>A quadrivalent vaccine (Q-LAIV or QIV) preferred</td>
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<tr>
<td></td>
<td>• QIV</td>
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<td></td>
<td>• TIV</td>
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<tr>
<td>Children 2–17 years of age: immune compromising conditions</td>
<td>• QIV</td>
<td>QIV preferred</td>
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<tr>
<td></td>
<td>• TIV</td>
<td>Q-LAIV contraindicated</td>
</tr>
<tr>
<td>Pregnancy</td>
<td>• QIV</td>
<td>Q-LAIV not recommended (not studied; theoretical risk to fetus of live vaccine)</td>
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<tr>
<td></td>
<td>• TIV</td>
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* For vaccine options for adults see reference 2.

QIV Quadrivalent inactivated influenza vaccine; TIV Trivalent inactivated influenza vaccine; Q-LAIV Quadrivalent live attenuated influenza vaccine; ATIV Adjuvanted trivalent inactivated influenza vaccine

References


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