

Pocket Guide for Immunizers: Pneumococcal Vaccination

The purpose of this pocket guide is to serve as a tool for health care providers to learn more about pneumococcal vaccines, enabling them to make strong recommendations to their patients.

Invasive pneumococcal disease (IPD)—including pneumococcal pneumonia with bacteremia, pneumococcal sepsis and pneumococcal meningitis—is a major cause of illness and death worldwide. The disease is caused by the bacteria *Streptococcus pneumoniae*, of which 100 different serotypes have been identified, with a smaller subset of serotypes causing the majority of illness in Canada.

Asymptomatic upper respiratory tract colonization is common, with 20% to 60% of healthy children acting as asymptomatic carriers. However, colonization can lead to infection and occasionally can develop into life-threatening IPD. IPD is most common among the very young (children under the age of 5), in older adults (over the age of 65), and in people with underlying medical conditions (of any age).

Highly effective vaccines exist against the *Streptococcus pneumoniae* serotypes that causes the highest burden of disease in Canada. Routine immunization of children is an essential tool to prevent pneumococcal disease, and targeted immunization of at-risk groups, including older adults, provides life-saving protection against this deadly disease.



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What vaccines are available?

There are two types of pneumococcal vaccines: conjugate and polysaccharide.

This pocket guide will focus primarily on conjugate vaccines. The polysaccharide vaccine is being phased out across Canada and is no longer available in many regions.

Each conjugate vaccine protects against specific pneumococcal serotypes, with the number of serotypes covered by a given vaccine indicated in the vaccine code (see Table 1).

Table 1: Pneumococcal conjugate vaccine preparations authorized and recommended for use in Canada

Class Code	Class Details	Authorized Ages for Use	Product Name	Product Code
PNEU-C	Conjugate vaccines	6 weeks and older	Pevnar [®] 13	PNEU-C-13
		6 weeks and older	VAXNEUVANCE [®]	PNEU-C-15
		6 weeks and older	PREVNAR 20 [™]	PNEU-C-20
		18 years and older	CAPVAXIVE [™]	PNEU-C-21

Note: Throughout the rest of this guide, vaccines will be referred to by vaccine code when there is a specific recommendation within the class, and by class code (or the text "conjugate vaccines") when there is not.

While PNEU-C-10 (SYNFLORIX[®]) is still approved for use in Canada, it is no longer recommended for use.

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What is the recommended dosage and how is it given?

For all authorized preparations, dosage is 0.5mL. All conjugate vaccines should be administered intramuscularly (IM).

How do I choose which vaccine to give?

Because conjugate vaccines provide stronger and longer-lasting protection, they are recommended both for routine childhood immunization and for people at increased risk of invasive pneumococcal disease (including older adults and immunocompromised persons).

For children, the most recently available pneumococcal vaccines – PNEU-C-20 and PNEU-C-15 – are both recommended and preferred over PNEU-C-13. PNEU-C-13 remains a recommended alternative if it is more practical for reasons of cost and availability. However, PNEU-C-20 is the only vaccine recommended for children at high risk of invasive pneumococcal disease (IPD).

For adults, the most recently available pneumococcal vaccines – PNEU-C-21 and PNEU-C-20 – are both recommended. Either formulation may be offered, but the decision on which vaccine to administer to adults may depend on cost, availability, and local epidemiology.

The differences between PNEU-C-21 and PNEU-C-20 are: 1) each vaccine protects against different serotypes, with only

partial overlap, and 2) each vaccine is authorized for use in different age groups. PNEU-C-21 is authorized only for use in adults 18 years and older, and was designed to protect against serotypes more commonly seen among older adults. PNEU-C-20 is authorized for use in both children and adults.

For children and adults with risk factors for invasive pneumococcal disease, if their immunization series was completed with a pneumococcal vaccine that protects against fewer serotypes, an additional dose of PNEU-C-20 (all ages) or PNEU-C-21 (adults only) is recommended.

Refer to [Table 2](#) for a list of underlying medical conditions that result in a high risk of IPD.



A Note on Interchangeability

In general, conjugate vaccines may be used interchangeably in the interest of completing a course of immunization. For example, a series that was begun with PNEU-C-13 may be continued with PNEU-C-15.

Who should receive pneumococcal immunization?

Healthy children (2 months to 5 years of age)

- Routine immunization with PNEU-C-20 or PNEU-C-15 is recommended.
- The recommended provincial and territorial schedules may consist of either 3 or 4 doses, beginning at 2 months of age, with the final dose usually being given between 12 and 15 months of age.
- Children 12 months to less than five years of age with incomplete or interrupted pneumococcal vaccination schedules should have their previous pneumococcal immunization history evaluated to determine the number of doses they need to receive. Please see this table in the *Canadian Immunization Guide* chapter on pneumococcal vaccines for more information.
- See [Table 3](#) for schedule

Children at high risk of IPD (2 months to 17 years of age)

- Immunization with a 4-dose (3+1) schedule of PNEU-C-20 is recommended for infants with underlying medical conditions associated with a high risk of IPD who first present for immunization at 2 months to less than 7 months of age.
- For the recommended PNEU-C-20 immunization schedules for children at high risk of IPD who first present for immunization at 7 months of age and older, please refer to [Table 4](#) in the *Canadian Immunization Guide* chapter on pneumococcal vaccines.
- In addition to underlying medical conditions, please refer to [Table 1](#) in the *Canadian Immunization Guide* chapter on pneumococcal vaccines for a list of social, behavioural, and environmental factors that can place children at high risk for IPD.
- See [Table 4](#) for schedule

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Older adults (65+ years of age)

- Immunization with PNEU-C-21 or PNEU-C-20 is recommended for all adults aged 65 or older, regardless of prior immunization status.
- See [Table 5](#) for schedule

Adults at high risk of IPD (18+ years of age)

- Immunization with PNEU-C-21 or PNEU-C-20 is recommended for adults with immunocompromising/underlying medical conditions resulting in high risk of IPD.
- In addition to underlying medical conditions, please refer to [Table 1](#) in the *Canadian Immunization Guide* chapter on pneumococcal vaccines for a list of social, behavioural, and environmental factors that can place adults at high risk for IPD.
- See [Table 5](#) for schedule



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Table 2: Underlying medical conditions resulting in high risk of IPD (highest risk italicized)

Immunocompromising Conditions	Non-immunocompromising Conditions
<i>Sickle cell disease, asplenia, or splenic dysfunction</i>	Chronic cerebrospinal fluid (CSF) leak
<i>Congenital immunodeficiencies involving any part of the immune system</i>	Chronic neurologic condition that may impair clearance of oral secretions
<i>Immunocompromising therapies undertaken within the last 2 years (corticosteroids, chemotherapy, radiation, post-transplant therapy)</i>	Cochlear implants, including children and adults who are to receive implants
<i>HIV infection</i>	Chronic heart disease
<i>Hematopoietic stem cell transplant (HSCT) (recipient)¹</i>	Diabetes mellitus
<i>Malignant neoplasms, including leukemia and lymphoma</i>	<i>Chronic kidney disease</i>
<i>Nephrotic syndrome</i>	<i>Chronic liver disease, including hepatic cirrhosis (any cause)</i>
<i>Solid organ or islet transplant (candidate or recipient)</i>	Chronic lung disease, including asthma requiring medical care in the preceding 12 months

1. There is a special schedule for HSCT recipients. See page 7.

What specific populations require special attention?

Persons with inadequate immunization records

Children and adults with incomplete immunization records, or no immunization records, should be considered unimmunized and should receive pneumococcal vaccines on a schedule appropriate to their age and risk factors, regardless of possible previous immunization. No adverse effects have been demonstrated from repeated pneumococcal immunization.

Infants born prematurely

Premature infants in stable clinical condition should be immunized with PNEU-C-15 or PNEU-C-20 at the same chronological age and according to the same schedule as full-term infants. Hospitalized infants with birth weights under 1500g should receive continuous cardiac and respiratory monitoring for 48 hours after their first immunization.

Recipients of hematopoietic stem cell transplantation (HSCT)

HSCT recipients are at increased risk of IPD. Antibody response to pneumococcal vaccination is known to be poor in this population.

Pediatric HSCT recipients should be immunized with a 4-dose series of PNEU-C-20. Adult HSCT recipients should be immunized with a 3-dose series of PNEU-C-20 or PNEU-C-21, followed by a booster dose of whichever of those two was not given during the primary series (i.e., 3 doses of PNEU-C-20 with a PNEU-C-21 booster, or 3 doses of PNEU-C-21 with a PNEU-C-20 booster).



Who should not receive the pneumococcal vaccine?

These vaccines have a well-established history of safety, but there are some contraindications and situations which warrant extra precautions.

- Individuals who have previously experienced an anaphylactic reaction to the vaccine—or who have a proven history of immediate or anaphylactic hypersensitivity to any vaccine component, including diphtheria toxoid—should not be given the vaccine.

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- Individuals with suspected hypersensitivity or non-anaphylactic allergy to the vaccine or any of its components should be investigated further in consultation with an allergist. Immunization in a controlled setting may be advised.
- Immunization should be postponed for individuals with moderate or severe acute illness—for example, if they have a high fever, worsening symptoms, or need urgent medical care. This is to avoid confusion between the illness and possible vaccine side effects, and to ensure medical care is not complicated. In the case of minor illness, with or without fever, immunization may proceed normally.

Can the pneumococcal vaccines be given at the same time as other vaccines?

All pneumococcal vaccines can be given simultaneously with other routine and age appropriate vaccines, *except other pneumococcal formulations*. Specifically, the polysaccharide pneumococcal vaccine (PNEU-P-23) *should not* be given concurrently with a conjugate pneumococcal vaccine.

Remember

In all cases, if vaccines are administered simultaneously, a separate injection site and a different syringe must be used for each.

What about side effects and adverse reactions?

Severe adverse effects are rare following immunization and, in most cases, data does not suggest a causal relationship. Some short-term mild to moderate reactions are more commonly seen. The following may be seen after receiving a conjugate pneumococcal vaccine:

- soreness or redness at the injection site
- occasional slight fever
- fatigue
- headaches
- irritability and decreased appetite

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Immunization Schedules

Table 3: Recommended routine pneumococcal immunization for healthy children

At 2 months of age	1 dose of PNEU-C-20 or PNEU-C-15
At 4 months of age	1 dose of PNEU-C-20 or PNEU-C-15
At 6 months of age	0 or 1 dose of PNEU-C-20 or PNEU-C-15, depending on provincial or territorial schedule. When a 3-dose schedule is being followed, no dose is given at 6 months of age.
Between 12 and 15 months of age	1 booster dose of PNEU-C-20 or PNEU-C-15 If a 3-dose schedule is being followed, the booster should be administered at 12 months of age.

For the recommended pneumococcal immunization schedules for immunocompetent children first presenting for pneumococcal vaccination from 7 months to less than 18 years of age, see [Table 3](#) in the Canadian Immunization Guide chapter on pneumococcal vaccines.

Table 4: Recommended pneumococcal immunization for children at high risk of IPD

At 2 months of age	1 dose of PNEU-C-20
At 4 months of age	1 dose of PNEU-C-20
At 6 months of age	1 dose of PNEU-C-20
Between 12 and 15 months of age	1 booster dose of PNEU-C-20

For the recommended pneumococcal immunization schedules for children at high risk of IPD first presenting for pneumococcal vaccination from 7 months to less than 18 years of age, see [Table 4](#) in the Canadian Immunization Guide chapter on pneumococcal vaccines.

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Notes on Tables 3 and 4

- In all instances of pediatric immunization, PNEU-C-20 is the preferred vaccine when possible, and PNEU-C-15 is preferred when PNEU-C-20 is not available or practical. A series of vaccines that began with PNEU-C-13 or PNEU-C-15 may be continued with PNEU-C-20.
- Doses of PNEU-C should be administered at least 8 weeks apart.

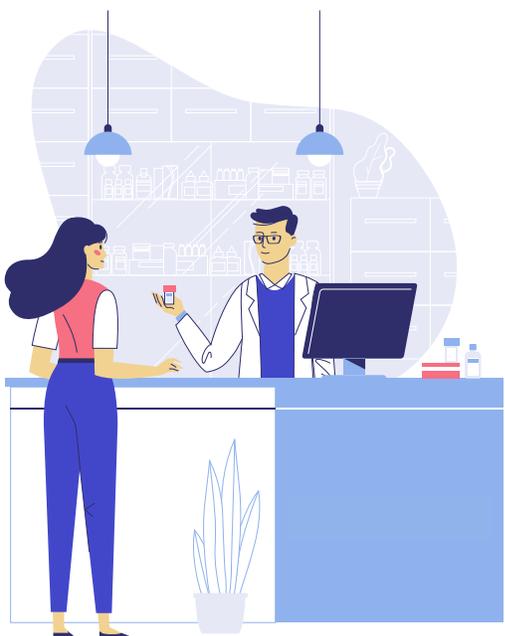
Accelerated and catch-up schedules

For children less than 12 months of age who have received a partial or incomplete series of PNEU-C immunization, that series should be completed using PNEU-C-20 (for immunocompetent or immunocompromised children) or PNEU-C-15 (for immunocompetent children only) to bring them up to the appropriate total number of doses.

Children aged 12 months or older who have received a partial or incomplete series of PNEU-C immunization should be assessed to determine the number of doses of PNEU-C-20 (for immunocompetent or immunocompromised children) or of PNEU-C-15 (for immunocompetent children only) required to complete the series.

All children at increased risk of risk of IPD (see page 4) who have completed their recommended immunization schedule using PNEU-C-15 or PNEU-C-13 should receive one booster dose of PNEU-C-20. If a child at high risk of IPD received a dose of the polysaccharide pneumococcal vaccine (PNEU-P-23) and needs to receive a booster dose of PNEU-C-20, PNEU-C-20 should be administered at least one year after their dose of PNEU-P-23.

All doses of conjugate pneumococcal vaccines should be administered at least 8 weeks apart.



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Table 5: Recommended pneumococcal vaccination for adults

Adults aged 65+, regardless of previous immunization history	1 dose of PNEU-C-21 or PNEU-C-20
Adults aged 18+ who are at higher risk for IPD (including immunocompromised persons), regardless of previous immunization history	1 dose of PNEU-C-21 or PNEU-C-20

Notes on Table 5

- PNEU-C-21 and PNEU-C-20 are the preferred conjugate pneumococcal vaccines; however, they are not currently publicly funded in all provinces and territories.
- In adults who have previously been immunized with PNEU-C-15, PNEU-C-13, PNEU-P-23 or another pneumococcal vaccine, an interval of 1 year is recommended between those doses and the recommended vaccination above. However, PNEU-C-21 or PNEU-C-20 may be administered after an interval as short as 8 weeks after a dose of PNEU-C-13 in adults anticipating becoming immunocompromised through treatment.
- Anyone who is pregnant or breastfeeding can receive pneumococcal immunization without risk.

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This pocket guide was reviewed by and supplemented with commentary made by expert reviewers.