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Rapid Review

Publicly funded pneumococcal vaccine programs and monitoring vaccine coverage for Canadian adults

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About

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List of Abbreviations

CSF	cerebrospinal fluid
HSCT	hematopoietic stem cell transplant
IPD	Invasive pneumococcal disease
NACI	National Advisory Committee on Immunization
PCV13	13-valent pneumococcal conjugate vaccine
PCV15	15-valent pneumococcal conjugate vaccine
PCV20	20-valent pneumococcal conjugate vaccine
PPV23	23-valent pneumococcal polysaccharide vaccine
PT	Province and territory, or provinces and territories

Executive Summary

Considered within the top-10 leading causes of death in Canada (Statistics Canada, 2022), pneumonia can lead to serious complications such as invasive pneumococcal disease (IPD) (Drijkoningen & Rohde, 2014; Public Health Agency of Canada, 2023e). Older adults (Nasreen et al., 2021), adults that are immunosuppressed, and older adults living in long-term care facilities bear the largest burden for pneumococcal disease (Cafiero-Fonseca et al., 2017). Canada's National Advisory Committee on Immunization (NACI) recommends pneumococcal vaccines at certain dose schedules for adults based on their risk for IPD. There are currently four pneumococcal vaccines authorized for adult usage in Canada: 23-valent pneumococcal polysaccharide vaccine (PPV23); 13-valent pneumococcal conjugate vaccine (PCV13); 15-valent pneumococcal conjugate vaccine (PCV15); and 20-valent pneumococcal conjugate vaccine (PCV20) (Public Health Agency of Canada, 2023c). However, there is variability in how provinces and territories (PTs) publicly fund pneumococcal vaccines for eligible adults and in how jurisdictions monitor vaccine coverage. We conducted a rapid review to document and compare the eligibility criteria of publicly funded adult pneumococcal vaccine programs across PTs to the 2016 NACI recommendations on pneumococcal vaccination in adults; and also to document and compare how pneumococcal vaccine coverage is monitored across PTs.

Our summarized findings indicate that many PTs in Canada align with the 2016 NACI recommendations on population eligibility and dose schedules for publicly funded pneumococcal vaccines, with differences found in British Columbia, Manitoba, Ontario, Quebec, New Brunswick, Newfoundland and Labrador, Northwest Territories, and Nunavut. Additionally, smoking as a lifestyle factor was not considered in most PTs' eligibility criteria, despite NACI recommendation. Furthermore, only six PTs had publicly available information on pneumococcal vaccine monitoring. Of these, Manitoba and Quebec were the only PTs that reported some level of data disaggregation of sociodemographic factors related to pneumococcal vaccine uptake/coverage.

Based on our findings and the updated NACI guidelines we list the following recommendations for future research and considerations for PTs:

1. Continue to monitor changes across PTs and undertake cost-effectiveness analyses for publicly funded PCV15 and PCV20 immunization programs for adults.
2. Examine the possible impacts of these changes on pneumococcal disease, including possible impacts from any associated delays in implementing NACI recommendations.
3. Continue to prioritize eligibility for populations at high risk for IPD in publicly funded pneumococcal vaccine programs.
4. Prioritize research that investigates outreach and access of publicly funded pneumococcal vaccines for adults with high risk for IPD that may not have consistent encounters with or face barriers to accessing healthcare services (e.g., adults with social risk factors, adults in rural or remote locations etc.).
5. Improve public accessibility of PT-wide adult pneumococcal vaccine monitoring and surveillance, ensuring data disaggregation of sociodemographic factors that can be further studied to discern equitable uptake for various populations.

Introduction & Background

Evidence has shown the importance of vaccination to prevent premature mortality, reduce healthcare costs, and enhance quality of life (Stancu et al., 2023). Despite its importance for healthy aging, the immunization of adults remains an under-researched area of public health as many vaccination programs primarily target children (Doherty et al., 2019). In the absence of a national vaccine registry in Canada, adult vaccine coverage is measured through country-wide immunization surveys conducted every two years by the Public Health Agency of Canada, as well as province and territory-wide surveillance in some jurisdictions to monitor vaccination coverage goals (Public Health Agency of Canada, 2023d; Wilson et al., 2016). Among Canadian adults, immunization coverage for many key vaccines is below national targets (Public Health Agency of Canada, 2023b). For example, a national survey from 2020–2021 reported vaccine coverage rates of 40% for influenza, 34% for pertussis, and 27% for shingles among adults aged 50 years and older (Public Health Agency of Canada, 2022). Of particular concern is the low uptake of pneumococcal vaccines among eligible adult populations in Canada. Although the national pneumococcal vaccination coverage goal for adults aged 65 years and older is 80%, only 55% of adults in this age group reported receiving the pneumococcal vaccine in 2021, with the rate of uptake dropping further to 26% among eligible adults aged 18–64 due to underlying or chronic medical conditions (Public Health Agency of Canada, 2021).

Pneumococcal disease, caused by *Streptococcus pneumoniae*, can lead to serious complications such as bacteremia and meningitis in cases of invasive pneumococcal disease (IPD) (Public Health Agency of Canada, 2023e); Pneumonia is in the top ten leading causes of death in Canada (Statistics Canada, 2022). The Ontario Burden of Infectious Disease Study reported pneumonia as the most "burdensome infectious disease syndrome in terms of the years and quality-of-life lost to infection" (O'Reilly et al., 2023). Older adults (Nasreen et al., 2021), adults that are immunosuppressed and/or have comorbidities, and older adults living in long-term care facilities bear the biggest burden for pneumococcal disease (Cafiero-Fonseca et al., 2017).

There are currently four pneumococcal vaccines authorized for adult usage in Canada, with some variability in how they are used and monitored across the country. The four vaccines are: 23-valent pneumococcal polysaccharide vaccine (PPV23), authorized in 1983; 13-valent pneumococcal conjugate vaccine (PCV13), authorized in 2009; 15-valent pneumococcal conjugate vaccine (PCV15) authorized in 2021; and 20-valent pneumococcal conjugate vaccine (PCV20) authorized in 2022 (Public Health Agency of Canada, 2023c). Recommendations on pneumococcal vaccine administration are made by the National Advisory Committee on Immunization (NACI)—a federal advisory committee that publishes recommendations for the use of vaccines and identifies at-risk populations that should be targeted in vaccination programs (Public Health Agency of Canada, 2023a). Since the 1980s, NACI has been making recommendations for the use of pneumococcal vaccines in adults based on their risk for IPD, which are described in the *Canadian Immunization Guide for Health Professionals* (Public Health Agency of Canada, 2023c, 2016). Importantly, these recommendations are advisory in nature, with provinces and territories (PTs) responsible for designing and delivering their immunization programs. Some PTs have immunization committees (e.g., Quebec and Ontario) that provide provincial recommendations when new vaccines are considered for publicly funded programs, including operational considerations like budget, training, and vaccine supply.

Therefore, there is variability in how PTs publicly fund pneumococcal vaccines for eligible adults (Sulis et al., 2022) and in how jurisdictions monitor vaccine coverage. One of the many reasons why adults remain unvaccinated for pneumococcal disease is a lack of awareness of their eligibility to receive publicly funded vaccination (Public Health Agency of Canada, 2022). Thus, it is important to understand who is eligible across

PTs. It is also important to understand if and how PTs are tracking adult pneumococcal vaccine coverage, and if coverage data are disaggregated by factors that could be further studied to assess if vaccine uptake is equitable. For example, the national immunization survey *Vaccine Uptake in Canadian Adults 2021* disaggregated pneumococcal vaccine coverage by broad age groups, gender, and declaration of a chronic medical condition (Public Health Agency of Canada, 2022). In this rapid review, we aim to document and compare the eligibility of publicly funded adult pneumococcal vaccines, and document and compare how pneumococcal vaccine coverage is monitored and tracked across PTs.

Methods

A rapid environmental scan was conducted to explore and document the: i) population eligibility of publicly funded pneumococcal vaccine programs for adults (aged 18 and older) across all Canadian PTs; and ii) the availability of monitoring measures related to pneumococcal vaccine coverage across all PTs. A literature search using Google search engine was conducted in May–August 2023; key terms used in the search included "pneumococcal or pneumonia vaccine", "vaccine eligibility", "publicly funded vaccine" and "vaccine monitoring and surveillance" across all Canadian PTs. The search resulted in screening across government health and immunization authorities' websites, including the Public Health Agency of Canada, NACI, and PT public health and immunization authorities. We excluded literature on individual immunization records access and vaccine inventory and distribution.

Case summaries were created for each PT from publicly available sources outlining population eligibility for publicly funded pneumococcal vaccine programs as of August 2023, and if and how pneumococcal vaccine coverage is monitored across PTs. Information about population eligibility and dose scheduling for pneumococcal vaccines in each PT were extracted and directly compared to the 2016 NACI guidelines on adult pneumococcal vaccination from the *Canadian Immunization Guide* (Public Health Agency of Canada, 2016). The case summaries were shared with local experts to validate findings and fill any knowledge gaps. Experts were contacted by email to provide feedback and additional sources to supplement findings. Four provincial case studies (British Columbia, Alberta, Ontario, and Quebec) were reviewed and validated by local experts.

Limitations

There are a few limitations to consider for this review. First, expert validation of the case summary reports was only received from local experts in British Columbia, Alberta, Ontario, and Quebec. We were unable to successfully contact experts from other jurisdictions, and thus relied on publicly available information when experts in other jurisdictions were not available to verify the accuracy of the findings. Second, some of the sources were only available in French and were translated into English by a team member (AS) with a working level of French and Google Translate. Therefore, some information may not have been precisely translated when collecting the data. Third, many of the PTs did not classify eligible medical conditions listed by NACI as "immunocompromising" and "non-immunocompromising"; our team assessed each condition individually to determine its immunocompromising status by using clinical sources and advice from team members with expertise in immunology. Therefore, our findings could have discrepancies in immune classifications compared to how some jurisdictions classify such conditions.

Finally, we reference NACI's recommendations published in 2016 for pneumococcal vaccines to compare population and vaccine eligibility across PTs. We acknowledge that these recommendations were updated in February 2023 to include the use of PCV15 and PCV20 following Health Canada authorization in 2021 and 2022, respectively (Public Health Agency of Canada, 2023c). However, as of August 2023, Quebec was the only PT to publicly fund and provide recommendations for the use of PCV20 for certain adult populations. Since PCV20 was not yet publicly funded across all other PTs, the 2016 NACI recommendations for pneumococcal vaccines were used to compare population and vaccine eligibility across jurisdictions, and to help inform PT policy responses to the updated NACI PCV15 and PCV20 recommendations.

Analytic Overview

The pneumococcal vaccines PPV23 and PCV13 are widely used across PTs in publicly funded vaccination programs; as of August 2023, Quebec is the only jurisdiction that publicly funds PCV20 for immunocompromised adults (Santé et Services Sociaux Québec, 2023a). Prior to the authorization of PCV13, PCV15, and PCV20, NACI recommended the use of PPV23 for adult populations that faced risk of IPD. In 2013, NACI recommended PCV13 in series with PPV23 for adults with immunocompromising conditions at high risk for IPD (Public Health Agency of Canada, 2023c). Subsequently, PPV23 was recommended for most eligible adults as part of routine immunization programs, and PCV13 was recommended for targeted groups.

As of 2016, NACI recommended PPV23 and PCV13 in various dose schedules for the following populations:

- adults aged 65 years and older (1 dose of PPV23),
- adults younger than age 65 living in long-term care facilities (1 dose of PPV23),
- adults less than age 65 with a non-immunocompromising medical condition (1 dose of PPV23 and 1 booster dose of PPV23 at least 5 years later for people at highest risk for IPD),
- adults with an immunocompromising medical condition (1 dose of PCV13; 1 dose of PPV23 at least 8 weeks after PCV13 and 1 booster dose of PPV23 at least five years later; various doses of PPV23 and PCV13 for hematopoietic stem cell transplant recipients), and
- adults younger than age 65 who smoke, experience alcoholism[1], use illicit drugs, and experience homelessness (1 dose of PPV23) (Public Health Agency of Canada, 2016, 2023c).

Below, we summarize and highlight key findings on publicly funded pneumococcal vaccine eligibility across all PTs in comparison to the 2016 NACI recommendations (**Tables 1 and 2**)**.** Detailed eligibility criteria for each PT can be found in **Appendix A**. We also highlight key findings on the availability of monitoring/surveillance measures related to pneumococcal vaccine coverage across all PTs (**Table 3**). Detailed information on pneumococcal vaccine monitoring for British Columbia, Alberta, Ontario, and Quebec can be found in **Appendix B**. Finally, we synthesize recommendations for future research and considerations for PTs regarding publicly funded pneumococcal vaccines.

Pneumococcal Vaccine Eligibility

Most of the PTs' population and vaccine eligibility criteria are aligned with NACI recommendations. As shown in **Table 1**, alignment is particularly highlighted in Alberta, Nova Scotia, Prince Edward Island and Yukon across the main population groupings, and all PTs for the eligibility of PPV23 for adults aged 65+. There are some differences between the PT's eligibility and NACI recommendations, which are grouped as booster dose-related differences (blue, symbolized with a diamond); primary dose-related differences (purple, symbolized with a star); and differences of both the primary and booster doses (red, symbolized with an "X"). Booster and primary dose-related differences are characterized by variability of eligibility based on age and/or condition that are recommended by NACI. In some instances, eligibility criteria were unclear or information could not found. The following sections detail the main similarities and differences across PTs for publicly funded pneumococcal vaccine programs as compared to 2016 NACI recommendations. Detailed eligibility criteria for each PT can be found in **Appendix A**.

[1] The 2023 NACI guidelines replace the term "alcoholism" with "alcohol use disorder." As our report references the 2016 guidelines, we use the term "alcoholism" throughout the findings.

Adults aged 65 years and older & adults in long-term care facilities

All PTs publicly fund one dose of PPV23 for adults aged 65 years and older, with the exception of Nunavut that has a lower age threshold of adults aged 50 years and older (Nunavut Department of Health, 2017). For adults younger than 65 in long-term care facilities, most jurisdictions fund one dose of PPV23, except for Quebec that does not publicly fund this population; eligibility for PPV23 in the Northwest Territories and Nunavut could not be determined.

Adults with non-immunocompromising conditions

Most PTs align with NACI recommendations by publicly funding one dose of PPV23 for adults with a non-immunocompromising condition, followed by a booster dose at least five years after the initial dose for conditions deemed at highest risk of IPD. The *Canadian Immunization Guide* also states that a dose of pneumococcal conjugate vaccine (e.g., PCV13) can be given prior to PPV23 administration for some conditions at high risk for IPD, based on an expert's recommendation (Public Health Agency of Canada, 2016). In New Brunswick and Nova Scotia, there was a lack of information on PPV23 booster eligibility (Government of New Brunswick, n.d.-b; Nova Scotia Health Authority, 2019). Some differences in PT eligibility compared with NACI recommendations include Manitoba restricting PPV23 booster dose eligibility only to adults aged 65 years and older with certain conditions (Manitoba Health, 2023), and Northwest Territories' lack of specificity on what conditions are eligible for primary and booster PPV23 doses (Government of Northwest Territories, 2023a). Furthermore, Newfoundland and Labrador excluded two medical conditions for PPV23 eligibility that NACI identified as resulting in high risk of IPD (chronic cerebrospinal fluid [CSF leak] and chronic neurologic conditions that may impair clearance of oral secretions) (Government of Newfoundland and Labrador, 2019).

Adults with immunocompromising conditions

For adults with immunocompromising conditions, NACI recommends one dose of PCV13 followed by one dose of PPV23 at least eight weeks later, and one booster dose of PPV23 at least five years later; NACI also recommends adult hematopoietic stem cell transplant (HSCT) recipients to receive two extra doses of PCV13 (Public Health Agency of Canada, 2016). Many PTs align with NACI recommendations, with some jurisdictions deviating in the types of conditions considered eligible for both vaccines. For example, in British Columbia only people with HIV infections and HSCT recipients are eligible for PCV13; all other immunocompromising conditions are eligible for PPV23 only (BC Centre for Disease Control, 2023). In Ontario, adults with immunocompromising conditions are only eligible for PCV13 if they are aged 50 years and older, while adults younger than 50 with immunocompromising conditions are eligible for PPV23 (Government of Ontario, 2022). Furthermore in Nunavut, PCV13 is not publicly funded for any condition; only PPV23 is publicly funded for immunocompromised adults (Nunavut Department of Health, 2014). Additionally, Manitoba and New Brunswick publicly fund PCV13 for only a limited number of conditions; all other immunocompromising conditions recommended by NACI are eligible for PPV23 (Manitoba Health, 2023; Government of New Brunswick, n.d.-b).

Moreover, Quebec recently updated their guidelines in January 2023 to publicly fund PCV20 for immunocompromising conditions (Ministère de la Santé et des Services Sociaux, 2023); PCV20 replaced the use of both PCV13 and PPV23 for all immunocompromising conditions. It is important to note that the 2023 NACI guidelines recommend the use of PCV20 for certain adult populations (Public Health Agency of Canada, 2023c), but as stated previously, our review references the 2016 recommendations as all PTs aside from Quebec do not yet currently publicly fund PCV20.

TABLE 1. Population and pneumococcal vaccine eligibility for adults across PTs compared to 2016 NACI recommendations as of August 2023 (excluding lifestyle factors)

PTs	POPULATION & DOSE SCHEDULES (NACI GUIDELINES)				
	Adults 65+ *PPV23:1 dose*	**Adults <65 years in long term care facilities** *PPV23: 1 dose*	**Adults with non-immunocompromising conditions** *PPV23: 1 dose + 1 booster at least 5 years later for conditions at highest risk for IPD*	**Adults with immunocompromising conditions** PCV13: *1 dose* [A]	PPV23: *1 dose at least 8 weeks after PCV13 + 1 booster dose of PPV23 at least 5 years later*
BC	✓	✓	✓	☆ *Only two conditions are eligible*	✓
AB	✓	✓	✓ *2 conditions are also eligible for 1 dose of PCV13*	✓	✓
SK	✓	✓	✓	✓	◊ *Only some conditions are eligible for booster*
MB	✓	✓	◊ *Only adults 65+ are eligible for booster*	☆ *Only certain conditions are eligible*	◊ *Only adults 65+ with certain conditions are eligible for booster*
ON	✓	✓	✓	☆ *Only adults 50+ are eligible*	✓
QC	✓	**X**	☆ *Nephrotic syndrome is also eligible for 1 dose + 1 booster* [D]	☆ *PCV20 replaced used of PCV13 and PPV23 for all immunocompromising conditions*	**X** *PCV20 replaced use of PCV13 and PPV23 for all immunocompromising conditions; a booster dose of PPV23 is not required following administration of PCV20*
NB	✓	✓	✓ [B]	☆ *Only certain conditions are eligible*	✓ [B]
NS	✓	✓	✓ [B]	✓	✓ [B]
PE	✓	✓	✓	✓	✓
NL	✓	✓	☆ *2 conditions excluded/ineligible; 1 additional condition is eligible for 1 dose of PCV13*	✓	✓ [B,C]
YU	✓	✓	✓	✓	✓ *3rd dose may be administered after age 65*
NT	✓	**ND**	☆ *Conditions at risk for IPD are eligible; however, no conditions are specified*	☆ *(Conditions listed by Canadian Immunization Guide are eligible; however, no conditions are specified)*	☆ *Conditions at risk for IPD are eligible; however, no conditions are specified*
NU	☆ *Adults 50+*	**ND**	✓	**X**	✓ [B]

Legend:

✓	No difference between PT eligibility and NACI recommendations
◊	Population and vaccine eligibility differences for booster dose
☆	Population and vaccine eligibility differences for primary dose
X	PT eligibility does not align with NACI recommendations (primary and booster dose differences)
ND	Not determined – Unclear if population is eligible

Notes:

Many of the PTs did not classify eligible medical conditions listed by NACI as "immunocompromising" and "non-immunocompromising." Further information on the categorization of medical conditions listed by each jurisdiction is detailed in the case summaries in **Appendix A**.

[A] Adult HSCT recipients are recommended to have 3 doses of PCV13 3–9 months post-transplant & 1 dose of PPV23 12–18 months post-transplant.

[B] Booster eligibility not found.

[C] Some immunocompromising conditions are not specified (i.e., listed as general "immunosuppression").

[D] NACI categorizes nephrotic syndrome under immunocompromising conditions, while Quebec categorizes nephrotic syndrome under chronic kidney diseases; hence, nephrotic syndrome is eligible for PPV23 in Quebec.

Adults with lifestyle factors at risk for IPD

NACI recommends PPV23 for certain lifestyle factors[2] at risk for IPD, including alcoholism, smoking, and homelessness; NACI also states that illicit drug use should be considered for PPV23 vaccination (Public Health Agency of Canada, 2016). As shown in **Table 2** below, most jurisdictions publicly fund PPV23 for alcoholism/alcohol use disorder (10 PTs), homelessness (9 PTs), and illicit drug use (9 PTs). Interestingly, only two jurisdictions (Prince Edward Island and Yukon) publicly fund PPV23 for smoking, and are also the only PTs that explicitly state PPV23 eligibility for all four factors (Health PEI, 2017; Government of Yukon, 2022). Conversely, no lifestyle factors are eligible for PPV23 in Nunavut and Ontario (Nunavut Department of Health, 2018; Government of Ontario, 2022). In September 2023, the Ontario Immunization Advisory Committee released recommendations supporting NACI's guidelines that a pneumococcal vaccine should be recommended for populations with social risk factors including those who smoke, who use unregulated drugs, with alcohol use disorder, and who are unhoused/ underhoused (Ontario Agency for Health Protection and Promotion [Public Health Ontario], 2023). However, as of September 2023, no changes have been made to the publicly funded program regarding social risk factors. Lastly, we could not determine whether any lifestyle factors are eligible in the Northwest Territories as public sources only states that adults "at risk for invasive pneumococcal disease" are eligible for PPV23 (Government of Northwest Territories, 2023a).

TABLE 2. Population eligibility criteria of lifestyle factors at risk for IPD recommended/considered by 2016 NACI guidelines for one dose of PPV23 across PTs

Lifestyle factors in NACI Guidelines	PTs												
	BC	AB	SK	MB	ON	QC	NS	NL	NB	PE	YU	NT	NU
Alcoholism	✓	✓	✓	✓	X	✓	✓	✓	✓	✓	✓	ND[F]	X
Smoking	X	X	X	X	X	X	X	X	X	✓	✓[E]	ND[F]	X
Homelessness	✓	✓[A]	✓	✓	X	✓	✓	X	✓	✓	✓	ND[F]	X
Illicit drug use	✓	✓[B]	✓[C]	✓	X	✓[D]	✓	X	✓	✓	✓	ND[F]	X

Legend:

✓	Population and vaccine eligibility align with NACI guidelines
X	Population and vaccine eligibility do not align with NACI guidelines
ND	Not determined–unclear if population is eligible

Notes:

[A] Living in homeless/chronically disadvantaged situations (e.g., no address or home, staying in shelters, cars etc.) (Alberta Health Services, 2023).
[B] Illicit injection drug use (Alberta Health Services, 2023).
[C] Substance use: illicit non-injection and injection drug use (Government of Saskatchewan, 2023a).
[D] Current and regular use of hard drugs by inhalation or injection with a deterioration in health or precarious living conditions (Santé et Services Sociaux Québec, 2023d).
[E] Cigarette smokers (Government of Yukon, 2022).
[F] No specification is given whether lifestyle factors are considered eligible (Government of Northwest Territories, 2023a).

[2] The 2023 NACI recommendations replace the term "lifestyle factors" with "social risk factors" (Public Health Agency of Canada, 2023c). As our report references the 2016 recommendations, we use the term "lifestyle factors" throughout the findings.

Pneumococcal Vaccine Coverage Monitoring/Surveillance Across PTs

As shown in **Table 3**, publicly available information on pneumococcal vaccine coverage monitoring/ surveillance were only found in six jurisdictions (Alberta, Manitoba, Quebec, Nova Scotia, Prince Edward Island, and the Northwest Territories). While these six PTs mention some level of pneumococcal vaccine coverage monitoring through a vaccine registry, only Manitoba and Quebec were found to publish immunization coverage reports that included pneumococcal vaccines. In Manitoba and Quebec, population-level pneumococcal vaccine coverage is primarily tracked for PPV23 coverage among adults aged 65 years and older on an annual or biennial basis, respectively (Manitoba Health, Seniors and Active Living, 2019; Trottier & Dubé, 2022). Quebec also monitors pneumococcal vaccine coverage among certain high-risk populations, including individuals aged 64 years and younger at increased risk of IPD, and those aged 50 years and older with severe asthma requiring additional care (Trottier & Dubé, 2022). Detailed information on pneumococcal vaccine monitoring for British Columbia, Alberta, Ontario, and Quebec can be found in **Appendix B**.

TABLE 3. Public documentation of adult pneumococcal vaccine coverage across PTs

PTs	Mention of Pneumococcal Vaccine(s) Coverage Monitoring/Surveillance
BC	**ND** – No publicly available information was found specific to adult pneumococcal vaccine coverage in the provincial immunization registry.
AB	**Yes** – Health practitioners are required to upload information into the provincial repository for all influenza/ pneumococcal vaccines. However, no publicly available information clarified what adult age groups for pneumococcal vaccine coverage are monitored.
SK	**ND** – No publicly available information found specific to adult pneumococcal vaccine coverage in provincial immunization registry.
MB	**Yes** – The annual *Immunization Surveillance Report* (that uses data from the provincial immunization registry) mentions the % of adults 65+ that have received at least one dose of PPV23 (Manitoba Health, Seniors and Active Living, 2019). No publicly available information was found clarifying if adults <65 are monitored for pneumococcal vaccine coverage.
ON	**ND** – No publicly available information found specific to adult provincial immunization registry; only immunizations for school-age children are monitored (Public Health Ontario, n.d.).
QC	**Yes** – Vaccine coverage is measured for certain target groups under the provincial pneumococcal vaccination program and published in biennial reports (Trottier & Dubé, 2022).
NB	**ND** – No publicly available information found specific to adult pneumococcal vaccine coverage in provincial immunization registry.
NS	**Yes** – PPV23 and PCV13 are mentioned as monitored vaccines in the provincial Panorama registry (Government of Nova Scotia, 2020). However, no publicly available information found clarifying what adult age groups for pneumococcal vaccine coverage are monitored.
PE	**Yes** – The "Pneumococcal Vaccine Orders" web page states that "[a]ll immunizers are required to collect data on each vaccine recipient and report to the Chief Public Health Office" (Government of Prince Edward Island, n.d.) However, no publicly available information found clarifying what adult age groups for pneumococcal vaccine coverage are monitored.
NL	**ND** – No publicly available information found specific to adult pneumococcal vaccine coverage in provincial immunization registry.
YU	**ND** – No publicly available information found specific to adult pneumococcal vaccine coverage in territorial immunization registry.
NT	**Yes** – PCV13 and PPV23 are included in the Notifiable Immunization Register, stated by the *Public Health Act* (Government of Northwest Territories, 2022). However, no publicly available information found clarifying what adult age groups for pneumococcal vaccine coverage are monitored.
NU	**ND** – No publicly available information found specific to adult pneumococcal vaccine coverage in territorial immunization registry.

ND – Not determined

Considerations of Equity in Pneumococcal Vaccine Population Eligibility & Vaccine Monitoring

Our review found that some jurisdictions expanded pneumococcal vaccine eligibility for certain populations at risk for IPD that were not outlined in the 2016 NACI recommendations. In particular, Quebec and Newfoundland and Labrador publicly fund pneumococcal vaccines for Indigenous populations and communities. In Quebec, PCV20 is publicly funded for people aged 50 years and older in the Indigenous communities of Nunavik and Terres-Cries-de-la-Baie-James, and for residents aged 18–49 years in the same communities with high risk for IPD (Santé et Services Sociaux Québec, 2023d). In Newfoundland and Labrador, PPV23 is publicly funded for Indigenous populations of all ages (Government of Newfoundland and Labrador, 2019). Furthermore, Nunavut (in which approximately 85% of the population identifies as Indigenous [Statistics Canada, 2023])) extended the age range of publicly funded PPV23 to age 50 years and older for all immunocompetent adults (Nunavut Department of Health, 2017).

Although Ontario has not expanded vaccine eligibility as of yet, in September 2023 the Ontario Immunization Advisory Committee released recommendations supporting NACI guidelines that a pneumococcal vaccine should be recommended for those "who live in communities or settings experiencing sustained high IPD rates, which may include some Indigenous communities, in which case consultations with these communities are necessary" (Ontario Agency for Health Protection and Promotion [Public Health Ontario], 2023). While not stated in the 2016 NACI recommendations, the 2023 NACI recommendations did identify that First Nations, Métis, and Inuit communities in Canada have a younger age distribution, but increased risk for IPD when compared to the rest of Canada and that "age-based recommendations may need to be modified to offer protection to individuals in these communities" (Public Health Agency of Canada, 2023c). Many intersecting factors have been attributed to the increased risk for IPD in Indigenous communities including, but not limited to, the impacts of settler colonization and structural oppression, persisting inequities in the socioeconomic determinants of health, underlying medical conditions, and inadequate access to appropriate healthcare (Lee et al., 2023; Public Health Agency of Canada, 2023c).

Regarding pneumococcal vaccine monitoring, most jurisdictions have limited publicly available information on immunization coverage with an equity-focused lens. However, Manitoba and Quebec have publicly available information on pneumococcal vaccine monitoring, with some form of data disaggregation of sociodemographic factors that could be further assessed when analyzing equitable vaccine coverage. For example, Manitoba's Annual Immunization Report displays the percentage of adults aged 65 years and older who received PPV23 within the five geographic areas served by regional health authorities (Manitoba Health, Seniors and Active Living, 2019). In Quebec, vaccine coverage data for adults aged 65 years and older, adults at risk for IPD under 64 years, and adults 50 years and older with severe asthma are collected through population surveys and published in biennial reports for influenza, shingles, and pneumococcal vaccine coverage (Trottier & Dubé, 2022); this data is disaggregated by factors such as gender, age group, and reasons for pneumococcal vaccination or non-vaccination. It is important to note that although other sociodemographic data such as region, language spoken, education, and occupation are collected in the population surveys, this information is not published specifically for pneumococcal vaccine coverage.

Furthermore, at the time of this report, Ontario does not have a comprehensive immunization registry to capture immunizations across the lifespan (except for COVID-19 vaccines for which data exists for all ages). Without such a registry, data sources for monitoring coverage of adult vaccines (e.g., pneumococcal vaccines) rely on vaccine ordering and inventory information, and administrative data such as vaccine-billing codes submitted by healthcare providers (S. Wilson, personal communication, September 27, 2023). Province-wide adult immunization registries and surveillance systems are pivotal to understand if vaccine coverage is equitable across Ontario and all other PTs.

Conclusions

This rapid review found that most PTs in Canada align with the 2016 NACI recommendations on population eligibility and dose schedules for publicly funded pneumococcal vaccines. Differences from the recommendations were found in British Columbia, Manitoba, Ontario, Quebec, New Brunswick, Newfoundland and Labrador, Northwest Territories, and Nunavut; smoking as a lifestyle factor was found to be ineligible for publicly funded PPV23 in most jurisdictions (10 PTs).

Our findings also uncovered that publicly available information on monitoring and surveillance of adult pneumococcal vaccine coverage was limited in some jurisdictions. Of the six PTs that did have information on pneumococcal vaccine coverage monitoring, only Manitoba and Quebec publish immunization coverage reports that included pneumococcal vaccines; the immunization coverage reports in both provinces also provide some level of data disaggregation of sociodemographic factors related to pneumococcal vaccine coverage (e.g., age and region in Manitoba, and age and health condition in Quebec).

Considerations for Future Research and Policy

Publicly funded pneumococcal vaccination programs for adults are likely to change in the near future as PTs consider whether, when, and how to incorporate PCV15/PCV20 in their adult programs based on NACI's updated recommendations (2023). There are many areas for future research priorities and suggestions for PTs to address gaps in their publicly funded pneumococcal vaccine programs (Public Health Agency of Canada, 2023c). Below we list some considerations for future research and PT policy regarding adult pneumococcal vaccine population eligibility criteria, vaccine monitoring and surveillance, and equitable vaccine uptake:

1. Continue to monitor changes across PTs and undertake cost-effectiveness analyses for publicly funded PCV15 and PCV20 immunization programs for adults.
2. Examine the possible impacts of these changes on pneumococcal disease, including possible impacts from any associated delays in implementing NACI recommendations.
3. Continue to prioritize eligibility for populations at high risk for IPD in publicly funded pneumococcal vaccine programs.
4. Prioritize research that investigates outreach and access of publicly funded pneumococcal vaccines for adults with high risk for IPD that may not have consistent encounters with or face barriers to accessing healthcare services (e.g., adults with social risk factors, adults in rural or remote locations etc.).
5. Improve public accessibility of PT-wide adult pneumococcal vaccine monitoring and surveillance, ensuring data disaggregation of sociodemographic factors that can be further studied to discern equitable uptake for various populations.

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Appendix A. Case Study Summaries, Vaccine Eligibility

British Columbia

TABLE A1. Population and pneumococcal vaccine eligibility for British Columbia compared to 2016 NACI recommendations

NACI Pneumococcal Vaccine Recommendations *(Public Health Agency of Canada, 2016)*		Eligibility of publicly funded vaccine in British Columbia
Population	**Dose schedule**	
Adults aged 65 years and up	**PPV23:** 1 dose	**PPV23:** 1 dose
Adults aged less than 65 years in long-term care facilities	**PPV23:** 1 dose	**PPV23:** 1 dose (HealthLinkBC, 2017; BC Centre for Disease Control, 2017)
Adults with non-immunocompromising conditions such as: • Chronic CSF leak • Chronic neurologic conditions that may impair clearance of oral secretions • Cochlear implants • Chronic heart disease • Diabetes mellitus • Chronic kidney disease • Chronic liver disease, including hepatic cirrhosis due to any cause • Chronic lung disease, including asthma that required medical care in the preceding 12 months	**PPV23:** 1 dose + 1 booster dose at least 5 years later for people at highest risk for IPD **PCV13:** 1 dose may be given in combination with **PPV23** at different intervals based on recommendation from healthcare provider).	**PPV23:** 1 dose for the following conditions (BC Centre for Disease Control, 2023) • Chronic heart or lung disease (except asthma, unless management involves ongoing high-dose oral corticosteroid treatment) • Cystic fibrosis • Chronic kidney disease • Chronic liver disease including cirrhosis, chronic hepatitis B, hepatitis C • Diabetes • Chronic CSF leak • Cochlear implant (candidate or recipient) • Chronic neurological conditions that may impair clearance of oral secretions **PPV23:** booster dose 5 years after initial dose to those who have • Chronic kidney disease • Chronic liver disease including cirrhosis, chronic hepatitis B, and hepatitis C
Adults with immunocompromising conditions such as: • Sickle cell disease, congenital or acquired asplenia, or splenic dysfunction • Congenital immunodeficiencies involving any part of the immune system, including B-lymphocyte (humoral) immunity, T-lymphocyte (cell) mediated immunity, complement system (properdin or factor D deficiencies), or phagocytic functions • Immunocompromising therapy, including use of long-term corticosteroids,	**PCV13:** 1 dose AND **PPV23:** 1 dose at least 8 weeks after **PCV13** + 1 booster dose of **PPV23** at least 5 years later Multiple doses of vaccines may be given based on condition and recommendation from healthcare provider.	**PCV13:** 1 dose for (BC Center for Disease Control, 2023) • those with HIV infection • HSCT recipients[2] Individuals with these conditions should get one dose of PPV23 after last dose of PCV13. **PPV23:** 1 dose + booster dose after 5 years to those who have (BC Centre for Disease Control, 2023) • Anatomic or functional asplenia • Sickle cell disease • Immunosuppression related to disease (HIV, lymphoma, Hodgkin's, multiple myeloma) or therapy (e.g., high dose, systemic steroids) • Congenital immunodeficiency states

chemotherapy, radiation therapy, and post-organ transplant therapy • HIV infection • HSCT recipient[1] • Malignant neoplasms, including leukemia and lymphoma • Nephrotic syndrome • Solid organ or islet transplant (candidate or recipient)		• Solid organ or islet cell transplant • HSCT recipients[2]
Immunocompetent adults less than 65 years of age with lifestyle factors at high risk of IPD: • Alcoholism • Smoking • Homelessness • Illicit drug use	**PPV23**: 1 dose	**PPV23:** 1 dose for these groups (BC Centre for Disease Control, 2023) • People experiencing homelessness • People who use illicit drugs • Alcohol use disorder
Other (not included in NACI guidelines)	N/A	N/A

Notes:

N/A Not available

[1] NACI recommends that adult HSCT recipients receive 3 doses of PCV13 3–9 months post-transplant and 1 dose of PPV23 12–18 months post-transplant; 1 booster dose of PPV23 is also recommended 1 year later by some experts (Public Health Agency of Canada, 2016).

[2] For adult HSCT recipients, the first dose of PCV13 is recommended 6-12 months post-transplant; second dose of PCV13 is recommended 1 month after first dose; third dose is recommended 2 months after first dose; PPV23 is recommended 8 months after first dose of PCV13 (BC Centre for Disease Control, 2020).

Alberta

TABLE A2. Population and pneumococcal vaccine eligibility for Alberta compared to 2016 NACI recommendations

NACI Pneumococcal Vaccine Recommendations *(Public Health Agency of Canada, 2016)*		Eligibility of publicly funded vaccine in Alberta[3]
Population	**Dose schedule**	
Adults aged 65 years and up	**PPV23:** 1 dose	**PPV23:** 1 dose for adults aged 65 years and up (Alberta Provincial Immunization Program, 2022). One dose should be taken as long as 5 years have passed since a previous vaccine dose (Alberta Health Services, 2023).
Adults aged less than 65 years in long-term care facilities	**PPV23:** 1 dose	**PPV23:** 1 dose for all residents of long-term care facilities (Alberta Health Services, 2023)
Adults with non-immunocompromising conditions such as: • Chronic CSF leak • Chronic neurologic conditions that may impair clearance of oral secretions • Cochlear implants • Chronic heart disease • Diabetes mellitus • Chronic kidney disease • Chronic liver disease, including hepatic cirrhosis due to any cause • Chronic lung disease, including asthma that required medical care in the preceding 12 months	**PPV23:** 1 dose + 1 booster dose at least 5 years later for people at highest risk for IPD **PCV13:** 1 dose may be given in combination with **PPV23** at different intervals based on recommendation from healthcare provider).	**PPV23:** 1 dose sufficient for most individuals considered medically at risk; some conditions that contribute to higher risk for IPD require a booster dose (Alberta Health Services, 2023). Conditions for people "medically at risk" aged 24 months–64 years old: • Chronic renal disease, including nephrotic syndrome • Chronic liver disease, including hepatic cirrhosis due to any cause, hepatitis B carriers and hepatitis C infection • Chronic cardiac disease • Chronic neurologic conditions that may impair clearance of oral secretions • Chronic CSF leak • Chronic pulmonary disease (including asthma requiring medical treatment within the last 12 months regardless of whether they are on high dose steroids) • Cochlear implants (candidates and recipients • Diabetes mellitus **PCV13:** 1 dose for conditions that contribute to high risk for IPD. **PPV23** may also be given at different intervals along with PCV13 for high risk individuals (Government of Alberta, 2018). Adults with conditions resulting in high risk for IPD: • Chronic CSF leak • Cochlear implants (candidates and recipients)
Adults with immunocompromising conditions such as: • Sickle cell disease, congenital or acquired asplenia, or splenic dysfunction • Congenital immunodeficiencies involving any part of the immune system, including B-lymphocyte (humoral) immunity, T-	**PCV13:** 1 dose AND **PPV23:** 1 dose at least 8 weeks after **PCV13** + 1 booster dose of **PPV23** at least 5 years later	**PCV13:** 1 dose for conditions that contribute to high risk for IPD. **PPV23** may also be given at different intervals along with **PCV13** for high risk individuals (Government of Alberta, 2018). Adults with conditions resulting in high risk for IPD: • Asplenia (anatomical or functional) • Congenital immunodeficiencies involving any part of the immune system, including B-lymphocyte (humoral) immunity, T-lymphocyte (cell) mediated immunity, complement system (properdin or factor D deficiencies) or phagocytic functions

lymphocyte (cell) mediated immunity, complement system (properdin or factor D deficiencies), or phagocytic functions • Immunocompromising therapy, including use of long-term corticosteroids, chemotherapy, radiation therapy, and post-organ transplant therapy • HIV infection • HSCT recipient[1] • Malignant neoplasms, including leukemia and lymphoma • Nephrotic syndrome • Solid organ or islet transplant (candidate or recipient)	Multiple doses of vaccines may be given based on condition and recommendation from healthcare provider.	• HIV infection • HSCT recipients[2] • Immunosuppressive therapy including use of long-term corticosteroids, chemotherapy, radiation therapy, post-organ transplant therapy, biologic and non-biologic immunosuppressive therapies for rheumatologic and other inflammatory diseases • Malignant hematologic disorders (affecting the bone marrow or lymphatic system) including leukemia, lymphoma Hodgkin's disease and multiple myeloma • Malignant solid organ tumors undergoing or anticipating immunosuppressive therapy (chemotherapy or radiation) • Nephrotic Syndrome • Sickle cell disease and other hemoglobinopathies • Solid organ or islet cell transplant candidates and recipients **PPV23:** 1 dose sufficient for most individuals considered medically at risk; some conditions that contribute to higher risk for IPD require a booster dose (Alberta Health Services, 2023). Conditions for people "medically at risk" aged 24 months–64 years old: • Asplenia/hyposplenism (functional or anatomic) • Congenital immune deficiencies involving any part of the immune system, including B-lymphocyte (humoral) immunity; T-lymphocyte (cell) mediated immunity; complement system (properdin or factor D deficiencies); or phagocytic functions • HSCT recipients[2] • HIV infection • Undergoing or anticipating immunosuppressive therapy including: use of long-term corticosteroids; chemotherapy; radiation therapy; post-organ transplant therapy • Biologic and non-biologic immunosuppressive therapies for: inflammatory arthropathies, e.g., systemic lupus erythematosus, rheumatoid or juvenile arthritis; inflammatory dermatological conditions, e.g., psoriasis, severe atopic dermatitis and eczema; and inflammatory bowel disease, e.g., Crohn's disease, ulcerative colitis • Malignant hematologic disorders (affecting the bone marrow or lymphatic system), including leukemia, lymphoma, Hodgkin's disease and non-Hodgkin's lymphomas, and multiple myeloma • Malignant solid organ tumors either currently or within past 5 years • Sickle cell disease and other hemoglobinopathies • Solid organ or islet transplant candidates and recipients
Immunocompetent adults less than 65 years of age with lifestyle factors at high risk of IPD:	**PPV23**: 1 dose	**PPV23:** 1 dose (Alberta Health Services, 2023)

• Alcoholism • Smoking • Homelessness • Illicit drug use		• Living in homeless/chronically disadvantaged situations (e.g., no address or home, staying in shelters, cars etc.) • Illicit injection drug use • Alcoholism
Other (not included in NACI guidelines)	N/A	N/A

Notes:

N/A Not available

[1] NACI recommends that adult HSCT recipients receive 3 doses of PCV13 3–9 months post-transplant and 1 dose of PPV23 12–18 months post-transplant; 1 booster dose of PPV23 is also recommended 1 year later by some experts (Public Health Agency of Canada, 2016).

[2] For adult HSCT recipients, first dose of PCV13 is recommended 6 months post-transplant; second dose of PCV13 is recommended 7 months post-transplant; third dose of PCV13 is recommended 8 months post-transplant; first dose of PPV23 is recommended 14 months post-transplant; booster dose of PPV23 is recommended 24 months post-transplant (Government of Alberta, 2023).

[3] Provincial sources from Alberta did not differentiate between immunocompromising and non-immunocompromising conditions.

Saskatchewan

TABLE A3. Population and pneumococcal vaccine eligibility for Saskatchewan compared to 2016 NACI recommendations

NACI Pneumococcal Vaccine Recommendations *(Public Health Agency of Canada, 2016)*		Eligibility of publicly funded vaccine in Saskatchewan
Population	**Dose schedule**	
Adults aged 65 years and up	**PPV23:** 1 dose	**PPV23:** 1 dose (Government of Saskatchewan, 2023b)
Adults aged less than 65 years in long-term care facilities	**PPV23:** 1 dose	**PPV23:** 1 dose for all residents of extended or intermediate care facilities (Government of Saskatchewan, 2023b)
Adults with non-immunocompromising conditions such as: • Chronic CSF leak • Chronic neurologic conditions that may impair clearance of oral secretions • Cochlear implants • Chronic heart disease • Diabetes mellitus • Chronic kidney disease • Chronic liver disease, including hepatic cirrhosis due to any cause • Chronic lung disease, including asthma that required medical care in the preceding 12 months	**PPV23:** 1 dose + 1 booster dose at least 5 years later for people at highest risk for IPD **PCV13:** 1 dose may be given in combination with **PPV23** at different intervals based on recommendation from healthcare provider).	**PPV23 and PCV13:** 1 dose sufficient for most individuals; some conditions eligible for **PPV23** booster after 5 years) (Government of Saskatchewan, 2023a): • Cardiac disease • CSF disorder • Cochlear implant • Cystic fibrosis • Diabetes mellitus • Liver disease (including alcoholism) • Lung disease (asthma only if on high dose oral corticosteroid therapy) • Neurological conditions that impede the clearance of respiratory/oral secretions • Renal disease
Adults with immunocompromising conditions such as: • Sickle cell disease, congenital or acquired asplenia, or splenic dysfunction • Congenital immunodeficiencies involving any part of the immune system, including B-lymphocyte (humoral) immunity, T-lymphocyte (cell) mediated immunity, complement system (properdin or factor D deficiencies), or phagocytic functions • Immunocompromising therapy, including use of long-term corticosteroids, chemotherapy, radiation therapy, and post-organ transplant therapy • HIV infection	**PCV13:** 1 dose AND **PPV23:** 1 dose at least 8 weeks after **PCV13** + 1 booster dose of **PPV23** at least 5 years later Multiple doses of vaccines may be given based on condition and recommendation from healthcare provider.	**PCV13 and PPV23:** 1 dose sufficient for most individuals; some conditions eligible for **PPV23** booster after 5 years (Government of Saskatchewan, 2023a) • Asplenia[3] • Cancer/malignancies[3] • Sickle cell disease[3] • Acquired Complement Deficiency • Congenital immunodeficiency • HIV • Related to disease (e.g., myelodysplasia; collagen vascular disease) • Transplant candidate or recipient (including organs, islet, and HSCT[2]) • Treatments: chemotherapy and radiation therapies; currently taking immunosuppressants (e.g., for inflammatory bowel disease; systemic lupus erythematosus; rheumatoid arthritis (e.g., immune modulators such as anti-rheumatics drugs); long-term corticosteroids

• HSCT recipient[1] • Malignant neoplasms, including leukemia and lymphoma • Nephrotic syndrome • Solid organ or islet transplant (candidate or recipient)		
Immunocompetent adults less than 65 years of age with lifestyle factors at high risk of IPD: • Alcoholism • Smoking • Homelessness • Illicit drug use	**PPV23**: 1 dose	**PPV23:** 1 dose designated as "Special Populations" (Government of Saskatchewan, 2023a): • Homeless • Substance use: illicit non-injection and injection drug use • Alcoholism
Other (not included in NACI guidelines)	N/A	N/A

Notes:

[1] NACI recommends that adult HSCT recipients receive 3 doses of PCV13 3–9 months post-transplant and 1 dose of PPV23 12–18 months post-transplant; 1 booster dose of PPV23 is also recommended 1 year later by some experts (Public Health Agency of Canada, 2016).

[2] For adult HSCT recipients, first dose of PCV13 is recommended 6 months post-transplant; second dose of PCV13 is recommended 7 months post-transplant; third dose of PCV13 is recommended 8 months post-transplant; PPV23 is recommended 20 months post-transplant and 1 booster dose after 5 years (Government of Saskatchewan, 2023a).

[3] Provincial source from Saskatchewan differentiated conditions by "chronic" and "immunocompromised". Source categorized "asplenia, cancer/malignancies, and sickle cell disease" under chronic conditions instead of immunocompromised (Government of Saskatchewan, 2023a).

Manitoba

TABLE A4. Population and pneumococcal vaccine eligibility for Manitoba compared to 2016 NACI recommendations

NACI Pneumococcal Vaccine Recommendations *(Public Health Agency of Canada, 2016)*		Eligibility of publicly funded vaccine in Manitoba
Population	**Dose schedule**	
Adults aged 65 years and up	**PPV23:** 1 dose	**PPV23:** 1 dose, at least 5 years after any previous PPV23 vaccine and 8 weeks after any previous dose of PCV13 (Manitoba Health, 2023)
Adults aged less than 65 years in long-term care facilities	**PPV23:** 1 dose	**PPV23:** 1 dose, 8 weeks after any previous dose of PCV13 (Manitoba Health, 2023)
Adults with non-immunocompromising conditions such as: • Chronic CSF leak • Chronic neurologic conditions that may impair clearance of oral secretions • Cochlear implants • Chronic heart disease • Diabetes mellitus • Chronic kidney disease • Chronic liver disease, including hepatic cirrhosis due to any cause • Chronic lung disease, including asthma that required medical care in the preceding 12 months	**PPV23:** 1 dose + 1 booster dose at least 5 years later for people at highest risk for IPD **PCV13:** 1 dose may be given in combination with **PPV23** at different intervals based on recommendation from healthcare provider).	**PPV23:** 1 dose for those under 65 years of age with the following conditions (Manitoba Health, 2023) • Chronic CSF leak • Chronic neurologic condition that may impair clearance of oral secretions • Cochlear implants • Chronic cardiac disease • Diabetes mellitus • Chronic kidney disease • Chronic liver disease (including hepatic cirrhosis due to any cause) • Chronic pulmonary disease + 1 lifetime booster dose of **PPV23** for those aged 65 years and older, and newly diagnosed as being at highest risk of IPD including (Manitoba Health, 2023) • Hepatic cirrhosis • Chronic renal failure
Adults with immunocompromising conditions such as: • Sickle cell disease, congenital or acquired asplenia, or splenic dysfunction • Congenital immunodeficiencies involving any part of the immune system, including B-lymphocyte (humoral) immunity, T-lymphocyte (cell) mediated immunity, complement system (properdin or factor D deficiencies), or phagocytic functions • Immunocompromising therapy, including use of long-term corticosteroids,	**PCV13:** 1 dose AND **PPV23:** 1 dose at least 8 weeks after **PCV13** + 1 booster dose of **PPV23** at least 5 years later Multiple doses of vaccines may be given based on condition and recommendation from healthcare provider.	**PCV13:** 1 dose at least 1 year after any previous dose of PPV23 vaccines for those with the following conditions (Manitoba Health, 2023) • Hematopoietic stem cell transplant (HSCT) recipients[4] • HIV infection[3] • Solid organ transplant recipient • Malignant neoplasms[2] (solid tissue and haematological; leukemia, lymphoma, clonal blood disorder) AND immunosuppressive therapy (chemotherapy, radiation therapy) • Hypo- or asplenic[1] (Sickle Cell Disease, etc.) **PPV23:** 1 dose for adults less than 65 years of age with the following conditions (Manitoba Health, 2023) • Asplenia (functional or anatomic)

chemotherapy, radiation therapy, and post-organ transplant therapy • HIV infection • HSCT recipient[1] • Malignant neoplasms, including leukemia and lymphoma • Nephrotic syndrome • Solid organ or islet transplant (candidate or recipient)		• Hemoglobinopathies • Congenital immunodeficiencies involving the immune system (B-lymphocyte (humoral) immunity, T-lymphocyte (cell) mediated immunity, complement system (properdin, factor D deficiencies), phagocytic functions) • Immunocompromising therapy including use of long-term corticosteroids, post-organ transplant therapy, and certain anti-rheumatic drugs • HIV infection • HSCT recipient[4] • Solid organ or islet transplant (candidate or recipient) • Nephrotic syndrome • Malignant neoplasms[2] (solid tissue and haematological; leukemia, lymphoma, clonal blood disorder) AND immunosuppressive therapy (chemotherapy, radiation therapy) • Hypo- or asplenic[2] (Sickle Cell Disease, etc.) **+** 1 lifetime booster dose of **PPV23** for those aged 65 years and older, and newly diagnosed as being at highest risk of IPD • Asplenia (functional or anatomic) • Sickle cell disease • HIV infection • Immunosuppression related to disease or therapy • Nephrotic syndrome
Immunocompetent adults less than 65 years of age with lifestyle factors at high risk of IPD: • Alcoholism • Smoking • Homelessness • Illicit drug use	**PPV23**: 1 dose	**PPV23**: 1 dose for those under 65 years of age with the following lifestyle factors (Manitoba Health, 2023) • Alcoholism • Homelessness • Illicit drug use
Other (not included in NACI guidelines)	N/A	N/A

Notes:

Provincial sources from Manitoba did not separate conditions by non-immunocompromising/ immunocompromising/ lifestyle conditions (Manitoba Health, 2023); PPV23 and PCV13 eligibility grouped under high-risk criteria/ medical condition, and PPV23 lifetime booster eligibility grouped under highest risk of invasive pneumococcal disease (IPD).

[1] NACI recommends that adult HSCT recipients receive 3 doses of PCV13 3–9 months post-transplant and 1 dose of PPV23 12–18 months post-transplant; 1 booster dose of PPV23 is also recommended 1 year later by some experts (Public Health Agency of Canada, 2016).

[2] Patients under the care of a hematologist or oncologist at CancerCare Manitoba.

[3] Should be followed up eight weeks later by a dose of PPV23; individuals < 65 years of age who are living with HIV should receive 1 lifetime booster dose of PPV23 after five years.

[4] For adult HSCT recipients,1st dose of PCV13 is recommended 3 months post-transplant; 2nd dose of PCV13 is recommended 4 months post-transplant; 3rd dose of PCV13 is recommended 5 months post-transplant; 1st dose of PPV23 is recommended 12 months post-transplant; 2nd dose of PPV23 is recommended 24 months post-transplant (CancerCare Manitoba, 2017).

Ontario

TABLE A5. Population and pneumococcal vaccine eligibility for Ontario compared to 2016 NACI recommendations

NACI Pneumococcal Vaccine Recommendations *(Public Health Agency of Canada, 2016)*		Eligibility of publicly funded vaccine in Ontario *(Government of Ontario, 2022)*
Population	**Dose schedule**	
Adults aged 65 years and up	**PPV23:** 1 dose	**PPV23:** 1 dose
Adults aged less than 65 years in long-term care facilities	**PPV23:** 1 dose	**PPV23:** 1 dose for residents of nursing homes, homes for the aged, and chronic care facilities or wards
Adults with non-immunocompromising conditions such as: • Chronic CSF leak • Chronic neurologic conditions that may impair clearance of oral secretions • Cochlear implants • Chronic heart disease • Diabetes mellitus • Chronic kidney disease • Chronic liver disease, including hepatic cirrhosis due to any cause • Chronic lung disease, including asthma that required medical care in the preceding 12 months	**PPV23:** 1 dose + 1 booster dose at least 5 years later for people at highest risk for IPD **PCV13:** 1 dose may be given in combination with **PPV23** at different intervals based on recommendation from healthcare provider).	**PPV23:** 1 dose for those with the following conditions: • Diabetes mellitus • Chronic cardiac disease • Chronic CSF leak • Cochlear implants • Chronic liver disease (including hepatitis B and C and hepatic cirrhosis) • Chronic renal disease • Chronic respiratory disease, excluding asthma (unless treated high-dose corticosteroid therapy) • Neurologic conditions that may impair clearance of oral secretions + 1 lifetime booster dose of **PPV23** for these the following conditions: • Hepatic cirrhosis • Chronic renal failure or nephrotic syndrome
Adults with immunocompromising conditions such as: • Sickle cell disease, congenital or acquired asplenia, or splenic dysfunction • Congenital immunodeficiencies involving any part of the immune system, including B-lymphocyte (humoral) immunity, T-lymphocyte (cell) mediated immunity, complement system (properdin or factor D deficiencies), or phagocytic functions • Immunocompromising therapy, including use of long-term corticosteroids, chemotherapy, radiation therapy, and post-organ transplant therapy • HIV infection	**PCV13:** 1 dose AND **PPV23:** 1 dose at least 8 weeks after **PCV13** + 1 booster dose of **PPV23** at least 5 years later Multiple doses of vaccines may be given based on condition and recommendation from healthcare provider.	**PCV13**: 1 dose, only for adults 50 years and older with the following conditions: • Asplenia (anatomical or functional) • Congenital immunodeficiencies involving any part of the immune systems, including B-lymphocyte (cell) mediated immunity, complement system (properdin or factor D deficiencies) or phagocytic functions • HIV • Immunocompromising therapy including use of long-term corticosteroids, chemotherapy, radiation therapy, post organ-transplants therapy, biologic and certain anti-rheumatic drugs • HSCT recipient[2] • Malignant neoplasms including leukemia and lymphoma • Sickle cell disease or other hemoglobinopathies • Solid organ or islet cell transplant (candidate or recipient)

• Hematopoietic stem cell transplant (HSCT) recipient[1] • Malignant neoplasms, including leukemia and lymphoma • Nephrotic syndrome • Solid organ or islet transplant (candidate or recipient)		**PPV23**: 1 dose, following dose of **PCV13** for those with the following conditions: • Asplenia (functional or anatomic), splenic dysfunction • Congenital immunodeficiencies involving any part of the immune systems, including B-lymphocyte (cell) mediated immunity, complement system (properdin or factor D deficiencies) or phagocytic functions • HIV • Nephrotic syndrome • Immunocompromising therapy including use of long-term systemic corticosteroids, chemotherapy, radiation therapy, post organ-transplants therapy, certain anti-rheumatic drugs and other immunosuppressive therapy • Malignant neoplasms, including leukemia and lymphoma • Sickle cell disease and other sickle cell haemoglobinopathies • Solid organ or islet cell transplant (candidate or recipient) • HSCT recipients[2] + 1 lifetime booster dose of **PPV23** for these conditions: • Asplenia (functional or anatomic) or sickle cell disease • HIV • Immunocompromised related to disease or therapy
Immunocompetent adults less than 65 years of age with lifestyle factors at high risk of IPD: • Alcoholism • Smoking • Homelessness • Illicit drug use	**PPV23**: 1 dose	Not eligible
Other (not included in NACI guidelines)	N/A	N/A

Notes:

People with alcoholism are recommended to have 1 dose of PPV23 but this is NOT publicly funded (Ontario Ministry of Health and Long-Term Care, 2015)
Provincial sources do not differentiate by "immunocompromising" and "non-immunocompromising"; conditions are grouped under "high risk eligibility criteria" (Government of Ontario, 2022),

[1] NACI recommends that adult HSCT recipients receive 3 doses of PCV13 3–9 months post-transplant and 1 dose of PPV23 12–18 months post-transplant; 1 booster dose of PPV23 is also recommended 1 year later by some experts (Public Health Agency of Canada, 2016).

[2] For adult HSCT recipients, 1st dose of PCV13 is recommended 3–9 months post-transplant; 2nd dose of PCV13 recommended 1 month after 1st dose; 3rd dose of PCV13 is recommended 1 month after 2nd dose; 1 dose of PPV23 is recommended 12–18 months post-transplant.

Quebec

TABLE A6. Population and pneumococcal vaccine eligibility for Quebec compared to 2016 NACI recommendations

NACI Pneumococcal Vaccine Recommendations *(Public Health Agency of Canada, 2016)*		Eligibility of publicly funded vaccine in Quebec
Population	**Dose schedule**	
Adults aged 65 years and up	**PPV23:** 1 dose	**PPV23:**1 dose, at least 5 years from previous dose (Government of Québec, 2023a)
Adults aged less than 65 years in long-term care facilities	**PPV23:** 1 dose	N/A
Adults with non-immunocompromising conditions such as: • Chronic CSF leak • Chronic neurologic conditions that may impair clearance of oral secretions • Cochlear implants • Chronic heart disease • Diabetes mellitus • Chronic kidney disease • Chronic liver disease, including hepatic cirrhosis due to any cause • Chronic lung disease, including asthma that required medical care in the preceding 12 months	**PPV23:** 1 dose + 1 booster dose at least 5 years later for people at highest risk for IPD **PCV13:** 1 dose may be given in combination with **PPV23** at different intervals based on recommendation from healthcare provider).	**PPV23:** 1 dose for those with the following conditions (Santé et Services Sociaux Québec, 2023d): • Chronic discharge of CSF • Medical condition that may compromise the evacuation of respiratory secretions and increase the risk of aspiration (e.g., cognitive disorder, medullary injury, convulsive disorder, neuromuscular disorders) • Cochlear implant • Chronic heart disease (e.g., heart failure, cardiomyopathy, cyanogenic heart disease) • Diabetes • Chronic liver disease (e.g., alcoholism, carrier of hepatitis B or hepatitis C, cirrhosis) • Chronic lung disease (e.g., cystic fibrosis, chronic bronchitis, emphysema, bronchopulmonary dysplasia) • Asthma severe enough to require regular medical follow-up or hospital care for people aged 50 and over (not for those <50, unless accompanied by chronic bronchitis, emphysema, or long-term systemic corticosteroid therapy) • Chronic kidney diseases (hemodialysis or peritoneal dialysis [current or foreseeable], chronic renal failure and other chronic kidney disease, including nephrotic syndrome) (Santé et Services Sociaux Québec, 2023a) + 1 additional dose of **PPV23** 5 years later for those with the following conditions (Santé et Services Sociaux Québec, 2023c) • Chronic kidney failure • Nephrotic syndrome
Adults with immunocompromising conditions such as: • Sickle cell disease, congenital or acquired asplenia, or splenic dysfunction	**PCV13:** 1 dose AND	**PCV20**[2]: 1 dose for those with the following conditions (Santé et Services Sociaux Québec, 2023a): • Anatomical or functional asplenia (or conditions leading to functional asplenia)

• Congenital immunodeficiencies involving any part of the immune system, including B-lymphocyte (humoral) immunity, T-lymphocyte (cell) mediated immunity, complement system (properdin or factor D deficiencies), or phagocytic functions • Immunocompromising therapy, including use of long-term corticosteroids, chemotherapy, radiation therapy, and post-organ transplant therapy • HIV infection • Hematopoietic stem cell transplant (HSCT) recipient[1] • Malignant neoplasms, including leukemia and lymphoma • Nephrotic syndrome • Solid organ or islet transplant (candidate or recipient)	**PPV23:** 1 dose at least 8 weeks after **PCV13** + 1 booster dose of **PPV23** at least 5 years later Multiple doses of vaccines may be given based on condition and recommendation from healthcare provider.	○ Hemoglobinopathy (e.g., sickle cell anemia, thalassemia major, spherocytosis) ○ Essential thrombocythemia (excess platelets) ○ Systemic lupus erythematosus ○ Celiac disease (gluten enteropathy) ○ Inflammatory enteropathies (Crohn's disease and ulcerative colitis) • Conditions leading to immunosuppression: ○ Hematopoietic stem cell transplant (HSCT) recipient (schedule prescribed by the transplant center) ○ Malic hematological disorder (leukemia, lymphoma or any other neoplasm of the bone marrow or lymphatic system) ○ Some malignant solid tumors (non-hematological cancers) ○ Chemotherapy, radiotherapy, or immunosuppressive treatment ○ Congenital antibody deficiency ○ Complementary, properdin, D-factor or H-factor deficiency ○ Other congenital immune deficiency (e.g., Di George syndrome) ○ Other diseases causing immunosuppression ○ Transplantation of a full organ ○ HIV infection
Immunocompetent adults less than 65 years of age with lifestyle factors at high risk of IPD: • Alcoholism • Smoking • Homelessness • Illicit drug use	**PPV23**: 1 dose	**PPV23** (dose not specified) for the following (Santé et Services Sociaux Québec, 2023d): • Alcoholism • Homeless • Current and regular use of hard drugs by *inhalation* or *injection* with a deterioration in health or precarious living conditions.2/12/2024 1:01:00 PM
Other (not included in NACI guidelines)	N/A	**PCV20** (dose not specified) for the following: (Santé et Services Sociaux Québec, 2023d) • People aged 50 and over living in the Indigenous communities of Nunavik and Terres-Cries-de-la-Baie-James • People aged 18 to 49 living in the same communities and presenting a (high-risk) condition.

Notes:

- Adults with anatomical or functional asplenia or an immunosuppressive state must receive Pneu-C-20 vaccine 1 year after the last dose of PPV23 (Santé et Services Sociaux Québec, 2023d).
- Québec classifies nephrotic syndrome under chronic kidney diseases (hence its classification in the non-immunocompromising category).
- Provincial sources categorize pneumococcal vaccines as Pneu-P: polysaccharide and Pneu-C: conjugate. Pneu-C: conjugate vaccines include PCV10, PCV13, PCV15 and PCV20.
- Provincial sources group eligible populations under other conditions; conditions are not separated by non-immunocompromising/immunocompromising/lifestyle conditions.

[1] NACI recommends that adult HSCT recipients receive 3 doses of PCV13 3–9 months post-transplant and 1 dose of PPV23 12–18 months post-transplant; 1 booster dose of PPV23 is also recommended 1 year later by some experts (Public Health Agency of Canada, 2016).

[2] PPV23 is not required following administration of PCV20 (Santé et Services Sociaux Québec, 2023c).

New Brunswick

TABLE A7. Population and pneumococcal vaccine eligibility for New Brunswick compared to 2016 NACI recommendations

NACI Pneumococcal Vaccine Recommendations *(Public Health Agency of Canada, 2016)*		Eligibility of publicly funded vaccine in New Brunswick
Population	**Dose schedule**	
Adults aged 65 years and up	**PPV23:** 1 dose	**PPV23:** 1 dose (Government of New Brunswick, 2021) Adults who received PPV23 before 65 years of age, should receive 1 dose of PPV23 again at 65 years of age (at least 5 years after any previous dose) (Government of New Brunswick, n.d.-a).
Adults aged less than 65 years in long-term care facilities	**PPV23:** 1 dose	**PPV23:** 1 dose (Government of New Brunswick, n.d.-a)
Adults with non-immunocompromising conditions such as: • Chronic CSF leak • Chronic neurologic conditions that may impair clearance of oral secretions • Cochlear implants • Chronic heart disease • Diabetes mellitus • Chronic kidney disease • Chronic liver disease, including hepatic cirrhosis due to any cause • Chronic lung disease, including asthma that required medical care in the preceding 12 months	**PPV23:** 1 dose + 1 booster dose at least 5 years later for people at highest risk for IPD **PCV13:** 1 dose may be given in combination with **PPV23** at different intervals based on recommendation from healthcare provider).	**PPV23:** 1 dose for those with the following conditions (Government of New Brunswick, n.d.-b) • Chronic Neurological Conditionals (chronic neurological conditions that may impair clearance of oral secretions) • Cochlear Implant • Diabetes mellitus • Chronic Liver Disease (including hepatitis C, chronic hepatitis B, and other diseases) • Chronic CSF leak • Chronic Lung disease (not including asthma for adults) • Cystic Fibrosis • Chronic salicylic acid therapy • Cochlear Implant • Renal disease and dialysis • Heart disease and stroke

Adults with immunocompromising conditions such as: • Sickle cell disease, congenital or acquired asplenia, or splenic dysfunction • Congenital immunodeficiencies involving any part of the immune system, including B-lymphocyte (humoral) immunity, T-lymphocyte (cell) mediated immunity, complement system (properdin or factor D deficiencies), or phagocytic functions • Immunocompromising therapy, including use of long-term corticosteroids, chemotherapy, radiation therapy, and post-organ transplant therapy • HIV infection • Hematopoietic stem cell transplant (HSCT) recipient[1] • Malignant neoplasms, including leukemia and lymphoma • Nephrotic syndrome • Solid organ or islet transplant (candidate or recipient)	**PCV13:** 1 dose AND **PPV23:** 1 dose at least 8 weeks after **PCV13** + 1 booster dose of **PPV23** at least 5 years later Multiple doses of vaccines may be given based on condition and recommendation from healthcare provider.	**PCV13:** 1 dose for those with the following conditions • HSCT[2] • HIV • Congenital Immunodeficiency • Solid Organ Transplant • Splenic Disorders (including Sickle Cell Disease or other hemoglobinopathies) If **PCV13** was given first, wait 8 weeks and follow with 1 dose of **PPV23** (Government of New Brunswick, n.d.-b) **PPV23:** 1 dose for those with the following conditions (Government of New Brunswick, n.d.-b): • Cancers • Congenital Immunodeficiency • HSCT[2] • HIV • Immunosuppressive Therapy • Solid Organ Transplant • Splenic Disorders (including Sickle Cell Disease or other hemoglobinopathies) • Hemophilia, Bleeding Disorders (multiple blood or plasma/component transfusions)
Immunocompetent adults less than 65 years of age with lifestyle factors at high risk of IPD: • Alcoholism • Smoking • Homelessness • Illicit drug use	**PPV23**: 1 dose	**PPV23:** 1 dose for the following (Government of New Brunswick, n.d.-b): • Alcoholism • Homelessness • Illicit drug use
Other (not included in NACI guidelines)	N/A	N/A

Notes:

[1] NACI recommends that adult HSCT recipients receive 3 doses of PCV13 3–9 months post-transplant and 1 dose of PPV23 12–18 months post-transplant; 1 booster dose of PPV23 is also recommended 1 year later by some experts (Public Health Agency of Canada, 2016).

[2] HSCT recipients are eligible to receive 3 doses of PCV13 and 1 dose of PPV23 (Government of New Brunswick, n.d.-b).

Nova Scotia

TABLE A8. Population and pneumococcal vaccine eligibility for Nova Scotia compared to 2016 NACI recommendations

NACI Pneumococcal Vaccine Recommendations *(Public Health Agency of Canada, 2016)*		Eligibility of publicly funded vaccine in Nova Scotia (Nova Scotia Health Authority, 2019)
Population	**Dose schedule**	
Adults aged 65 years and up	**PPV23:** 1 dose	**PPV23:** 1 dose
Adults aged less than 65 years in long-term care facilities	**PPV23:** 1 dose	**PPV23:** 1 dose
Adults with non-immunocompromising conditions such as: • Chronic CSF leak • Chronic neurologic conditions that may impair clearance of oral secretions • Cochlear implants • Chronic heart disease • Diabetes mellitus • Chronic kidney disease • Chronic liver disease, including hepatic cirrhosis due to any cause • Chronic lung disease, including asthma that required medical care in the preceding 12 months	**PPV23:** 1 dose + 1 booster dose at least 5 years later for people at highest risk for IPD **PCV13:** 1 dose may be given in combination with **PPV23** at different intervals based on recommendation from healthcare provider).	**PPV23:** 1 dose for those with the following conditions: • Chronic CSF leak • Chronic neurological conditions (only those that may impair clearance of oral secretions) • Cochlear implant • Heart disease • Diabetes mellitus • Chronic renal disease • Chronic liver disease • Chronic lung disease (not asthma) • Cystic fibrosis
Adults with immunocompromising conditions such as: • Sickle cell disease, congenital or acquired asplenia, or splenic dysfunction • Congenital immunodeficiencies involving any part of the immune system, including B-lymphocyte (humoral) immunity, T-lymphocyte (cell) mediated immunity, complement system (properdin or factor D deficiencies), or phagocytic functions • Immunocompromising therapy, including use of long-term corticosteroids, chemotherapy, radiation therapy, and post-organ transplant therapy • HIV infection	**PCV13:** 1 dose AND **PPV23:** 1 dose at least 8 weeks after **PCV13** + 1 booster dose of **PPV23** at least 5 years later Multiple doses of vaccines may be given based on condition and recommendation from healthcare provider.	**PCV13:** 1 dose followed by **PPV23** (1 dose) at least 8 weeks later for these conditions: • Splenic disorders including Sickle cell disease or other Hemoglobinopathies • Congenital immunodeficiency • Cancers • Immunosuppressive therapy • HIV • HSCT[2] • Solid organ transplant

• Hematopoietic stem cell transplant (HSCT) recipient[1] • Malignant neoplasms, including leukemia and lymphoma • Nephrotic syndrome • Solid organ or islet transplant (candidate or recipient)		
Immunocompetent adults less than 65 years of age with lifestyle factors at high risk of IPD: • Alcoholism • Smoking • Homelessness • Illicit drug use	**PPV23**: 1 dose	**PPV23:** 1 dose for the following: • Alcoholism • Homelessness • Illicit drug use
Other (not included in NACI guidelines)	N/A	N/A

Notes:

- Provincial source groups eligible populations together under “immune-suppressing conditions” and “others” (Nova Scotia Health Authority, 2019).
- Conditions are not separated by non-immunocompromising/ immunocompromising/lifestyle conditions.

[1] NACI recommends that adult HSCT recipients receive 3 doses of PCV13 3–9 months post-transplant and 1 dose of PPV23 12–18 months post-transplant; 1 booster dose of PPV23 is also recommended 1 year later by some experts (Public Health Agency of Canada, 2016).

[2] HSCT recipients considered “never immunized” and require complete re-immunization post transplantation.

Prince Edward Island

TABLE A9. Population and pneumococcal vaccine eligibility for Prince Edward Island compared to 2016 NACI recommendations

NACI Pneumococcal Vaccine Recommendations *(Public Health Agency of Canada, 2016)*		Eligibility of publicly funded vaccine in Prince Edwad Island
Population	**Dose schedule**	
Adults aged 65 years and up	**PPV23:** 1 dose	**PPV23**: 1 dose (Government of Prince Edward Island, 2023)
Adults aged less than 65 years in long-term care facilities	**PPV23:** 1 dose	**PPV23**: 1 dose for individuals residing in a long-term care or community care facility (Health PEI, 2017)
Adults with non-immunocompromising conditions such as: • Chronic CSF leak • Chronic neurologic conditions that may impair clearance of oral secretions • Cochlear implants • Chronic heart disease • Diabetes mellitus • Chronic kidney disease • Chronic liver disease, including hepatic cirrhosis due to any cause • Chronic lung disease, including asthma that required medical care in the preceding 12 months	**PPV23:** 1 dose + 1 booster dose at least 5 years later for people at highest risk for IPD **PCV13:** 1 dose may be given in combination with **PPV23** at different intervals based on recommendation from healthcare provider).	**PPV23:** 1 or 2 doses, depending on condition (PEI Department of Health and Wellness, 2019). Conditions labelled as "Adults without immunocompromise (high risk)" include: • Asthma that required treatment in the preceding 12 months • CSF fluid leak • Neurological conditions that may impair clearance of oral secretions • Cochlear implants • Chronic cardiac disease • Chronic pulmonary disease • Diabetes mellitus • Chronic liver disease (including hepatic cirrhosis due to any cause)[2] • Chronic kidney disease/ dialysis[1]
Adults with immunocompromising conditions such as: • Sickle cell disease, congenital or acquired asplenia, or splenic dysfunction • Congenital immunodeficiencies involving any part of the immune system, including B-lymphocyte (humoral) immunity, T-lymphocyte (cell) mediated immunity, complement system (properdin or factor D deficiencies), or phagocytic functions • Immunocompromising therapy, including use of long-term corticosteroids, chemotherapy, radiation therapy, and post-organ transplant therapy • HIV infection	**PCV13:** 1 dose AND **PPV23:** 1 dose at least 8 weeks after **PCV13** + 1 booster dose of **PPV23** at least 5 years later Multiple doses of vaccines may be given based on condition and recommendation from healthcare provider.	**PCV13:** 1 dose for conditions at high risk of IPD, followed by 1 dose of **PPV23** at least 8 weeks later; one booster dose of **PPV23** is eligible at least 5 years later (PEI Department of Health and Wellness, 2019). Immunocompromising conditions include: • Asplenia • Congenital immunodeficiency • Solid organ transplant • Immunocompromising therapy: use of long-term corticosteroids (other than by inhalation, topical, or injection into a joint) e.g. oral prednisone for longer than 2 weeks; chemotherapy; radiation therapy; post-organ transplant therapy and certain anti-rheumatic drugs • HIV • HSCT recipient[3] • Malignant neoplasms • Nephrotic syndrome • Sickle cell disease

• Hematopoietic stem cell transplant (HSCT) recipient[1] • Malignant neoplasms, including leukemia and lymphoma • Nephrotic syndrome • Solid organ or islet transplant (candidate or recipient)		**PPV23:** 1 or 2 doses, depending on condition followed by 1 dose of **PPV23** at least 8 weeks later; one booster dose of PPV23 is eligible at least 5 years later (PEI Department of Health and Wellness, 2019). Conditions labelled below as "adults with immunocompromise (Highest risk)" include: • Sickle cell disease or other hemaglobinopathies • Congenital immunodeficiency involving any part of the immune system • Asplenia (functional or anatomic) • Immunocompromising therapy: use of long-term corticosteroids (other than by inhalation, topical, or injection into a joint) e.g. oral prednisone for longer than 2 weeks; chemotherapy; radiation therapy; post-organ transplant therapy and certain anti-rheumatic drugs • HIV • HSCT recipient[3] • Malignant neoplasms including leukemia and lymphoma • Nephrotic syndrome • Solid organ transplant (candidate or recipient)
Immunocompetent adults less than 65 years of age with lifestyle factors at high risk of IPD: • Alcoholism • Smoking • Homelessness • Illicit drug use	**PPV23**: 1 dose	**PPV23:** 1 dose for those with the following lifestyle factors (Health PEI, 2017): • Homeless • Illicit drug use • Alcoholism • Smoking Some individuals may require a booster 5 years later.
Other (not included in NACI guidelines)	N/A	N/A

Notes:

[1] NACI recommends that adult HSCT recipients receive 3 doses of PCV13 3–9 months post-transplant and 1 dose of PPV23 12–18 months post-transplant; 1 booster dose of PPV23 is also recommended 1 year later by some experts (Public Health Agency of Canada, 2016).

[2] Provincial source from PEI categorized "chronic liver disease (including hepatic cirrhosis due to any cause) and chronic kidney disease/dialysis" under immunocompromising conditions with the highest risk (PEI Department of Health and Wellness, 2019).

[3] For adults with HSCT, 3 doses of PCV13 are recommended 4 weeks apart, 3–9 months post-transplant; 1 dose of PPV23 is recommended 6–12 months after last dose of PCV13 (12–18 months post-transplant) (PEI Department of Health and Wellness, 2019).

Newfoundland and Labrador

TABLE A10. Population and pneumococcal vaccine eligibility for Newfoundland and Labrador compared to 2016 NACI recommendations

NACI Pneumococcal Vaccine Recommendations *(Public Health Agency of Canada, 2016)*		Eligibility of publicly funded vaccine in Newfoundland and Labrador *(Government of Newfoundland and Labrador, 2019)*
Population	**Dose schedule**	
Adults aged 65 years and up	**PPV23:** 1 dose	**PPV23**: 1 dose
Adults aged less than 65 years in long-term care facilities	**PPV23:** 1 dose	**PPV23:** 1 dose
Adults with non-immunocompromising conditions such as: • Chronic CSF leak • Chronic neurologic conditions that may impair clearance of oral secretions • Cochlear implants • Chronic heart disease • Diabetes mellitus • Chronic kidney disease • Chronic liver disease, including hepatic cirrhosis due to any cause • Chronic lung disease, including asthma that required medical care in the preceding 12 months	**PPV23:** 1 dose + 1 booster dose at least 5 years later for people at highest risk for IPD **PCV13:** 1 dose may be given in combination with **PPV23** at different intervals based on recommendation from healthcare provider).	**PPV23:** 1 dose for those with the following conditions: • All persons receiving or with cochlear implants • Chronic cardiac disease • Chronic respiratory disease • Chronic renal disease • Cirrhosis • Diabetes mellitus **PCV13:** 1 dose for all persons receiving or with cochlear implants
Adults with immunocompromising conditions such as: • Sickle cell disease, congenital or acquired asplenia, or splenic dysfunction • Congenital immunodeficiencies involving any part of the immune system, including B-lymphocyte (humoral) immunity, T-lymphocyte (cell) mediated immunity, complement system (properdin or factor D deficiencies), or phagocytic functions • Immunocompromising therapy, including use of long-term corticosteroids, chemotherapy, radiation therapy, and post-organ transplant therapy • HIV infection	**PCV13:** 1 dose AND **PPV23:** 1 dose at least 8 weeks after **PCV13** + 1 booster dose of **PPV23** at least 5 years later Multiple doses of vaccines may be given based on condition and recommendation from healthcare provider.	**PCV13:** 1 dose for those with the following conditions: • Asplenia or splenic dysfunction • Sickle-cell disease • Immunosuppression (e.g., induced through HIV infection and other conditions) **PPV23:** 1 dose for those with the following conditions: • Chronic renal disease; • Asplenia or splenic dysfunction • Sickle-cell disease • Nephrotic syndrome • Immunosuppression (e.g., induced through HIV infection and other conditions)

• Hematopoietic stem cell transplant (HSCT) recipient[1] • Malignant neoplasms, including leukemia and lymphoma • Nephrotic syndrome • Solid organ or islet transplant (candidate or recipient)		
Immunocompetent adults less than 65 years of age with lifestyle factors at high risk of IPD: • Alcoholism • Smoking • Homelessness • Illicit drug use	**PPV23**: 1 dose	**PPV23:** 1 dose for the following lifestyle factor: • Alcoholism
Other (not included in NACI guidelines)	N/A	• Indigenous populations are eligible for the PPV23 vaccine. • Other chronic conditions which increase an individual's risk for IPD.

Notes:

[1] NACI recommends that adult HSCT recipients receive 3 doses of PCV13 3–9 months post-transplant and 1 dose of PPV23 12–18 months post-transplant; 1 booster dose of PPV23 is also recommended 1 year later by some experts (Public Health Agency of Canada, 2016).

Yukon

TABLE A11. Population and pneumococcal vaccine eligibility for Yukon compared to 2016 NACI recommendations

NACI Pneumococcal Vaccine Recommendations *(Public Health Agency of Canada, 2016)*		Eligibility of publicly funded vaccine in Yukon *(Government of Yukon, 2022)*
Population	**Dose schedule**	
Adults aged 65 years and up	**PPV23:** 1 dose	**PPV23:** 1 dose
Adults aged less than 65 years in long-term care facilities	**PPV23:** 1 dose	**PPV23:** 1 dose, for all residents of extended or intermediate care facilities
Adults with non-immunocompromising conditions such as: • Chronic CSF leak • Chronic neurologic conditions that may impair clearance of oral secretions • Cochlear implants • Chronic heart disease • Diabetes mellitus • Chronic kidney disease • Chronic liver disease, including hepatic cirrhosis due to any cause • Chronic lung disease, including asthma that required medical care in the preceding 12 months	**PPV23:** 1 dose + 1 booster dose at least 5 years later for people at highest risk for IPD **PCV13:** 1 dose may be given in combination with **PPV23** at different intervals based on recommendation from healthcare provider).	**PPV23:** 1 dose + 1 booster for these conditions: • Diabetes • Chronic CSF leak • Chronic liver disease including cirrhosis, chronic hepatitis B, hepatitis C • Chronic heart disease • Chronic lung disease • Cystic Fibrosis • Chronic kidney disease • Cochlear implant (candidate or recipient)
Adults with immunocompromising conditions such as: • Sickle cell disease, congenital or acquired asplenia, or splenic dysfunction • Congenital immunodeficiencies involving any part of the immune system, including B-lymphocyte (humoral) immunity, T-lymphocyte (cell) mediated immunity, complement system (properdin or factor D deficiencies), or phagocytic functions • Immunocompromising therapy, including use of long-term corticosteroids, chemotherapy, radiation therapy, and post-organ transplant therapy • HIV infection	**PCV13:** 1 dose AND **PPV23:** 1 dose at least 8 weeks after **PCV13** + 1 booster dose of **PPV23** at least 5 years later Multiple doses of vaccines may be given based on condition and recommendation from healthcare provider.	**PCV13:** 1 dose for individuals with the following conditions: • Asplenia (anatomical or functional) • Sickle cell disease or other hemoglobinopathies • Congenital immunodeficiencies involving any part of the immune system, including B-lymphocyte (humoral) immunity, T-lymphocyte (cell) mediated immunity, complement system (properdin, or factor D deficiencies), or phagocytic functions • Immunosuppressive therapy including use of long-term corticosteroids, chemotherapy, radiation therapy, post-organ-transplant therapy, biologic and non-biologic immunosuppressive therapies for rheumatologic and other inflammatory diseases • Malignant neoplasms including leukemia and lymphoma • Solid organ or islet cell transplant (candidate or recipient) • HIV infection

• Hematopoietic stem cell transplant (HSCT) recipient[1] • Malignant neoplasms, including leukemia and lymphoma • Nephrotic syndrome • Solid organ or islet transplant (candidate or recipient)		**PPV23:** 1 dose + 1 booster after 5 years; a 3rd dose may be administered after age 65 if 2nd dose was given prior to this age for individuals with the following conditions: • Anatomic or functional asplenia • Sickle cell disease • Immunosuppression related to disease (e.g., malignant neoplasm, HIV, multiple myeloma) or therapy (e.g., high dose, systemic or severe rheumatoid arthritis requiring immunosuppressive therapy) • Congenital immunodeficiency states (complement system e.g., properdin or factor D deficiency) • Receipt of HSCT[2] • Candidate or recipient of organ or islet cell transplant
Immunocompetent adults less than 65 years of age with lifestyle factors at high risk of IPD: • Alcoholism • Smoking • Homelessness • Illicit drug use	**PPV23**: 1 dose	**PPV23:** 1 dose + 1 booster after age 65 for individuals with the following lifestyle factors: • Alcoholism • Homelessness • Illicit drug use • Cigarette smokers
Other (not included in NACI guidelines)	N/A	N/A

Notes:

Territorial source from Yukon did not explicitly differentiate between immunocompromising and non-immunocompromising conditions.

[1] NACI recommends that adult HSCT recipients receive 3 doses of PCV13 3–9 months post-transplant and 1 dose of PPV23 12–18 months post-transplant; 1 booster dose of PPV23 is also recommended 1 year later by some experts (Public Health Agency of Canada, 2016).

[2] HSCT recipients ≥ 2 years of age: must follow re-immunization schedule specific to province in which treatment was given and contact Immunization Program Manager (Government of Yukon, 2022).

Northwest Territories

TABLE A12. Population and pneumococcal vaccine eligibility for Northwest Territories compared to 2016 NACI recommendations

NACI Pneumococcal Vaccine Recommendations *(Public Health Agency of Canada, 2016)*		**Eligibility of publicly funded vaccine in Northwest Territories**
Population	**Dose schedule**	
Adults aged 65 years and up	**PPV23:** 1 dose	**PPV23 (**1 dose) (Government of Northwest Territories, 2023b)
Adults aged less than 65 years in long-term care facilities	**PPV23:** 1 dose	**PPV23** (dose not specified) • 65 years of age and younger at risk for invasive pneumococcal disease • More than one dose of a publicly funded vaccine may be required depending on the type; no information on which vaccines (Government of Northwest Territories, 2023a) **PCV13** (dose not specified) • Covered for individuals with certain medical conditions as per Canadian Immunization Guide (decided on a case-by-case basis) (Government of Northwest Territories, 2023b)
Adults with non-immunocompromising conditions such as: • Chronic CSF leak • Chronic neurologic conditions that may impair clearance of oral secretions • Cochlear implants • Chronic heart disease • Diabetes mellitus • Chronic kidney disease • Chronic liver disease, including hepatic cirrhosis due to any cause • Chronic lung disease, including asthma that required medical care in the preceding 12 months	**PPV23:** 1 dose + 1 booster dose at least 5 years later for people at highest risk for IPD **PCV13:** 1 dose may be given in combination with **PPV23** at different intervals based on recommendation from healthcare provider).	
Adults with immunocompromising conditions such as: • Sickle cell disease, congenital or acquired asplenia, or splenic dysfunction • Congenital immunodeficiencies involving any part of the immune system, including B-lymphocyte (humoral) immunity, T-lymphocyte (cell) mediated immunity, complement system (properdin or factor D deficiencies), or phagocytic functions • Immunocompromising therapy, including use of long-term corticosteroids, chemotherapy, radiation therapy, and post-organ transplant therapy • HIV infection • Hematopoietic stem cell transplant (HSCT) recipient[1]	**PCV13:** 1 dose AND **PPV23:** 1 dose at least 8 weeks after **PCV13** + 1 booster dose of **PPV23** at least 5 years later Multiple doses of vaccines may be given based on condition and recommendation from healthcare provider.	

• Malignant neoplasms, including leukemia and lymphoma • Nephrotic syndrome • Solid organ or islet transplant (candidate or recipient)		
Immunocompetent adults less than 65 years of age with lifestyle factors at high risk of IPD: • Alcoholism • Smoking • Homelessness • Illicit drug use	**PPV23**: 1 dose	
Other (not included in NACI guidelines)	N/A	N/A

Notes:

PCV13 recommended for those 5 years and older with "certain health conditions" (Government of Northwest Territories, 2023a); listed as non-publicly funded but some vaccines on the list may be provided for free depending on health status.

[1] NACI recommends that adult HSCT recipients receive 3 doses of PCV13 3–9 months post-transplant and 1 dose of PPV23 12–18 months post-transplant; 1 booster dose of PPV23 is also recommended 1 year later by some experts (Public Health Agency of Canada, 2016).

Nunavut

TABLE A13. Population and pneumococcal vaccine eligibility for Nunavut compared to 2016 NACI recommendations

NACI Pneumococcal Vaccine Recommendations *(Public Health Agency of Canada, 2016)*		Eligibility of publicly funded vaccine in Nunavut
Population	**Dose schedule**	
Adults aged 65 years and up	**PPV23:** 1 dose	**PPV23:** 1 dose is recommended for adults 50 years and above (Nunavut Department of Health, 2017).
Adults aged less than 65 years in long-term care facilities	**PPV23:** 1 dose	N/A
Adults with non-immunocompromising conditions such as: • Chronic CSF leak • Chronic neurologic conditions that may impair clearance of oral secretions • Cochlear implants • Chronic heart disease • Diabetes mellitus • Chronic kidney disease • Chronic liver disease, including hepatic cirrhosis due to any cause • Chronic lung disease, including asthma that required medical care in the preceding 12 months	**PPV23:** 1 dose + 1 booster dose at least 5 years later for people at highest risk for IPD **PCV13:** 1 dose may be given in combination with **PPV23** at different intervals based on recommendation from healthcare provider).	**PPV23:** 1 dose for adults at increased risk who have not previously received the **PPV23** vaccine (Nunavut Department of Health, 2014): • Chronic CSF leak • Chronic neurologic condition that may impair clearance of oral secretions • Cochlear implants • Chronic cardiac or pulmonary disease • Diabetes mellitus • Chronic kidney disease, including nephrotic syndrome • Chronic liver disease (including hepatic cirrhosis due to any cause) • Re-immunization booster dose: An additional (1) booster dose is recommended 5 years later for select high-risk adults. Maximum 2 doses.
Adults with immunocompromising conditions such as: • Sickle cell disease, congenital or acquired asplenia, or splenic dysfunction • Congenital immunodeficiencies involving any part of the immune system, including B-lymphocyte (humoral) immunity, T-lymphocyte (cell) mediated immunity, complement system (properdin or factor D deficiencies), or phagocytic functions • Immunocompromising therapy, including use of long-term corticosteroids, chemotherapy, radiation therapy, and post-organ transplant therapy	**PCV13:** 1 dose AND **PPV23:** 1 dose at least 8 weeks after **PCV13** + 1 booster dose of **PPV23** at least 5 years later Multiple doses of vaccines may be given based on condition and recommendation from healthcare provider.	**PPV23:** 1 dose for adults at increased risk who have not previously received **PPV23** (Nunavut Department of Health, 2014): • Asplenia (functional or anatomic) • Sickle cell disease or other hemoglobinopathies • Congenital immunodeficiencies involving any part of the immune system, including B-lymphocyte (humoral) immunity, T-lymphocyte (cell) mediated immunity, complement system (e.g., properdin or factor D deficiencies), or phagocytic functions • HSCT recipient • HIV infection • Immunosuppressive therapy including use of long-term corticosteroids, chemotherapy, radiation therapy, post-organ transplant therapy, and certain anti-rheumatic drugs • Malignant neoplasms including leukemia and lymphoma

• HIV infection • Hematopoietic stem cell transplant (HSCT) recipient[1] • Malignant neoplasms, including leukemia and lymphoma • Nephrotic syndrome • Solid organ or islet transplant (candidate or recipient)		• Solid organ or islet transplant (candidate or recipient)
Immunocompetent adults less than 65 years of age with lifestyle factors at high risk of IPD: • Alcoholism • Smoking • Homelessness • Illicit drug use	**PPV23**: 1 dose	N/A
Other (not included in NACI guidelines)	N/A	Pregnant and breastfeeding women may be eligible for pneumococcal vaccines if they have underlying medical conditions that put them at high risk of invasive pneumococcal disease (Nunavut Department of Health, 2018)

Notes:

[1] NACI recommends that adult HSCT recipients receive 3 doses of PCV13 3–9 months post-transplant and 1 dose of PPV23 12–18 months post-transplant; 1 booster dose of PPV23 is also recommended 1 year later by some experts (Public Health Agency of Canada, 2016).

Appendix B. Monitoring and Surveillance of Pneumococcal Vaccines

TABLE B1. Pneumococcal vaccine monitoring in British Columbia, Alberta, Ontario, and Quebec

British Columbia	Alberta	Ontario	Quebec
• The Provincial Public Health Information System is a compilation of more than 10 systems, which include a central public health information system (Panorama) (Provincial Health Services Authority, n.d.). • The Provincial Public Health Information System works collaboratively with the Ministry of Health, Regional Health Authorities, First Nation Health Authority and Yukon Territory (Provincial Health Services Authority, n.d.): • Immunization registries enable provincial immunization coverage surveillance, immunization decision support, physician access to records, citizen access to immunization records, and provincial readiness to manage outbreaks of vaccine-preventable diseases. • No information was found regarding adult pneumococcal vaccine monitoring/uptake with an equity-focused lens (i.e., no disaggregation of vaccine coverage data based on factors such as rural vs. urban, regional, socioeconomic status etc.)	• Health practitioners are required to upload all immunization records (including pneumococcal vaccines) for patients into the Alberta vaccine registry (Imm/ARI) (Alberta Health Services, 2022). • "Immunization data is analyzed provincially and used to assess the efficacy of provincially funded vaccines and to analyze the immunization programs. Non identifiable summary data is forwarded to Health Canada and included in the national summary data used for analysis of immunization programs" (Alberta Health, 2022). • Adult vaccine coverage data is only publicly reported for COVID-19 and influenza; adult pneumococcal vaccine coverage data is not publicly reported (J. Kellner, personal communication, August 18, 2023). • No information was found regarding adult pneumococcal vaccine monitoring/uptake with an equity-focused lens (i.e., no disaggregation of vaccine uptake data based on factors such as rural vs. urban, regional, socioeconomic status etc.)	• Public Health Ontario manages the provincial surveillance of school-based immunization coverage. However, public information regarding adult vaccine coverage was not found (Public Health Ontario, n.d.).	• The electronic database (Panorama: Quebec Vaccine Registry) is used by health professionals and public health authorities to track outbreaks of vaccine-preventable diseases, access vaccination history, communicate potential recalls of vaccine batches, and monitor vaccination programs (Government of Québec, 2023b). • Mandatory registration for all people who received vaccines in Quebec and Quebec residents who received vaccines out of the province (Government of Québec, 2020). Information collected includes: name, date of birth, gender, health insurance number, home address, other vaccines received and contraindications; record of all vaccinations, including those not publicly funded. • Vaccination coverage is measured for pneumococcal vaccination in the elderly and high-risk groups and is publicly available on provincial sources (Santé et Services Sociaux Québec, 2023b). • Series of reports based on population surveys for influenza, pneumococcal, and shingles vaccine coverage conducted every 2 years (publicly available in French) (Trottier & Dubé, 2022). 2/12/2024 1:01:00 PM2024-02-12 1:01:00 PM ○ Main objectives at the provincial level: Estimate lifetime vaccination coverage against pneumococcal disease and its determinants among individuals aged 65+ and people living with one or more chronic diseases; Describe knowledge, attitude, and behaviours related to vaccination.

			○ Secondary objectives: Estimate lifetime pneumococcal vaccination coverage in individuals aged 65 and over, aged 50 and over with asthma that receive regular medical follow-up, and with chronic diseases; Estimate the time of the last pneumococcal dose received in the targeted groups; Determine the main reason for vaccination or non-vaccination against pneumococcal disease, at the provincial level, for persons aged 65 years and older and those one or more chronic diseases aged 18–64 years (those with asthma between ages 18 and 49 will be excluded). ○ Data on target populations under the pneumococcal vaccination program (individuals aged 65 and over, under 64 years of age at increased risk of IPD, and 50 and over with asthma severe enough to require regular medical follow-up or hospital care) is disaggregated by factors such as gender, age group, seasonal influenza vaccination status, recommendation from healthcare professional, and reasons for pneumococcal vaccination or non-vaccination. ○ Sociodemographic data for survey respondents based on region, language spoken, education, and household composition is recorded, but this information is not available in pneumococcal vaccine coverage sections.2024-02-12 1:01:00 PM

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