

# Ensuring equitable access to adult vaccines across Canada

GSK

Position Paper

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# Acknowledgement

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GSK is a global biopharma company with a purpose to unite science, technology and talent to get ahead of disease together. We are a global leader in vaccines with a current portfolio consisting of more than 20 vaccines to help protect people at all stages of life. This position paper is an evidence-based report that summarizes an analysis of the gaps between Canada's federal and provincial approaches to adult vaccination and potential ways to address these gaps.

This paper is based on insights from stakeholder interviews and information from publicly-available sources. The paper was made possible by more than 20 experienced leaders who generously contributed their time and insights to inform this discussion through stakeholder interviews. Interviews were performed with public health leaders, researchers, and policy makers across the country, who have experience in infectious disease research and care, vaccine program implementation and decision-making, and more. Interviews were also conducted with stakeholders who have international experience in immunization programs. Publicly available information was drawn from a variety of sources including academic publications and online jurisdictional government websites. KPMG LLP was

engaged by GSK to conduct the factual research and interviews in support of the development of this report.

The objective of this position paper is to help advance public policy discussion and debate in Canada regarding public funding for adult vaccines.

## This position paper includes:

- A review of the variability of adult vaccination coverage of NACI recommended vaccines
- An assessment of the rationale behind different provincial approaches to vaccination coverage
- A review of the funding models used for vaccine coverage and delivery in Canada
- Policy considerations for public funding of adult vaccines

# Executive Summary

## Ensuring equitable access to adult vaccines across Canada

Vaccination has saved more lives than any other innovation in modern medicine,<sup>1</sup> but the benefits of disease-preventing vaccines are not equally accessible across Canada. Over the last two decades, the progress made in improving vaccine access and uptake in children has not been observed among adult Canadians.<sup>2</sup>

Currently, there is no obligation for Canadian provinces, territories, nor the federal government, to allocate funding for adult vaccines that have been recommended by Canada's National Advisory Committee on Immunization (NACI). Consequently, the availability of publicly funded immunizations across Canada is patchy and inconsistent for certain diseases, limiting access to those who are aware of the vaccine and have the ability to pay for the vaccine.

For example, Herpes Zoster Disease (shingles), which causes neuropathic pain and painful rashes on the face and body, is expected to impact nearly one in three Canadians in their lifetime – some of which will experience severe complications, including long-lasting nerve pain. There are vaccines to prevent the disease. For example, Shingrix<sup>®</sup>, a vaccine against shingles, is strongly recommended by NACI for all those 50 years of age and older, yet the vaccine is only publicly funded for a small subset of people in six out of thirteen provinces/territories (P/Ts). For people in all other P/Ts, it comes at an out-of-the-pocket cost.

Without public funding for robust adult immunization programs, people across Canada – especially older adults and those who may not have the ability to pay – are at greater risk of severe health outcomes due to vaccine preventable diseases.

What stands between NACI recommendations and equitable access to vaccines across P/Ts is often the lack of public health funding to support vaccination programs. For the majority of adult vaccines in Canada, the funding burden for vaccine purchasing and program implementation is the responsibility of each P/T. P/Ts are faced with tough and complex decisions around allocation of their healthcare budgets and competing priorities that can impinge the P/T's decision to fund a vaccine.<sup>3</sup> This has created a patchwork approach to vaccine access across Canada.

In some instances the federal government has provided additional support to promote improved access to vaccines. This includes developing and supporting the National Immunization Strategy, the **Immunization Partnership Fund** and other funding support mechanisms such as:

- **Purchasing vaccines:** In certain cases, the federal government has purchased and procured vaccines for the country, distributing the vaccines broadly to all provinces and territories. In recent history, this model has been used for rapid vaccine deployment to address urgent public health threats including COVID-19. This approach has allowed Canada to secure vaccine supply and rapidly deploy vaccines across the country to provide more timely access to all eligible Canadians
- **Making funds available for immunization programs:** The federal government has made funds available to provinces to specifically augment and supplement their immunization programs. Most notably, this was used in the case of four children's vaccines in the early 2000s and an adolescent vaccine in 2006, through the **Public Health and Immunization Trust**, which had considerable impact on catalyzing provinces and territories to add five new vaccines to their immunization programs, creating more, uniform, equitable access to vaccines across the country.<sup>4</sup>

**Despite the efforts to improve equitable access to vaccines,<sup>5</sup> there is more work to be done.** As new innovative vaccines come to the Canadian market, there is an expected increase in the number of NACI-recommended vaccines for adults, and increased costs with implementing respective immunization programs. These new vaccines, however, present opportunities to improve equity in vaccination access to reduce suffering and death while alleviating burden on our healthcare systems – governments have a primary responsibility to capitalize on these opportunities.

## Increased federal funding is required to support provincial and territorial immunization programs in their efforts to support more equitable access to adult vaccines across Canada.

Without change, current inequities in vaccination access may persist and widen for adult vaccines. Alongside increased funding, thoughtful consideration should be put into addressing additional barriers to access, including providing convenient immunization delivery locations, and improving education and awareness around vaccine preventable diseases.

This position paper analyses the gaps between NACI recommendations and provincial approaches to adult vaccination – specifically for influenza, shingles, and pneumonia – and potential opportunities to address these gaps. The purpose of this analysis is to help advance public policy discussion and debate in Canada regarding equitable access to adult vaccines across the country so that the benefits of disease-preventing immunizations are spread equally across Canada.

# 01

## Introduction

### Overview of adult vaccination in Canada

Vaccination has saved more lives than any other innovation in modern medicine.<sup>8</sup> Each year, vaccines prevent millions of deaths that would have been caused by diseases like smallpox, measles, tetanus, pertussis and diphtheria.<sup>9</sup> Yet, vaccine preventable diseases still present a significant burden to our health system – influenza alone contributes to more than 12,000 hospitalizations per year, and combined influenza and pneumonia are the 7th leading cause of death in Canada.

Although several vaccinations are available in Canada for both children and adults, the success of vaccine uptake and adherence to immunization guidelines seen in children has not been observed among adult Canadians.<sup>10</sup> Contributing to limited uptake are disparities in access to publicly-funded vaccines across provinces and territories (P/Ts). Currently, there is no obligation for Canadian provinces, territories, nor the federal government, to allocate funding for adult vaccines that have been recommended by the National Advisory Committee on Immunization (NACI). Consequently, the availability of publicly-funded immunizations across Canada is patchy and inconsistent for certain diseases.

One province may provide and deliver a NACI-recommended vaccine as part of their publicly-funded provincial health program, while another provides no funding, limiting access to those who are aware of the vaccine and have the ability to pay for the vaccine.<sup>12</sup> When a vaccine is not publicly funded, it is commonly referred to as a “recommended but unfunded vaccine”, which often has limited uptake relative to a funded vaccine.<sup>13,14</sup> Recommended but unfunded vaccines leave adults in Canada more vulnerable to vaccine-

preventable diseases (VPDs) – especially older adults who are more susceptible to severe health outcomes caused by VPDs, and those who are not able to pay for recommended but unfunded vaccines out-of-pocket.

**According to the World Health Organization (WHO), vaccination is the most effective public health intervention available and is one of the most effective tools available for reducing the burden on the Canadian healthcare system, keeping vulnerable seniors out of hospitals and saving lives.<sup>6</sup>**

**In addition to providing health benefits, immunization is one of the most cost-effective public health interventions – with many vaccines providing savings in health care costs.<sup>7</sup>**

The **National Advisory Committee on Immunization (NACI)** is Canada's national entity that issues recommendations to P/Ts and the public on the use of authorized vaccines. As Canada's National Immunization Technical Advisory Group (NITAG), they evaluate vaccines based on a variety of technical and scientific factors and issue two separate recommendations on the vaccinations: one for public health program-level recommendations, and another one for individual-level decision-making. NACI is an external committee that reports to the Public Health Agency of Canada (PHAC), to provide ongoing and timely medical, scientific, and public health advice.<sup>11</sup>

Since healthcare delivery is the responsibility of P/Ts, the decision to fund adult immunization programs often rests with P/T governments. Due to limited funding for public health programs, decision-makers who evaluate new immunization programs are faced with challenging decisions to assess the economic value of vaccines relative to other alternative uses of health care budgets.<sup>15</sup> Further, as more new vaccines are emerging, there is an expected increase in the number of NACI-recommended vaccines for adults, and increased financial burden of implementing respective immunization programs.

Given this context, it is important to explore improving equitable access to vaccines across Canada. This position paper analyses the gaps between NACI recommendations and provincial approaches to adult vaccination and potential opportunities to address these gaps. More specifically, this paper analyses vaccines that have been recommended for broad adult populations such as influenza, shingles, and pneumococcal disease. The purpose of this analysis is to help advance public policy discussion and debate in Canada regarding equitable access to adult vaccines across the country so that the benefits of disease-preventing immunizations are spread equally across Canada, independently of where an individual lives or their ability to pay.



## Adult vaccination context following the COVID-19 pandemic



Despite challenges with pandemic management, COVID-19 adult vaccination rates for the primary course of immunization (i.e., two doses) were some of the highest vaccination rates in Canadian history, making it one of the most successful adult vaccine campaigns in Canada, and around the world.

As a result of several interventions, including the national COVID-19 vaccination approach, there were low immunization rate variations across P/Ts, and high immunization uptake – with up to 89% of adults receiving the primary course of immunization. These rates were some of the world’s best, surpassing uptake in countries such as Finland, Germany, France and United Kingdom.<sup>16,17</sup>

In Canada, COVID-19 vaccines were procured and paid for by the federal government and rolled out in partnership between the federal and provincial/territorial governments. Funding mechanisms were also introduced to support P/Ts in providing equitable access to vaccines.

Now, there may be opportunities to build on progress

and lessons learned made through COVID-19 to create more accessible vaccination programs of the future. Specifically,

### COVID pandemic response has:

- Highlighted health inequities and unique challenges of health services for underserved populations, including older adults, who may be more at risk of severe complications from infectious diseases.
- Accelerated the development of vaccine data infrastructure – including data registries, vaccine passports, and real-time monitoring mechanisms – and improved the public literacy around vaccination.<sup>18</sup>
- Catalyzed significant capital and human resources investments in pandemic management and relief.

**Through the pandemic, we’ve seen that our health system is underserving our adult population. Providing equitable access to vaccines is an important part of keeping our adult populations – who are some of the most vulnerable members of our communities – healthy and well.**

**Dr. Jia Hu, Public Health Physician, CEO and Co-Founder of 19 To Zero, Corporate Medical Director – Cleveland Clinic Canada**

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P/T refers to 'province/territory

# 02

# Assessment: Canada's approach to adult vaccination coverage

## 2.1 Review of the variability of adult vaccination coverage

Like other aspects of Canada's healthcare system, vaccination coverage and delivery differ across Canadian jurisdictions. The delivery of health services is the responsibility of the provincial and territorial governments, and the delivery of public health services – including vaccines – is no exception. Canada's publicly-funded immunization programs are primarily a P/T responsibility, meaning decisions around program funding and delivery are the responsibility of P/Ts. Canadian adults, as a result, have different access to vaccines based on the province they live in.

The vaccine approval process begins with a review by Health Canada, which is responsible for reviewing safety and effectiveness of health products, such as vaccines, and for assessing market authorization.<sup>19</sup> Upon authorization, vaccine administration can begin at this point, but often vaccines require additional review and analysis of implementation considerations. This analysis is led by Canada's national immunization technical advisory group, NACI.

NACI was originally established in 1964 with a mandate to provide advice on immunizing agents to the Department of National Health and Welfare, and to make recommendations on immunizing agents to the Dominion Council of Health. Over the years, NACI has evolved to providing advice and technical guidance for more than 50 authorized vaccine products to prevent 24 different diseases, which are incorporated in Canada's Immunization Guide.<sup>20</sup>

Today, NACI is highly regarded globally as one of the 15 well-established National Immunization Technical Advisory Groups.<sup>21</sup> NACI helps make thorough evidence-based recommendations on vaccinations based on their public health impact, effectiveness and safety. They issue public recommendations at two levels: the individual level and program-level. The individual-level recommendations are intended for people who would like to protect themselves from the disease, and for care providers who are informing patients. Program-level recommendations are intended for P/Ts responsible for making decisions on publicly-funded immunization programs.<sup>22</sup>

Since 2019, NACI has expanded their scope to considering programmatic factors and cost-effectiveness to facilitate timely decision-making at the provincial and territorial levels.<sup>23</sup>

Complementary to NACI, the Canadian Immunization Committee (CIC) was established in 2004 as a federal/provincial/territorial body that provides advice and recommendations on implementing Canada's National immunization Strategy (NIS). Since the committee is composed of Assistant Deputy Ministers of Health and Medical Officers of Health, the CIC offers opportunities for P/Ts to share relevant insights regarding immunization program strategies and implementation. This includes exchanging knowledge regarding funding immunization programs. It allows for greater transparency into practices across jurisdictions and helps facilitate a more uniform vaccination approach across Canada.



### What if a P/T does not fund an authorized vaccine?

Canadians can receive vaccines that have been authorized by Health Canada – but accessing adult vaccines differs depending on the province.

If a P/T covers the costs of immunization for a specific vaccine, people in the P/T may be able to receive the vaccine from their family doctor, local immunization clinic and/or pharmacist for free.

If a P/T does not cover the cost of the immunization program, people in the P/T may need to pay for the vaccine out-of-pocket or through insurance. Further, to access the vaccine, people in the P/T may have to seek a prescription for the vaccine from their family doctor, fill the prescription at a pharmacy and get the vaccine administered. The latter option is often time and cost-prohibitive to many people, contributing to the disparities in vaccine uptake across P/Ts.

Upon NACI recommendation and CIC analyses, the final step towards a public immunization program is funding approval by the province or territory (see Figure 2 for details). Each P/T has their own evaluation methods and decision-making processes. Generally, public health teams within each P/T will evaluate available literature – including NACI and CIC recommendations – in the context of their unique P/T. They may then issue recommendations to decision-makers, requesting public funding for the vaccine.

The rigour of evaluation methodologies, however, differ across P/Ts. Some provinces, like British Columbia and Quebec,<sup>24</sup> have established immunization committees that perform robust analyses with implementation considerations. Others have limited resources, and thus may not have dedicated established committees to perform these province-specific analyses.

Since the federal government does not always provide programmatic funding for the delivery of NACI-recommended vaccines, the P/T's decision to fund a vaccine is often made against other competing funding requests, which can impinge on the decision.<sup>25</sup> This has created a system where requests to fund vaccines are increasingly framed in terms of up-front investment.

As a consequence, access to publicly-funded adult vaccines differs across Canada due to separate P/Ts reaching different conclusions about the effectiveness and efficiency of immunization programs. NACI

recognizes that there are differences in operational contexts across Canada and suggests that P/Ts consider differences between age cohorts if prioritization of immunization programs is required. Canada's independent P/Ts as a result have discordant internal programs that sometimes depart from the national NACI recommendation.

It is important to note, however, that funding a particular vaccine is not the only factor that leads to greater uptake and reduced vaccine preventable diseases. While P/T funding for vaccine programs makes a large impact on the accessibility of vaccines within the province, there are several other determinants that contribute to vaccine uptake. For example, key determinants of uptake include culture and beliefs, geographical distance from health centres, income levels and education status, among other factors.<sup>28</sup>

Disease (Vaccine)	NACI recommendation	Criteria	BC	AB	SK	MB	ON	QC	NB	NS	PEI	NL	YT	NT	NU
Influenza (High-dose flu vaccines)	IL: High-dose should be used over standard dose for 65+	Funded for people 65+	●	●	●	●	●	●	●	●	●	●	●	●	●
	PL: Any flu vaccine should be used, cost-effectiveness is inconclusive <sup>29</sup>	Funded in LTC settings	●	●	●	●	●	●	●	●	●	●	●	●	●
Pneumococcal (Pneu P-23)	PL: Offer to populations 65+ <sup>30,31</sup>	Funded for ALL 65+	●	●	●	●	●	●	●	●	●	●	●	●	●
Herpes Zoster / Shingles (Recombinant Zoster Vaccine)	IL & PL: Offer to populations 50+ <sup>32</sup>	Funded for ANY 50+	●	●	●	●	●	●	●	●	●	●	●	●	●
		Funded for ALL 50+	●	●	●	●	●	●	●	●	●	●	●	●	●

Figure 1: Summary of provincial and territorial vaccination coverage and uptake for key adult vaccines (Source: CanAge, Canadian Immunization Guide)

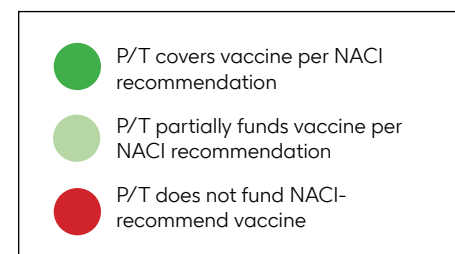


Figure 1 illustrates some of the variability of adult vaccine coverage across Canada. The three vaccines highlighted are those that are recommended by NACI for broad adult populations. The high-dose flu vaccine, which is recommended by NACI for individuals aged 65+, is an example of the high variability in coverage across P/Ts. Although it is provided for free in long-term care facilities across Canada, only five jurisdictions provide the vaccine for free to all those 65+. The vaccine for Herpes Zoster, which is recommended by NACI for all people 50+, is only provided for free in six jurisdictions for some age groups (65+ in NT, 65-73 in Ontario, 65+ in PEI, 65-79 in Yukon, coverage for some immunocompromised individuals in Alberta, and coverage details in Quebec are to be determined).<sup>33</sup> Of the three, the pneumococcal conjugate vaccine (Pneu-P-23) is the only vaccine that is provided to people for free in all P/Ts. Access, however is impacted by the availability of the vaccine in certain settings, such as long-term care facilities and pharmacies.<sup>34</sup>

\*For solid organ transplant patients only.



## Access to adult vaccinations is a growing concern

It's been nearly 20 years since the release of Canada's National Immunization Strategy (NIS). While Canada has made progress against the goals outlined in the NIS, new public health threats are emerging, the pace of vaccine innovation is accelerating, and inflation is further pressuring health system budgets.

Meanwhile, vaccine preventable diseases are still a considerable burden to our health systems, carrying substantial economic and societal costs.<sup>26</sup> In the US, for example, vaccine preventable influenza, pertussis, shingles and pneumococcal disease annually contribute to an estimated \$7-\$35 billion USD in societal prospective costs.<sup>27</sup>

This context presents a need to re-evaluate the barriers between innovations and access, including the funding models for improved equitable access to preventative vaccines.



## Key lessons from around the world: National immunization approaches are not all equal

### Australia

Australia's health system, in a similar way to Canada's, is supported in partnership by the federal, state and territorial, and local governments. Unlike Canada, however, vaccine policy development – including vaccine funding decision-making – is a federal responsibility, which has established a more uniform vaccine access across states.

Australia's approach to vaccine funding recommendations is designed specifically to bridge federal and state roles and responsibilities through a transparent and predictable process based on scientific foundations.<sup>35</sup> This is supported by Australia's national health funding model, which is founded on the principle of equity of access for all. Today, Australia is known to have one of the most comprehensive national immunization programs around the world.<sup>36</sup>



## Key lessons from around the world: National immunization approaches are not all equal

### Europe

Unlike Canada's provincial and territorial approach to immunization program funding, several European countries use a federal approach to deciding to fund vaccines in alignment with their national health system delivery model. This is often done through a model where the country's National Immunization Technical Advisory Group (NITAG) will develop a recommendation – sometimes in partnership with a Health Technology Assessment group – and the country will then fund the vaccine in accordance with the recommendations.

In the UK, for example, the Secretary of State for Health poses a question to the UK's Joint Committee on Vaccines and Immunization, which provides recommendations on universal vaccination.<sup>37</sup> - Of note, however, UK, like most European countries, has a national healthcare system and therefore are not a direct comparison to the Canadian system. Upon government acceptance of the recommendation, the vaccine would be publicly funded for all jurisdictions. This approach has helped the UK achieve and maintain more uniform access to nationally-recommended vaccines across geographic jurisdictions. The UK was the first European country to introduce a national immunization program for shingles, resulting in uptake of 50-64% across the UK<sup>38</sup> in the first three years of the program.

Among several factors that contribute to improved access, the UK has introduced mechanisms like a centralized vaccination invitation promotion program that actively invites those at-risk to get vaccinated for the flu and COVID-19 (mail, text, NHS App).<sup>39</sup>



## Key lessons from around the world: National immunization approaches are not all equal

### United States

Although the United States does not have a universal healthcare system, the US's process for deciding to cover vaccines is well-recognized around the world. Their national immunization technical advisory group, called the Advisory Committee on Immunization Practices (ACIP), holds a unique role relative to Canada's NACI. ACIP is responsible for reviewing vaccine efficacy as well as developing national policy for vaccine usage.<sup>40</sup> The latter part of their mandate allows them to play a more significant role in decision-making for public vaccine funding.

Specifically, in contrast to NACI, ACIP recommendations are directly funded for specific targeted groups. For children, ACIP is responsible to inform which vaccines will be funded as part of the Vaccines for Children (VFC) program, which provides vaccines for free to all those that aren't already covered through private insurers.<sup>41</sup>

For adults, ACIP-recommended vaccines are added to adult immunization schedules and often covered for some eligible adults via the Affordable Care Act (ACA).<sup>42</sup> In practice, ACIP recommendations are covered and reimbursed for some adults through Medicare, Medicaid, and private insurance coverage.<sup>44,45</sup> This model helps support a more nationally uniform immunization program across all states for older adults and adults below certain income levels.





## How gaps in data are impacting vaccination uptake and coverage

Despite progress in the digitization of health and medical records, there are still significant gaps in the availability of consistent, accurate and real-time immunization uptake information across Canada, especially for adults.<sup>46</sup> Data collection on vaccine usage is often disparate and non-standardized, which makes the harmonization and comparison of uptake data across Canada difficult.

As a result, public health vaccine funding decisions are often made without a comprehensive view into real-world impacts of the vaccine in Canada.

Of note, however, are a few initiatives that have made significant strides in data collection and monitoring.

Specifically, the Public Health Agency of Canada leads their annual Seasonal Influenza Vaccination Survey<sup>47</sup> to collect information on the uptake of key vaccines. Other survey data are available including the Canadian Community Health Survey<sup>48</sup> and the adult National Immunization Coverage Survey.<sup>49</sup>

Further, efforts like CANImmunize<sup>50</sup> have taken steps to address the need for private and secure digitized

vaccination records due to COVID-19 vaccination mandates.

COVID-19 vaccination passports and trackers<sup>51</sup> have demonstrated that the infrastructure can be made to track vaccination status across vaccine delivery mechanisms nearly in real time. Despite progress, the majority of publicly-funded vaccines are not tracked in the same way. In fact, rarely is vaccine usage reported consistently across P/Ts for reliable vaccination coverage data.

These gaps in data collection and harmonization make it difficult for public health teams to evaluate the effectiveness and the benefits of vaccination programs, including their uptake and awareness interventions.

Among the many others impacted, these gaps impact funders who evaluate vaccines, researchers who are looking to improve vaccine effectiveness, and patients who want access to their medical records.

# 02

# Assessment: Canada's approach to adult vaccination coverage

## 2.2 Review and assessment of provincial approaches to vaccine coverage

Each Canadian P/T uses an independent approach to assessing vaccines and evaluating whether the vaccine should be made available for free as part of a publicly funded immunization program. Ultimately, the decision to fund an immunization program rests with each province, and is often considered against competing funding requests for other public programs.

Often, after a new vaccine is approved by Health Canada, the Public Health Agency of Canada (PHAC) leverages their external advisory body, NACI, to assess the vaccine's safety and efficacy, as well as the burden of the disease that the vaccine prevents. Through the analysis, NACI incorporate considerations on economics, ethics, equity, feasibility, and acceptability, following publicly available frameworks and methods.<sup>52</sup>

While each P/T considers NACI recommendations in developing its own program schedules for children and adults, each jurisdiction must plan, fund and deliver vaccine programs independently – taking into account its own unique set of operational circumstances. This is often done through P/T immunization advisory committees or equivalent government functions.<sup>53</sup>

Despite guidelines issued by NACI on the evaluation of vaccines, provincial immunization committees have varying assessment mechanisms and frameworks, contributing in part, to the variability in the scope of vaccine coverage referenced in section 2.1.

Some provinces leverage established immunization committees to advise on developing and operationalizing immunization programs.

For example:

- **In Quebec**, the Quebec Immunization Committee (CIQ) serves as a key advisory body that issues recommendations and advice on the optimal use of vaccines to the Ministry of Health and Social Services.<sup>54</sup> The CIQ often uses NACI's recommendations to inform their own recommendations, but incorporates programmatic considerations such as feasibility, burden of disease, costs and political considerations that are specific to Quebec.<sup>55</sup> The CIQ is a well-established entity that issues recommendations publicly, which increases transparency into their evaluation process and engagement with the public.
- **In British Columbia**, the Communicable Disease Policy Advisory Committee (CD Policy) provides recommendations to the Ministry of Health related to communicable disease control based on a scientific review. A subcommittee of CD Policy, the BC Immunization Committee (BCIC) then assesses programmatic issues (e.g., feasibility and acceptability) and develops recommendations to deliver optimal immunization services across BC.<sup>56</sup>



Not all provinces, however, have dedicated immunization committees, and even among those who do, evaluation methodologies differ and as a result – vaccine coverage differs across the country.

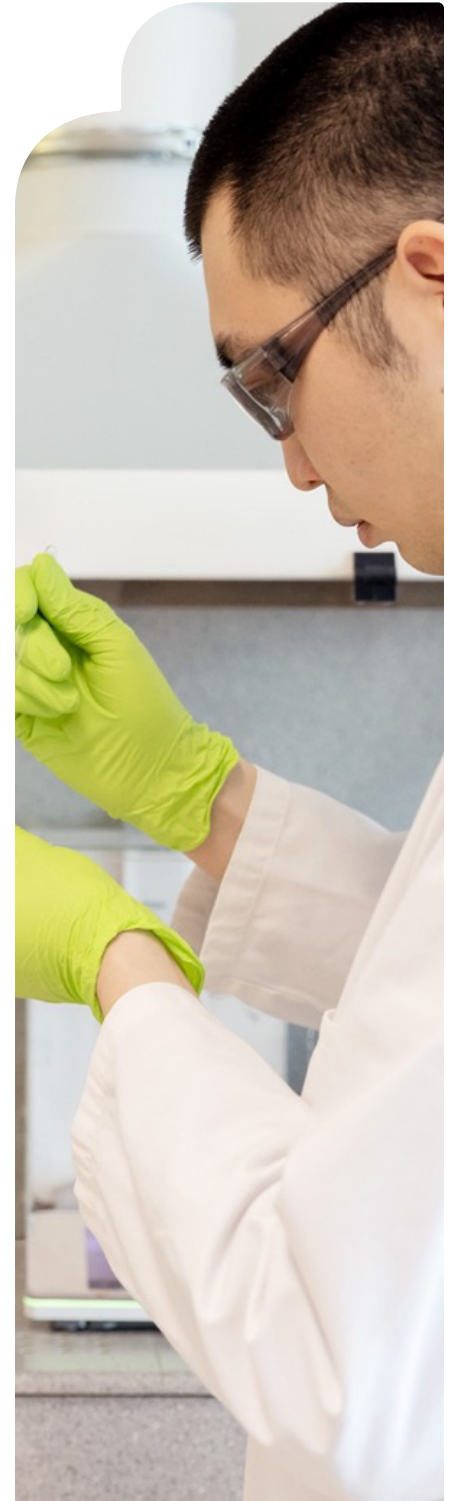
The disparities between federal, provincial, and territorial approaches have been recognized for many years. Between 1999 and 2002, four new vaccines were added to the Canadian Immunization Guide, however by 2003 only two provinces publicly funded at least three of the vaccines. The federal, provincial, and territorial Deputy Ministers of Health recognized these challenges and endorsed the development of a NIS, which was launched in 2003. The strategy sought to overcome some of the obstacles to harmonization of provincial/territorial programs, which included focusing on equitable and timely access to recommended vaccines.<sup>57</sup>

In 2004, the Canadian Immunization Committee (CIC) was established to implement the NIS and provide a framework to bridge recommendations made by NACI with provincial/territorial priority setting and program planning. The CIC is comprised of public health decision-makers from each province and territory who convene to share findings and best practices regarding immunization programming. The CIC encourages national consensus and harmonization<sup>58</sup> and recommendations from the CIC often represent joint decisions made by all Canadian jurisdictions.

Overall, the NIS – along with the federal funding support for the strategy – led to all 13 jurisdictions adding all four new vaccines to their routine schedule, enabling more equitable access to these four vaccines. Canada, however, has not met all of its NIS objectives, and harmonized approaches to adult vaccines still remain challenged by intergovernmental relations and funding limitations.

**Over the last 20 years, we've seen examples when federal government's support and investments catalyzed and accelerated progress in vaccination programs across all provinces and territories. We cannot underestimate the power of working together across provinces in pursuit of better health outcomes for Canadians.**

**Dr. André Corriveau, Public health specialist and former Chief Public Health Officer, NWT.**



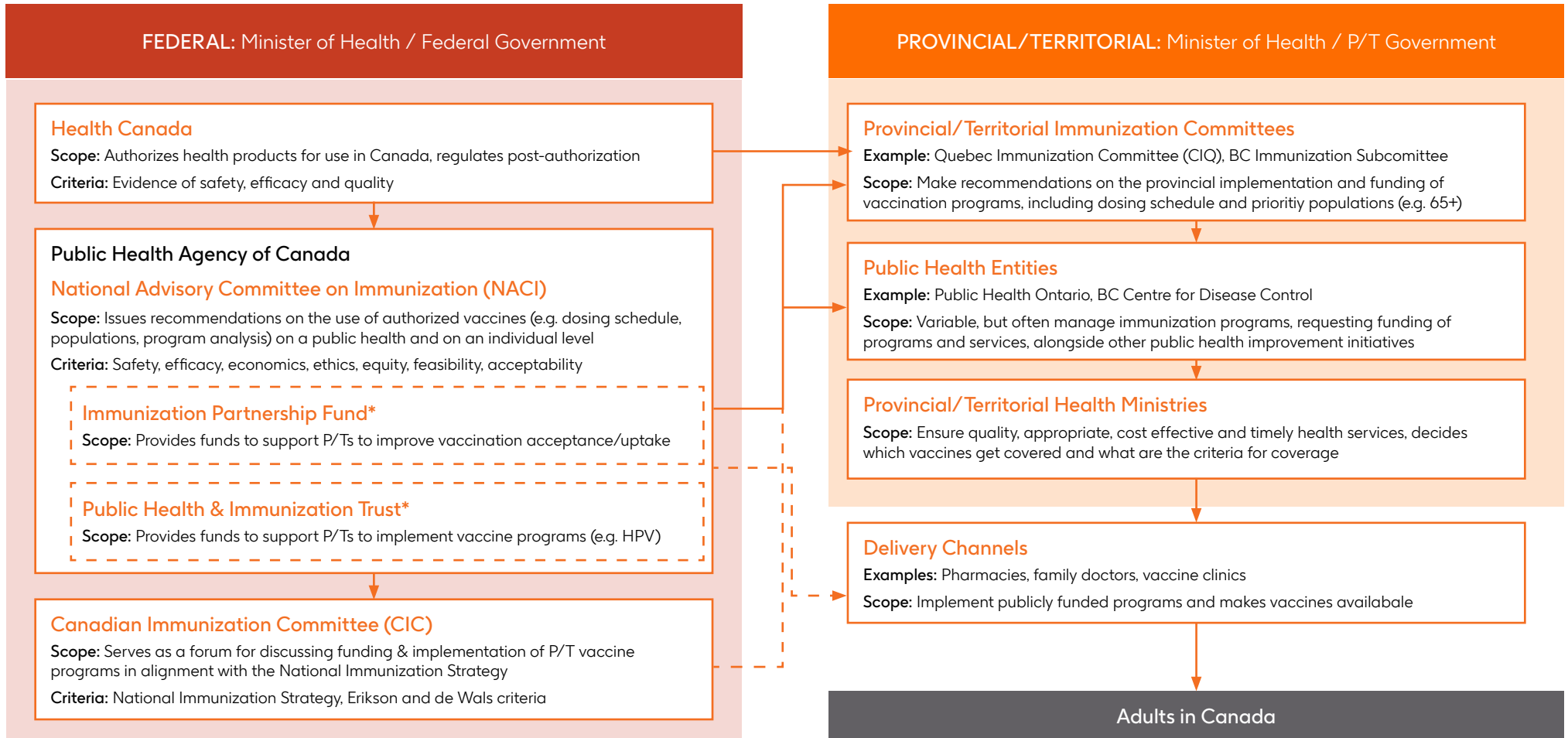
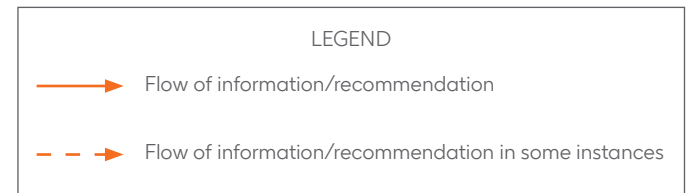


Figure 2: Overview of vaccine approval process and key decision-makers

Notes: 1. Not all P/Ts have separate/independent immunization committees. As such, NACI recommendations are used directly by the public health entities. 2. These steps may not always be performed sequentially. Notably, NACI and Provincial Immunization Committees may perform analyses in parallel. 3. NACI's recommendations for individuals are also used directly by physicians for advising on immunizations, and by the public for informing their personal decisions. | \*In some cases, the federal government may decide to purchase vaccines (e.g., COVID) or fund vaccination programs (e.g., HPV). Federal support still engages many of these steps, but funds are made available through mechanisms such as the Immunization Partnership Fund and the Public Health & Immunization Trust denoted in this figure.



## Children vs. adults: Lessons from the paediatric vaccine landscape



Relative to adult vaccinations, paediatric vaccination uptake is higher<sup>59</sup> and less variable across P/Ts. A core set of paediatric vaccines are available at no cost to citizens across Canada in alignment with a national vaccine schedule. This is due, in part, to the standards for funding paediatric vaccines, as well as the implementation mechanisms that support greater uptake of vaccines for children.

Further, globally, there is a recognized difference in urgency between childhood and adult immunization coverage decisions. For example, it took an average of 55 months for European countries to introduce pneumococcal vaccination programmes for children after the initial market authorization of the vaccine – versus 158 months for adult vaccination programmes.<sup>60</sup>

The following three factors play an important role in the uptake of paediatric vaccination:

### A) Evaluation modalities that contribute to paediatric vaccine funding

Sometimes, when P/Ts evaluate vaccines, the economic benefit of a vaccine for children can be more pronounced than with older adults.<sup>61</sup> For example, when using standard impact evaluation measures for vaccines – such as years of lives saved – the impact of the vaccine in children may be more significant than with adults. Additionally, the economic impacts of a child's life can be more pronounced than retired adults.

Since cost effectiveness and economic considerations are integrated in decision-making, and budget availability is a key factor in funding decisions, these evaluation criteria can introduce bias against vulnerable older populations.

### B) School programs and mandates

Most children in Canada are in school, which presents a unique modality to roll-out widespread public health interventions. School and day care immunization mandates (e.g., in Ontario) further encourage the uptake of vaccines in young children. These programs contribute to greater adherence with national standards and improved compliance with childhood vaccination schedules.

The broader adult population, however, does not convene in the same way, with some exceptions of long-term care and retirement homes. As such, both awareness and access to adult vaccines is limited, and deliberate efforts are required to build awareness and make vaccines more accessible.

### C) Access to primary care

Improved vaccine uptake is positively associated with access to primary care physicians.<sup>62</sup> According to the WHO, sustainable immunization programs embedded within primary health care is the basis for achieving high vaccination coverage.<sup>63</sup>

Through childhood, Canadian parents often follow well-accepted routine primary care and paediatrician visits through the first 2-3 years of their child's life, facilitating increased vaccine uptake.

Adults, however, do not often have frequent interactions with their primary care providers. Nearly 15% of Canadians do not have a regular healthcare provider at all.<sup>64,65</sup> Further, when visiting primary care providers, the interactions are often focused on acute issues, diagnostics, and therapeutics, rather than preventative interventions such as immunization. This further necessitates improved methods of building awareness both in the primary care setting and beyond.

## 2.2.1 Spotlight 1: High-dose flu

Adult vaccines for the flu are recommended and widely available across Canada every year,<sup>66</sup> but only some P/Ts invest in more effective, high-dose flu vaccines for older adults.

Influenza, or the flu, is a respiratory infection that causes multiple symptoms, such as high fever, chills, headache and fatigue. Usually, people with the flu will recover within a week or so, but older adults are at greater risk and can develop more severe complications, such as pneumonia.

High-dose trivalent inactivated influenza vaccine (HD TIIV) or Fluzone<sup>®</sup> HD helps protect against influenza (flu). Fluzone<sup>®</sup> HD was approved by Health Canada in 2015<sup>67</sup> and was recommended by NACI at the individual-level for superior protection relative to standard dose for adults 65 years of age and older since 2016.<sup>68,69,70,71,72,73</sup> Shortly thereafter, Manitoba was the first province to fund the vaccine for those aged 65 and over living in long-term care facilities.<sup>74</sup>

In 2018, NACI began evaluating high-dose flu vaccines at both the programmatic level and the individual level. Cost-effectiveness assessments, however, were out of scope of NACI's evidence review at the time of evaluation, and there were evidence gaps in relative effectiveness between high-dose and other specific types of flu vaccines. As such, NACI concluded that there is insufficient evidence to make comparative recommendations between high-dose and regular dose flu vaccines at the programmatic level. Thus, at a programmatic level, NACI recommends that any of the four flu vaccines available for use in adults 65+ should be used.<sup>75</sup>

During the 2020-2021 influenza season amidst the complex pandemic context, the federal government specifically contributed to procure and pay for a bulk supply of high-dose influenza vaccines. P/Ts were allocated a set number of doses and used

the allotment for long-term care residents who are 65 years of age and older, the population that was disproportionately impacted during the pandemic<sup>76</sup> and at higher risk of complications due to the flu.<sup>77</sup> This contribution by the federal government, as we understand, was part of considerations and a larger response to the COVID-19 pandemic.

Since the federal investment, six provinces (Ontario<sup>78</sup>, Manitoba<sup>79</sup>, New-Brunswick<sup>80</sup>, PEI<sup>81</sup>, Saskatchewan<sup>82</sup>, Alberta<sup>83</sup>) and one territory (Yukon<sup>84</sup>) have expanded funding to cover high-dose flu vaccines for all people 65 years old and older. This may be, in part, due to the inconclusive public health program-level NACI recommendation. It has now been more than six years from the initial Health Canada authorization of Fluzone<sup>®</sup> HD, and only some of Canada's vulnerable populations have free access to it.

## 2.2.2 Spotlight 2: Shingles

Although Shingrix<sup>®</sup>, a vaccine against shingles, is recommended by NACI for all those over 50 years of age, the vaccine is only publicly-funded for a small subset of people in six P/Ts. For others, it may come at a cost.

Shingles is a common name for Herpes Zoster Disease, a disease that causes neuropathic pain and painful rashes on the face and body. The disease can have severe complications, including long-lasting nerve pain. The incidence and severity of shingles and its complications increase with age. Nearly one in three Canadians will develop shingles in their lifetime.

In 2008, Health Canada approved a vaccine against shingles for use among persons 60 years and older. By 2011, a refrigerator-stable product, Zostavax<sup>®</sup>II (Live Zoster Vaccine, LSV) was approved for all those age 50 and older. In 2017, Shingrix<sup>®</sup> (Recombinant Zoster Vaccine, RSV) was authorized by Health Canada and strongly recommended by NACI at both the public health program level and individual level.

Specifically, NACI recommended the Shingrix<sup>®</sup> vaccine for all people 50 and over, including those who were previously vaccinated with LSV and those who previously had shingles.

Additionally, NACI performed an economic Cost Utility Analysis, and found both vaccines to be cost effective compared to no vaccination, and are the most cost effective in those 65-79 years of age.<sup>85</sup>

Since the recommendation, only six P/Ts were able to provide funding for the vaccine – and only for specific age ranges. Namely, Ontario provides coverage of Shingrix<sup>®</sup> for people aged 65-73, Yukon for people aged 65-79, while the Northwest Territories and Prince Edward Island offer Shingrix<sup>®</sup> free of charge to all people over the age of 65 (see Figure 1). Coverage in Quebec remains to be determined, and coverage in Alberta is limited to some immunocompromised individuals.

In part due to this coverage pattern, the uptake of Shingrix<sup>®</sup> across Canada for those 50 years and older (per NACI's recommendation) is estimated to be around 30%.<sup>86</sup> Shingles non-vaccination has been attributed to the lack of awareness and the cost of the vaccine, among other factors.<sup>87</sup>

When comparing uptake across both NITAG-recommended age groups, Canada's vaccination uptake is starkly contrasted by uptake in the United Kingdom. The UK's Joint Committee on Vaccination and Immunization recommended the LSV in for people aged 70-79 in 2013.<sup>88</sup> Within the first year of being introduced, the program achieved 60-65% uptake and having further gradual increases to over 75% in eligible populations. Furthermore, an estimated 40,500 fewer zoster consultations and close to 2,000 fewer hospitalisations occurred in the five years following the implementation of the program.<sup>89</sup> Studies have shown that contributors to this uptake include being prompted by a health care practitioner, and other socio-psychological factors.<sup>90</sup>

## 2.2.3 Spotlight 3: Pneumococcal

Pneumococcal vaccines illustrate that more equitable access extends beyond provincial and territorial vaccine coverage.

Streptococcus pneumoniae is a bacterium that can cause many types of diseases including invasive pneumococcal disease and pneumonia. Pneumonia can cause flu-like symptoms, and sometimes severe forms of infection where bacteria invade the bloodstream and central nervous system. If infected, seniors are some of the most at-risk for severe complications and death.<sup>91</sup>

In Canada, vaccines for pneumococcal disease have been recommended since 1989. Today, NACI recommends Pneu-P-23, a specific type of pneumococcal vaccine, for all those aged 65+ across Canada.<sup>92</sup> Every province and territory offers this vaccine for free to their respective populations of people aged 65+.

Despite widespread funding and free access, the 2021 uptake rate for pneumococcal vaccines was 55% for people aged 65 and older,<sup>93</sup> which is 29% less than the UK uptake rate of 71%,<sup>94</sup> and well below the national goal of 80% coverage.

One of the key factors contributing to this disparity is awareness. In Europe, the most common driver for pneumonia vaccination among older adults was a prompt from a healthcare provider. The primary reason reported for not receiving a pneumococcal vaccine in Canada was the perception that the vaccine was not necessary. Only 25% of Canadian adults reported receiving information from their provider on any vaccines at all.<sup>95</sup> Further, nearly 15% of Canadians do not have a regular healthcare provider, which contributes awareness gaps among older adults.<sup>96,97</sup> This underscores the importance of better equipping primary care professionals with information and tools they can use to help improve vaccine uptake in older adults.<sup>98</sup>



# 02

# Assessment: Canada's approach to adult vaccination coverage

## 2.3 Review and assessment of funding models

For the majority of adult vaccines in Canada, funding for vaccine purchasing and program implementation has been the responsibility of each province and territory. But for some cases, alternative funding models have been used to promote vaccine access and uptake.

Over the last 20 years in Canada, the federal government has played various roles in supporting immunizations programs. The federal government's approach to supporting immunization programs depends on a variety of factors, including epidemiology and urgency.

Table 1: Federal funding for adult vaccination programs in Canada can be summarized into three key models:

	Funding for purchasing vaccines	Funding for immunization implementation	Delivery of immunization programs
P/Ts fund immunization programs	P/Ts	P/Ts	P/Ts
Federal government funds and purchases vaccines	Federal	P/Ts	P/Ts
Federal government makes funding available for P/Ts immunization programs	Federal & P/Ts	Federal & P/Ts	P/Ts



Funded immunization programs are best able to achieve high participation rates, optimal protection of the target population, and indirect protection of others.<sup>99</sup>

Generally, each immunization program in Canada is funded through one of these models. In some cases, more than one model can be used as Canada manages a vaccine preventable disease. For example, the federal government may purchase vaccines in pandemic/emergency situations, then the responsibility may transfer to P/Ts.

It is important to consider, however, that while procuring vaccines is the responsibility of P/Ts, the Government of Canada supports provincial and territorial immunization programs in many other ways, including securing and maintaining vaccine supply, and monitoring and negotiating contracts with manufacturers.<sup>100</sup>

Each model has advantages and challenges to consider. The following review of immunization program funding models were made based on data from publicly available information and insights from key informant interviews, such as current and former public health leaders.



# 02

# Assessment: Canada's approach to adult vaccination coverage

## 2.3.1 Model 1: Provinces and Territories fund immunization programs

For P/Ts, the responsibility to fund vaccine program implementation lies within public health budgets, and follows public funding and approval processes, similar to other public services and initiatives.

Upon a provincial/territorial public health authority recommendation to fund an immunization program, the province or territory must decide to accept the recommendation. Part of this decision to accept depends on the cost of the immunization program,

including the cost of the vaccine and operational considerations for vaccine delivery within the province/territory (e.g., pharmacist-delivered vaccines).

As such, despite efforts to bridge recommendations made by NACI with provincial/territorial priority setting and program planning (e.g., CIC, detailed above), there remains inequities between jurisdictions regarding how they offer publicly funded vaccines.

### Key advantages:

- This model offers total control to the P/Ts to act according to their independent public health objectives and priorities.
- Since vaccine coverage decisions are made within P/Ts, the model allows for the integration of vaccine assessments with real-world implementation considerations, which can reduce the risk of vaccine roll-out challenges and delays (e.g., local delivery channels, stakeholder engagement).
- This model allows P/Ts to control roll-out and implementation (e.g., dosing regimen, manufacturer).

### Key challenges:

- The current funding model and approach has resulted in a wide variance in vaccination coverage and uptake across P/Ts (see section 2.2). This has been attributed, in part, due to the limited provincial and territorial public health budgets for new vaccine programs.
- Given that not all P/Ts implement all recommended adult immunization programs, Canada may not be able to capitalize on the scale of national vaccine demand throughout contract negotiations with manufacturers.

# 02

# Assessment: Canada's approach to adult vaccination coverage

## 2.3.2 Model 2: Federal purchasing of vaccines for the country

In some cases, the federal government has purchased and procured vaccines for the country, distributing the vaccines broadly to all P/Ts. In recent history, this model has been used for rapid vaccine deployment to address urgent public health threats.

This model has been used to address major and urgent public health issues, such as the resurgence of influenza in 2009 when the Public Health Agency of Canada purchased 50 million doses of pandemic H1N1 influenza<sup>101</sup> and, most recently, COVID-19 in 2021 when the federal government committed more than \$9 billion to procure vaccines<sup>102</sup>.

The model was also used to provide high-dose influenza vaccines to people living in long-term care settings across Canada through the 2020-2021 flu season.

In the instance of COVID-19, the federal government was responsible for negotiating and buying vaccines from different suppliers and distributing them to different P/Ts, who were responsible to administer and deliver the vaccines to patients. Although the federal government purchased COVID-19 vaccines, they also provided financial supports to P/Ts for pandemic management and vaccine delivery, as described in section 2.3.3.

### Key advantages:

- Centralized national procurement and purchasing of vaccines can serve as a catalyst for vaccine uptake and coverage in P/Ts. In the examples of high-dose flu, H1N1 and COVID-19, P/Ts rapidly mobilized to deliver the vaccines. In the case of high-dose flu, several jurisdictions expanded funding for the vaccine, even after the federal funding expired. This model has helped alleviate the cost burden on P/Ts for purchasing the vaccine, which is often a significant consideration when rolling out publicly-funded programs.
- Relative to individual P/T purchasing decisions, a collective national approach to purchasing vaccines may improve purchasing power and, as a result, may lower the purchase price per vaccine and reduce delays related to procurement. Federal purchasing programs can also help stabilize vaccine supply for the country. Other comparable countries, such as US, have also recognized the value in increasing purchasing power.<sup>103</sup>

**Key challenges:**

- Since healthcare delivery is responsibility of P/Ts, federal purchasing and distribution of vaccines may not align with P/Ts public health mandates and priorities.
- This model may introduce some challenges with the sustainability and role of P/Ts in vaccine programs. Sustainability of immunization programs relies on continued federal involvement in paying for vaccines. After federal funding expires, P/Ts are often left to secure additional funds for sustaining the vaccine program.
- Purchasing vaccines without additional financial support for implementation (e.g., staff, admin, transport, awareness) can cause gaps in immunization programs such as lack of awareness, education and monitoring. Ensuring equitable access to vaccines extends beyond free vaccines, and P/Ts are responsible for rolling out all aspects of immunization delivery, including supply chain management, and public awareness.



# 02

## Assessment: Canada's approach to adult vaccination coverage

### 2.3.3 Model 3: Federal funding made available for provincial/ territorial vaccination programs

In some cases, the Canadian federal government has made funds available to P/Ts to specifically augment and supplement their vaccine programs. This was used in the case of four children's vaccines in the early 2000s and an adolescent vaccine in 2006.

Following the introduction of Canada's National Immunization Strategy in 2003, there was wide recognition that not all jurisdictions would have the necessary funding available to implement the NIS approach, particularly as it relates to standing up new vaccination programs.

In the 2004 federal budget, a per capita allocation of \$400 million was made available to P/Ts in the form of a third-party trust - the **Public Health and Immunization Trust**.<sup>104</sup> These funds were earmarked for the four newly recommended vaccines at the time (see table 2). Within three years, all 13 jurisdictions had added all four new vaccines to their routine schedule, creating more, uniform, equitable access to vaccines across the country.<sup>105</sup>

Table 2: The provincial public funding for these vaccines was notably accelerated and more consistent across jurisdictions post federal funding.<sup>106</sup>

Vaccine	First Licensed	NACI recommendation	P/T uptake pre-NIS and funding (2003)	P/T uptake post-NIS and funding (2007)
Varicella	1998	1999	5	13
Pneumococcal	2001	2002	3	13
Meningococcal-C conjugate	2001	2001	3	13
Acellular Pertussis	1997	2003	7	13

In 2006, the federal government allocated an additional \$300 million into the trust for a new HPV vaccine.<sup>107</sup> Funds were available to the P/Ts between 2007-2010. Although P/Ts were not restricted from using the additional funds to support other immunization priorities, each province rolled out their own HPV programs, with 12/13 jurisdictions rolling out their routine immunization program for girls by 2009.<sup>108</sup>

vaccines with minimal intergovernmental discord. It is important to note that this mechanism was successful due to the deliberate pairing of national guidelines (i.e., NIS) with flexible start-up funding (i.e., **Public Health & Immunization Trust**). This pairing, along with public awareness and pressures, incentivized P/T governments to capitalize on the opportunity and leverage the funds provided.<sup>109</sup>

These initiatives were generally viewed as a success, rapidly resolving the issue of equal access to new

#### Key advantages:

- Through the mentioned examples, this model has demonstrated that federal funding for vaccination programs can remove a key barrier to the implementation of publicly-funded vaccination programs – budget constraints at the provincial/territorial level to start-up new immunization programs. This model has shown it can also accelerate the implementation of publicly-funded vaccination programs – thus, accelerating improved public access to free vaccines.
- The model strikes a balance between intergovernmental collaboration and federal leadership, without introducing constitutional ambiguities over federal, provincial and territorial jurisdiction in the delivery of healthcare.
- This model has allowed P/Ts some flexibility to allocate funds to the immunization programs that they've prioritized.

#### Key challenges:

- Although start-up funding is provided, securing sustained program funding can be an ongoing challenge for P/Ts. They may be vulnerable to a unilateral federal discontinuation of a program, finding it politically difficult to remove a program targeted at protecting the health of the province after it's been initiated (e.g., HPV).<sup>110</sup>

# 03

## Opportunities and considerations

Despite the efforts to improve equitable access to vaccines through the NIS and several province-specific initiatives,<sup>111</sup> there is more work to be done.

Publicly-funded adult vaccination programs have greater participation than programs that require out-of-pocket payments.<sup>112</sup> In Canada, what stands between NACI recommendations and P/T funding a vaccine is often the lack of public health funding to support vaccination programs.

Without change, current inequities in vaccination access may persist and widen for adult vaccines. As more new and improved vaccines become available, there will be an increasing need for thoughtful and deliberate consideration into federal and provincial/territorial approaches to vaccination coverage. Above all, there will be increasing opportunities to improve equity in vaccination access to reduce suffering and

death while alleviating burden on our healthcare systems – and governments have a primary responsibility to exploit these opportunities.

Increased funding is necessary to support the procurement of vaccines as well as the delivery of vaccination programs that suit the needs of each P/T. Making funds available to P/Ts, as has previously been done through the Public Health & Immunization Trust, has shown to be an excellent catalyst in accelerating the implementation of vaccination programs.



Increased federal funding is required to support provincial and territorial immunization programs in their efforts to create more equitable access to adult vaccines in Canada.

Alongside increased funding, thoughtful consideration should be put into allowing the flexibility of P/Ts to implement programs in alignment with their public health objectives, while incentivizing effective immunization programs that help progress toward Canada’s immunization objectives.

While increased public funding can help support greater access to vaccinations, achieving equitable access requires additional considerations of systemic issues that prevent adults in Canada from receiving vaccines. Suggested additional considerations for F/P/T governments, decision-makers and leaders in immunization across Canada include:

Although there is often a focus on the cost of immunization programs, we should be thinking more about the cost of not having access to vaccines – including the unnecessary hospitalizations and burden of vaccine preventable diseases. Disease prevention through vaccines shouldn’t be considered a cost – rather it should be seen as an investment in the health of Canadians.

Dr. Arlene King, Medical specialist, Public Health and Preventative Medicine; former Chief Medical Officer of Health, Ontario.

**Practical and financial considerations**

- **Expand delivery:** Expand scope of providers to administer vaccines (e.g., pharmacists in some P/Ts) and expand immunization delivery models (e.g., workplaces, pop-up clinics) such that more people in Canada can conveniently access immunizations and immunization information.
- **Align incentives:** Review incentives and disincentives for vaccine administration to align with leading practices and standards. This may include reviewing financial incentives for delivery channels (e.g., pharmacist reimbursement levels), and identifying the legal, practical, financial and policy barriers that may impede expansion of the adult immunization provider network.
- **Reduce financial barriers:** Consider alternative payment models (e.g., patient co-pay, private insurers, low-income consumer programs) such that more adults have timely access to high-cost innovative vaccines that are recommended by NACI.

**Education and awareness**

- **Increase awareness:** Make accurate, easy-to-understand information on vaccine recommendations and adult vaccine schedules widely available and accessible to the public, including tailored messaging for specific groups using the appropriate channels.
- **Continue to educate the public:** Provide the necessary tools and infrastructure to healthcare providers and community leaders to increase public awareness and education of NACI-recommended vaccines for adults. For example, governments can encourage providers to assess patients’ vaccination status at clinical encounters, recommend needed immunizations and administer vaccines or refer patients for vaccine administration.



**Political and social factors**

- **Reinforce federal, provincial and territorial collaboration:** Continue to strengthen collaboration and partnership between federal, provincial and territorial governments through a revised National Immunization Strategy to improve equitable immunization access.

**Immunization data infrastructure**

- **Build data monitoring and evaluation mechanisms:** Support the establishment of harmonized and integrated vaccine data tracking, monitoring and evaluation programs at the Federal, Provincial and Territorial levels so future funding/coverage decisions can be more evidence-based.

Despite scientific and medical advances in disease-preventing vaccines, the availability of free adult immunizations across Canada is patchy and inconsistent. Without public funding for robust adult immunization programs, adults across Canada – especially older adults and those who are not able to pay for vaccines out-of-pocket – are at greater risk of severe health outcomes caused by vaccine preventable diseases. The current Canadian system is underserving adults, and as new innovative vaccines come to the Canadian market, ignoring inequities in vaccine access can magnify the problem.

As governments at all levels are focused on improving health equity and outcomes, now is the time to reflect on lessons learned through COVID-19, build on the National Immunization Strategy, and get ahead of vaccine-preventable diseases together.



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