HEALTH COALITION OF ALBERTA

Navigating Patient Access to Vaccines and the Path to Equitable Public Health

December 2024

EXECUTIVE SUMMARY

The Health Coalition of Alberta developed this paper in response to inquiries from member organizations and individuals regarding the current state of vaccines. Many requested information about the number of new vaccines, and what they are, who they are recommended for, and if they are publicly funded in Alberta. For a comprehensive overview, this paper provides high level information on vaccine ingredients, approval processes and procurement in Canada, and their public health value. We also address barriers to vaccination and uptake.

Our research included reviewing government websites, medical journals, news articles, and consultations with patient organizations, vaccine manufacturers, and government officials. Key findings include:

- Alberta's vaccine access is similar to most of Canada but could be further expanded. Some vaccines recommended by the National Advisory Committee on Immunization (NACI) are not covered in Alberta, while others are covered but not widely available.
- There is a significant gap in patient involvement in vaccine decision-making and procurement, especially when compared to the role of patient input in medication reviews.
- Traditional government-led awareness campaigns have had limited success in addressing vaccine hesitancy. Public health education efforts should be co-developed with patient organizations and health charities to effectively combat mistrust and misinformation.

Recommendations:

1. Collaborate with Patient Organizations: Work in partnership with patient organizations, health care providers, associations, governments, and public health decision-makers to amplify vaccine education and awareness campaigns, focusing on high-risk populations, vaccine availability, and vaccination timelines in Alberta.
2. Build Trust and Confidence in Vaccines: Address vaccine hesitancy through a multistakeholder approach, with patient organizations co-designing campaigns that resonate with diverse communities and promote confidence in vaccine safety and efficacy.
3. Engage Patients in Vaccine Decision-Making: Prioritize patient input in the vaccine approvals process to ensure a range of vaccine options are available, addressing patient needs and improving accessibility, particularly for those with specific health requirements.
4. Invest in Health Equity Solutions: Align provincial funding with National Advisory Committee on Immunization (NACI) recommendations to ensure comprehensive vaccine coverage for high-risk populations, expand access through existing health care channels, and support public education on new vaccines.

Who We Are:

The Health Coalition of Alberta is an alliance of more than 120 health charities, patient groups, non-profit organizations and individuals driven by a unified purpose. Through the strength of our membership, we have voice and influence into public health decisions that impact the health of Albertans. We use a collaborative, solution-focused approach to engage with governments, health policy decision-makers and other stakeholders to achieve our goals.

TABLE OF CONTENTS

I. Introduction

Vaccination is an essential public health tool that helps prevent the serious impacts of infectious diseases. It is a collective effort that protects entire communities, crossing borders to create a global impact. High vaccination rates in one generation not only benefit the current population but also enhance the health of future generations. Vaccines have saved more lives in Canada than any other modern health intervention.[1] Yet, while there are several vaccines available for infectious diseases in Canada, their uptake is low due to several barriers in access, affordability, and lack of public education and awareness.

This paper aims to improve public understanding of vaccines and their vital role in supporting health. It also strives to broaden awareness of the evolving definition of high-risk populations, expanding beyond age to include individuals who are immunocompromised. These individuals have weakened immune systems due medical conditions (e.g., cancer, autoimmune diseases, HIV) and/or medications and treatments (e.g., chemotherapy, immunosuppressants). With a compromised immune system, their bodies struggle to fight off infections and illnesses, increasing their risk of severe health complications.

As a Coalition of health charities, patient groups, non-profits and individuals, we are unified in ensuring that the voices of Albertans are heard in public health decisions. We want to highlight the multifaceted challenges related to vaccine education and access, which are crucial for safeguarding the health and wellbeing of all communities across Alberta. We do this by exploring the complex regulatory pathways governing vaccine approval and reimbursement in Canada, with a specific focus in Alberta. While our analysis centers on vaccination programs for adults and older adults, we acknowledge the importance of childhood vaccination and its broader implications for promoting health. We also note that high-risk populations include individuals who may be exposed to infection due to their work environment (e.g., lab workers, health care professionals, researchers), living conditions, or lifestyle factors (e.g., sexual behaviors, substance drug use), though these aspects are outside the scope of this paper. Ultimately, this paper aspires to foster greater awareness and education for equitable vaccine access as a cornerstone of public health strategy.

Canada's Demographics

Understanding vaccines and their critical role in promoting public health must be framed within the context of Canada's rapidly changing demographics. A significant portion of the population are in their older years, with nearly 7.8 million Canadians are 65 and older as of July 1, 2024. Research indicates that this age group could triple over the next 25 years.[2,3] In Alberta, the percentage of older adults increased from 12% to 16% of the population in just a decade.[4] By 2051, one in five Albertans is expected to be a senior.

Statistics Canada also reported that in 2021, nearly half (45%) of Canadians were living with at least one major chronic disease.[5] These included overweight or obesity, arthritis, and high blood pressure. The impacts of health inequity are clear, as those with lower household incomes were significantly more affected by multiple chronic diseases compared to those with highest household incomes. Additionally, those 65 years and older had the highest prevalence of chronic diseases.

II. Vaccines and Their Value for Public Health

Vaccines are biological substances designed to prevent infection and prepare the immune system to fight infections and diseases.[6] The main goal of a vaccine is to create long-lasting immune memory, teaching the body how to defend itself against future infections. For adults and older adults, in particular, the goal is to prevent hospitalization, severe disease, and death.

The key ingredient in vaccines is called an antigen. It comes from a certain pathogen, which is a microorganism, such as a virus, bacteria, parasite, or fungus that can cause disease or illness. Antigens can also be produced in a lab. Antigens are crucial because they trigger the immune system without causing the disease itself.

Vaccines are primarily used for two reasons. The first is to prevent disease, known as prophylactic, and the other is therapeutic, which is given to boost the immune system and eliminate infected cells after exposure. Therapeutic vaccines are typically customized for individual patients since they take clinical samples, such as white blood cells, to develop the vaccine. Studies are looking at using them to prevent or treat cancer, AIDS, Alzheimer's disease, diabetes, multiple sclerosis, stroke, rheumatoid arthritis, and more. However, therapeutic vaccines are still in early stages of research and is beyond the scope of this paper.

There are many vaccines available in Canada. Below is a list of diseases for which vaccines are recommended for prevention and treatment. In Section V, we cover what these vaccines are and who they are publicly funded for in the province of Alberta.

- COVID-19
- diphtheria
- hepatitis A
- hepatitis B
- herpes zoster (shingles)
- human papillomavirus (HPV)
- measles
- mumps
- pneumococcal
- polio
- rubella
- tetanus
- pertussis (whooping cough)
- varicella (chicken pox)

Vaccine Ingredients

Vaccines undergo incredibly comprehensive review processes to ensure their safety and efficacy. From research to its availability and use, the regulatory management of vaccines involve multiple stages of testing, preclinical and extensive clinical trials, safety and post-market reviews and monitoring, and more; all to ensure that they provide the greatest benefit for the public.

To support the effectiveness of vaccines, they may also contain other components, such as preservatives, stabilizers, antibiotics, adjuvants, and residual manufacturing products.[6]

- Preservatives prevent the growth of bacteria and fungi and are typically added in multi-dose vials, such as the flu vaccine.
- Stabilizers help maintain the vaccine's effectiveness during storage after it has been made.
- Adjuvants support how well a vaccine works. They enhance the body's immune response and efficacy in vulnerable populations, such as infants, elderly, and those who are immunocompromised.

Lastly, there can be traces of manufacturing products in vaccines and they can include small amounts of inactivating ingredients, such as formaldehyde, or leftover materials from cell cultures.

Side Effects

As with any medication, vaccines can produce mild to moderate side effects after their administration.[6] These typically occur 24 to 48 hours after administration and can include injection site pain, soreness, muscle ache, and fever.

Serious side effects can occur, but they are very rare and taken seriously, with protocols in place for reporting and investigation.[7] However, the vast benefits of vaccines for public health outweigh its associated risks.

Types of Vaccines

There are several ways to categorize vaccines, such as their composition, how they work, and the technology used in their development.[6,8] Below, we describe the following:

1. Inactivated
2. Live, attenuated
3. Subunit
4. Conjugate
5. Recombinant
6. Next generation technologies (i.e., DNA/mRNA)

Inactivated

Inactivated vaccines contain pathogens that have been killed, usually through a chemical process with the use of a formaldehyde solution. They trigger an immune response that produces antibodies, but individuals often need larger doses and regular boosters for effective, long-term protection due to their lower immunogenicity, or ability to activate an immune response in the body. This can increase the risk of side effects, manufacturing costs, and lower vaccine uptake. Additionally, the longer development times can hinder timely responses to new, or variants of, infectious diseases. However, they are inexpensive to produce, stable at various temperatures, and can be stored for a long time.

Live, Attenuated

Attenuated vaccines use live pathogens, or related organisms to the pathogen, that have been weakened to limit their ability to grow in humans. These vaccines mimic natural infections infecting, replicating, and releasing in the host without causing illness or reverting to a harmful form. Typically, only one dose is needed for lifelong immunity as these vaccines are effective in stimulating a strong and lasting immune response.

However, since these vaccines contain live pathogens, Health Canada has advised that they should not be used in people who have immunocompromised systems or whose immune status is unclear because of the risk of illness from the vaccine strains.[9] They recommend consulting a health care professional to discuss appropriate vaccine options.

Another drawback of live attenuated vaccines is that their production is labor-intensive and demands rigorous quality control and skilled personnel. This can lead to increased manufacturing costs and delays in timely responses during pandemics.

Subunit
These vaccines use specific and purified components of a pathogen, such as proteins, peptides, polysaccharides, or inactivated toxins. By focusing on these targeted elements, subunit and cellular vaccines effectively stimulate the immune system without introducing the whole pathogen, making them safer options. This approach allows for a tailored immune response because it only uses certain parts of the pathogen, resulting in a targeted immune response. It often results in fewer side effects compared to inactivated and live vaccines and can often be safe for use in immunocompromised populations and those living with chronic diseases. However, booster shots might be needed to maintain protection over time.

Conjugate
Conjugate vaccines are a type of subunit vaccine that connects a part of a pathogen, such as bacterial polysaccharides, to a carrier protein to improve their effectiveness in an immune response. It is especially useful when other vaccine types do not work.

Recombinant
Recombinant vaccines are another type of a subunit vaccine. Using genetic engineering, recombinant vaccines program a harmless organism to create antigens against pathogens.[10] These organisms are typically from safe bacteria, yeast, mammalian, and insect cells, and researchers insert DNA from the pathogen into the organism.

Next Generation Technologies
Lastly, DNA/RNA, synthetic DNA and mRNA-based vaccines are some of the next generation vaccines. Genetic material from the pathogen enters into human cells and use the cell's equipment to produce some protein(s) of the pathogen encoded by the gene(s). There are various in use, such as mRNA COVID-19 vaccines, and others in development. They have great potential for advancing vaccine technology and effectiveness.

III. From Research to Recommendations and Oversight

The approval and implementation of vaccines are very complex and involves several regulatory bodies, agencies, committees and working groups, with potential for overlap in responsibilities and tasks which can contribute to delays. While an expedited approval process can take up to six months, the timeline from approval to delivery to health care providers is often longer. Several factors can contribute to the delay of a vaccine, especially if it will be included in a government-funded routine immunization program. Reasons for delay can include factors such as the need for additional funding, government

support, reviewing and confirming contract negotiations, the involvement of multiple reviewers and approvers, pending scientific advisory committee reviews and recommendations, lengthy procurement processes, contract negotiations, and issues related to product availability, emerging data, and pricing reviews.

The following sections will outline the typical process from research and development to Health Canada approval and explain how vaccines ultimately make their way to local pharmacies. However, it is important to note that there is no universal approach to vaccine implementation.

Vaccine Research and Development

There have been significant changes in the process of developing vaccines within the last century.[11] From research and development to clinical trials and market approval, it is estimated that the entire process takes about 10 to 15 years and can cost as much as USD 1B (CAD 1.4B) per vaccine.

Vaccines typically go through three phases of clinical reviews, namely phase I, phase II, and phase III clinical trials.[12] In phase I, the main focus of the trial is to evaluate the safety and tolerability of the vaccine in a small group of healthy adults. It also looks at whether it generates an immune response and helps identify the appropriate dosage.

Phase II evaluates the vaccine's ability to trigger an immune response and its safety profile in hundreds of individuals. It includes study participants with characteristics, such as age and sex, similar to the target population. Several trials are often conducted in this phase to assess the vaccine in different formulations and populations. Phase II trials also include a comparator group, who receives a placebo and does not receive the vaccine, to help determine safety and efficacy versus the vaccinated group. Participants are usually blinded, meaning they are unaware if they received the vaccine or a placebo, to ensure an unbiased assessment.

Phase III trials are the final step before a vaccine can be submitted for market approval. These trials test the vaccine's effectiveness and safety on thousands of individuals. Similar to phase II trials, some individuals receive the vaccine and are compared to a group that receives a placebo or a different vaccine with the same indication. Phase III trials often have several clinical trial sites in multiple countries and different locations within a country to make sure the results are appropriate for diverse populations. If the vaccine proves to be safe and effective, the manufacturer can then submit a formal application to a country's regulatory body for approval of sale in the country.

Health Canada's Role in Vaccine Approval

Health Canada is the regulatory body that authorizes the use and sale of vaccines in the country. Manufacturers must submit their clinical evidence for a vaccine to Health Canada, which evaluates it for safety, efficacy, and quality, and if the benefits of the vaccine outweigh any identified risks. Specifically, the Biologic and Radiopharmaceutical Drugs Directorate is the federal program within Health Canada that reviews the data in the manufacturer's submission.[3]

If Health Canada approves a vaccine, it issues the product a Notice of Compliance (NOC) and a Drug Identification Number (DIN). Health Canada, through various programs, also continues to monitor the vaccine's quality and conducts post-market surveillance to ensure that it remains safe and effective.

The *Food and Drugs Act* and the *Food and Drug Regulations* classify vaccines as biologic drugs.[13] Biologics are complex, large molecule medications developed in living cells. They are made using human or animal tissue or living organisms as a starting material and are produced using unique, intricate processes. As a result, each biologic has a distinctive composition. They are not manufactured chemically, like most small-molecule medications that are commonly available, and require more regulatory oversight and quality control on their manufacturing processes.

To add to the importance of stringent regulations, vaccines are created for use among children, adults, and high-risk populations such as those who are immunocompromised, so ensuring patient safety is paramount.

Patented Medicines Prices Review Board and Vaccine Pricing

The Patented Medicine Prices Review Board (PMPRB) is an independent quasi-judicial body that ensures that the public prices of patented medicines in Canada are not excessive.[14] They determine the highest price a drug or vaccine can have through complex scientific and price review processes.[15] However, vaccines undergo special consideration and are only reviewed by the PMPRB if a complaint is received. The PMPRB typically conducts their review after a medicine has received Health Canada approval.

National Advisory Committee on Immunization: Shaping Vaccine Recommendations

The National Advisory Committee on Immunization (NACI) is an External Advisory Body to the Public Health Agency of Canada (PHAC), conducting independent, up-to-date recommendations on vaccine use in the general population.[13] NACI also identifies high-risk populations who should receive vaccination and provides a specific set of guidelines for them.[16] These recommendations are publicly available in the Canadian Immunization Guide (CIG).

NACI was established in 1964, known then as the National Advisory Committee on Immunizing Agents.[17] Its membership consists of volunteers who are experts from various specialties, such as pediatrics, infectious diseases, immunology, pharmacy, epidemiology, and more. NACI collaborates with staff from the Centre for Immunization and Respiratory Infectious Diseases, a division of the Public Health Agency of Canada (PHAC), and reports to the Infectious Disease Prevention and Control Branch, another entity within PHAC. They also develop Working Groups as needed to support the organization's workplan. This includes the creation of the Vaccine Safety Working Group (VSWG), discussed below.

In 2019, PHAC expanded NACI's mandate to include factors such as economics, ethics, equity, feasibility, and acceptability (the EEFA framework) in its development of recommendations.[18]

Vaccine Education and Monitoring by the Public Health Agency of Canada

The Public Health Agency of Canada (PHAC) plays a crucial role by delivering and promoting information on approved vaccines and immunization schedules, based on recommendations from the National Advisory Committee on Immunization (NACI).[13] PHAC also monitors the safety of vaccines through the Canadian Adverse Events Following Immunization Surveillance System (CAEFISS).

Pan-Canadian Public Health Network

In 2005, the federal, provincial, and territorial (FPT) Ministers of Health created the Pan-Canadian Public Health Network (PHN). It is the formal public health governance for FPTs and is intended to strengthen public health policies, foster cooperation, and improve system readiness and responsiveness to public health events and threats.[19]

Governance of the PHN consists of the Pan-Canadian Public Health Network Council (PHNC), senior government officials from FPTs, the Council of Chief Medical Officers of Health, and Health Canada's Chief Medical Advisor.[20] The PHN reports to the Conference of FPT Deputy Ministers of Health, which provides direction and approves public health policy priorities for Canada. These Deputy Ministers of Health are accountable to the FPT Ministers of Health.

Other members of the PHN include the PHN Secretariat and three steering committees, which are: (1) Healthy People and Communities Steering Committee; (2) Public Health Infrastructure Steering Committee; and (3) Communicable and Infectious Diseases Steering Committee. These committees can establish temporary expert working groups to further the PHN's priorities.

In particular, the Communicable and Infectious Diseases Steering Committee manages the Canadian Immunization Committee (CIC).

The Canadian Immunization Committee and the Vaccine Safety Working Group
The Canadian Immunization Committee (CIC) and the NACI Vaccine Safety Working Group (VSWG) discusses NACI's recommendations, initiating complex processes that involve government agencies, other regulatory and advisory bodies, and organizations.

The CIC was established as a national platform to carry out the objectives of the National Immunization Strategy (NIS).[19] Its goal is to boost the effectiveness and efficiency of immunization programs, address emerging challenges, and support collaboration and engagement among FPT governments and stakeholders. Membership includes representatives of vaccine programs within the provincial and territorial (PT) governments. The CIC reviews the NACI recommendations and provides support to the Ministries of Health (MOH) in the PT governments. Each MOH has their own immunization advisory body that assesses these vaccine programs and determines how they are best fit for the jurisdiction's needs, vaccine quantities, existing policies and programs, budgetary considerations, and funding approaches. Once the Ministry has a vaccine procurement strategy approved, they then work with the VSWG to enter into contract negotiations.

The Vaccine Safety Working Group (VSWG) includes members from NACI, liaison members and experts, and they manage the negotiations and procurement process,[21] working with the Public Service and Procurement Canada (PSPC) to negotiate tenders for vaccines on behalf of PTs.

Public Service Procurement Canada
In terms of access, the procurement process for a new vaccine usually begins once NACI has published its recommendations for an immunization program.

Through the Public Services and Procurement Canada (PSPC), the federal government is able to work with the provinces and territories to purchase vaccines in bulk to secure the best possible prices, monitor and develop strategies to ensure supply, and provide recommendations to PTs on contracts it enters into with vaccine manufacturers.[22] It is an open, fair and competitive process.

The PSPC is a hub for Canadian businesses, including governments, to purchase a wide variety of goods, services and construction.[23] The website is a platform for buyers and sellers to access items from tires and tubes to toiletries, and NATO Goods. The PSPC is also a unique pathway for vaccines, as there are separate scientific, price review, and purchasing processes dedicated for majority of medicines in Canada.

With the PSPC acting as an agent for the VSWG, a consensus among provinces and territories are required before they can engage in negotiations with vaccine manufacturers. Often, the contract is awarded to the vaccine supplier that offers the best value based on a fair and transparent procurement process. To promote supply and patient choice, at least two different vaccines have been typically awarded contracts. PSPC then issues a final notice to jurisdictions to confirm quantity, pricing, delivery timing requirements, terms of the contract, and more. Once approved by the Ministries of Health, transition plans for the immunization program are developed and carried out, such as developing policy coverage documents, education and training for health care providers. Finally, the first monthly batch of vaccines are delivered to all participating provinces and territories.

The Final Decision-Maker: Provincial and Territorial Governments

Despite all these federal and pan-Canadian processes, provincial and territorial governments are responsible for the management, administration and funding of vaccines and immunization schedules with their respective regions.[13] The federal government provides and oversees funding for some programs, such as declared nationwide pandemics. They also provide health care funding to the provinces and territories via the Canada Health Transfers, but they are not specifically designated for vaccine programs.

Provincial and territorial governments have the authority to design immunization policies based on their jurisdiction's expert immunization advisory committees, jurisdictional needs, NACI recommendations, available resources, and other relevant priorities. These governments also oversee disease surveillance, adverse event reporting, public and professional education, vaccine distribution, and provide guidance on vaccine-related issues. Consequently, there can be differences in immunization programs and approaches across the country, leading to issues of inequity and barriers to affordable access. We highlight some of these differences below, comparing NACI recommendations with Alberta's immunization programs available for adults and older adults.

Indigenous Health

The federal government's responsibility for health care for Indigenous peoples is complex and often involves collaboration with provincial and territorial health partners. The Non-Insured Health Benefits (NIHB) program, which provides benefits for First Nations and Inuit and is administered and covered by the federal government, does not include vaccines. The Métis people are also not included under NIHB.

In Alberta, the immunization program involves collaboration between Alberta Health, Alberta Health Services (AHS) Provincial Partner Oversight Team, AHS staff, Indigenous Services Canada (ISC), First Nations, and other providers such as pharmacies.[24] The ISC's First Nations and Inuit Health Branch (FNHIB) works with First Nations communities to identify immunization providers, determine the vaccine type and quantity, and community requirements. Alberta Health, on the other hand, is responsible for vaccine allocation, scheduling, and distribution to rural and remote First Nations. Since 2022, the Government of Alberta has taken significant steps to enhance engagement and collaboration with Indigenous peoples, aiming to improve culturally safe health care delivery that addresses the unique needs of their diverse communities. However, these efforts are ongoing, and the focus on immunization remains uncertain.

IV. Other Agencies and Committees

There are several other agencies and committees involved in Canada's complex decision-making process for vaccines, as well as avenues of compensation for harms resulting from vaccines. Below discusses only a few.

Committee to Advise on Tropical Medicine and Travel (CATMAT)
The Committee to Advise on Tropical Medicine and Travel also supports PHAC through recommendations on infectious diseases and other health hazards for Canadians travelling outside of the country. Members are also volunteers, and they offer guidance on epidemiological research priorities and other activities relating to travel or tropical medicine.[19]

Amid the widespread discussions about vaccine hesitancy during the pandemic, it is easy to overlook the importance of vaccines for a variety of other infectious diseases, including those for travel. Many countries mandate specific vaccines for entry to safeguard public health, both for visitors and local populations, underscoring the continued relevance of vaccination programs for adults. However, vaccination for travel is beyond the scope of this paper.

National Immunization Strategy
Launched in 2003 by the federal government, the National Immunization Strategy is an action plan created to promote consistency, equitable access, and address gaps in vaccine planning, purchasing, delivery and education across Canada.[25] Currently, it has 5 objectives focused on evidence-based goals, identification of under and un-immunized populations, timely, equitable access, evidence-based interventions to improve immunization rates, and understanding barriers to vaccine access and hesitancy.

Post-Market Surveillance
Following regulatory approval, Health Canada continues to monitor the safety and effectiveness of vaccines on an ongoing basis.[13] The Public Health Agency of Canada also monitors safety and reports on adverse events through CAEFISS, as described above.

However, most of the responsibility for reporting is on manufacturers. Each lot of vaccines that manufacturers sell in Canada must be reported to Health Canada with information on tests and samples to be evaluated independently.[13] If a manufacturer wishes to make changes in the manufacturing process or indication, they must submit these changes to Health Canada for review and approval. For adverse events, manufacturers are also required to report these to Health Canada within 15 days of receiving the report of such an incident. Manufacturers submit these to the Canada Vigilance Program (CVP). CVP also accepts reports from health care providers and the public. There are several other processes to ensure safety, compliance to regulatory standards, and promote active reporting of vaccines.

Vaccine Injury Support Program
This program offers financial compensation to individuals (or caregivers) who received a Health Canada approved vaccine and experienced a serious and permanent injury, or death, as a result.[26] The vaccine must have been received in the country on or after December 8, 2020. Anyone in Canada can apply, which means that citizenship is not a requirement for eligibility. However, it is not available to those who

live in Quebec, since the province offers a similar program for its residents called the Vaccine Injury Compensation Program.[27]

The Vaccine Injury Support program is funded by PHAC and administered by OXARO Inc., a digital and advisory services company.[26] Since its inception, it has received 2,628 claims and paid $14M of financial support to claimants in the form of income replacement indemnities, injury indemnities, coverage for funeral expenses, and reimbursement for out-of-pocket medical expenses.[28] The Medical Review Board evaluates the claims and it consists of medical experts who are independent of PHAC or Health Canada. An appeals process is also available in the program.

V. Recommended Vaccines: NACI and Alberta

The chart below displays NACI recommendations for adult vaccines and compares them to what is publicly covered in Alberta and who they are covered for, such as individuals who are high-risk (e.g., age, immunocompromised). We only focus on a selection so this is not an exhaustive list. Alberta's adult immunization program includes additional vaccines for other infectious diseases that are not covered here. Visit the Alberta Health Services Immunization Program Standards Manual for more information.

Please consult a health care provider (HCP) if you have any allergies to medicinal ingredients. For a complete list of considerations, please refer to the NACI Vaccine Guidelines available on the Government of Canada website.

Infection/Disease	**NACI**	**Alberta**[29]
Coronavirus disease (COVID-19)	Approved vaccines:[30] • Spikevax® (2024-2025 formula, KP.2 subvariant) • Comirnaty® (2024-2025 formula, KP.2 subvariant) • Nuvaxovid™ (JN.1 subvariant, might not be available for upcoming season) Recommended for: All individuals at increased risk of infection, regardless of immunization history, which include • Adults (65+) • Residents of long-term care or congregate settings (e.g., group homes, shelters, prisons) • Pregnant and breastfeeding individuals • First Nations, Métis and Inuit communities • Members of racialized or equity-deserving communities • Essential community service providers All other individuals may choose to receive a vaccine Specific populations: • Immunocompromised individuals	Publicly funded vaccines:[31,32] • Moderna Spikevax KP.2 • Pfizer Comirnaty KP.2 Covered for: All individuals at increased risk of infection or severe disease • Adults (65+) • Residents of senior supportive living homes • Are moderately or severely immunocompromised • Pregnant and breastfeeding individuals • First Nations, Métis and Inuit • Members of racialized and other equity-deserving communities • Essential community service providers Covered for all other individuals who wish to receive a vaccine

	Interchangeability: • May be used interchangeably Co-administration: • Can be taken with other vaccines at different injection sites	Interchangeability: • N/A Co-administration: • Can be taken with other vaccines at different injection sites, except for RSV vaccines
Hepatitis A	Approved vaccines: [33] • Avaxim® • Havrix® 1440 • Twinrix® • Vaqta® • GamaSTAN® (immunoglobulin, Ig) Recommended for: High-risk groups before exposure are those who may be exposed to Hepatitis A • Travellers, residents, and close contacts from countries where it is prevalent • Individuals with lifestyle risks of infection such as illicit substance drug use and men who have sex with men • Employees that may work closely with the virus (researchers, military, humanitarian workers, zookeepers, vets) High-risk groups after-exposure • Childcare and kindergarten contacts • Close contacts of infected individuals (e.g., household, co-workers of infected food handlers) Special populations: • Adults with inadequate or no history of immunization • Individuals with chronic diseases, such as chronic liver disease • Recipients of plasma-derived clotting factors • Immunocompromised individuals (consult HCP) • Pregnant and breastfeeding individuals (consult HCP) Interchangeability: • May be used interchangeably Co-administration: • Can be taken with other vaccines at different injection sites	Publicly funded vaccines:[34] • Havrix® 1440 • Vaqta® • Twinrix® (combined for Hepatitis A and B)[35,36] Covered for: • Individuals with chronic liver disease, liver transplant candidates, and those with chronic liver graft-versus-host disease following stem cell transplant • Recipients of plasma-derived clotting factors • Individuals with lifestyle risks of infection such as illicit substance drug use and men who have sex with men • Close contacts from countries where it is prevalent • Twinrix® is covered for individuals who meet the criteria for Hepatitis A and B[35,36] Special populations: • Pregnant and breastfeeding individuals (consult HCP) Interchangeability: • No preference for products • May be used interchangeably Co-administration: • Can be taken with other vaccines at different injection sites

Hepatitis B	Approved vaccines:[37] • Engerix®-B • Recombivax HB® • Recombivax HB®-Adult dialysis • Prehevbrio™ • Twinrix® (combined for Hepatitis A and B) • HepaGam B® (Immunoglobulin, Ig) • HyperHEP B® S/D (Ig) Recommended for: High-risk groups before exposure are those who may be exposed to Hepatitis B • Adults with inadequate immunization • Travellers, residents, workers, and close contacts from countries where it is prevalent • Close contacts of infected individuals or carriers (e.g., household, childcare and kindergarten contacts, inmates) • Individuals with lifestyle risks of infection such as illicit substance drug use, unprotected sex, persons with a history of sexually transmitted infections, men who have sex with men • Residents and staff of institutions for the developmentally challenged • Employees that may work closely with the virus (researchers, health care workers, correctional facilities staff) • Any individual infected with Hepatitis B • Any individual who wishes to lower their risk of infection a) High-risk groups after-exposure: • Infants of mothers who are infected • Exposure to infectious blood or body fluids • Close contacts of acute cases or chronic carriers Special populations: • Individuals with chronic liver disease, including renal disease and dialysis, and congenital immunodeficiencies • Those with hemophilia and receiving regular blood transfusions • Immunocompromised individuals (consult HCP) • May be taken during pregnancy and breastfeeding Interchangeability: • May be used interchangeably	Publicly funded vaccines:[38,39] • Engerix®-B • Recombivax HB® • HyperHEP B® (Ig) • HepaGam B® (Ig) Covered for: • Adults with inadequate or no history of immunization • Close contacts of infected individuals or carriers (e.g., household, childcare and kindergarten contacts, inmates) • Individuals with lifestyle risks of infection such as illicit substance drug use, unprotected sex, persons with a history of sexually transmitted infections, men who have sex with men • Residents and staff of institutions for the developmentally challenged • Employees that may work closely with the virus (researchers, health care workers, correctional facilities staff) • Exposure to infectious blood or body fluids Special populations: • Individuals with chronic liver disease • Those with hemophilia and receiving regular blood transfusions • Immunocompromised individuals (e.g., inflammatory bowel disease) • Pregnant and breastfeeding individuals, if eligible Interchangeability: • No preference for products • May be used interchangeably, preferably from the same manufacturer if possible Co-administration:

	Co-administration: • Can be taken with other vaccines at different injection sites	• Can be taken with other vaccines at different injection sites
Herpes zoster (Shingles)	Approved vaccine:[40] • Shingrix® Recommended for: • Adults (50+) • Adults (50+) who did not yet receive Shingrix® or had a prior shingles infection • Adults (18+) at increased risk due to immunodeficiency or immunosuppression Special populations: • Immunocompromised individuals may take the vaccine before initiating suppressive treatment (consult HCP) • Residents of health care institutions (e.g., long-term care facilities) • immunocompromised should take before taking immunosuppressive treatment, • May be taken during pregnancy and breastfeeding (consult HCP) Interchangeability: • N/A Co-administration: Can be taken with other vaccines at different injection sites	Publicly funded vaccine:[41] • Shingrix® Covered for: • Individuals (18+) who are recipients of solid organ transplants or autologous hematopoietic stem cell transplants Special populations: • May be taken during pregnancy and breastfeeding (consult HCP) Interchangeability: • N/A Co-administration: Can be taken with other vaccines at different injection sites
Human Papillomavirus (HPV)	Approved vaccines:[42] • Gardasil® 9 • Cervarix® Recommendations: • Individuals 9-45 years of age with inadequate or no history of immunization Special populations: • Recommended for immunocompromised individuals and those living with HIV • May be taken during pregnancy and breastfeeding Interchangeability: • Gardasil® 9 is preferred for greater protection • May be used interchangeably	Publicly funded vaccines:[43] • Gardasil® 9 Covered for: • Individuals 17-26 years old • 9-45 years old and recipients of hematopoietic stem cell transplantation • 9-45 years old and candidates or recipients of solid organ transplant Special populations: • Not recommended for pregnant individuals or those planning to become pregnant by the end of the dose series

	Co-administration: • Can be taken with other vaccines at different injection sites, preferably after other vaccines due to injection site pain	Interchangeability: • N/A Co-administration: • Can be taken with other vaccines at different injection sites
Influenza (flu)	Approved vaccines:[44] Inactivated • Afluria® Tetra • Fluad® • Flulaval® Tetra • Fluzone® Quadrivalent • Fluzone® High-Dose • Influvac® Tetra • Flucelvax® Quad Recombinant • Supemtek™ Live attenuated • FluMist® Quadrivalent Recommended for: • 18-59 years old can receive any of the following: Afluria® Tetra, Flulaval® Tetra, Fluzone® Quadrivalent, Influvac® Tetra, Flucelvax® Quad, Supemtek™, FluMist® Quadrivalent • 60-64 years old can receive any of the following: Afluria® Tetra, Flulaval® Tetra, Fluzone® Quadrivalent, Influvac® Tetra, Flucelvax® Quad, Supemtek™ • 65+ can receive any of the following: Fluad®, Afluria® Tetra, Flulaval® Tetra, Fluzone® Quadrivalent, Influvac® Tetra, Fluzone® High-Dose, Flucelvax® Quad, Supemtek™ Special populations: All individuals at increased risk of infection or severe disease • Adults (65+) • Adults with chronic health conditions (e.g., cardiac or pulmonary disorders, cancer, immunocompromised, diabetes, anemia, obesity, and more) • Pregnant and breastfeeding individuals (inactivated or recombinant vaccines only) • Residents of senior supportive homes	Publicly funded vaccines:[45,46] • Fluzone® • FluLaval® Tetra • Flucelvax® Quad • Fluzone® High-Dose Covered for: All individuals at increased risk of infection or severe disease • Adults (65+) • Adults (18+) who are recipients of hematopoietic stem cell transplants, CAR T-cell therapy, or solid organ transplants • Pregnant individuals Covered for all other individuals who wish to receive a vaccine[47] Special populations: • Residents of senior supportive homes • Indigenous Peoples • Those with chronic health conditions • Individuals with insecure housing or members of equity-deserving groups • Fluzone® may be used off-label in adults younger than 65 years old • May be taken while breastfeeding (except Fluzone® High-Dose) Interchangeability: • May be used interchangeably for 65+ Co-administration: • Can be taken with other vaccines at different injection sites, except RSV vaccines

	• Indigenous Peoples • Contacts of high-risk individuals (e.g., health care workers, care providers, household contacts, child care workers) • Essential community service providers • Those in contact with infected poultry during culling • Postpone vaccine in those who have serious acute illnesses until symptoms have resolved Interchangeability: • N/A Co-administration: • Can be taken with other vaccines at different injection sites	
Measles, mumps, rubella (MMR)	Approved vaccines:[48] • MMR®II • Priorix® Recommended for: • Susceptible adults born on or after 1970 • High-risk groups, such as travellers, health care workers, military personnel, and students in post-secondary, regardless of year of birth Special populations: • Adults with inadequate or no history of immunization • Residents of long-term care facilities • Individuals living with chronic diseases who are not immunocompromised • Immunocompromised individuals (consult HCP) • Not recommended for use during pregnancy • May be taken while breastfeeding Interchangeability: • May be used interchangeably Co-administration • Can be taken with other vaccines at different injection sites	Publicly funded vaccines:[49,50] • MMR®II • Priorix® Covered for: Pre-exposure • Adults born 1970 or later with inadequate or no history of immunization • Health care workers with inadequate or no history of immunization • For rubella, vaccines are covered for adults born 1957 or later with inadequate or no history of immunization, health care workers and staff of daycare facilities Post-exposure • Close contacts of infected individuals Special populations: • May be taken while breastfeeding Not recommended for individuals who • have a weak or impaired immune system or a family history of a weak immune system • Had a blood product in the past 11 months • Are receiving immunosuppressive therapy

		• Untreated tuberculosis • Received another live vaccine in past 1-3 months • Are pregnant or are planning pregnancy within 4 weeks after immunization Interchangeability: • No preference for products • May be used interchangeably Co-administration: • Specific administration instructions with other products
Monkeypox (Mpox)	Approved vaccines:[51] • Imvamune® Recommended for: High risk groups before exposure • Men who have sex with men and engage in unprotected sex, have multiple partners, partners with a history of sexually transmitted infections, • Individuals involved in sex work, staff or volunteers in venues with potential contact with contaminated surfaces, and those engaging in sex tourism Post exposure • Close contacts of a person, or in settings, where there is a probable or confirmed infection Special populations: • Immunocompromised individuals • During pregnancy and breastfeeding, if eligible Interchangeability: • N/A Co-administration: • Can be taken with other vaccines at different injection sites	Publicly funded vaccines: • Imvamune® Covered for: Pre-exposure • Men who have sex with men and engage in unprotected sex, have multiple partners, partners with a history of sexually transmitted infections, • Individuals involved in sex work, staff or volunteers in venues with potential contact with contaminated surfaces, and those engaging in sex tourism • Research lab employees at high risk of exposure. Post exposure • Close contacts of a person, or in settings, where there is a probable or confirmed infection Special populations: • Immunocompromised individuals • People living with atopic dermatitis • During pregnancy and breastfeeding, if eligible Interchangeability: • N/A Co-administration:

		• Can be taken with other vaccines at different injection sites
Pneumococcal	Approved vaccines:[52] • Prevnar®13 (13-valent conjugate) • Vaxneuvance® (15-valent conjugate) • Prevnar 20™ (20-valent conjugate) • Capvaxive™ (21-valent conjugate) • Pneumovax®23 (polysaccharide 23-valent) Recommended for: • Adults, older adults (65+) and those who are at an increased risk of infection due to medical condition(s) and/or environmental or living conditions • Medical conditions include those living with chronic conditions, immunocompromised, recipients of organ or stem cell transplants, and more • Environmental and living conditions include homelessness, alcohol use disorder, illicit drug use, smoking/vaping, residential care, and communities with high infection rates. • One dose of Prevnar 20™ or Capvaxive™ is preferred for those at increased risk and 65+ • If Prevnar 20™ ™ or Capvaxive™ are unavailable, Prevnar®13 followed by Vaxneuvance® is preferred for adults (18+) Special populations: • Adults with inadequate or no history of immunization • Prevnar 20™ is recommended for residents in health care institutions and LTC even if they have received other vaccine strains • Prevnar 20™ is recommended for individuals with chronic diseases, immunocompromised, or are recipients of hematopoietic stem cell transplants • May be taken during pregnancy and breastfeeding Interchangeability: • May be interchangeable if needed and the vaccine from the same manufacturer is not available Co-administration: • May be taken with other vaccines at different injection sites, except for different pneumococcal vaccines	Publicly funded vaccines:[53] • Prevnar 20™ Covered for: • Older adults (65+) who have not received a pneumo-polysaccharide or pneumococcal 20-valent conjugate vaccine • 18+ who are at increased risk for IPD and did not receive the previously recommended doses of pneumococcal conjugate and polysaccharide vaccines Special populations: Those at increased risk are • Residents of senior supportive homes • First Nations, Métis and Inuit • Individuals with medical conditions (e.g., cardiac disease, diabetes, chronic pulmonary disease, and more) • Those with alcohol use disorder, illicit drugs, smoke or vape • People experiencing homelessness • Living in poor indoor air quality • May be taken during pregnancy and breastfeeding (consult HCP) Interchangeability: • N/A Co-administration: • Can be taken with other vaccines at different injection sites

Polio	Approved vaccines:[54] • Adacel® Polio • Boostrix®-Polio • Imovax® Polio Recommended for: • Adults with inadequate or no history of immunization • One lifetime booster dose for adults previously immunized and at increased risk of exposure (e.g., travelers to areas with wild or vaccine-derived polio outbreaks, lab workers) Special populations: • Residents in long-term care • Immunocompromised individuals (consult HCP) • May be taken during pregnancy and breastfeeding Interchangeability: • Interchangeable but prefer same manufacturer Co-administration: • Can be taken with other vaccines at different injection sites	Publicly funded:[55] • Imovax® Polio Covered for: • Adults with inadequate or no history of immunization • Close contacts of individuals from polio-prevalent communities, including those working with refugees or in humanitarian missions, and health care and lab workers Special populations: • May be taken during pregnancy, if immediate protection is needed (consult HCP) • May be taken during breastfeeding if needed (consult HCP) Interchangeability: • N/A Co-administration: • Can be taken with some vaccines at different injection sites (consult HCP)
Respiratory syncytial virus (RSV)	Approved vaccines:[56] • Arexvy • Abrysvo™ Recommended for: • Older adults (75+), particularly those at increased risk of severe disease (some chronic health conditions e.g., diabetes, cardiac, pulmonary, renal, liver, neurologic, obesity) • Older adults (60+) and live in a senior supportive home • All other older adults (60+) who wish to be vaccinated should consult their HCP Special populations: • Beyfortus™ is preferred over Abrysvo™ during pregnancy, but if Abrusvo™ is taken, it should be during gestation (consult HCP) • Arexvy is not recommended for use during pregnancy and breastfeeding	Publicly funded vaccine:[57] • Abrysvo™ Covered for: • Adults (60+) with no history of immunization and live in senior supportive homes • Adults (75+) with no history of immunization Special populations: • Not recommended during pregnancy and breastfeeding Interchangeability: • N/A Co-administration • Not recommended to be taken with other vaccines

	• May be taken while breastfeeding Interchangeability: • Only one dose is required Co-administration: • May be taken with other vaccines (consult HCP)	
Tetanus, diphtheria, pertussis (also known as whooping cough, or Tdap)	Approved vaccines:[58] • Adacel® • Adacel®-Polio • Boostrix® • Boostrix®-Polio Recommended for: • Adults (18+) who have not received the vaccine • Booster dose is recommended every 10 years • Individuals living in health care institutions (e.g., long-term care) • Those living with chronic diseases • Health care workers/students Special populations: • May be taken during pregnancy and breastfeeding • Immunocompromised individuals (consult your doctor) Interchangeability: • Use vaccines from the same manufacturer when possible Co-administration: • Can be taken with other inactivated and live vaccines at different injection sites	Publicly funded vaccines:[59] • Adacel® • Adacel®-Polio • Boostrix® • Boostrix®-Polio Covered for: • Adults (18+) who have not received the vaccine or completed the full series • Booster dose every 10 years • Every pregnancy • If you wounded yourself and need a tetanus immunization history evaluation • Health care workers/students Special populations: • Covered for every pregnancy • May be taken while breastfeeding Interchangeability: • No preference for products • May be used interchangeably Co-administration: • Can be taken with other vaccines at different injection sites
Typhoid	Approved vaccines:[60] • Typhim Vi® • Vivotif® Recommended for: • Individuals (2+) travelling to South Asia, and other countries if needed • Lab personnel at risk of S. typhi exposure • Close contacts of carriers Special populations: • Immunocompromised individuals (consult HCP) • Close contacts of immunocompromised individuals	Publicly funded:[61] • Typhim Vi® Covered for: • Individuals (2+) who are close contacts of carriers • Lab personnel at risk of S. typhi exposure Special populations: • May be taken during pregnancy and breastfeeding (consult HCP)

	• May be taken during pregnancy and breastfeeding (consult HCP) Interchangeability: • May be used interchangeably Co-administration • Not recommended to be taken at the same time as some vaccines (consult HCP)	Interchangeability: • N/A Co-administration: • Can be taken with other vaccines at different injection sites
Varicella (chickenpox)	Approved vaccines:[62] • Varilrix® (univalent) • Varivax®III (univalent) • VariZIG™ (Immunoglobulin, Ig) Recommended for: Univalent vaccines are recommended for all susceptible adults 18-50 years old • Non-pregnant women • Contacts of immunocompromised individuals • Households expecting a newborn • Health care workers • Adults at occupational risk (e.g., working with young children) • Immigrants and refugees from tropical regions • Susceptible adults exposed to varicella Special populations: • Univalent vaccine may be taken by some individuals with immunodeficiencies and chronic diseases • Those on chronic salicylate therapy (e.g., ASA) • People living with cystic fibrosis • Immunocompromised individuals (consult HCP) • Not recommended during pregnancy • May be taken while breastfeeding Interchangeability: • Use vaccine products from the same manufacturer if available Co-administration: Can be taken with some vaccines at different injection sites	Publicly funded:[63,64] • Varilrix® • Varivax® III • VariZIG® (Immunoglobulin, Ig) Covered for: • Individuals (13+) with no history of vaccination and no prior infection before • Health care workers and students with no history of vaccination Special populations: • Immunocompromised individuals (consult HCP) • There are several contraindications (consult HCP) • Not recommended during pregnancy, but can be taken after • May be taken while breastfeeding (consult HCP) Interchangeability: • May be used interchangeably Co-administration Can be taken with some vaccines at different injection sites (consult HCP)

This chart is current as of November 25, 2024.

VI. Confronting Barriers to Vaccination

Canada has a remarkable history of leadership in vaccine development. The journey began in the late 1800s with the introduction of the smallpox vaccine, inspired by the pioneering work of English physician Edward Jenner.[8] Following this milestone, the rabies vaccine emerged in the early 1900s, thanks to the ground-breaking efforts of French chemist Louis Pasteur.

Despite Canada's innovative foundations in vaccine research, we are facing significant barriers to their education, accessibility, investment and affordability, severely hindering vaccine uptake. This is exacerbated by vaccine hesitancy and deep-seated mistrust in government, which developed in large part as a result of enforced restrictions during the COVID-19 pandemic.

According to the 2023 Adult National Immunization Coverage Survey, Canada has failed to meet all of its national vaccination coverage goals for adults.[65] For instance, only 55% of adults aged 65 and older received at least one dose of the pneumococcal vaccine, falling short of the 80% target. Similarly, influenza vaccination rates are 70% for those 65 and older and 47% for adults aged 18-64, both below the 80% goal. While 87% of adults have received at least one dose of the measles vaccine and 84% for polio, which are both highly contagious diseases, immunization against HPV, the most common sexually-transmitted infections (STIs) and a leading cause of cervical cancer, is only at 17.7% among those 18 and older, with higher rates in females and younger individuals (62.9% for ages 18-26 compared to 12.5% for those 27 and older).

In Alberta, the flu vaccine uptake from 2023 to 2024 was at 24%, the lowest in a decade. Yet, from 2023 to 2024, there were 16,229 cases of the flu in the province, and 20% of them led to hospitalization, while 1% resulted in death.[66] For COVID-19, vaccine uptake was approximately 17%. There were 23,922 cases, with 25% resulting in hospitalization, and 3% in death. These statistics highlight the urgent need to address vaccine uptake and improve public health strategies to prevent the spread of infectious diseases in Alberta.

Education and Awareness

Several interconnected factors contribute to the low uptake of vaccines among adults. A significant issue is the lack of education and awareness surrounding available vaccines, affecting both public and health care providers. Many health care providers may not be knowledgeable on the latest recommendations or what vaccinations are publicly covered. This knowledge gap can result in missed opportunities for vaccination recommendations by health care providers during patient appointments.

Gaps in immunization records and patient access to electronic medical records makes it more challenging for individuals and their health care providers to confirm immunization history. This can lead to additional laboratory tests, such as blood tests to check immunity levels, which may not be publicly covered and can result in out-of-pocket expenses.

There is also inconsistent and, in some cases, outdated information found across government health websites regarding recommended vaccines. Key details, such as which specific vaccine products are recommended and whether they are publicly covered, are often unclear, adding to confusion and frustration for patients seeking guidance. For example, both the MyHealth Alberta and Alberta Health Services (AHS) webpages on adult immunization lists some of the recommended types of vaccines, but does not provide information on what specific vaccine is recommended and whether it is publicly

covered. If it is not publicly covered, there is no information on how much the out-of-pocket cost would be.

Additionally, some of Alberta's immunization guidelines may need updating, as they include vaccines that are no longer approved in Canada or have been discontinued. For instance, Typherix®, a vaccine for polio, was discontinued in December 2018,[67] but it is still listed in AHS' Immunization Program Standards Manual, which was last revised February 2018.[61] As we did not review all vaccines in the Manual, there may be additional instances of outdated listings.

Without effective public awareness campaigns on vaccines, patients are left behind to navigate and cross reference immunization guidelines and records in attempts to be proactive with their health. Despite awareness of common risk factors, some individuals do not recognize that they belong to high-risk groups.[68] This is especially crucial for patients living with chronic conditions and those aged 65 and older as they face a higher risk of severe disease and worse health outcomes with infection.

Public Funding and Affordability

Another significant issue is public funding and the affordability of vaccines and immunization programs. Despite the numerous complex agencies and working groups across all levels of government, there is no mandate to prioritize funding for adult vaccines recommended by the National Advisory Committee on Immunization (NACI). Between 2017 and 2021, routine vaccine procurement accounted for just 0.15% to 0.21% of total public sector health spending in Canada.[69] Despite overall increases in health spending, this proportion remained stable, even as total spending grew from $172.2 billion in 2017 to $241 billion in 2021. However, disruptions from the COVID-19 pandemic led to a significant decline in routine vaccine procurement during 2021-2022.

At the provincial level, Alberta stands out as a leader in transparency regarding the funding of immunization programs, being one of only three provinces that report this information alongside Saskatchewan and Manitoba. Other provinces and territories lack clarity on how funding is allocated, including details on the distribution of resources for services like vaccine delivery to local health units, administration of vaccination programs, and investments in communication strategies, research, surveillance, and reporting. Additionally, decision-making around immunization budgets is often influenced by various factors, including political dynamics and input from the provincial or territorial Minister of Finance.

Alberta also provides several routine vaccination programs for infants and children within its public health strategy.[70] However, there is a notable lack of support for adult immunization programs and awareness campaigns. There is inconsistent public funding for NACI-recommended adult vaccines across the country. In Alberta's adult immunization programs, only one NACI-recommended vaccine is often publicly funded among various infectious diseases. Some vaccines are only covered for specific populations in Alberta, despite broader recommendations from NACI. There may be additional gaps in vaccine access as federal funding for COVID-19 vaccines is set to end in December 2024. Afterwards, the responsibility for funding these vaccines will shift to provincial and territorial governments, with the costs coming from their health budgets. This transition could create challenges in ensuring continued access to COVID-19 vaccines, especially in jurisdictions with limited resources.

Case Study: Shingles

Shingles (herpes zoster) is a painful skin rash caused by the reactivation of the chickenpox virus (varicella-zoster) that remains dormant in the body after a previous infection. Approximately 1 in 3

Canadians develop shingles in their lifetime, and this increases significantly for those 50 years of age and older, as well as those who are immunocompromised.[40] The infection spreads through direct contact with the rash. Symptoms include tingling, burning pain, and a blistering rash, which can be itchy and typically appears on one side of the face or body. Other common symptoms include fever, chills, headache, joint pain, and muscle weakness.

The only NACI-recommended vaccine for shingles is Shingrix®. In Alberta, it is currently covered only for solid organ or stem cell transplant recipients, while NACI recommends it for all individuals aged 50 and older, particularly those who are immunocompromised within that age group.

Case Study: Human Papillomavirus

The human papillomavirus (HPV) is a common sexually transmitted infection in Canada, and more than 75% of sexually active adults will develop it at some point in their lives.[71] It is the primary cause of cervical cancer, an aggressive cancer and the fourth most common in women globally.[72] In Canada, one-third of HPV-related cancers occur in males. However, a vaccine is available to prevent HPV for at least 10 years, yet it is not widely covered for Albertans.

NACI recommends HPV vaccination for all individuals between 9 to 45 years of age. However, in Alberta the vaccine, namely Gardasil® 9, is covered for students in grade six and nine and up to 26 years of age. It is not covered for those 27 to 45 years of age unless you have had a hematopoietic stem cell transplantation or a solid organ recipient. Health Canada has also approved Cervarix® but this is not publicly funded in the province. Individuals aged 27 to 45 with no prior vaccination history who wish to receive the vaccine will need to pay approximately $200 per dose. With 2 to 3 doses needed, this can total up to $600 in out-of-pocket costs.[73]

Accessibility

Accessibility to vaccine clinics and treatment options also plays a crucial role in low vaccination rates. Fortunately, Alberta is a leader in Canada as an early adopter of expanding pharmacist' scope of practice. In 2007, pharmacists in Alberta were provided the authority to administer drugs and vaccines by injection. This was widely operationalized in 2009 during the swine flu (H1N1) pandemic in 2009.

However, there are still challenges. Currently there are not enough adult vaccine clinics, and those that exist tend to be less organized across primary care settings and pharmacies. Alberta Health Services encourages adults to book their immunization appointments primarily at community pharmacies, and at local public health or community health centers, which are available in rural, remote, and underserved areas. Yet, the availability of clinics, healthcare professionals, and vaccine options can vary across these regions, creating challenges for those seeking access to immunization services.

On the supply side, there can also be delays in the tendering process for vaccines, leaving some clinics with inadequate or no supply of vaccines in time for the respiratory season. Vaccines and drug shortages can also occur for various reasons in the manufacturing and contract negotiations process, contributing to lack of access. As a result, those who wish to be vaccinated are often left to bear the full cost of vaccines. Some also travel to other countries, typically the United States, incurring more financial expenses.

In the 2023 Adult National Immunization Coverage Survey, participants identified the primary barriers to vaccination as cost (38.9%), difficulty taking time off work or school (38.2%), and uncertainty about where to get vaccinated (24.4%).[65] Urban residents generally have higher vaccination coverage for

vaccines such as hepatitis B, varicella, HPV, pneumococcal, shingles, polio, and meningococcal vaccines, while rural areas demonstrated higher coverage for tetanus. Additionally, limited public coverage of vaccine options restricts patient choice and access, especially for individuals with contraindications to specific vaccines or medicinal ingredients. These obstacles disproportionately affect equity-deserving populations, exacerbating existing disparities in access and health outcomes.

Confidence in Vaccines and Vaccine Hesitancy

Lastly, there is a significant lack of understanding regarding vaccine effectiveness, their critical role in public health in Canada and abroad, and their safety, all of which contribute to vaccine hesitancy. The Adult National Immunization Coverage Survey indicated that 18% of adults express hesitancy about vaccinations, with common concerns about safety, side effects, and feelings of unnecessary vaccination.[65] This hesitancy existed despite high levels of overall agreement on vaccine safety (98%), effectiveness (90%), and their ability to protect those with weakened immune systems (88.7%). Additionally, fear of injections remains a barrier for many individuals. This data is consistent with findings from other studies. In August 2024, the International Federation on Ageing conducted a survey of Canadians aged 50 and older to assess their views on vaccination.[74] The results revealed that only 58% of respondents plan to get vaccinated against COVID-19 for the upcoming respiratory season. Nearly half (48%) expressed concerns about vaccine side effects, and only 50% viewed COVID-19 as a serious health threat, a significant drop from 83% at the start of the pandemic. The survey also highlighted a deep mistrust of TV, radio, government agencies, and print media, underscoring the need for a targeted and comprehensive education and awareness campaign to promote vaccine literacy and increase uptake across diverse audiences.

Vaccines are essential not only for protecting public health in Canada but also for safeguarding health when traveling abroad. Many countries require specific vaccines for entry, both to protect their residents and to ensure the health of travelers. This highlights the continued importance of vaccination programs for adults.

Interestingly, public perceptions of vaccines can shift dramatically when people witness the physical effects of a disease, as seen with shingles. A 2021 Canadian study analyzed online comments from national news articles about influenza, pneumococcal pneumonia, and herpes zoster (shingles).[75] Comments about shingles often reflected negative, traumatic experiences, with users expressing strong support for the vaccine. Many even suggested that the out-of-pocket costs were a “small price to pay” for protection against the disease. In contrast, opinions on pneumonia and influenza were more varied, with mixed support for their respective vaccines. The study concluded that personal experiences with diseases significantly influence individuals’ attitudes toward vaccines. This highlights the importance of amplifying patient experiences and the adds to the value of collaborating with patient organizations to share these experiences widely.

VII. Recommendations

To improve vaccination rates and promote public health, it is essential to address key barriers in education, vaccine confidence, health equity and accessibility. Our recommendations emphasize the importance of involving patients and their representatives in education campaigns to help build trust and confidence in vaccines. It is crucial to focus on strengthening public confidence by providing clear, accurate information and promoting patient engagement in health care decisions. In addition, investing in health equity solutions will ensure that all individuals, particularly vulnerable populations, have access to immunization services. By addressing these issues directly and working in partnership, we can ensure that vaccines are accessible to everyone and that public health goals are met.

1. **Collaborate with Patient Organizations for Vaccine Education**

There must be effective collaboration between patient organizations, health care providers, associations, governments, and public health decision-makers to amplify vaccine education and awareness campaigns. These joint efforts should focus on informing the public about who should be vaccinated, particularly high-risk populations, when to get vaccinated, and the vaccines publicly available in Alberta.

Health charities, patient groups, and nonprofit organizations are well-positioned to support vaccine awareness initiatives by leveraging their established trust within communities across this province to effectively communicate the importance of vaccination. Using a variety of communication methods, such as digital platforms, community events, and health care settings, patient organizations can reach diverse audiences and engage them in meaningful ways. Through partnership, these organizations can help address concerns around vaccine safety, efficacy, and accessibility while ensuring that communications are culturally and linguistically appropriate.

By working together, patient organizations and health care providers—including medical associations, pharmacists, nurses, and researchers—can create tailored resources that help patients and caregivers make informed decisions. These efforts can include providing accurate information on vaccine schedules, age-specific recommendations, and addressing individual health considerations. Public Health decision-makers can further support these initiatives by providing financial resources, training, and access to necessary data, ensuring that the collaboration results in meaningful outreach and improved public health outcomes.

2. **Build Trust and Confidence in Vaccines**

In Canada, public trust in government-led health initiatives has varied, particularly during the COVID-19 pandemic. Although there is a high level of scientific agreement on the safety and effectiveness of vaccines, significant public hesitancy remains, as shown by the National Immunization Coverage Survey and the International Federation on Ageing Survey. This hesitancy is further fueled by a mistrust of traditional media outlets, such as TV, radio, and print.

To address this, it is essential for awareness campaigns to be co-designed with patient organizations, which already have established trust within their communities. These organizations can tailor messages to resonate with diverse audiences, address specific concerns, and help increase vaccine confidence.

Countering vaccine hesitancy requires a collaborative approach, involving multiple stakeholders and using various communication methods to reach and engage different audiences. Innovative strategies should focus on communicating the importance of vaccines in a way that aligns with individuals' values

and beliefs. This can include engaging in open discussions about the benefits and risks of vaccination. Partnering with patient and community organizations, health care providers, and trusted local figures will further enhance the credibility of these messages. People are more likely to trust vaccination information when it comes from sources they know and respect.

Vaccine manufacturers also have an important role to play in educating the public. By providing transparent information about the research and approval processes, as well as debunking myths and misinformation, manufacturers can offer evidence-based insights tailored to the needs of different populations.

Through these strategies and partnerships with local patient organizations and leaders, government-led public health vaccination campaigns can more effectively address public concerns and build greater confidence in immunization efforts.

3. **Engage Patients and Prioritize Choice in Vaccine Decision-Making**

Patient engagement is a crucial yet missing component of the vaccine procurement process, especially when compared to the well-established practices of incorporating patient input in the medication review process in Canada. Patient input is actively sought in the review of medications at the federal, pan-Canadian, and some provincial levels. This is significantly absent in vaccine procurement.

Including patient input will highlight the value of vaccines in promoting public health and will ensure that patient choice is prioritized in vaccine product availability, so that individuals have access to the vaccines that best meet their needs. This approach should also extend to offering a range of vaccine options (e.g., protein-based, mRNA) to provide patients with alternatives if one type of vaccine is not suitable for them.

Patient input will also provide insights into care gaps and highlight the real-world impact of immunization programs and policies, ultimately improving vaccine accessibility, awareness, and public health outcomes.

It is essential that federal decision-making processes prioritize patient perspectives and allow for patient choice in vaccine recommendations. Including patient input in these processes will help identify and understand gaps in care, the consequences of health policies that overlook the patient experience, and ensure that policies reflect the diverse needs of individuals, ultimately fostering a more inclusive and effective vaccination program.

4. **Invest in Health Equity Solutions**

To address health inequities in Alberta, the provincial government must align its funding criteria with the National Advisory Committee on Immunization (NACI) recommendations. This includes ensuring full coverage for all vaccines, particularly for high-risk populations identified by NACI, and providing a range of vaccine options to meet the diverse needs of patients. This approach will ensure that vaccines are accessible to all, regardless of a patient's ability to pay.

Vaccines are one of the most effective tools for protecting public health, yet their value has not been adequately reflected in public investments. Furthermore, when new vaccines are publicly funded, this must be accompanied by additional budget for public health education and awareness campaigns, so that patients are informed about the availability, benefits, and uses of the vaccine.

In addition to increasing funding, it is essential to expand vaccine access through existing health care channels, such as doctors' offices, pharmacies, public health sites, home and community care services, long-term care facilities, and congregate care settings. While Alberta benefits from pharmacies administering vaccines, significant inequities in access persist, particularly in rural and underserved urban areas. Addressing these disparities will help ensure that all Albertans can access the vaccines they need.

VIII. Conclusion

Improving adult vaccination rates in Alberta and across Canada demands a concerted, collaborative effort from all sectors of society. Addressing the barriers of education, vaccine confidence, accessibility, and health equity requires a multi-faceted approach that involves patient organizations, health care providers, policymakers, public health officials, and vaccine manufacturers. By engaging patients and their representatives in vaccine education, we can build trust and confidence in immunization programs, particularly among vulnerable populations who stand to benefit most from increased access to vaccines.

Prioritizing patient choice and inclusion in vaccine decision-making is essential to ensuring that individuals have access to the vaccines that best meet their needs. Additionally, investing in health equity solutions, such as aligning funding with NACI recommendations and expanding vaccine access through existing health care channels, will ensure that vaccines are available to all, regardless of geographic location or financial means.

Moreover, when new vaccines are publicly funded, accompanying public education and awareness campaigns are crucial to ensure the public is informed about their availability and benefits. By working together in partnership and committing to these essential actions, we can foster greater vaccine confidence, close gaps in care, and ultimately improve the health outcomes of all Canadians. Strengthening these efforts will not only protect individual health but also contribute to the broader goal of building a healthier, more resilient society for generations to come.

IX. References:

[1] Desai, Shalini. "Canada's National Advisory Committee on Immunization: Celebrating 50 Years." *Can J Infect Dis Med Microbiol,* vol. 26, no. 3, 2015, pp. 126-128. https://doi.org/10.1155/2015/431428.
[2] "Older adults and population aging statistics." *Statistics Canada,* https://www.statcan.gc.ca/en/subjects-start/older_adults_and_population_aging.
[3] "A portrait of Canada's growing population aged 85 and older from the 2021 Census." *Statistics Canada,* https://www12.statcan.gc.ca/census-recensement/2021/as-sa/98-200-X/2021004/98-200-X2021004-eng.cfm.
[4] "Resources to help older adults and seniors age in their community." *Government of Alberta,* https://www.alberta.ca/seniors-resources.
[5] Health Statistics Branch. "Health of Canadians." *Statistics Canada,* https://www150.statcan.gc.ca/n1/pub/82-570-x/82-570-x2023001-eng.htm.
[6] Ghattas, Majed. "Vaccine Technologies and Platforms for Infectious Diseases: Current Progress, Challenges, and Opportunities." *Vaccines,* vol. 9, no. 12, 2021. https://doi.org/10.3390/vaccines9121490.
[7] "Adverse events following immunization (AEFI): Canadian Immunization Guide." *Government of Canada,* https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-2-vaccine-safety/adverse-events-following.html.
[8] Lu, Bowen, et. al. The next-generation DNA vaccine platforms and delivery systems: advances, challenges and prospects." *Front Immunol,* vol. 15, no. 1332939, 2024. https://doi.org/10.3389/fimmu.2024.1332939.
[9] "Immunization of immunocompromised persons: Canadian Immunization Guide." *Government of Canada,* https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-3-vaccination-specific-populations/page-8-immunization-immunocompromised-persons.html.
[10] "Recombinant Vaccine." *ScienceDirect,* https://www.sciencedirect.com/topics/pharmacology-toxicology-and-pharmaceutical-science/recombinant-vaccine.
[11] Han, Seunghoon. "Clinical vaccine development." *Clin Exp Vaccine Res.* vol. 4, no. 1, 2015, pp. 46-53. https://doi.org/10.7774/cevr.2015.4.1.46.
[12] "How are vaccines developed?" *World Health Organization,* https://www.who.int/news-room/feature-stories/detail/how-are-vaccines-developed.
[13] "Regulating vaccines for human use in Canada." *Government of Canada,* https://www.canada.ca/en/health-canada/services/drugs-health-products/biologics-radiopharmaceuticals-genetic-therapies/activities/fact-sheets/regulation-vaccines-human-canada.html.
[14] "Patented Medicine Prices Review Board." *Government of Canada,* https://www.canada.ca/en/patented-medicine-prices-review.html.
[15] "Regulatory Process." *Government of Canada,* https://www.canada.ca/en/patented-medicine-prices-review/services/regulatory-process.html.
[16] "National Advisory Committee on Immunization (NACI): Membership and representation." *Government of Canada,* https://www.canada.ca/en/public-health/services/immunization/national-advisory-committee-on-immunization-naci/naci-membership-representation.html.
[17] Gemmil, I. "The National Advisory Committee on Immunization (NACI): A celebration of fifty years of service." *The Public Health Agency of Canada,* vol. 40, no. 17, 2014, https://doi.org/10.14745/ccdr.v40i17a05.

[18] "National Advisory Committee on Immunization (NACI): Methods and process." *Government of Canada,* https://www.canada.ca/en/public-health/services/immunization/national-advisory-committee-on-immunization-naci/methods-process.html.
[19] "Immunization in Canada: Canadian Immunization Guide." *Government of Canada,* https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-1-key-immunization-information/page-2-immunization-in-canada.html.
[20] "About the Pan-Canadian Public Health Network." *Pan-Canadian Public Health Network,* https://www.phn-rsp.ca/en/about/index.html.
[21] IQVIA Canada. "Understanding Current Immunization Funding, Decision-making, and Gaps in Vaccine Access and Coverage in Canada: Final Report." *BIOTECanada*, 2023, https://www.biotech.ca/wp-content/uploads/2023/06/BIOTECanada_Vaccine-Funding-and-Access-Gap_Final-Report_May-2023.pdf
[22] "Vaccine supply." *Government of Canada,* https://www.canada.ca/en/public-health/services/vaccine-supply.html.
[23] "CanadaBuys." *Government of Canada,* https://canadabuys.canada.ca/en.
[24] "Alberta Outreach Immunization Program." *Government of Alberta,* 2024, https://open.alberta.ca/dataset/58d31634-61d9-469d-b95f-f714719b923e/resource/8941e5e5-703c-45b8-a09c-772a5f94b9b7/download/aip-alberta-outreach-immunization-program.pdf.
[25] "National Immunization Strategy." *Government of Canada,* https://www.canada.ca/en/public-health/services/immunization-vaccine-priorities/national-immunization-strategy.html.
[26] "Vaccine Injury Support Program (VISP)." *Public Health Agency of Canada,* https://vaccineinjurysupport.ca/en.
[27] "Vaccine Injury Compensation Program." *Government of Québec,* https://www.quebec.ca/en/health/advice-and-prevention/vaccination/vaccine-injury-compensation-program.
[28] "Vaccine Injury Support Program – Statistics." *Public Health Agency of Canada,* https://vaccineinjurysupport.ca/en/program-statistics.
[29] "Immunization and vaccines." *Alberta Health Services,* https://myhealth.alberta.ca/topic/immunization/Pages/default.aspx.
[30] "COVID-19 vaccines: Canadian Immunization Guide." *Government of Canada,* https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-4-active-vaccines/page-26-covid-19-vaccine.html.
[31] "COVID-19 Vaccine – mRNA Moderna Spikevax KP.2 Frozen Vaccine 6 months of age and older." *Alberta Health Services,* 2024, https://www.albertahealthservices.ca/assets/info/hp/cdc/if-hp-cdc-moderna-kp-2-vac-bio-pg-07-226.pdf.
[32] "COVID-19 Vaccine – mRNA Pfizer-BioNTech Comirnaty KP.2 – Ultra frozen Vaccine 12 years of age and older." *Alberta Health Services,* 2024, https://www.albertahealthservices.ca/assets/info/hp/cdc/if-hp-cdc-pfizer-kp-2-vac-bio-pg-07-227.pdf.
[33] "Hepatitis A vaccines: Canadian Immunization Guide." *Government of Canada,* https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-4-active-vaccines/page-6-hepatitis-a-vaccine.html.
[34] "Hepatitis A Vaccine Biological Page." *Alberta Health Services,* 2019, https://www.albertahealthservices.ca/assets/info/hp/cdc/if-hp-cdc-hep-a-vac-bio-pg-07-230.pdf.
[35] "Hepatitis A and Hepatitis B Combined Vaccine Biological Page." *Alberta Health Services,* 2020, https://www.albertahealthservices.ca/assets/info/hp/cdc/if-hp-cdc-hep-ab-vac-bio-pg-07-232.pdf.
[36] "Hepatitis A and Hepatitis B Combined Vaccine Biological Page." *Alberta Health Services,* 2020, https://www.albertahealthservices.ca/assets/info/hp/cdc/if-hp-cdc-hep-ab-vac-bio-pg-07-232.pdf.

[37] "Hepatitis B vaccines: Canadian Immunization Guide." *Government of Canada,* https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-4-active-vaccines/page-7-hepatitis-b-vaccine.html.
[38] "Hepatitis B Vaccine Biological Page." *Alberta Health Services,* 2024, https://www.albertahealthservices.ca/assets/info/hp/cdc/if-hp-cdc-hep-b-vac-bio-pg-07-234.pdf.
[39] "Hepatitis B Immune Globulin Biological Page." *Alberta Health Services,* 2023, https://www.albertahealthservices.ca/assets/info/hp/cdc/if-hp-cdc-hep-b-immne-globn-07-233.pdf.
[40] "Herpes zoster (shingles) vaccine: Canadian Immunization Guide." *Government of Canada,* https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-4-active-vaccines/page-8-herpes-zoster-(shingles)-vaccine.html.
[41] "Herpes Zoster Non-Live Recombinant Vaccine Biological Page." *Alberta Health Services,* 2024, https://www.albertahealthservices.ca/assets/info/hp/cdc/if-hp-cdc-herpes-zost-vac-bio-pg-07-215.pdf.
[42] "Human papillomavirus (HPV) vaccines: Canadian Immunization Guide." *Government of Canada,* https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-4-active-vaccines/page-9-human-papillomavirus-vaccine.html.
[43] "Human Papillomavirus 9-Valent Vaccine Biological Page." *Alberta Health Services,* 2024, https://www.albertahealthservices.ca/assets/info/hp/cdc/If-hp-cdc-hpv-bio-pg-07-241.pdf.
[44] "Statement on seasonal influenza vaccine for 2024–2025." *Government of Canada,* https://www.canada.ca/en/public-health/services/publications/vaccines-immunization/national-advisory-committee-immunization-statement-seasonal-influenza-vaccine-2024-2025.html.
[45] "Influenza Vaccine Quadrivalent Inactivated." *Alberta Health Services,* 2024, https://www.albertahealthservices.ca/assets/info/hp/cdc/if-hp-cdc-influenza-qiv-fluzone-bio-pg-07-265.pdf.
[46] "Influenza Vaccine High-Dose Quadrivalent Inactivated." *Alberta Health Services,* 2024. https://www.albertahealthservices.ca/assets/info/hp/cdc/if-hp-cdc-highdose-inf-vac-bio-pg-07-266.pdf.
[47] "Standard for Influenza Immunization." *Alberta Health Services,* 2024. https://www.albertahealthservices.ca/assets/info/hp/cdc/if-hp-cdc-standard-influenza-immunization-15-100.pdf
[48] "Measles vaccines: Canadian Immunization Guide." *Government of Canada,* https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-4-active-vaccines/page-12-measles-vaccine.html.
[49] "Measles, mumps, rubella (MMR) vaccine." *Alberta Health Services,* https://myhealth.alberta.ca/topic/immunization/pages/mmr-vaccine.aspx.
[50] "Measles Mumps Rubella Vaccine Biological Page." *Alberta Health Services,* 2024, https://www.albertahealthservices.ca/assets/info/hp/cdc/if-hp-cdc-mmr-vac-bio-pg-07-270.pdf.
[51] "Smallpox and mpox vaccines: Canadian Immunization Guide." *Government of Canada,* https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-4-active-vaccines/page-21-smallpox-vaccine.html.
[52] "Pneumococcal vaccines: Canadian Immunization Guide." *Government of Canada,* https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-4-active-vaccines/page-16-pneumococcal-vaccine.html.
[53] "Pneumococcal Vaccine, 20-valent Conjugate (Pneu-C20): Prevnar 20." *Alberta Health Services,* 2024, https://www.albertahealthservices.ca/assets/info/hp/cdc/if-hp-cdc-pneu-c20-conjate-vac-bio-pg-07-293.pdf.
[54] "Poliomyelitis (polio) vaccines: Canadian Immunization Guide." *Government of Canada,* https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-4-active-vaccines/page-17-poliomyelitis-vaccine.html.

[55] "Polio Vacine Biological Page." *Alberta Health Services,* 2024, https://www.albertahealthservices.ca/assets/info/hp/cdc/if-hp-cdc-polio-vac-bio-pg-07-300.pdf.
[56] "Respiratory syncytial virus (RSV) vaccines: Canadian Immunization Guide." *Government of Canada,* https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-4-active-vaccines/respiratory-syncytial-virus.html.
[57] "Respiratory Syncytial Virus Vaccine (RSV) Biological Page." *Alberta Health Services,* 2024, https://www.albertahealthservices.ca/assets/info/hp/cdc/if-hp-cdc-ipsm-rsv-vac-bio-pg-07-316.pdf.
[58] "Tetanus toxoid: Canadian Immunization Guide." *Government of Canada,* https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-4-active-vaccines/page-22-tetanus-toxoid.html.
[59] "Tetanus-Diphtheria-Acellular Pertussis Combined Vaccine Biological Page (Tdap) Biological Page." *Alberta Health Services,* 2024, https://www.albertahealthservices.ca/assets/info/hp/cdc/if-hp-cdc-tet-dip-acellu-pert-cmbd-vac-bio-pg-07-210.pdf.
[60] "Typhoid vaccines: Canadian Immunization Guide." *Government of Canada,* https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-4-active-vaccines/page-23-typhoid-vaccine.html.
[61] "Typhoid Vaccine Biological Page." *Alberta Health Services,* 2018, https://www.albertahealthservices.ca/assets/info/hp/cdc/if-hp-cdc-typhoid-inject-vac-bio-pg-07-340.pdf.
[62] "Varicella (chickenpox) vaccines: Canadian Immunization Guide." *Government of Canada,* https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-4-active-vaccines/page-24-varicella-chickenpox-vaccine.html.
[63] "Varicella Vaccine Biological Page," *Alberta Health Services,* 2024, https://www.albertahealthservices.ca/assets/info/hp/cdc/if-hp-cdc-var-vac-bio-pg-07-350.pdf.
[64] "Varicella Zoster Immune Globulin (Human) Biological Page." *Alberta Health Services,* 2020, https://www.albertahealthservices.ca/assets/info/hp/cdc/if-hp-cdc-var-immne-globu-bio-pg-07-351.pdf.
[65] "Adult National Immunization Coverage Survey (aNICS): 2023 results." *Government of Canada,* https://www.canada.ca/en/public-health/services/immunization-vaccines/vaccination-coverage/adult-national-immunization-coverage-survey-2023-results.html.
[66] "Respiratory virus dashboard." *Government of Alberta,* https://www.alberta.ca/stats/dashboard/respiratory-virus-dashboard.htm?data=historical-data.
[67] "Product Monograph Typherix®." *GlaxoSmithKline Inc.,* 2014, https://pdf.hres.ca/dpd_pm/00023826.PDF.
[68] Sihota, Aaron, et. al. "A future-forward influenza immunization model of care for high-risk patients in pharmacies: A Canadian consensus." *Canadian Pharmacists Journal,* vol. 157, no. 5, 2024, pp. 209-217. https://doi.org/10.1177/17151635241263548.
[69] "National Health Expenditure Trends, 2021 — Snapshot." *Canadian Institute for Health Information,* https://www.cihi.ca/en/national-health-expenditure-trends-2021-snapshot.
[70] "Provincial and territorial routine and catch-up vaccination schedule for infants and children in Canada." *Government of Canada,* https://www.canada.ca/en/public-health/services/provincial-territorial-immunization-information/provincial-territorial-routine-vaccination-programs-infants-children.html.
[71] "Human papillomavirus." *Canadian Cancer Society,* https://cancer.ca/en/cancer-information/reduce-your-risk/get-vaccinated/human-papillomavirus-hpv.
[72] "Cervical cancer." *World Health Organization,* https://www.who.int/news-room/fact-sheets/detail/cervical-cancer.

[73] Dangerfield, Katie. “HPV vaccine can prevent cancer. So why isn’t it free for many Canadians?” *Global News,* 2024, https://globalnews.ca/news/10259784/hpv-vaccine-cervical-cancer-canada-cost/.
[74] “International Federation on Ageing (IFA) Launches Educational Campaign in Response to Survey Findings on Older Adults' COVID-19 Vaccination Attitudes.” *International Federation on Ageing,* 2024, https://www.vaccines4life.com/wp-content/uploads/2024/10/IFA-Press-Release-Understanding-COVID-19-Vaccine-Uptake-in-Canada.pdf.
[75] Lynch, Megan, et al. “Uncovering Public Perceptions of Older Adults' Vaccines in Canada: A Study of Online Discussions from National Media Sources.” *Can J Aging,* vol. 41, no. 4, 2022, pp. 657-666. https://doi.org/10.1017/s0714980822000010.

HEALTH COALITION OF ALBERTA

Contact Us

director@healthcoalitionab.ca
403-605-2859
@CoalitionAB
healthcoalitionab.ca