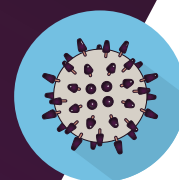


The Underappreciated Burden of Influenza Among Canada's Older Population. And What We Need to Do About It.



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NIA NATIONAL
INSTITUTE
ON AGEING*

National Institute on Ageing Immunization Series

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Disclaimer: The NIA has developed this document to provide a summary of general information about the burden of influenza and the benefit of the influenza vaccine, as well as provide evidence-informed recommendations to support uptake of the influenza vaccine. The NIA's work is guided by the current evidence. This document can be reproduced without permission for non-commercial purposes, provided that the NIA is acknowledged. Funding for this report was generously provided by Sanofi Canada in the form of an unrestricted educational grant. All of the research, writing and recommendations herein have been independently produced by the NIA on the basis of sound evidence.

About the National Institute on Ageing

The National Institute on Ageing (NIA) is a public policy and research centre based at Ryerson University in Toronto. The NIA is dedicated to enhancing successful ageing across the life course. It is unique in its mandate to consider ageing issues from a broad range of perspectives, including those of financial, physical, psychological, and social well-being.

The NIA is focused on leading cross-disciplinary, evidence-based, and actionable research to provide a blueprint for better public policy and practices needed to address the multiple challenges and opportunities presented by Canada's ageing population. The NIA is committed to providing national leadership and public education to productively and collaboratively work with all levels of government, private and public sector partners, academic institutions, ageing-related organizations, and Canadians.

The NIA further serves as the academic home for the National Seniors Strategy (NSS), an evolving evidence-based policy document co-authored by a group of leading researchers, policy experts and stakeholder organizations from across Canada and first published in 2014.

The NSS outlines four pillars that guide the NIA's work to advance knowledge and inform policies through evidence-based research around ageing in Canada: Independent, Productive and Engaged Citizens; Healthy and Active Lives; Care Closer to Home; and Support for Caregivers.

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Executive Summary

While Canada recommends an influenza vaccination target of 80% for those aged 65 years and older¹, only approximately 70% of older Canadians (and 40% of Canadians in general) receive the influenza vaccine each year², which is lower than other developed countries such as New Zealand, the United States, and the United Kingdom.³ What makes matters worse is that vaccination rates among older Canadians have also stagnated in recent years, and may even be decreasing, despite the additional risks posed by COVID-19 and higher reported intention to get vaccinated.⁴

Over the next two decades, Canada's population aged 65 and older is expected to double.⁵ Influenza rates could also climb during this period because those aged 65 and older, as well as those living with chronic health conditions, are disproportionately affected by influenza. As a result, we expect that serious influenza outcomes will become more prevalent. Nevertheless, we still do not fully understand the burden of influenza among those infected with the virus, even though influenza and its related complications have a significant impact on the Canadian health care system and society in general.

In Canada influenza contributes to an average of 12,200 hospitalizations and an

average of 3,500 deaths each year.⁶ Influenza and pneumonia are the 7th leading cause of death in Canada⁷ and the leading cause of death among vaccine preventable diseases.⁸

The negative consequences of influenza are likely underestimated, as it is difficult to accurately determine the extent and degree to which influenza affects other health complications including overall mortality. For example, when the cause of death is due to a complication, or to an underlying condition which was worsened by influenza, it is not necessarily understood that this is a direct consequence of influenza. Despite its severity, popular misconceptions regarding the seriousness of influenza persist, with many people often dismissing its symptoms as being 'just a cold'.

Vaccination is overall the best way to prevent influenza. However, older adults and people living with chronic conditions respond less robustly to vaccination. One of the most important ways to reduce rates of influenza among this population is through widespread influenza vaccination or herd immunity, which is when enough of the population is vaccinated, the chance of becoming infected lowers for everyone.

Compounding the problem is that Canadian health care institutions and providers have inconsistent and inadequate vaccination policies and outcomes that contribute to

low provider uptake of the vaccination as well. During the 2016-17 'flu' season, only 53% of health care providers in hospitals were vaccinated against influenza.⁹

Influenza vaccine therefore faces a policy and practice mismatch. Both the variable effectiveness of the vaccine from year to year and the requirement for an annual vaccination raises unique policy and communications challenges for influenza compared to other vaccinations.

This white paper will provide a concise summary of the current scientific evidence to inform future policy solutions. Showcasing these findings will create a stronger appreciation for the benefit of influenza vaccination and other measures in preventing influenza, as well as its often related but unattributed complications including functional loss and all-cause mortality.

The report makes the following 9 evidence-informed recommendations to support policy and practice approaches for health authorities and organizations towards supporting both influenza prevention and vaccination across Canada:

1. Improve Influenza Prevention Practices More Generally
2. Promote a Life-Course Vaccination Schedule that includes Older Adults

3. Continue Working Towards Understanding and Further Developing Influenza Vaccines
4. Include Influenza Vaccination in Clinical Guidelines for Older Adults and for Treating Chronic Conditions
5. Provide Clinical Education and Support for Primary Care Providers and Pharmacists to Deliver Vaccinations
6. Universal Funding for Influenza Vaccinations Needs to Be in Place to Ensure it is Accessible to All Canadians
7. Highly Recommend the Influenza Vaccine for all Health Care Providers and Mandate it for Providers and Residents in Long-Term Care Homes
8. Develop Better and Mandatory Reporting of Influenza Vaccination Rates
9. Co-administer Influenza with COVID-19 Vaccines

While Canada recommends that 80% of older adults and health care providers get vaccinated,¹⁰ only **40% of Canadians aged 18 years and older¹¹, 70% of older adults,¹² and approximately 50% of health care workers** are vaccinated against influenza.¹³



Background and Context

Why is Influenza an Important Societal Issue?

Each year, influenza epidemics cause **1 billion cases of influenza**, 3-5 million cases of severe influenza-related illnesses, and lead to **250,000 to 500,000 deaths worldwide**.¹⁴ Influenza, together with all causes of pneumonia, is the **7th leading cause of death in Canada**,¹⁵ and is the **leading cause of death among vaccine-preventable diseases**.¹⁶





In Canada

Influenza cases peak during our November to March 'flu' season.¹⁸

Influenza has been reported to cause an average of 12,200 hospitalizations annually.¹⁹

Influenza has been reported to cause an average of 3,500 influenza-related deaths annually.²⁰

Although most Canadians do not perceive influenza as a serious threat, (perhaps because most 'flu' cases experienced are mild²¹), it can lead to severe illness resulting in hospitalization or death and can be particularly hazardous to young children and adults aged 65 years and older.²² This is because these populations are at an increased risk of secondary complications such as pneumonia.²³ Older adults, in particular, are at increased risk due to the potential worsening of their underlying chronic medical conditions.²⁴

The burden of influenza is also a challenge to assess because its related complications and exacerbating effects are often not linked to the original influenza or influenza-like illness.²⁵ Furthermore, it is difficult to determine whether mortality is related to influenza because people are not

always tested for influenza when seeking medical attention. In addition, people who do seek medical attention may do so specifically for a secondary complication or an exacerbation of a pre-existing condition, and these visits may never be attributed to influenza, despite its role in the complication.²⁶ Influenza also has a serious economic impact on work productivity,²⁷ leading to an estimated 1.5 million lost work days each year.²⁸

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Respiratory infections (including influenza, colds, and other respiratory infections) have the second-highest indirect costs in Canada totalling \$2.8 billion in 2008 alone.²⁹

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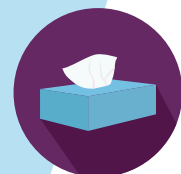
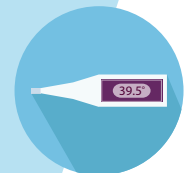
What is Influenza?

How Does it Work?

Influenza, or the 'flu', is caused by two types of **constantly mutating** viruses – influenza A and influenza B,³⁰ and typically infects the nose, throat, and lungs.³¹ It is most contagious when you have symptoms such as sneezing, coughing, or anything that may send the virus into the air. It is thought that the 'flu' can also be spread if people touch doorknobs, phones, remotes, or someone else's hands who has influenza.³²

The influenza virus is able to mutate, or change, very quickly – which is why there are constantly new strains that emerge throughout the influenza season.³³

Some of the symptoms of influenza include a fever of over 38°C, achy muscles, chills and/or sweats, headache, dry and persistent cough, fatigue/weakness, nasal congestion, and a sore throat.³⁴



Populations at Higher-Risk for Influenza

Canada's National Advisory Committee on Immunization (NACI) and Public Health Ontario (PHO) consider those living with chronic conditions to be at increased risk of influenza-related complications including hospitalizations and death.

Those living with the following chronic conditions are considered at increased risk

- Heart or lung conditions (including asthma and chronic obstructive pulmonary disorder)
- Diabetes
- Conditions that compromise the immune system, especially cancer
- Kidney disease
- Dementia
- History of stroke
- Blood disorders
- Neurologic and neurodevelopmental conditions
- Morbid obesity (Body Mass Index (BMI)>40).^{35, 36}

Other groups at increased risk for complications of influenza³⁷

- People aged 65 years and older
- Children under 5
- Pregnant women
- Indigenous individuals
- Long-term care residents

In Ontario, over 65% of those who had a reported direct influenza complication had one or more underlying medical risk factors.³⁸

In Ontario, over 65% of those who had a reported direct influenza complication had one or more underlying medical risk factors.³⁸ Research has found that patients living with cardiovascular disease have an increased risk of adverse events from influenza infection including pneumonia, heart attacks, hospitalizations, and death.^{39,40,41} A 2018 study suggested that hospital admissions for heart attacks were six times higher a week after laboratory confirmed influenza when compared to controls.^{41a} It was also higher after infection with other respiratory viruses.^{41b} It is further thought that some of the costs associated with treating heart disease in general may be due to the increased hospitalizations due to cardiovascular complications that occur during the influenza season.⁴²

Obesity, defined as having a Body Mass Index (BMI) over 30, has been found to be associated with an increased risk of complications due to influenza including respiratory-related hospitalizations.⁴³ The association was most strongly related to

respiratory conditions including pneumonia and influenza, other acute respiratory diseases, and chronic lung diseases.⁴⁴

People living with diabetes are also considered to be at increased risk for influenza-related complications.⁴⁵ People living with diabetes have been found to be more likely to be hospitalized and die.⁴⁶ Diabetes may weaken the immune system and make it harder to fight off infections, while it may also make it harder to control blood sugar.⁴⁷

Chronic lung diseases, neuromuscular diseases, neurological diseases, cancer and chronic kidney diseases are also associated with an increased risk of death from influenza.⁴⁸ Those with chronic lung diseases and chronic obstructive pulmonary disease, who also have influenza, experience increased risk of death, hospital admission and admission to an intensive care unit, respectively.⁴⁹

A Disproportionate Influenza Burden for those aged 65 years and older

In Canada, the prevalence of high-risk medical conditions for influenza complications (i.e. heart disease, lung diseases, diabetes, cancer, or kidney diseases)ⁱⁱ, increases dramatically with age. In Ontario, for those aged 20-64, approximately 30% have one of these medical conditions, this rises to

approximately 53% of those over age 50, and to over 70% among those over aged 65 and older.⁵⁰

The presence of chronic conditions increases the likelihood of complications from influenza, including increased hospitalizations and higher mortality rates.⁵⁶ For those who were hospitalized with influenza in Ontario, over 65% had an underlying condition; while approximately 85% of those who died from complications, had underlying risk factors.⁵⁷

Older adults bear the greatest burden of influenza due to having a higher prevalence of high-risk medical conditions that can

lead to influenza complications. Adults aged 65 years and older accounted for about 18% of Canada's population and 21% of Canada's laboratory confirmed cases for influenza A and influenza B infections during the 2019-20 influenza season. Yet older Canadians accounted for the clear majority of Canada's influenza-related deaths, with 70% of all reported influenza deaths during the 2019-20 influenza season occurring among those aged 65 years and older.^{57a}

The highest rates of complications have been reported in those aged 70 and older with an underlying condition.⁵⁸

Why Are Older Adults Particularly Vulnerable to Influenza? Introducing the Concept of Immunosenescence.

Older adults naturally have diminished immune system functioning as they age, and are more likely to contract influenza and less likely to respond well to the vaccine.⁵¹



Immunosenescence refers to changes that occur in the immune system as people age, which results in an increased risk of infectious disease and decreased protection from vaccination.⁵² There have been attempts to better address the lack of effectiveness in adults aged 65 years and older including using new vaccines that have been developed to address the changes in immune function.⁵³



Another way to increase protection for individuals aged 65 years and older, is indirectly through herd immunity (i.e. vaccinating those around them).⁵⁴



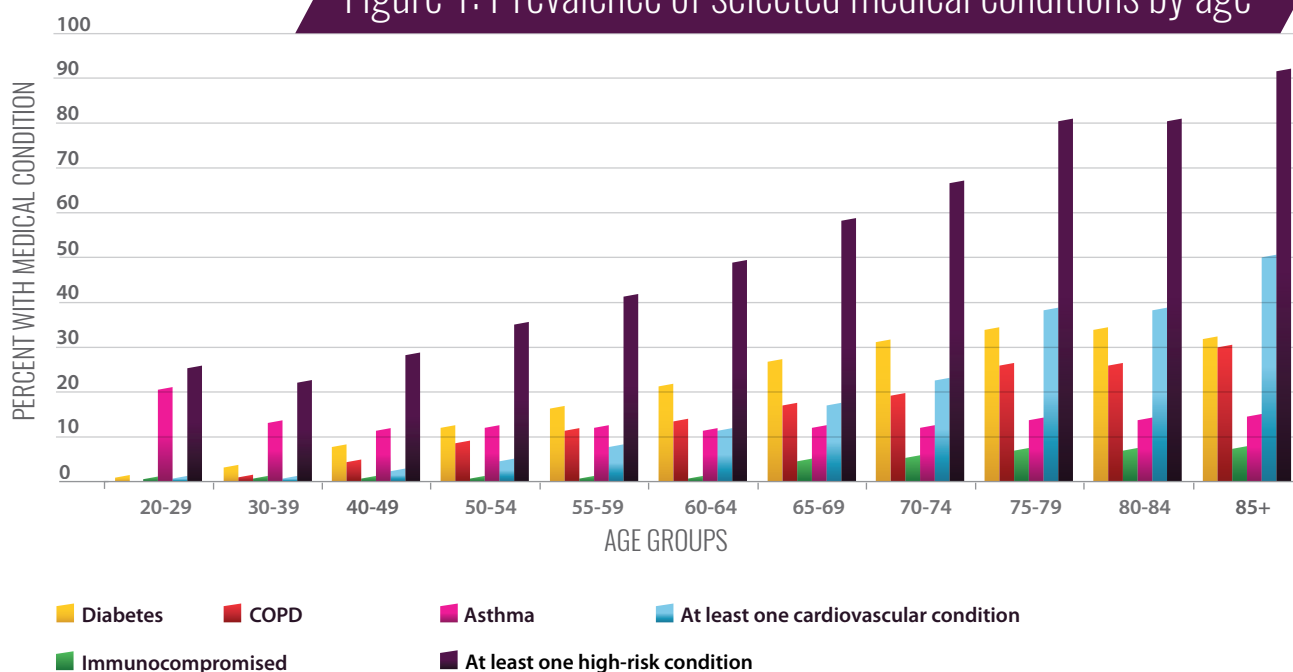
For those who were hospitalized with influenza in Ontario, over 65% had an underlying condition; while approximately 85% of those who died from complications, had underlying risk factors.⁵⁷

Influenza increases the risk of hospitalization among older adults, which can be devastating for their health. Any hospitalization (due to 'flu' or in general) can severely affect an older adult's ability to live independently because functional

decline can occur very quickly during a hospital stay.⁵⁹ Studies have found that as many as one-third of older adults leave hospitals with a reduced ability to carry out their activities of daily living.⁶⁰

Indeed, it has been shown that prolonged stays in hospitals can lead to a 'cascade of dependency' where immobility leads to poor outcomes including significant functional loss that in some cases requires older patients to have additional rehabilitative care or to move to a long-term care home.⁶¹ The decline of independence and functional ability among older patients while in hospital can be exacerbated by influenza. It has been found that influenza can impact a person's ability to perform their activities of daily living, as well as cause weight loss, pressure ulcers, and infections.⁶²

Figure 1: Prevalence of selected medical conditions by age⁵⁵



Vaccination – A Public Health Success Story

Some of the challenges of improving influenza vaccination rates may ironically be due to the public health success of vaccinations in general. Vaccines have been estimated to prevent 2-3 million deaths annually worldwide.⁶³

Vaccines have been estimated to prevent 2-3 million deaths annually worldwide.⁶³

It is because of how well vaccines work that people have forgotten how severe many once common diseases were. This is especially true for diseases that have been entirely or almost completely eradicated. However, more frequent travel of people around the world means that some of these diseases that were once eradicated may make their way back into Canada as they are just a 'plane ride away' (e.g. polio).⁶⁴

Eradicating Smallpox through Vaccination

Smallpox was an infectious disease that caused painful, red blisters, with epidemics killing millions of people worldwide, including over 3,000 Canadians annually.⁶⁵ The smallpox vaccine was the first that was widely used and smallpox became the first human infectious disease to be eradicated, back in 1979.⁶⁶ Smallpox was easier to target because it had very distinct clinical features that were well recognized and feared.⁶⁷ Smallpox remains the only human infection to ever be eradicated.⁶⁸

How do Vaccines Work?

In general, vaccines use a tiny amount of dead or weakened virus/bacteria or toxin. This helps the body to build 'antibodies' which are like memories in the immune system.^{69,70} Vaccines do not cause the disease itself, because the virus they use is too weak to cause harm, but strong enough that the immune system's reaction to it will help it protect against infection later.⁷¹ Humans naturally form immunity when infected with influenza, but because the virus changes rapidly, previous infection is usually not effective in preventing or lessening the severity of influenza in the future.⁷² There are some vaccines that protect against one disease with a single injection (i.e. influenza vaccine) and there are some vaccines that cover multiple diseases with a single injection (i.e. measles, mumps, and rubella).⁷³

Herd Immunity

Vaccines are not only a protection mechanism for an individual, but they can also help an entire population through 'herd immunity' or 'community immunity'.

This occurs when there are enough people in the community immunized against a disease that there is an overall decrease in the risk of the disease for everyone.⁷⁴ Vaccination protects you from getting sick if you are exposed to the influenza virus, which then protects others because you are less likely to spread the virus.⁷⁵

Herd immunity is particularly important as it protects vulnerable groups who cannot yet be immunized, such as infants (who cannot be immunized before 6 months of age), cancer patients undergoing chemotherapy, the older adults who are more likely to experience immunosenescence, and other people who cannot be immunized for medical reasons.⁷⁶

The Influenza Vaccination – Still Our Best Defence Against Influenza

Vaccination is the best defence against influenza.⁸³

Vaccination is the best defence against influenza.⁸³ Public health agencies all over the world recommend influenza vaccination as a key defence against the 'flu'. The World Health Organization (WHO) recommends that pregnant women, children aged 6-23 months old, older adults and people living with chronic conditions should be priority groups for vaccination.⁸⁴

How does the Influenza Vaccine get to the Providers in Canada?



First, the World Health Organization (WHO) determines which virus is most likely to cause infection in the upcoming season.⁷⁷ Then the WHO distributes the strains and reagents to the influenza vaccine manufacturers and continuously monitors the quality of the vaccine that is produced for distribution.⁷⁸

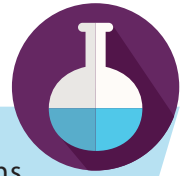
Influenza vaccine manufacturers across North America and Europe participate in safety checks and processes before their vaccines are distributed.⁷⁹ The Government of Canada purchases influenza vaccines for the provinces and territories through Public Works and Government Service Canada.⁸⁰ The Public Health Agency of Canada (PHAC) helps coordinate the distribution of the vaccines and works with a Federal/Provincial/Territorial (FPT) committee to address vaccine supply issues.⁸¹ PHAC carries out surveillance for any adverse effects from the vaccine.⁸²

It also recommends that health care providers (HCPs) be vaccinated as they are potential sources of influenza infection⁸⁵ and are more likely to be in contact with individuals at higher risk, such as infants, older people and people living with chronic conditions. HCPs and people who live with children also have an increased risk of contracting influenza.⁸⁶ HCPs may develop asymptomatic or very mildly symptomatic infections, which is particularly problematic because they may not appear sick, but are still able to pass it to the vulnerable people (i.e. frail elderly) they care for.⁸⁷

Why Do We Need to Get a 'Flu Shot' Every Year?

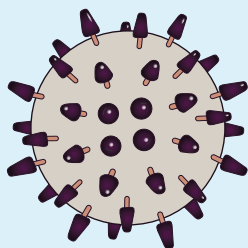
The influenza vaccine differs from other vaccinations because the circulating viruses mutate each season (and throughout the season). This means that every year a new vaccine is created for the upcoming influenza season.⁸⁸ The effectiveness of the influenza vaccine depends on how well the World Health Organization selecting the vaccine strains predicts what viruses will be present that season, and how much the influenza viruses mutate in the six months it takes to make influenza vaccines. Overall, influenza vaccine effectiveness is about 60% in healthy adults.⁸⁹ However, it varies substantially from year to year, and differs for different strains. For example, vaccine effectiveness varied from 10% to 60% between the 2004-05 and 2016-17 seasons. During the 2019-20 season, the overall estimated effectiveness of the influenza vaccine was 53%.⁹⁰

In addition, the effectiveness of the vaccine wanes over time. It has been found that as the time since the influenza vaccine was administered increases, the effectiveness of the vaccine decreases.⁹¹



How the Influenza Vaccine Works

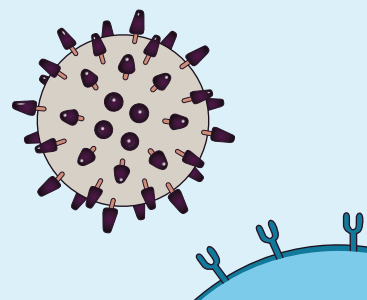
Influenza viruses are covered by proteins called 'hemagglutinins', which have a head and a stalk portion. If the head of the hemagglutinin locks onto a human cell, it can enable the influenza virus to spread by replicating itself. The influenza vaccine uses a dead or weakened version of the flu virus to get the immune system to produce antibodies, which are Y-shaped molecules.⁹² Antibodies bind to the head of the hemagglutinin, which then stops it from being able to infect our cells.⁹³ It is the head of the hemagglutinin that changes every year and this is what we have to vaccinate against.⁹⁴ This means that the antibodies that our body made last year after receiving the influenza vaccine (or being infected by influenza) may no longer be effective, and this can cause us to still be susceptible to getting sick from this year's upcoming strains of influenza.⁹⁵



The flu virus is a sphere covered by numerous proteins known as **hemagglutinin**, which resembles a lollipop.

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The flu shot prompts our bodies to make **antibodies**, which block the hemagglutinin head from locking into our cells, preventing illness.



What are the Different Types of Influenza Vaccines

The Influenza Vaccine - How is it Made?

Each year, extensive research is conducted by scientists to determine which influenza strains are most likely to occur in the upcoming influenza season and then the vaccine is formulated to protect against those strains.⁹⁷

Most influenza vaccinations are made to protect against four viruses: two influenza A viruses (H3N2 and H1N1) and two influenza B viruses (from both the Yamagata and Victoria lineages). These are called 'quadrivalent' vaccinations. The only 'trivalent' influenza vaccine currently available in Canada is the adjuvanted influenza vaccine. It is designed to protect against influenza B viruses of only one of the two lineages, in addition to the earlier noted influenza A viruses.⁹⁸

Inactivated Influenza Vaccines (IIV)

In these vaccines, the influenza virus has been killed and the proteins partially purified. Manufacturers are moving from trivalent (protects against three strains of influenza) to quadrivalent (protects against four strains of influenza) versions of influenza vaccines. IIVs can be further categorized into standard-dose, adjuvanted, high-dose, and cell culture-based.⁹⁹ The main distinctions of these vaccines are:

- Cell culture-based vaccines are from viruses grown in cultured cells of mammalian origin, unlike traditional vaccines that are produced from viruses grown in eggs.¹⁰⁰
- Adjuvanted and high-dose vaccines look to provide a stronger immune response through using an adjuvant or an increased dose.

IIVs are approved for varying age groups, with adjuvanted and high-dose vaccines specifically approved for those aged 65 years and older.¹⁰¹

Recombinant Influenza Vaccine (RIV)

This vaccine is created by inserting a viral hemagglutinin gene into cultured insect cells, and purifying the produced viral hemagglutinin.¹⁰² This allows vaccines to not have hemagglutinin that might be modified by virus adaptation during growth in cells or eggs.¹⁰³ Unlike IIVs, this vaccine has only one antigen (the hemagglutinin); other viral proteins are not present. There is only one of these vaccines (quadrivalent) approved in Canada for those aged 18 years and older.¹⁰⁴

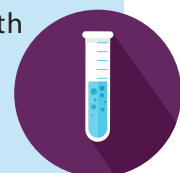
Live Attenuated Influenza Vaccine (LAIV)

These vaccines are made from weakened influenza viruses and are given through a nasal spray. There is only one of these vaccines (quadrivalent) approved in Canada for those aged 2 to 59 years.¹⁰⁵



New and Emerging Findings

- In 2018, NACI conducted a literature review comparing the efficacy and effectiveness of the high-dose to the adjuvanted influenza vaccine in adults aged 65 years and older. The review had four conclusions: (1) there is good evidence that the high-dose vaccine offers superior protection compared to a standard dose in older adults; (2) there is fair evidence that adjuvanted vaccine may be effective reducing hospitalization for influenza and influenza complications in older adults compared to the unvaccinated; (3) there is insufficient evidence that the adjuvanted vaccine is more effective than those who received an unadjuvanted trivalent inactivated vaccine; and (4) there is no evidence on how the high-dose vaccine directly compares to the adjuvanted vaccines.¹⁰⁶
- NACI's 2021 recommendation at the public health program level for adults aged 65 years and older is that any of the available influenza vaccines should be used for public health programs. However, both the high-dose trivalent and quadrivalent high-dose vaccines provide greater protection among older adults compared to their standard dose equivalents.¹⁰⁷
- Currently, NACI is conducting an updated review of influenza vaccination for adults aged 65 years and older to replace their previous review from 2018.^{107a} Recently, the United States' Advisory Committee on Immunization Practices (ACIP) released their systematic review of studies comparing various enhanced and standard-dose vaccines.¹⁰⁸ ACIP found the following enhanced vaccines to have a relative benefit when compared to standard-dose vaccines, especially in regards to influenza-associated hospitalizations: adjuvanted trivalent, high-dose trivalent, and recombinant quadrivalent.^{108a} However, this benefit varied between influenza seasons, with not all observational studies showing a benefit across all the seasons.^{108b} A few observational studies have compared the adjuvanted trivalent, high-dose trivalent, and recombinant quadrivalent vaccines among adults aged 65 years and older in the United States between the 2016-17 and 2019-20 influenza seasons.^{108c,108d,108e,108f,108g,108h,108i} ACIP concluded that currently available studies do not indicate that any of these enhanced vaccines is more consistently beneficial than the others across multiple seasons.^{108j}
- For the upcoming 2022-23 influenza season, Alberta, Manitoba, New Brunswick, Prince Edward Island, Saskatchewan and Yukon will fund high-dose influenza vaccines to all adults aged 65 years and older.^{109,109a,109b,109c,109d,109e} Some jurisdictions also fund high-dose influenza vaccines but only for certain groups of older adults, such as Northwest Territories, Nova Scotia, Newfoundland and Labrador and Quebec, where the high-dose vaccine is offered free of charge to adults aged 65 years and older who live in specific settings including long-term care and/or assisted living.^{109f,109g,109h,109i} There are also provinces that fund both the high-dose and adjuvanted influenza vaccines to older adults. Ontario will offer both vaccines to all adults 65 years and older,^{109j} whereas British Columbia will offer the adjuvanted vaccines to older adults living in the community and the high-dose vaccines to older adults living in long-term care, assisted living settings and First Nations communities.^{109k}



Spotlight on Current Research around the Influenza Vaccine in Canada

INVESTED – INfluenza Vaccine to Effectively Stop cardio Thoracic Events and Decompensated heart failure Trial ¹¹⁰

Influenza can lead to many complications and/or death in those living with heart disease. It has been found that influenza-related death is more common in individuals living with heart disease than individuals living with any other chronic condition. People who have heart disease who then get influenza are more likely to have a heart attack. Those who have heart failure are more likely to be hospitalized. Vaccination has been shown to reduce the risk of major cardiac events.¹¹¹ Furthermore, there is already some evidence to suggest that the high-dose vaccine can decrease the likelihood of influenza infection for individuals living with heart disease.

The INVESTED trial taking place across the United States and Canada is looking to determine which of the two formulations of influenza vaccine, either the standard quadrivalent influenza vaccine (QIV) or the high-dose trivalent influenza

vaccine (TIV), is more effective at reducing death and heart/lung disease-related hospital admissions.

The INVESTED trial is enrolling individuals aged 18 and older with at least one heart disease risk factor and a history of a heart attack (within the past year) or prior hospitalization for heart failure (within the past 2 years). The trial will randomly assign participants to either receive the standard QIV vaccine (or receive the high-dose TIV form of the vaccine or receive the high-dose trivalent vaccine.ⁱⁱⁱ This is a high-dose trivalent vaccine that is currently available for those aged 65 years and older but is considered investigational for anyone younger than 65.

For more details about the INVESTED Trial please visit <http://www.investedtrial.org/>.

Influenza Vaccination Internationally

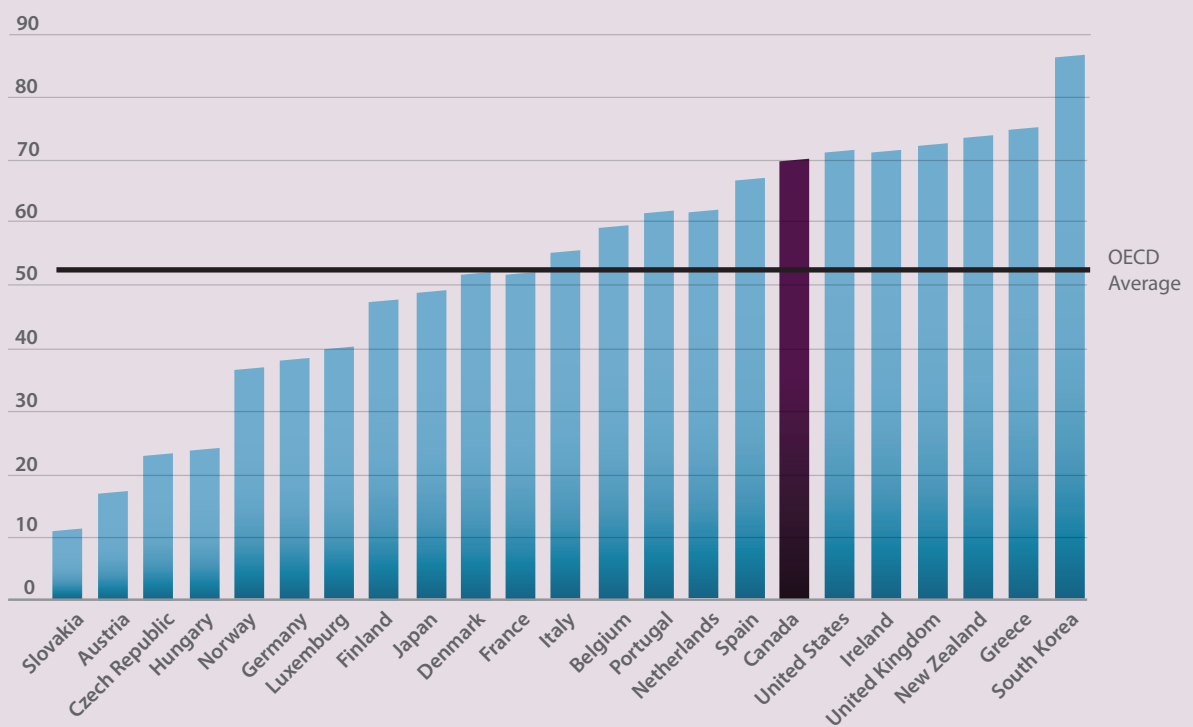
Canada's influenza vaccination rate^{iv} for older adults aged 65 years and older is lower than other developed countries

Canada's influenza vaccination rate of 70%¹¹² for older adults aged 65 years and older is in the top third of other developed countries, well above the OECD average of 51%.¹¹³ Canada lags behind Ireland, Greece, New Zealand, and South Korea.¹¹⁴ It is important to note that among OECD countries, only South Korea has achieved the World Health Organization's target vaccination rate of 75% for older adults.^{114,115}

Only 59% of WHO member countries reported having a national influenza immunization policy (as of 2014).¹¹⁶ Among those countries that did have a national policy in place, their programs targeted specific risk groups (as defined by the WHO) including pregnant women, young children, those living with chronic conditions, older adults, and health care workers.¹¹⁷ High or upper middle income countries were more likely to have a national policy.¹¹⁸ In addition, these countries were more likely to have introduced national policies around other vaccines.¹¹⁹

^{iv}The OECD Indicator for influenza refers to vaccination rates among the elderly, defined as the number of people aged 65 years and older who are vaccinated against influenza in a given country

Figure 2: Percentage of Population aged 65 years and older who have Received a Seasonal Influenza Vaccination for OECD Countries¹¹⁵



This figure was retrieved from <https://data.oecd.org/healthcare/influenza-vaccination-rates.htm>. The 2019 Canadian influenza vaccination rate for adults aged 65 years and older was 60.2%, extracted from the 2019 Canadian Community Health Survey (CCHS). However, we believe that 70% vaccination rate is a more accurate estimate of influenza vaccination among adults aged 65 years and older. This figure was taken from the Public Health Agency of Canada's 2019-20 influenza vaccination coverage estimates, which can be retrieved from (<https://www.canada.ca/content/dam/hc-sc/documents/services/immunization-vaccines/vaccination-coverage/seasonal-influenza-vaccine-coverage-in-canada-en.pdf>)

Comparing Influenza and COVID-19 Vaccine Uptake among Older Adults in Canada

COVID-19 has greatly impacted Canadians of all ages. Canada has recorded almost 3 million cases of COVID-19 and nearly 33,000 deaths since the beginning of the COVID-19 pandemic. Approximately 93% of these fatalities have occurred among Canadians aged 60 years and older. However, Canadians aged 60 years and older have not hesitated to get COVID-19 vaccines.^{115a}

In fact, Canadians aged 60 years and older have consistently had the highest vaccination rates in comparison to other age groups. As of January 2022, 96% of Canadians aged 60 years and older have received at least one dose of a COVID-19 vaccine and 94% have received two doses.^{115b}

Moreover, Canada achieved 90% coverage in a short period of time—from mid-December 2020 and mid-June 2021—suggesting that there is the potential to achieve high rates of influenza vaccination among older adults as well.^{115c}

Other Means of Prevention

Immunization alone is not enough.

Immunization alone is not enough. In addition to influenza vaccination, there are other important steps that may prevent influenza from spreading. These include:

- Regular and thorough hand-washing
- Coughing into sleeves
- Avoiding touching one's face with their hands
- Disinfecting commonly touched surfaces (i.e. doorknobs)
- Strengthening one's immune system (i.e. through healthy eating and physical activity)
- Avoiding interactions with others who are feeling ill¹²⁰

All of these measures will help prevent the spread of not only influenza, but other infections and illnesses as well.

Antiviral medications can also be used to control cases of influenza. The Association of Medical Microbiology and Infectious Disease Canada (AMMI Canada) recommends that treatment with antivirals

begin as soon as possible after symptoms occur, with better effects if started within 12 hours (versus 48 hours).¹²¹

AMMI also supports the selective use of antivirals for prophylaxis, for example using them to protect high-risk groups who cannot be vaccinated.¹²² The Ministry of Health and Long-Term Care in Ontario recommends that residents of long-term care homes, their families, formal caregivers, and visitors be educated on vaccination policies and recommendations, including education in proper hygiene.¹²³ There are policies that recommend wearing masks to control the spread of influenza – especially for those who may be infected asymptotically and for the protection of those who are unvaccinated.¹²⁴

AMMI also supports the selective use of antivirals for prophylaxis, for example using them to protect high-risk groups who cannot be vaccinated.¹²² The Ministry of Health and Long-Term Care in Ontario recommends that residents of long-term care homes, their families, formal caregivers, and visitors be educated on vaccination policies and recommendations, including education in proper hygiene.¹²³

There are policies that recommend wearing masks to control the spread of influenza – especially for those who may be infected asymptotically and for the protection of those who are unvaccinated.¹²⁴

Vaccination Policies and Outcomes in Canada

The State of Influenza Vaccination Policies and Outcomes in Canada

Influenza vaccination is recommended for all Canadians aged 6 months of age or older – with particular recommendations for groups that are at higher risk of influenza complications or hospitalizations (i.e. those aged 65 years and older, pregnant women, and those living with chronic conditions).¹²⁵

A total of 12 provinces and territories provide universal public funding for influenza vaccines.¹²⁶ While all jurisdictions provide public coverage for people aged 65 years and older to access influenza vaccines,^{126a} Ontario is the only province that provides all older adults with publicly funded enhanced vaccines in the form of the high-dose quadrivalent and adjuvanted trivalent influenza vaccine.^{126b} British Columbia also publicly funds both of the enhanced vaccines, however the adjuvanted trivalent vaccine is for older adults living in the community, whereas the high-dose quadrivalent vaccine is for older adults in living in long-term care, assisted living settings and First Nations communities.^{126c,126d} Six jurisdictions - Alberta, Manitoba, New Brunswick, Prince Edward Island, Saskatchewan, and Yukon - offer only the high-dose quadrivalent vaccine to their entire populations aged 65 years and older as part of their publicly funded

seasonal influenza vaccine programs.^{126e,126f,126g,126h,126i,126j}

In other jurisdictions, only certain groups of older adults such as residents of long-term care settings may be eligible for publicly funded high-dose quadrivalent vaccines, as is the case in Northwest Territories, Nova Scotia, Newfoundland and Labrador, and Quebec.^{126k,126l,126m,126n}

A total of 12 provinces and territories provide universal publicly funded influenza vaccines.¹²⁷

The only province that currently does not provide universal funding for influenza vaccines is Quebec.^{127a} However, in this province, the influenza vaccine is funded for various groups including those living with certain chronic conditions (i.e. asthma, diabetes) and for those in long-term care homes.^{127b} Also, Quebec recommends and funds influenza vaccination for adults aged 75 years and older.^{127c} Even though the province no longer recommends the influenza vaccine for healthy adults aged 60 to 74 years, these persons can also get the vaccine free of charge if they would like to get it.^{127d}

Ontario was the first province to implement a large-scale Universal Influenza

Immunization Program (UIIP), which was found to be associated with decreased mortality, hospitalizations, emergency department use, and doctor's office visits when compared to other provinces in Canada.¹²⁸

The Ontario program was found to be cost-effective because it reduced reported influenza cases, and the use of health services such as physician visits, hospitalizations and mortality.¹²⁹

Canada's provinces and territories also differ in how they deliver influenza vaccination. In general, vaccination is offered at doctor's offices, flu clinics, public health centres, workplaces, schools, hospitals, institutions, and pharmacies. Enabling pharmacists to offer influenza vaccinations is a relatively new initiative in Canada, which was designed to improve access and uptake. Alberta and British Columbia introduced this policy for pharmacists during the 2009-10 influenza season, New Brunswick in 2010-11, Ontario in 2012-13, and Nova Scotia in 2013-14.¹³⁰ Pharmacists can now offer the influenza vaccination in 11 of Canada's 13 provinces and territories.¹³¹

Pharmacists can now offer the influenza vaccination in 11 of Canada's 13 provinces and territories.¹³²

Influenza Vaccination Policies by Province (2022-23)

Influenza vaccines are provided at public health clinics, physician’s offices, travel clinics, or pharmacies in certain provinces.¹²⁰

Province/ Territory	Who can administer the influenza vaccination?	Universal Funding? ¹³³
Alberta	Alberta Health Services, family doctors & pharmacists ¹³⁴	<p>Yes</p> <p>Alberta funds high-dose influenza vaccines for all adults aged 65 years and older^{134a}</p>
British Columbia	Public health clinics, pharmacies, physician’s offices, and travel clinics ¹³⁵	<p>Yes</p> <p>British Columbia is now funding the adjuvanted influenza vaccines for adults aged 65 years and older living in the community. The province also funds the high dose influenza vaccines for adults aged 65 years and older who are living in:</p> <ul style="list-style-type: none"> - Long-term care settings - Assisted living settings - First Nations communities^{135a}
Manitoba	Public health offices, doctor’s offices, pharmacies, immunization clinics ¹³⁶	<p>Yes</p> <p>Manitoba is now funding the high-dose influenza vaccine for all adults aged 65 years and older.¹³⁷</p>

Influenza Vaccination Policies by Province (2022-23)

Influenza vaccines are provided at public health clinics, physician’s offices, travel clinics, or pharmacies in certain provinces.¹²⁰

Province/ Territory	Who can administer the influenza vaccination?	Universal Funding? ¹³³
New Brunswick	Seasonal influenza vaccine will be provided in New Brunswick through: primary care providers, Public Health nurses, New Brunswick Extramural Program health professionals and pharmacists ¹³⁸	Yes New Brunswick funds the high-dose influenza vaccine for all adults aged 65 years and older. ^{138a}
Newfoundland and Labrador	Public health, health care, occupational health services and physician’s offices and pharmacies ¹³⁹	Yes Newfoundland and Labrador is now funding the high-dose vaccine for adults aged 65 years and older who are living in long-term care and personal care homes. ^{139a}
Northwest Territories	Nurses or doctors ¹⁴⁰	Yes Northwest Territories is now funding the high-dose vaccine for adults aged 65 years and older who are living in long-term care homes. ^{140a}

Influenza Vaccination Policies by Province (2022-23)

Influenza vaccines are provided at public health clinics, physician’s offices, travel clinics, or pharmacies in certain provinces.¹²⁰

Province/ Territory	Who can administer the influenza vaccination?	Universal Funding? ¹³³
Nova Scotia	Pharmacies, doctor’s offices, Public Health clinics, and in some workplaces ¹⁴¹	<p>Yes</p> <p>Nova Scotia is now funding the high-dose vaccine for adults aged 65 years and older who are:</p> <ul style="list-style-type: none"> - Residents in long-term care settings - ‘Alternate level of care’ hospital patients awaiting long-term care setting placement^{141a}
Nunavut	Community Health Centres or Iqaluit Public Health ¹⁴²	<p>Yes</p>
Ontario	Pharmacies, doctor’s offices, public health units, workplaces, long-term care homes, hospitals, and community health centers ¹⁴³	<p>Yes</p> <p>Starting in the 2018-19 influenza season, Ontario began funding the high-dose influenza vaccine for adults aged 65 years and older. Ontario now offers either the high-dose or adjuvanted influenza vaccines to adults aged 65 years and older.¹⁴⁴</p>
Prince Edward Island	Flu vaccination clinics, pharmacists, family physicians, or nurse practitioners ¹⁴⁵	<p>Yes</p> <p>PEI is now funding the high-dose vaccine for all adults aged 65 years and older.^{145a}</p>

Influenza Vaccination Policies by Province (2022-23)

Influenza vaccines are provided at public health clinics, physician’s offices, travel clinics, or pharmacies in certain provinces.¹²⁰

Province/ Territory	Who can administer the influenza vaccination?	Universal Funding? ¹³³
Quebec	<p>Integrated health and social service centre update where vaccinations will be offered¹⁴⁶</p> <p>Pharmacists can also administer influenza vaccines.</p>	<p>No</p> <p>But, funded for:</p> <ul style="list-style-type: none"> ◦ Persons with morbid obesity ◦ Pregnant women ◦ People aged 75 years and older ◦ Residents of nursing homes or chronic care settings ◦ Health care workers ◦ Household contacts of people at high-risk ◦ People living with chronic conditions such as: cardiac disease, pulmonary disorder, diabetes, renal disease, liver disease, anemia or hemoglobinopathy, HIV patients, immune compromising conditions (i.e. cancer), and neurological or neurodevelopmental conditions <p>The vaccine is no longer recommended for healthy adults aged 60-74 or healthy children 6-23 months - however, they can receive the vaccine free if they wish.^{146a}</p>
Saskatchewan	<p>Public health clinics, pharmacies, physician’s and nurse practitioner’s offices¹⁴⁷</p>	<p>Yes</p> <p>Saskatchewan is now funding the high-dose vaccine for all adults aged 65 years and older.^{147a}</p>
Yukon	<p>Community health centres and pharmacies¹⁴⁸</p>	<p>Yes</p> <p>Yukon is now funding the high-dose vaccine for all adults aged 65 years and older.^{148a}</p>



Research has found that in provinces where pharmacists are able to administer the influenza vaccine, more people are vaccinated.¹⁴⁹

Research has found that in provinces where pharmacists are able to administer the influenza vaccine, more people are vaccinated.¹⁴⁹ Pharmacists have successfully increased access to the vaccine as they are conveniently located and accessible to many individuals, and are more likely to have longer hours, not require an appointment, and have shorter wait times.^{150,151,152} The pharmacy option may be especially effective among those in some high-risk populations who may be averse to visiting doctor's offices and prefer to visit pharmacies, such as smokers.¹⁵³

Influenza Vaccination Policies for Residents/Patients in Institutions

The Public Health Agency of Canada recommends that in acute and long-term

care settings, influenza vaccination should be part of patient care plans.¹⁵⁴ Furthermore, when transferring patients, information about their vaccinations should also be provided to the institution they are being sent to.¹⁵⁵

The Ministry of Health and Long-Term Care (MOHLTC) in Ontario supports the use of influenza vaccines as its main preventive measure against influenza in long-term care homes (LTCHs) and recommends that all LTCH residents should be vaccinated.¹⁵⁶ A study found an almost 20% reduction in outbreaks in LTCHs when over 90% of residents were vaccinated versus homes where fewer than 70% of residents were vaccinated.¹⁵⁷ The MOHLTC also recommends influenza vaccination for all visitors to LTCHs.¹⁵⁸ In 2012, health authorities in British Columbia were the first to implement a "vaccine-or-mask" policy.¹⁵⁹ This policy requires all employees of the health authorities, students, physicians, residents, contractors, vendors, and volunteers to be immunized or to be masked during influenza season.¹⁶⁰ This policy has further been expanded to include all visitors in health care facilities.¹⁶¹ All staff must report through an online reporting system whether they have been vaccinated.¹⁶²

Vaccination Rates in Canada

Current Influenza Vaccination Rates in Canada – Not Up to Our Own Standards

Only 40% of Canadians aged 18 years and older were vaccinated against influenza.¹⁶³

Only 40% of Canadians aged 18 and older were vaccinated against influenza during the 2020-21 season,¹⁵⁴ a significant improvement from 29% in 2013,^{163a} but significantly lower than the Canadian government target of 80%. In addition, these most recent rates show that influenza vaccinations have actually decreased during the COVID-19 pandemic, down from 42% during the 2018-19 and 2019-20 seasons.¹⁵⁴

Vaccination rates in key at-risk groups such as older adults (70%) and people aged 18-64 living with one or more chronic conditions (41%) are higher than the average among the general population.¹⁵⁴ However, declining vaccination rates among older adults in every province except Newfoundland and Labrador is a worrying trend.¹⁶⁵

Among Canada's 10 provinces, Nova Scotia consistently achieves the highest overall vaccination coverage - with increases from 47% during the 2014-15 flu season to 49% in 2018-19.¹⁶⁶

There is considerable variation in influenza vaccination rates across Canada. Among Canada's 10 provinces, Nova Scotia consistently achieves the highest influenza vaccination coverage—reaching 49% of the its population aged 12 and older in 2018-19.¹⁶⁶ Prince Edward Island and New Brunswick also had relatively high influenza vaccination coverage above 40% in 2018-19.¹⁶⁷ Quebec consistently has the lowest coverage, decreasing from 26% in 2015-16 to 21% in 2018-19.¹⁶⁸ Newfoundland, Manitoba, Saskatchewan, Alberta, and British Columbia all had influenza coverage rates between 34% and 39%.¹⁶⁹ Historically, coverage was further found to be much higher in provinces that have universal funding provisions.¹⁷⁰

Older Canadians have higher coverage rates compared to the general population, with 70% of those aged 65 years of age vaccinated during the 2020-21 influenza season, up from 65% during the 2015-16 season.¹⁷¹ Despite this success, vaccination rates for those aged 65 years of age have stagnated in more recent years, remaining at around 70% since the 2017-18 season, even in the midst of the COVID-19 pandemic.¹⁷² Just like with coverage for the entire population aged 12 years and older, there are also differences in vaccination coverage among older adults across Canada's 10 provinces.¹⁷³ During the 2018-19 influenza season, Nova Scotia (71.7%), Prince Edward Island (66.2%), and Ontario (67.1%) had the highest influenza vaccination rates among adults aged 65 years and over.¹⁷⁴ Quebec again had the lowest rates among all provinces at 45.3%.¹⁷² Newfoundland (54.8%) also had considerably lower influenza vaccination coverage rates among adults aged 65 years and older compared to the remaining provinces; Alberta (63.8%), British Columbia (64.4%), Manitoba (61.4%), and New Brunswick (61.3%).¹⁷⁵ In Newfoundland and Labrador, New Brunswick, Ontario, Saskatchewan, and Quebec, older adults who were vaccinated decreased between 2015 and 2019.¹⁷⁶

In one Canadian study, all ethnic groups (except Black Canadians) were more likely to have received influenza vaccination than Caucasian Canadians.^{177, 178} This may

be due to certain groups or populations having a higher likelihood of being exposed to specific anti-vaccination messages and media.¹⁷⁹

In another study, older adults receiving social assistance and benefits were more likely to be vaccinated than people who were employed.¹⁸⁰ A possible explanation for this is that these groups may have been specifically targeted to receive influenza vaccination.¹⁸¹ Another reason could be that high-risk groups are more likely to be given free influenza vaccination regardless of whether there is universal funding in that province, and individuals on social assistance are more likely to be living with comorbidities.¹⁸²

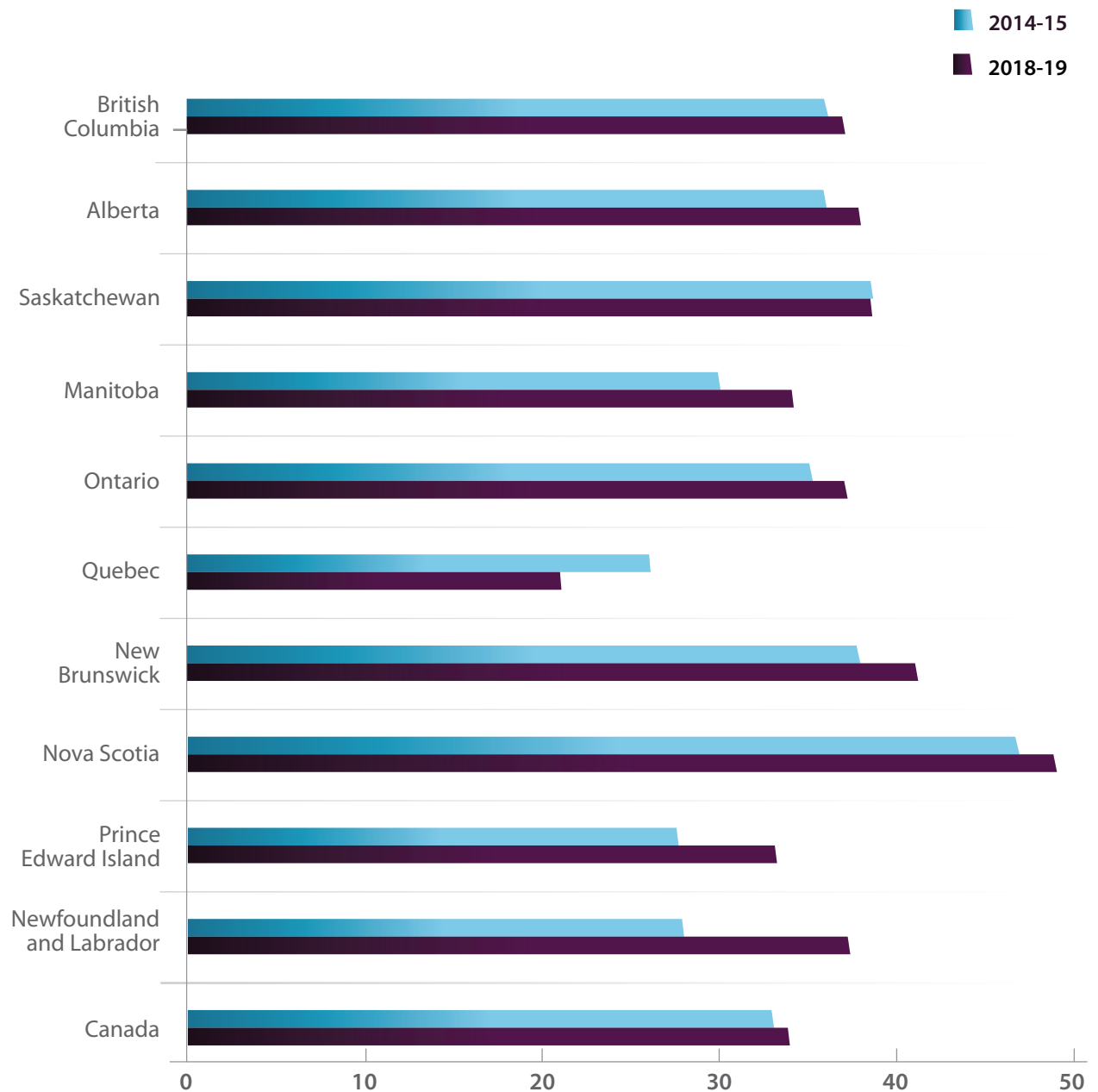
Health Care Provider Influenza Vaccination Policies in Canada

The Government of Canada requires that health care workers have their vaccination status assessed, as well as receive recommended vaccines, and booster doses as needed.¹⁸⁴ All health care workers in Canada are recommended to receive vaccinations against tetanus/diphtheria, pertussis, hepatitis B, measles, mumps, rubella, and varicella.¹⁸⁵

Influenza vaccination policies for health care providers vary widely across Canada and have often been met with controversy.

Flu Vaccination Rates in Canada 2014-15 and 2018-19.¹⁸³

Chart: Canadians aged 12 years and older who received an influenza immunization in the past year, in 2014-15 versus 2018-19



The first policies requiring influenza vaccination as a 'condition of service' in long-term care homes were introduced in Ontario in 1998, and extended to acute care hospitals across Ontario in 2000.¹⁸⁶ These policies require employees who are not vaccinated to take antiviral prophylaxis or not work during institutional outbreaks.¹⁸⁷

More recently, health care institutions have started to consider and implement policies that increase health care worker influenza vaccination. Many hospitals in the United States now require influenza vaccination as a condition of employment, and other institutions have implemented 'vaccinate-or-mask' policies, which require that health care workers who are not vaccinated wear a mask in clinical care areas of the hospital during periods of epidemic influenza activity.¹⁸⁸ As of 2014 in Canada, at least one long-term care home mandates annual influenza vaccinations for all of its health care workers.¹⁸⁹ All health authorities in British Columbia, one of two health authorities in New Brunswick, and some hospitals in Ontario have implemented vaccinate-or-mask policies.¹⁹⁰

Studies have shown that based on current data, mandated influenza vaccination policies for health care workers are not yet warranted.¹⁹¹ However, these researchers do agree with approaches to support voluntary vaccination or other practices such as staying home or wearing masks if symptomatic.

Vaccination Rates for Health Care Providers/Healthcare Facilities

Health Care Provider Influenza Vaccination Rates in Canada

Vaccination rates for health care providers across Canada is 50%, well below the PHAC target level of 80% for this population,²⁰⁹ and vaccination rates vary widely between occupations.²¹⁰

Vaccination rates for health care providers across Canada is 50%, well below the PHAC target level of 80% for this population,²⁰⁹ and vaccination rates vary widely between occupations.²¹⁰ Family physicians and general practitioners are more likely to be vaccinated, whereas chiropractors, midwives, and practitioners of natural healing are least likely to be vaccinated.²¹¹ Midwives in particular have been found to have very low vaccination rates.²¹²

Current Health Care Provider Influenza Vaccination Policies across Canada's Provinces and Territories

British Columbia	In 2012, British Columbia health authorities implemented a policy that required all health care workers in the province to either receive the influenza vaccine or wear a mask in patient areas for the entire influenza season. ¹⁹² A grievance was brought by the British Columbia Nurses Union; the arbitrator found the policy to be a reasonable exercise of management right. ¹⁹³
Alberta	Currently not required – but it is made accessible and convenient for staff. ¹⁹⁴
Saskatchewan	Currently not required. In 2014, the provincial government mandated a 'vaccinate or mask' policy – however, in 2015 the decision was made by The Medical Health Officers' Council of Saskatchewan to stop this policy. ¹⁹⁵
Manitoba	Currently not required – but influenza vaccination is strongly recommended for all health care workers. ¹⁹⁶
Ontario	Mandatory influenza vaccination policies would violate agreements between hospitals and the Ontario Nurses Association. No province-wide policy in regard to vaccination. Some hospitals have introduced 'vaccinate or mask' policies, including many of the Toronto Academic Health Science Network (TAHSN) hospitals. ¹⁹⁷ An initial grievance by the Ontario Nurses Association against one hospital policy found in favour of the union. ¹⁹⁸ The ONA fought and won against the vaccinate or mask (VOM) policy that was in effect at St. Michael's Hospital and other hospitals that are part of the TAHSN. ¹⁹⁹
Quebec	Currently not required – and a refusal to be vaccinated cannot be considered negligence. ²⁰⁰
Nova Scotia	Currently not required – but recommended and encouraged for health care workers. ²⁰¹
New Brunswick	One of the two regional health authorities has implemented a 'vaccinate or mask' policy. This policy was supported by the New Brunswick Nurses Union. They introduced a 'vaccinate or mask' policy in one of the regional health networks. ²⁰² However, their provincial news release for the 2018 influenza season now states that the Department of Health encourages health care workers to receive the influenza vaccine. ²⁰³
Newfoundland and Labrador	Currently not required – but recommended. ²⁰⁴
Prince Edward Island	Currently not required – but recommended and made available to health care workers. ²⁰⁵
Northwest Territories	Currently not required – but universally available to residents. ²⁰⁶
Yukon	Currently not required – but it is highly recommended for health care professionals. ²⁰⁷
Nunavut	Currently not required – but universally available to residents. ²⁰⁸

As many organizations and facilities are still below targets for influenza vaccination rates, there has been mounting pressure to publicly disclose vaccination rates.²¹³ Health care facilities in Ontario, for example, are required to report their rates of influenza vaccination among their staff, and large variations between facilities can be found.^{vi} During the 2016-17 flu season, approximately 53% of health care providers in hospitals were vaccinated, while 72.4% of health care providers in long-term care homes were vaccinated.²¹⁴



During the 2016-17 flu season, approximately 53% of health care providers in hospitals were vaccinated, while 72.4% of health care providers in long-term care homes were vaccinated.²¹⁴



^{vi} under 'The Influenza Prevention and Surveillance Protocol for Long-Term Care Homes

Influenza immunization rates among health care personnel, by occupation

Occupation	Flu shot in last 12 months, % (95% CI)
Specialist physician	59 (51-67)
Family physician or general practitioner	72 (65-79)
Dentist	44 (31-57)
Optometrist	32 (17-47)†
Chiropractor, midwife or practitioner of natural healing	4 (1-7)†
Pharmacist	50 (43-58)
Dietitian or nutritionist	61 (50-72)
Physiotherapist	44 (36-51)
Occupational therapist	51 (39-62)
Nurse	57 (55-60)
◦ Head nurse or supervisor	53 (45-62)
◦ Registered nurse	58 (55-60)
◦ Licensed practical nurse	59 (54-64)

Note:

CI = confidence interval.

* As per Statistics Canada confidentiality rules, unweighted n values have been rounded to the nearest 5.

† Use with caution (coefficient of variation (16.6%–33.3%))

Table adapted from: Buchan, S.A. & Kwong, J.C. (2016). Influenza immunization among Canadian health care personnel: a cross-sectional study. *Canadian Medical Association Journal*, 4(3), E479- E488. Doi: 10.9778/cmajo.20160018

Long-term care homes in Ontario are also required to provide staff with annual information regarding vaccination rates, and to promote and implement accessible vaccination clinics for staff.²¹⁵ They must also keep records of influenza vaccination status, advise agencies providing staff to the care home on their vaccination policies and develop staffing plans based on vaccination rates.²¹⁶ The care home must also ensure that consenting residents receive their influenza vaccines.²¹⁷ The Occupational Health Service in hospitals in Ontario similarly must make the influenza vaccine accessible to health care workers through on-site vaccination clinics, mobile programs, and by ensuring all shifts/sites have access, among other methods.²¹⁸ They must then report the rate of vaccination among health care workers to the hospital Infection Prevention and Control Committee and Joint Health and Safety Committee, and the Medical Officer of Health every December.²¹⁹ They must also ensure all staff know the policies regarding antiviral use and that they may face work restrictions if there is an outbreak.²²⁰ They are also required to keep documentation of the status of employees and any refusals must be documented.²²¹

Other provinces have similar policies around reporting vaccination uptake among health care workers. Nova Scotia reports vaccination rates for health care workers in acute care hospitals.²²² Alberta provides rates for health care workers in acute care, long-term care, home care, and public health.²²³ In British Columbia, all health care workers must report their influenza vaccination status and must report if a vaccination is declined.²²⁴ Being vaccinated against influenza does not necessarily mean that the person will not contract influenza and potentially spread it to others. One study systematically reviewed studies of health care workers who cared for people aged 65 years and older and whether or not they received an influenza vaccine and found that providing the vaccine to health care workers who provided care for those aged 65 years and older may not necessarily decrease the number of individuals diagnosed with influenza.²²⁵ This study reinforces that although important, vaccination cannot be solely relied upon to prevent influenza.²²⁶ Other policies such as handwashing, asking workers to stay home if ill, or use of antivirals are still important.²²⁷

A City Snapshot - How Toronto Health Care Facilities are Doing

Toronto requires reporting of influenza vaccination rates in its health care facilities.

Of the 18 acute care facilities in Toronto, none achieved the 80% target rate in 2016, with the closest facility reaching 68%.²²⁸ Among 15 complex continuing care/rehabilitation facilities, 2 were able to reach the 80% target rate in 2016 (McCall Centre for Continuing Care and Runnymede Healthcare Centre).²²⁹

Toronto's long-term care homes have much greater variation, but many homes reached the target. Of 86 long-term care homes, 45 (52%) were able to reach 80%+ influenza vaccination coverage rates, with 17 (20%) able to reach 90% or above.²³⁰

Three homes in particular were able to reach 99% vaccination rates (Yee Hong Centre for Geriatric Care, Rose of Sharon Korean Long-Term Care and the Mon Sheong Home for the Aged).²³¹ In two of these homes, only one employee was not vaccinated!²³² The overall results appear to indicate that certain culturally specific long-term care homes in Toronto may be more successful in achieving robust influenza provider vaccination rates.

However, differences in reported rates have also been found to be based on inconsistent definitions, making comparisons across organizations challenging.²³³ Also, documentation is not always required – sometimes verbal confirmation is used, which can also affect the accuracy of what is being reported.²³⁴

Innovating to Improve Provider Vaccination Rates

In Toronto, Mount Sinai Hospital

conducted a study during the 2011-12 and 2012-13 influenza seasons in which nurses provided vaccines from a mobile influenza vaccine cart that was available during the day, evenings, and weekends.²³⁵ Staff who were not vaccinated were offered either an intramuscular or an intradermal vaccine (smaller needle with less volume).²³⁶ Staff liked the intradermal vaccine, and many reported wanting this kind of vaccine in the future.²³⁷ Additionally, the use of the mobile cart was shown to improve accessibility and contributed to improved vaccination rates in the hospital.²³⁸



Vaccine Hesitancy

Understanding Vaccine Hesitancy through the 3C Framework: Complacency, Confidence and Convenience

The effectiveness of the influenza vaccine is well-established, so why aren't rates of vaccination higher? It's not because of lack of knowledge. Studies show that the public and their health care providers generally accept the concept of vaccination and understand that prevention is a better option than treatment.²³⁹ The public also understands that vaccinations are helpful and consider the side effects less severe than the condition the vaccine is preventing.²⁴⁰

Although there is widespread agreement that vaccination is a key preventive measure against infectious diseases and influenza, uptake of influenza vaccination still remains well below target levels. A possible explanation for this is 'vaccine hesitancy'. This is the 'delay in acceptance or refusal of vaccines despite availability of vaccination services',²⁴¹ which the SAGE Working Group on Vaccine Hesitancy addressed through its 3C framework: Complacency, Convenience, and Confidence.²⁴² Complacency occurs when the risks of illness seem low and vaccination is therefore not prioritized. Confidence addresses trust in the vaccine, the health system, and the policy-makers.²⁴³

Convenience refers to accessibility and affordability.²⁴⁴

This group recommends many possible ways to address the 3Cs, including engaging religious or influential leaders to promote vaccination, social mobilization, using mass media, improving convenience and access, mandating vaccinations or sanctioning non-vaccination, using reminders and follow-up processes, non-financial incentives to motivate vaccination, and training for health care workers on communicating messages.²⁴⁵

Unpacking Complacency – Many Canadians Don't Think Influenza is Serious Enough to Warrant Action

In one Canadian study, the most frequently reported reason for not receiving a vaccination was that it was perceived as unnecessary.²⁴⁶

In one Canadian study, the most frequently reported reason for not receiving a vaccination was that it was perceived to be unnecessary.²⁴⁶ This reason was less reported among those living with chronic conditions.²⁴⁷ Employed people are less likely to be vaccinated, perhaps because they believe they are healthier and do not need to engage in preventive measures.²⁴⁸ In another study, many people who did not receive a vaccination noted it was because they did not think they were at increased risk of contracting influenza.²⁴⁹ Another study from Quebec found that people felt they needed to get a vaccine in order to protect vulnerable family members (children and grandparents) but not that they had a responsibility to protect the public at large.²⁵⁰ Participants also felt strongly that they did not want to be told what to do and wanted the option to choose.²⁵¹

Unpacking Convenience – Barriers Still Exist in Some Parts of Canada to Access the Vaccine

Jurisdictions across Canada have made strides in reducing barriers to accessing the influenza vaccine, with almost all provinces and territories providing universal funding for influenza vaccines.²⁵² However, Quebec still only provides publicly funded vaccines to specific groups.^{252a}

Also, although allowing pharmacists to administer influenza vaccines has been shown to increase the likelihood of vaccination, the Northwest Territories and Nunavut still do not allow pharmacists to administer them.²⁵³

Unpacking Confidence – Low Trust Around the Influenza Vaccine May Be An Issue

When patients do not trust the influenza vaccine, either because of misinformation or negative past experiences, they may be less likely to receive the influenza vaccine.

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One study found that people were highly influenced by their primary care providers or spouses regarding the influenza vaccine.²⁵⁴ Primary care providers are particularly influential for older adults – in improving knowledge about influenza, the vaccine, and its potential side effects.²⁵⁵ However, hearing about perceived side effects can sow doubt among patients.

In one study, half of the participants who did not receive the vaccine reported that it was because of perceived side effects or hearing about others having perceived side effects that kept them from getting vaccinated again.²⁵⁶ On the other hand, a positive experience can help build confidence in the influenza vaccine.

Those who did receive the vaccine said that they have had past positive experiences getting the vaccination and that encouraged them to keep getting vaccinated.²⁵⁷ Health care providers can also have low levels of confidence in the influenza vaccine as well. One qualitative study of nurses found that some feared the safety of the vaccination because of the requirement that it be created annually, with short timeframes for testing.²⁵⁸

Many also did not trust the effectiveness of the vaccine, again due to the annual nature of the vaccine and because the viruses that the vaccine were created for could mutate and render the vaccine ineffective.²⁵⁹ Similarly, other studies have noted that HCPs may be vaccine hesitant due to worries about the safety of influenza vaccines.²⁶⁰ Where the information about the influenza vaccine comes from can also have a significant impact on vaccination uptake among HCPs. Providers trust those who recommend vaccines i.e. Chief Medical Officers of Health, public health practitioners, and medical journals, but are less trusting of recommendations from pharmaceutical companies and some government agencies.²⁶¹

Additionally, the experience of administering COVID-19 vaccines has shown that achieving high vaccination coverage among older adults is feasible. Older adults have consistently had the highest COVID-19 vaccination rates among all Canadians, achieving 90% vaccination coverage in only a few months. The high vaccination coverage of older adults suggests that only a very small proportion of the older adult population is resistant to vaccination, and that vaccine hesitancy can be systematically addressed.^{115c}

In the context of COVID-19 vaccines, specific efforts were made to increase public awareness around how to access a COVID-19 vaccine administration sites, along with the safety, efficacy, and benefits of getting a vaccine. Nearly all provinces and territories developed their COVID-19 vaccine awareness campaign materials in multiple languages to further improve the reach of their messaging. Moreover, COVID-19 vaccines were administered free of charge and through a wide variety of providers, including pharmacies, public health clinics, mass vaccination sites, and

primary care providers. These extra-efforts made by governments helped address the issues of convenience and complacency, while bolstering individuals' confidence in getting the vaccine, leading to timely and high vaccination rates.^{115c}

Developments and New Research – Developing a Universal Influenza Vaccine

Researchers around the world have been working on developing a universal 'flu' vaccine that targets the part of the influenza virus that does not change from year to year.²⁶² This would create a lasting target that would eliminate the need to come up with a different vaccine each year. Dr. Matthew Miller, an Assistant Professor of Biochemistry and Biomedical Sciences at McMaster University in Hamilton, Ontario, is one of the researchers involved in developing a universal influenza vaccine.²⁶³ His team has found a way for the immune system to react to the 'stalk' or never-changing part of the influenza virus.^{264,265} Dr. Miller believes that if they can target the "stalk" instead of the "head" that people will no longer need annual vaccinations.²⁶⁶

In the United Kingdom (UK), University of Oxford researchers began trialling a universal vaccine for people aged 65 years and older starting in 2017.²⁶⁷ Depending on the results of this study, the vaccine could potentially be used across the National Health Service in the UK and ultimately worldwide.

Evidence-Informed Recommendations

Through examination of current evidence and the state of vaccination rates and policies in Canada and beyond, there is clearly more work to be done to improve influenza prevention in Canada. The following eight recommendations provide evidence-informed policy and practice approaches for health authorities and organizations towards supporting both influenza prevention and vaccination across Canada.

1. Improve Influenza Prevention Practices More Generally

Influenza prevention should include, but not be limited to, influenza vaccination. Other key preventive health measures that should be promoted include hand washing as much as possible; avoiding coughing directly into one's hands; avoiding touching one's face or those of others with hands that have not been washed; cleaning and disinfecting objects that many people touch, like remote control devices, phones, and door handles; maintaining a healthy diet and staying physically active to improve one's overall immunity; and, being well-rested.²⁶⁸ Additional measures should include policies to quickly identify patients who are sick and respond accordingly,

implementing restrictions on work and visiting for people who are sick, and using anti-viral medications appropriately.²⁶⁹ These policies will also help to prevent against other respiratory viruses.

The Public Health Agency of Canada encourages acute and long-term care facilities to practice respiratory hygiene, such as coughing into sleeves or using tissues and masking when appropriate, for patients or any other individuals who appear to have 'flu' or a 'flu'-like illnesses.²⁷⁰ Patients should be screened to ensure it is a not another respiratory infection (i.e. tuberculosis).²⁷¹ The Agency encourages hand hygiene – preferably using an alcohol-based rub, unless hands are soiled which then requires soap and water.²⁷² It also encourages separating patients who may have influenza from other patients.²⁷³

Policies should be strengthened to include guidelines that promote hand hygiene and proactive visiting policies for institutions. These could be as simple as ensuring that sinks and alcohol hand-rub are available at entrances, or that receptionists ask whether visitors have 'flu'-like symptoms. In addition, consent policies for patients should be streamlined to include influenza vaccination and anti-virals where medically necessary

for patients; such consents should further be obtained for the duration of residence in the facility, rather than each year.

could be a simple way to streamline messaging and practice for providers and the public, and thereby support increased vaccination rates.

2. Promote a Life-Course Vaccination Schedule that includes Older Adults

Universal vaccination schedules for children are commonly accepted as part of routine care, however, routine vaccinations are also important for adults.²⁷⁴ Establishing a vaccination schedule for older adults

Although public health agencies and governments communicate the importance of adult immunizations, there is not consistent messaging around which vaccinations should be given, or when. Governments should include influenza as an essential vaccination, as part of a life-course vaccination schedule that includes older adults.

Opportunities for Streamlining Messaging Around Adult Immunizations

As the example below from Ontario on the Ministry of Health and Long-Term Care's social media account demonstrates, there are many opportunities available to streamline messaging about vaccinations for individuals over 65, and influenza could easily have been included in the messaging below.

Adult vaccines. What to get, when.

18-64 Years

- Tetanus, Diphtheria & Pertussis (once at 24-26 Years)
- Tetanus & Diphtheria (every 10 years after dose above)

65 Years & Older

- Pneumococcal (once at 65 years)
- Shingles (once at 65-70 years)
- Tetanus & Diphtheria (every 10 years)

ontario.ca/vaccines



3. Continue Working Towards Understanding and Further Developing Influenza Vaccines

For the upcoming 2022-23 influenza season, Alberta, Manitoba, New Brunswick, Prince Edward Island, Saskatchewan and Yukon will provide high-dose influenza vaccines to all adults aged 65 years and older.^{275,275a,275b,275c,275d,275e}

Some jurisdictions will fund high-dose influenza vaccines only for certain groups of older adults (ex. long-term care residents), such as Northwest Territories, Nova Scotia, Newfoundland and Labrador and Quebec.^{275f,275g,275h,275i} There are also provinces that provide both the high-dose and adjuvanted influenza vaccines to older adults. Ontario will offer either vaccines to all adults 65 years and older,^{275j} whereas British Columbia will only offer the adjuvanted vaccines to all older adults and the high-dose vaccines to specific groups (i.e. adults 65 years and older and living in long-term care settings).^{275k,275l}

Despite the use of high-dose and adjuvanted influenza vaccines across Canada, the most recent NACI review of evidence on these types of vaccines was published back in 2018, which looks at high-dose trivalent and adjuvanted trivalent vaccines among adults 65 years and older. The review states there is insufficient or no evidence comparing adjuvanted to standard-dose and high-dose

vaccines for older adults.²⁷⁶ However, NACI is currently conducting an updated review of influenza vaccination for adults aged 65 years and older to replace their previous review.^{276a} The recent review by ACIP (2022) in United States found that enhanced vaccines consistently demonstrate a relative benefit when compared to standard-dose vaccines for adults aged 65 years and older, especially in regards to influenza-associated hospitalizations.²⁷⁷ However, ACIP also concludes that currently available studies do not indicate that any of these enhanced vaccines is more consistently beneficial than the others across multiple seasons for older adults.^{277a} More research should be conducted to guide the future of available influenza vaccinations and to optimize the use of vaccines for those aged 65 years and older in Canada.

In addition to reviewing current vaccines, researchers around the world are working diligently on testing and developing a universal influenza vaccine and this work should be encouraged.

A breakthrough in influenza vaccine technology may become available in the form of messenger RNA vaccines (mRNA) – the same technology used to produce the Pfizer and Moderna COVID-19 vaccines – or in other technological developments associated with vaccine development during the pandemic. Several companies have launched clinical trials of mRNA

influenza vaccines. The mechanisms in an mRNA vaccine teach cells how to make a protein that triggers immune responses inside our bodies.^{277b} mRNA vaccines, should they be effective against influenza, have the advantage of requiring a shorter time to produce than protein-based vaccines, which may permit later selection of viral strains for the annual vaccine, and thus a better match to infecting strains. They might also have improved efficacy if multiple strains of A(H3N2) viruses can be included, or if RNA for other antigens (such as neuraminidase) can be included.^{277c}

4. Include Influenza Vaccination in Clinical Guidelines for Older Adults and for Treating Chronic Conditions

There is growing evidence of the interaction between influenza, complications of chronic conditions and the increasing burden of these associations. Influenza vaccination, as a result, should be included in clinical guidelines for the management of older adults and people living with chronic conditions.

Influenza vaccination should also be part of clinical guidelines for individuals aged 65 years and older. Influenza vaccination has been shown to reduce

hospitalizations due to influenza.²⁷⁸

Influenza vaccination should be included in diabetes clinical guidelines. Vaccination was found to reduce hospital admissions for cardiovascular complications and pneumonia or influenza among people with diabetes.²⁷⁹ Vaccination in people with obesity and also those with type 2 diabetes is an important part of secondary prevention efforts.^{280,281} Vaccination should also be an important part of cardiovascular disease clinical guidelines.

It is recommended that individuals with cardiovascular disease be vaccinated to prevent flu-related hospitalizations, reduce major adverse cardiovascular events, acute heart failure, and decrease mortality.²⁸²

Influenza vaccination has been found to be associated with a decreased risk of a major cardiovascular event within one year.^{282a}

Some research suggests that the efficacy of influenza vaccines to protect against heart attacks may range from 15-45%.^{282b}

Due to the relationship between influenza and respiratory conditions, it should also be an important part of respiratory disease clinical guidelines including asthma, COPD, and other lung-related conditions.²⁸³

5. Provide Clinician Education and Support for Primary Care Providers and Pharmacists to Deliver Vaccinations

Annual influenza vaccination should be a standard of care for older adults and should be prioritized as such for older adults in primary care²⁸⁴ and pharmacy settings. It is especially important for both the public and health care providers to realize how important vaccinations are in preventing morbidity and mortality due to complications associated with infections such as influenza.²⁸⁵

More should be done to assist primary care providers and pharmacists to ensure their patients can be vaccinated, including addressing barriers related to knowledge, skill, attitudes, policy, procedures and funding that may exist in primary care and pharmacy settings.

6. Universal Funding for Influenza Vaccinations Needs to be In Place to Ensure it is Accessible to all Canadians

Provinces that have universal funding for influenza vaccines have achieved higher coverage rates.^{286,287} In addition, studies comparing income and immunization have

found that publicly funded programs result in less differential in vaccination rates between higher and lower income persons, with one study finding that those on lower-incomes actually had higher rates of vaccination.²⁸⁸ The one remaining province, Quebec, should consider extending their policies to include universal funding for influenza vaccination.

7. Highly Recommend the Influenza Vaccine for all Health Care Providers and Mandate it for Providers and Residents in Long-Term Care Homes

Whereas several other vaccinations are requirements for employment depending on the hospital/jurisdiction (i.e. measles, mumps, rubella; varicella²⁸⁹), the influenza vaccine has remained optional.

Although different sectors and jurisdictions have considered mandating it, there remains considerable resistance from health care providers towards mandatory influenza vaccination and no province has yet required this.^{290,291}

The arguments against mandatory vaccinations policies in Canada have rested on employment law, the human rights code, and the Canadian Charter of Rights and

Mandatory Influenza Vaccination for Health Care workers – examples from the United States

The United States has had various jurisdictions attempt to make influenza vaccination a condition of employment for health care workers. Studies suggest that although these policies lead to increases in vaccination rates, there is much less evidence about the influence these policies have on the clinical outcomes and influenza infection rates among both health care workers and patients.²⁹⁹

Virginia Mason Hospital, an acute care hospital in Seattle, Washington, became the first in the state to make influenza vaccination mandatory in 2004.³⁰⁰ Before the requirement, only 54% of workers were vaccinated, and after implementation of this policy it increased to 98.9%.³⁰¹ The Washington State Nurses Association filed a grievance stressing that vaccination should be a choice, not mandated.³⁰² The court ruled in favour of the nurses.³⁰³

In 2009, New York State required that all health care professionals receive an influenza vaccination.³⁰⁴ However, this was recently overridden to become a 'vaccinate-or-mask' policy.³⁰⁵

BJC HealthCare, a Midwestern health care organization based in St. Louis, Missouri, with approximately 26,000 employees decided in 2008 to mandate influenza vaccination as a condition of employment with exemptions on medical or religious grounds.³⁰⁶ With this policy, they reached

a 98.4% vaccination rate (1.24% were medically exempted and 0.35% were religiously exempted from receiving the vaccine).³⁰⁷

The Hospital Corporation of America (HCA), based in Tennessee, adopted a mandatory vaccination policy for the 2009-10 influenza season.³⁰⁸ This was implemented across 163 hospitals, 112 outpatient clinics, and 368 medical practices, across 20 states.³⁰⁹ This policy required any employee who would not be vaccinated to either be reassigned to roles without patient contact or to wear surgical masks.³¹⁰ Along with this policy they implemented non-vaccine strategies such as cough etiquette, hand hygiene, and stressing the importance of staying home if ill.³¹¹ Prior to implementing this policy, the coverage rates varied from 20% to a high of 74% (with the average being 58%).³¹² After implementing the policy, 96% of staff was vaccinated.³¹³

In the United States, the Centers for Disease Control and Prevention (CDC), the Advisory Committee on Immunization Practices (ACIP), and the Healthcare Infection Control Practices Advisory Committee, all recommend that workers be vaccinated against influenza annually.³¹⁴ A survey by the CDC found that higher vaccination rates among health care providers was linked to employer requirements, vaccination promotion, and access to vaccination at work, at no cost.³¹⁵

Freedoms.²⁹² Those in favour of mandatory vaccination, for example Ontario's Provincial Infectious Disease Advisory Committee,²⁹³ are challenged by the fact that the influenza vaccine varies in its effectiveness, making it difficult to mandate in comparison with other vaccines with consistently high effectiveness. From a human rights perspective, opponents have argued that mandatory influenza vaccinations do not meet human rights conditions by allowing individuals to be exempt for medical or religious beliefs.²⁹⁴ In terms of the Canadian Charter of Rights and Freedoms, there have been arguments that these types of policies violate the right to liberty and security of the person, and the right to freedom of expression.²⁹⁵

However, when the influenza prevention policy in British Columbia was brought to court, the arbitrator concluded that it was a reasonable expression of the employer's rights and did not violate the Canadian Charter of Rights and Freedoms.²⁹⁶

In addition to being contested on grounds of individual freedom, mandatory vaccination policies have also been an issue in collective agreements between employers and labour unions.²⁹⁷ Most of the cases that have fought these policies involve unionized employees filing grievances saying that they violate integrity, autonomy, and privacy.²⁹⁸

In long-term care settings, mandating influenza vaccination for providers and residents should be considered. The National Advisory Committee on Immunization (NACI) recommends that residents of long-term care homes and other longer-term care facilities receive the annual influenza vaccine.³¹⁶ Studies have found that as vaccination rates (of both staff and residents) increase in long-term care homes, the risk of influenza outbreaks decrease.³¹⁷ Residents in many long-term care homes are often vaccinated annually against influenza in order to control the risk for outbreaks and illness among residents, however, there may be sufficient evidence to support the mandatory influenza vaccination of HCPs in long-term care homes.

In the context of the COVID-19 pandemic, continuously low staff vaccination rates led several provinces to introduce vaccination mandates for long-term care staff including British Columbia, Alberta, Manitoba, Quebec, and Nova Scotia. While Ontario and Prince Edward Island have adopted a 'shot or test' approach, which requires that long-term care staff either be fully vaccinated or take a COVID-19 test before every working day.^{298a, 298b, 298c, 298d, 298e, 298f, 298g,}

^{298h}

8. Develop Better and Mandatory Reporting of Influenza Vaccination Rates

There is no central agency or report that documents influenza vaccination rates in Canada and there is no standard definition for how to report these rates. Therefore, reporting should be mandatory and should be clearly defined so that rates can be reported, monitored and improved upon across Canada. Public health bodies can take the lead in defining how vaccination rates should be measured and reported.³¹⁸ They should also assist in developing guidelines for how to put in place monitoring systems and repositories to track progress.

The WHO European Region similarly recommended that national influenza vaccination policies and programs work to improve monitoring of vaccination rates in target groups including older adults, persons living with chronic conditions, pregnant women, and health care providers.³¹⁹ They suggest collecting uptake on an annual basis at the end of each flu season. This would allow for better monitoring of interventions and determining the effectiveness of seasonal influenza programs.

Currently, Canada's national surveillance system, FluWatch, monitors influenza and influenza-like illnesses across Canada but

does not report on influenza vaccination rates.³²⁰ They post reports every week with information about the viruses that are currently making their way across the country.³²¹ This information is helpful as it can detect outbreaks, provide up-to-date information about influenza across the country, monitor current strains and provide information to the WHO to support future vaccine production and development.³²² However, the reports are

released weekly and each report does not necessarily have data from every province and territory and the data collected and reported differs in different jurisdictions. For example, all provinces and territories except Nunavut report flu outbreaks in long-term care facilities and all except Nunavut and Quebec report hospital outbreaks.³²³ However, the definition and reporting of outbreaks in different facilities is different between jurisdictions.³²⁴ Also, certain regions (British Columbia, Nunavut, and Quebec) do not report hospitalizations, and only those requiring intensive care are reported by Saskatchewan.³²⁵

Unlike previous influenza vaccination efforts, COVID-19 vaccination coverage has been accurately monitored throughout the vaccine rollout. To book a COVID-19 vaccination appointment, most provinces require individuals to pre-register online, by telephone, or through their primary care

provider. Such a comprehensive registration system has enabled older adults to be easily identified and booked in for their vaccination appointments in a timely manner. These registries could be used to target hard-to-reach older adults. The digital health infrastructure currently being implemented across several provinces, to enable vaccine passports, should be adopted to further facilitate vaccine uptake through patient reminders, education, and appointment booking.^{325a}

Since 2001, the Public Health Agency of Canada has monitored vaccination rates using the adult National Immunization Coverage Survey (aNICS). It has been conducted 6 times between 2001 and 2016.^{326,327} This survey is conducted via telephone interviews with a small sample (3,005 individuals) and they categorize the individuals based on their age and chronic conditions.³²⁸

9. Co-administer Influenza Vaccines with COVID-19 Vaccines

On September 28, 2021, NACI recommended that COVID-19 vaccines could be delivered in conjunction with other vaccines. This means that, COVID-19 vaccines may be given at the same time, or any time before or after, other immunizations, including live, non-live, adjuvanted, and non-adjuvanted vaccines.

The simultaneous administration of COVID-19 vaccines with other vaccines can facilitate the rollout of the 2021-22 and future influenza campaigns.³²⁹

Future vaccination appointments scheduled for older adults who have yet to complete a full COVID-19 vaccine series or who are getting a booster shot should also offer a seasonal influenza vaccine. The COVID-19 vaccine rollout demonstrated that older adults are very willing to get vaccinated when there is increased awareness surrounding the risks of disease and importance of vaccination. Offering influenza vaccines at the same time as COVID-19 vaccines would provide a clear path to improving influenza vaccine coverage in Canada.

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