


# A future-forward influenza immunization model of care for high-risk patients in pharmacies: A Canadian consensus

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## Introduction

Influenza is one of the most common respiratory illnesses in the world, hospitalizing about 12,200 Canadians and contributing to approximately 3500 Canadian deaths annually.<sup>1</sup> Influenza epidemics (“flu seasons”) typically occur each year in the northern hemisphere from November to April, with the recent exceptions of the late 2019–2020 and 2020–2021 seasons, which were muted by precautionary measures against SARS-CoV-2.<sup>2</sup> Each flu season is marked by increased infections of influenza strains A and/or B.<sup>1</sup> Influenza vaccines are the most effective strategy to protect against infection; they protect against 2 strains of influenza A (H1N1 and H3N2) and 1 or both strains of influenza B (trivalent and quadrivalent vaccines, respectively).<sup>1,3</sup> Although data show a 40% to 60% reduction in illness with flu vaccination, by either preventing illness or reducing illness severity,<sup>4</sup> 39% of Canadians do not believe the flu vaccine will protect against the flu.<sup>5</sup> Nonetheless, the National Advisory Committee on Immunization (NACI) recommends influenza immunization for all Canadians over 6 months of age, especially individuals with high-risk status.<sup>6</sup>

The initiation and expansion of pharmacy-based influenza vaccination services in Canada have increased the accessibility of influenza immunization for all Canadians, including those with high-risk status.<sup>7</sup> Vaccination rates have increased since the introduction of pharmacy-based immunization,<sup>7</sup> especially among children<sup>8</sup> and adults older than 65 years.<sup>9</sup> From

2007 to 2014, provinces that allowed pharmacist-based influenza immunization experienced higher vaccination rates than provinces that did not allow pharmacists to vaccinate; universal funding for pharmacist-based influenza immunization further increased vaccination rates.<sup>7</sup> The 2022–2023 flu season found most Canadians vaccinated in pharmacies (52%), more than triple the number who were vaccinated in physician offices (17%).<sup>5</sup> To further support the benefits of pharmacy-based immunization, most Canadians live within 5 km of a community pharmacy;<sup>10</sup> community pharmacies tend to have longer hours of operation and shorter wait times and often do not require appointments or can schedule appointments sooner compared with other vaccination locations.<sup>11</sup>

The convenience of influenza vaccination available at community pharmacies increases the likelihood of receiving a vaccine, which can be especially important for high-risk patients who may experience more serious complications if they contract influenza. The NACI list of high-risk populations, for whom influenza vaccination is particularly important, includes, but is not limited to, children (6–59 months), individuals with chronic health conditions, pregnant individuals, residents of nursing homes or other chronic care facilities, adults 65 years or older, Indigenous peoples, health care workers and childcare workers.<sup>6</sup> Furthermore, despite being knowledgeable about widely publicized risk factors, some patients may not understand that they fit into a high-risk population.

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As highly accessible health care professionals with a unique expertise in medication management, pharmacists are well-positioned to proactively identify individuals at risk and facilitate vaccination.

The objective of this work is to provide expert guidance and create a practical, pharmacy-based, real-world model of care for community pharmacists to confidently identify, assess and educate high-risk patients on the benefits of immunization and risk of influenza-related complications, and to facilitate operationalizing influenza vaccination for high-risk patients.

## Methods

An expert team of clinician subject matter experts (SMEs) from across Canada was assembled to develop a consensus-based guidance for identifying and assessing high-risk patients for vaccination against influenza within the context of a community pharmacy environment. The multidisciplinary SME team consisted of 12 pharmacists, 1 pediatrician and 1 general practitioner physician. Each member of the expert faculty was recruited based on their clinical experience with managing high-risk patient populations and/or immunizing high-risk patients against influenza, with the aim of representing community, academic and institutional pharmacy practice environments across Canada as well as pediatrics and family medicine. Consensus recommendations were determined using a modified Delphi process, with a threshold of  $\geq 75\%$  agreement to designate a consensus finding. Ethics approval was not sought, as no animal or human subjects were used.

Each SME participated in the development of consensus statements, providing insight into key areas of interest. After reviewing and revising a first draft of statements, each team member voted on how much they agreed or disagreed with each statement; at least 75% of team members had to agree or strongly agree with a statement for it to reach consensus. Each level of agreement was associated with a numerical value: strongly disagree = 0, disagree = 1, somewhat disagree = 2, neither agree nor disagree = 3, somewhat agree = 4, agree = 5, strongly agree = 6. Overall strength of agreement was determined by the average level of agreement, from lowest possible average agreement (3.9) to highest possible (6.0). Within that range, weak agreement was defined as an average score of 3.9 to 4.9, moderate agreement as 5.0 to 5.4 and strong agreement as 5.5 to 6.0. The first questionnaire consisted of 53 statements, separated into 4 domains. Specifically, there were 5 proactivity statements, 15 screening statements, 4 statements on assistance with obtaining vaccination and 29 pharmacy workflow statements.

After the first round of voting, a synchronous virtual meeting was held to review, revise and revote on any statements that were near consensus ( $\geq 75\%$  somewhat agree, agree or strongly agree). Twelve team members attended the meeting and voted using polls through Zoom Video Communications (San Jose, California, USA); 2 team members were unable to attend and subsequently watched a recording of the meeting, provided any

additional insight into the discussions and voted using the online survey software Qualtrics XM (Seattle, Washington, USA). Ten statements were discussed during the meeting, including 1 proactivity statement, 2 statements on assistance with obtaining vaccination and 7 pharmacy workflow statements. No new questions were added to the second round of voting.

The round 1 surveys were produced using Qualtrics XM software. Round 2 voting was performed using Zoom polls (12 participants) and Qualtrics XM software (2 participants: M.K. and P.R.). Results from both rounds of voting were analyzed using Microsoft Excel (Redmond, Washington, USA).

## Results

Study participants identified 4 domains of interest: proactivity, patient screening, assistance with obtaining vaccination and pharmacy workflow. In round 1 of the modified Delphi process, 64% (34/53) of statements reached consensus, including 80% (4/5) of proactivity statements, 73% (11/15) of patient screening statements, 50% (2/4) of assistance with obtaining vaccination statements and 59% (17/29) of pharmacy workflow statements. In round 2, 80% of all statements reached consensus. This included 100% (1/1) of proactivity statements, 100% (2/2) of assistance with obtaining vaccination statements and 71% (5/7) of pharmacy workflow statements (Table 1). Round 1 statements and their voting results can be found in Appendix 1, in Supplemental Materials; round 2 statements and results can be found in Appendix 2.

### *Proactivity*

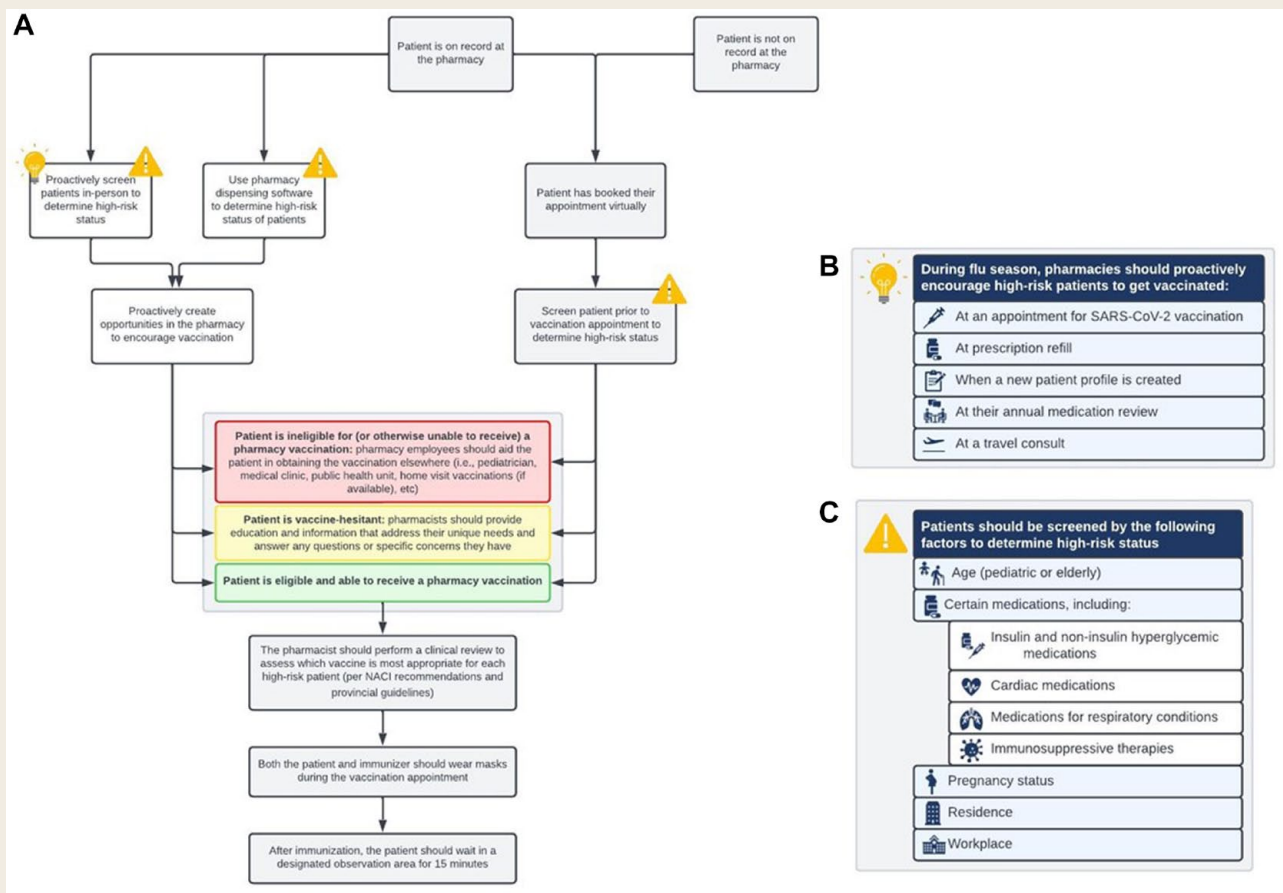
Guidance surrounding pharmacy proactivity was discussed and agreement was found on a number of statements (Table 2). Consensus voting found that pharmacies should leverage data from their respective pharmacy dispensing software and proactively identify and contact high-risk patients based on medication profiles to recommend vaccination against influenza (Figure 1A). Pharmacists should also proactively screen patients in person to identify individuals with high-risk status; pharmacists should subsequently identify opportunities to recommend vaccination, including at a prescription refill, when a new patient profile is created, as part of a medication review or analogous service and at a travel vaccine consult, among other intervention opportunities (Figure 1B). If eligible to be vaccinated against influenza at a pharmacy, patients should be encouraged to receive the influenza vaccine concurrently at appointments for SARS-CoV-2 vaccinations, when appropriate. Further, high-risk patients seeking influenza vaccinations should be encouraged to receive other vaccinations, if eligible, at the same appointment. The pharmacist should inform affected high-risk patients who book or present for their appointment whether the influenza vaccines specifically recommended for them are not available at the pharmacy; the pharmacist should also assist the patient as to where to receive the appropriate vaccine as needed.

**TABLE 1** Summary of question development and consensus analysis in rounds 1 and 2

	Total	Proactivity	Screening	Assistance with obtaining vaccination	Pharmacy workflow
Questions posed in round 1	53	5	15	4	29
Questions that reached consensus in round 1	64%	80%	73%	50%	59%
Total questions posed in round 2	10	1	0	2	7
Round 1 questions modified or reworded for round 2	6	1	0	2	3
Round 1 questions clarified for round 2	4	0	0	0	4
Questions that reached consensus in round 2	80%	100%	NA	100%	71%

NA, not applicable.

**FIGURE 1** Best practices for influenza immunization of high-risk patients in Canadian community pharmacies



(A) Pharmacy workflow for determining high-risk status of patients and subsequent influenza immunization. (B) Strategies to proactively encourage high-risk patients to immunize against influenza. (C) Factors by which patients should be screened to determine high-risk status.

*Patient screening*

Consensus was found on which factors should be used as clinical indicators of possible high-risk status to screen patients, in congruence with NACI guidance but with a lens on translating

this into practical implementation nuanced for a pharmacy environment (Table 3). Patients should be screened by age (pediatric age or elderly); pregnancy status; residency (e.g., nursing home, independent senior living); workplace (e.g.,

**TABLE 2** Summary of expert recommendations on pharmacy proactivity

Proactivity recommendations
We recommend that pharmacies screen patients for high-risk status based on the following factors: age (pediatric or elderly age), certain medications (antihyperglycemic medications, cardiac medications, medications for respiratory conditions, immunosuppressive therapies), pregnancy status, residency (long-term care, senior living facility, etc.), workplace (health care field).
We recommend a screening questionnaire to help identify high-risk patients who are not a patient on record at the pharmacy and to determine whether the patient is interested in being vaccinated against any other infectious diseases.
We recommend screening patients for contraindications to all influenza vaccines, per NACI or provincial/territorial guidelines.

NACI, National Advisory Committee on Immunization.

**TABLE 3** Summary of expert recommendations on patient screening

Patient screening recommendations
We recommend extracting information, including medications used to manage high-risk conditions, from pharmacy dispensing software or screening patients to determine high-risk status.
We recommend proactively contacting high-risk patients or creating opportunities (e.g., at an appointment for SARS-CoV-2 vaccination, at prescription refill, when a new patient profile is created, at their annual medication review, at a travel consult) within a community pharmacy environment to recommend vaccination against influenza.
Coadministration: We recommend encouraging patients to receive influenza vaccination during appointments for SARS-CoV-2 immunization and vice versa. A patient who is eligible for vaccinations against any other infections should be encouraged to receive those immunizations at the same appointment.
If the pharmacy does not have an appropriate vaccine for a high-risk patient, we recommend closing the loop and helping the patient find where to receive the appropriate influenza vaccine.

health care setting, child care setting) and certain medications, including medications for diabetes (e.g., insulin and noninsulin antihyperglycemic medications), cardiac medications (e.g., antiarrhythmics), medications for respiratory conditions (e.g., inhaled corticosteroids) and immunosuppressive therapies (e.g., antineoplastic agents, biologics) (Figure 1C). The pharmacy screening questionnaire should inquire whether the patient is interested in receiving any other vaccines at their appointment and should contain questions that help identify high-risk patients, as not everyone presenting to be vaccinated in a pharmacy will be a patient on record with history at that pharmacy. Pharmacists should also screen for contraindications to all influenza vaccines, including live attenuated influenza vaccine (LAIV), as per NACI or provincial/territorial guidelines, prior to appointment booking (Figure 1A).<sup>6</sup> Pharmacy screening questionnaires are freely available for use from health organizations such as medSask, a nonprofit organization sponsored by Saskatchewan Health.<sup>12</sup>

#### *Assistance with obtaining vaccination*

Guidance surrounding the pharmacist's role in helping patients obtain vaccination was discussed (Figure 1A) (Table 4). If a patient is not eligible for vaccination at a pharmacy (e.g., due to

age limit cut-offs outside of the scope of the pharmacy immunizer), the pharmacist should use this opportunity to aid the patient in obtaining the vaccine elsewhere (e.g., providing phone numbers or addresses for alternate medical clinics or public health unit linkage). Further, pharmacists should provide education and information to high-risk vaccine-hesitant patients who seek to address their unique needs (e.g., understanding perceived or actual barriers, contextualizing why they are high-risk and what happens if they contract influenza, discussing efficacy and safety of influenza vaccines) and answer any questions or specific concerns they have. This includes incorporating techniques and messaging that target the underlying determinants of vaccine hesitancy.<sup>13</sup> Parents and caregivers of children presenting at the pharmacy should be educated about pediatric vaccine eligibility and provided information on where to obtain vaccination. Finally, when interacting with homebound high-risk patients or their caregivers, pharmacies should provide information on how to access home visit vaccinations, where available.

#### *Pharmacy workflow*

There was robust discussion on the optimal workflow for high-risk influenza immunization in a community pharmacy setting (Figure 1A) (Table 5). It is preferable for immunization

**TABLE 4** Summary of expert recommendations on assistance with obtaining vaccination

<b>Assistance with obtaining vaccination recommendations</b>
We recommend that the pharmacy aid high-risk patients in obtaining the influenza vaccine elsewhere if they are not eligible to be vaccinated in the pharmacy.
We recommend that pharmacists personalize and contextualize their education to and communication to high-risk vaccine-hesitant patients on the risks associated with choosing not to vaccinate.
We recommend educating parents and caregivers of pediatric patients who present for vaccination on their eligibility, and providing information on where to obtain vaccination.
We recommend informing homebound high-risk patients (or their caregivers) on how to access home visit vaccinations, if available.

**TABLE 5** Summary of expert recommendations on pharmacy workflow

<b>Pharmacy workflow recommendations</b>
We recommend that influenza immunization appointments be booked virtually, through an online booking system; households looking to book together should be offered consecutive time slots.
We recommend that each pharmacy schedule appointments based on the pharmacy's resources; the ideal time between appointments may be different for each pharmacy.
We recommend that pharmacists assess which vaccine is most appropriate for each high-risk patient (per NACI or provincial/territorial guidelines and provincial/territorial eligibility criteria) and that a postvaccination observation area be designated to monitor for adverse reactions.
We recommend that masks be worn by both patients and immunizers during vaccination appointments.
We recommend that pharmacies personalize their optimal workflow, based on individual pharmacy resources, as well as NACI and provincial/territorial guidelines.

NACI, National Advisory Committee on Immunization.

appointments to be scheduled using an online/virtual booking system. Each pharmacy should determine its own ideal time interval between vaccine appointments and should book appointments accordingly to ensure safety in alignment with local pharmacy resources and unique practice-related constraints (e.g., number of staff and prescription volume). When booking together, households seeking immunizations should be accommodated by scheduling consecutive time slots. A postvaccination observation area should be designated, either inside or outside the pharmacy. To ensure optimal protection and prevent adverse reactions, pharmacists should perform a clinical review to assess which vaccine is most appropriate for each high-risk patient, as per NACI or provincial/territorial guideline recommendations, patient-specific contraindications and provincial/territorial funding criteria. For safety purposes, both patients and pharmacy immunizers should wear masks during vaccination appointments.

In addition to the pharmacist being able to perform tasks listed here, pharmacy students, interns, technicians and assistants should be used to their fullest scope to maximize pharmacy resources. Proactive patient screening to identify

potential high-risk patients may be performed by pharmacy interns and students, under supervision. Contacting high-risk patients to inform them that the pharmacist has identified them as high-risk and to offer an appointment may be performed by pharmacy students, interns, technicians and assistants. Similarly, patient intake at the time of a vaccination appointment may be performed by pharmacy students, interns, technicians and assistants. Pharmacy students, interns and injection-authorized registered technicians may perform vaccine administration, as permitted by jurisdiction-specific legislation. Finally, pharmacy interns and students may perform the patient follow-up (15-minute observation period). It was noted that the role of pharmacy technicians and assistants is technical or clerical in nature and any tasks for which they are responsible should not be clinically inclined (e.g., patient monitoring, patient education).

### Discussion

This multidisciplinary consensus research summarizes a practical model of care that can be implemented into a real-world community pharmacy practice setting in Canada for efficiently

identifying and immunizing high-risk patients against influenza while leveraging the specific expertise of the pharmacist. To our knowledge, this is the first such expert-produced guideline to be reported in this context. This article provides key guidance to community pharmacy professionals, who play an essential role in immunization against influenza for high-risk patients, and fills crucial knowledge gaps between real-world needs and clinical practice (Tables 2–5). Identifying high-risk patients (by screening for age, certain medications as indicators of comorbidities, pregnancy, type of residence and high-risk workplace) and proactively encouraging high-risk patients to get vaccinated (at an appointment for vaccination against SARS-CoV-2 or other infections, at prescription refill, when a new patient profile is created, at a medication review or at a travel consult) will improve vaccination rates and reduce influenza-mediated complications in this specific population.

Canada's National Immunization Strategy has an influenza vaccination target of 80% for all individuals in Canada; however, even high-risk individuals in Canada are far from reaching these targets. Older adults ( $\geq 65$  years) have the highest vaccination rate, with almost 75% vaccinated, whereas high-risk adults (aged 18–64 years) have a vaccination rate of less than 45%.<sup>5</sup> The most common reason found for not getting vaccinated against influenza was “not getting around to it” (e.g., too busy, lack of time).<sup>5</sup> Informing or reminding individuals of their high-risk status and the importance of immunization against influenza can contribute to increased vaccination rates in high-risk patients.<sup>14</sup>

NACI provides guidelines surrounding which vaccines should be provided to certain age groups and patients with immune-compromising conditions; guidelines for other high-risk patients are lacking.<sup>6</sup> Evidence suggests that, when possible and in alignment with NACI and provincial/territorial guidelines, vaccines with higher immunogenicity should be considered for patients with high-risk status.<sup>6</sup> High-risk status may be determined by using pharmacy dispensing software to run a query for medications that correlate to a specific disease, as medications can be used as a surrogate indicator of disease state. For instance, searching the pharmacy database for patients who are prescribed metformin or insulin will produce a list of patients with a high relative likelihood of having diabetes. Similar queries could be applied to medications that are used to manage the high-risk conditions listed in the NACI guidelines,<sup>6</sup> including cardiac medications, medications for respiratory conditions and immunosuppressive therapies. Across Canada, community pharmacies have more access to patient data than ever before; using this search strategy, in addition to other local patient profile notes or scanned patient documentation, to streamline the identification of patients using medications indicative of high-risk status may optimize the influenza vaccination process.

Offering patients additional immunizations against other diseases (if eligible and clinically appropriate) further optimizes the influenza vaccination appointment by adding

protection against other vaccine-preventable diseases. Patients looking to be vaccinated against influenza are likely to consider vaccines and be amenable to accepting other vaccine recommendations and vice versa. More than 20% of high-risk Canadian adults (18–64 years) stated that the COVID-19 pandemic increased the likelihood they would get immunized against influenza; similar values were found in adults over 65 years of age, with about 22% of individuals noting an increased likelihood of influenza immunization.<sup>2</sup> In fact, there is a high correlation between SARS-CoV-2 and influenza vaccinations; 70% of individuals who received at least 1 booster dose against SARS-CoV-2 also received the influenza vaccine.<sup>2</sup> Guidance on administering influenza vaccine in combination with other vaccines can be found in the NACI guidelines.<sup>6</sup>

There is a widespread belief that receiving the flu vaccine may cause an influenza infection, with 40% of Canadians being under this impression.<sup>5</sup> In fact, a high proportion of Canadians believe that children and adults should get infection-induced immunity against the flu by being exposed to the virus and receiving natural immunity.<sup>5</sup> Educating high-risk patients on the realities of influenza immunization with personalized messaging can dispel these untruths, help individuals appreciate the need for immunization and make Canadians feel safer about receiving their immunization. Targeting high-risk patients for immunization education may increase vaccination uptake, especially among the elderly.<sup>15</sup> Further, it may be beneficial to tailor and contextualize the educational content around the patient and their high-risk status; although low-risk individuals tend to immunize for social benefit, high-risk patients tend to be motivated by self-benefit.<sup>16</sup> In fact, high-risk patients provided with an educational brochure were more likely to get vaccinated than high-risk patients incentivized with a lottery-type stimulus.<sup>17</sup> When encouraging parents to bring their child for vaccination, a reminder/recall system (e.g., verbal and mailed reminders, electronic alerts, text message alerts) may be of use;<sup>18</sup> however, educating parents on the benefits of influenza immunization will likely provide a larger positive effect.<sup>19</sup> Further, vaccine-hesitant parents are likely to respond positively if vaccination is presented as a societal norm or default, they are informed about potential side effects, they trust the pharmacy staff member providing the vaccine, there is a focus on protection of their child and community, and any pain associated with vaccination is addressed.<sup>13</sup> Similar methods of education, reminders, social and behavioural intervention and persuasion should be considered when addressing vaccine-hesitant high-risk adult patients.<sup>20,21</sup> Vaccine hesitancy is complex and multifactorial and is shaped by individuals' attitudes and emotions toward vaccinations and societal factors that contribute to vaccine acceptance; as such, addressing immunization should be individualized for each patient.

Educating high-risk patients and their caregiver(s) on the safety of exposure to influenza through a vaccine is highly important. When an individual is naturally exposed to the

influenza virus, they may develop a greater immune response and symptoms compared with vaccine exposure; however, vaccines allow better control of the viral load and exposure to the patient, reducing the risk of serious complications, hospitalization and death.<sup>4</sup> This comparison can be indirectly observed from data comparing trivalent influenza vaccines (TIVs) and quadrivalent influenza vaccines (QIVs). Because QIVs immunize against 2 strains of influenza B, these vaccines are capable of preventing a B-mismatched season, whereas the TIV only protects against a nondominant B strain (which may occur in 50% of flu seasons).<sup>6</sup> Recent data indicate possible extinction of an influenza B strain (B/Yamagata) which, if confirmed, would prevent any future B-mismatched seasons.<sup>22</sup> TIVs slated for deployment during the 2023–2024 flu season were anticipated to incorporate the alternative B lineage, Victoria, and were expected to yield comparable levels of protection as QIVs.<sup>23</sup>

Despite immunization being a relatively recent expansion to pharmacists' scope of practice, pharmacies are now the leading immunizers against influenza in Canada.<sup>5</sup> In 2009, British Columbia became the first province to allow pharmacists to immunize;<sup>24</sup> as of November 2022, all regions in Canada had authorized pharmacists to immunize against influenza, with the exception of the Northwest Territories and Nunavut.<sup>25</sup> Recently, pharmacy technicians have expanded their scope of practice as well, with certain provinces allowing injection-trained pharmacy technicians to administer influenza vaccinations.<sup>26,27</sup> Creating consistency in scope across the country would create a more normalized perception of a pharmacist vaccination program and might lead to further uptake of immunizations.

Influenza immunization is publicly funded in all provinces and territories in Canada for high-risk populations.<sup>28</sup> However, each province and territory has different specifications and requirements for administering flu vaccines, which can

lead to some confusion when trying to follow NACI guidelines.<sup>6</sup> For example, the minimum age for pharmacy immunization varies significantly between provinces; Nova Scotia pharmacists can vaccinate patients 6 months and up,<sup>29</sup> whereas the other regions have a minimum of 2 years of age (Manitoba, Ontario, Quebec, New Brunswick), 4 years (British Columbia) or 5 years (Alberta, Newfoundland, Prince Edward Island, Saskatchewan, Yukon).<sup>30</sup> Further, each region denotes which vaccines will be publicly funded for the general population as well as for high-risk populations; these publicly available vaccines do not always align with NACI guidelines. As such, NACI or local provincial/territorial guidelines should be followed when possible; however, each pharmacy in each province or territory should adapt its workflow to follow approved legislation in their region and to optimize safety and efficiency.

In summary, our multidisciplinary panel of clinician SMEs used a modified Delphi process to develop a best practices pharmacy model of care that can be implemented in a Canadian community pharmacy practice environment for efficiently screening and administering influenza vaccinations for high-risk patients. The practical guidance established from this modified Delphi consensus will equip the Canadian pharmacist with the necessary confidence and skills to screen, identify and implement influenza immunizations for high-risk populations. There may be value in normalizing the perception of the pharmacist vaccination program through a more consistent scope of practice across the country and more consistent age of immunization. Empowering Canada's more than 42,000 community pharmacists to identify, educate and contextualize the benefits of influenza immunization and subsequently administer influenza vaccines to high-risk individuals is expected to help Canada achieve its immunization update target and improve the well-being of Canadians at high risk of influenza or its complications. ■

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**Availability of Data and Material:** The authors confirm that the data supporting the findings of this study are available within the article and/or its supplementary materials.

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