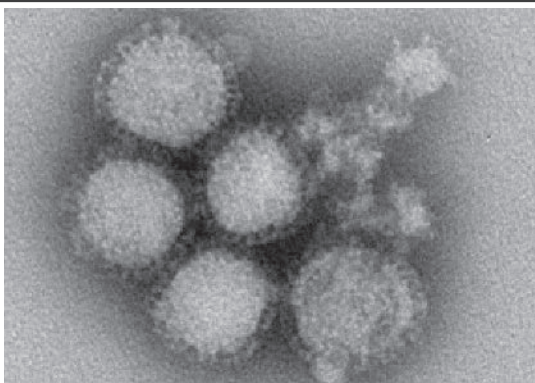


SEASONAL INFLUENZA VACCINE COVERAGE IN CANADA, 2017–2018



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This report summarizes the results from the national 2017–2018 Seasonal Influenza Vaccination Coverage Survey. Respondents were questioned regarding their influenza vaccine uptake for the 2017–2018 season, reasons for vaccination or non-vaccination, knowledge, attitudes, and beliefs (KAB) regarding vaccination, and select demographic information. Results are described for all adults and for two sub-groups at increased risk for complications from influenza: adults aged 18–64 years with a chronic medical condition (CMC) and seniors aged 65 years and older.

Key Findings

- Overall, vaccine coverage among adults (38.3%) was similar to the previous two seasons.
- More females (41.3%) than males (35.2%) received the vaccine.
- Among high risk groups, coverage for seniors aged 65 years and older (70.7%) and adults aged 18–64 years with CMC (39.4%) remained below the national coverage goals of 80%.
- The majority of adults received their influenza vaccine in October or November (79.0%).
- The main vaccination places were pharmacies (34.2%) or doctor's offices (30.4%).
- The most commonly reported reason for receiving the vaccine was to prevent infection or to avoid getting sick (38.3%), whereas the most common reason for non-vaccination was the perception that the vaccine was not needed or not necessary (22.4%).
- Among adults aged 18–64 without CMC, encountering multiple (≥ 3) sources of messaging promoting the influenza vaccine was significantly associated with influenza vaccine uptake.

INTRODUCTION

Influenza, also known as the flu, is a significant cause of morbidity and mortality in Canada, averaging 12,200 hospitalizations and 3,500 deaths in Canada each year (1). Though the influenza virus circulates in Canada year-round, most cases within the northern hemisphere occur between November and April.

The influenza vaccine remains the best way to prevent influenza and its potentially serious complications. Vaccination against influenza protects oneself and others by reducing the severity of the disease and likelihood of transmission (2–4). It is important to get the influenza vaccine every year because the influenza virus is constantly changing, and a new vaccine is developed for each influenza season based on the dominant circulating virus strain(s) (5). The best time to receive the influenza vaccine is between October and December, before the virus begins spreading in the community.

The National Advisory Committee on Immunization (NACI) recommends that all individuals aged six months and older receive the annual seasonal influenza vaccine, especially for populations at increased risk for influenza-related complications including:

- Children aged 6–59 months;
- People with certain chronic medical conditions (CMC);
- Seniors aged 65 years and older; and
- Pregnant women (1).

Slightly higher than the World Health Organization (WHO) coverage goals of 75%, the Canadian national influenza vaccination coverage goals for seniors aged 65 and older and adults aged 18–64 years with CMC were set at 80% in 2017 (6,7). Measuring influenza vaccination coverage is needed to track Canada's progress towards its coverage goals as well as to identify under-vaccinated subpopulations.

In addition to measuring influenza vaccination coverage, it is important to understand people's KAB regarding influenza vaccination. Any element of KAB regarding influenza vaccination could serve as a barrier or facilitator to vaccination (8). Understanding these elements can help inform vaccination promotion efforts in order to increase uptake within the Canadian population.

This report summarizes results from the 2017–2018 Seasonal Influenza Vaccination Coverage Survey to estimate seasonal influenza vaccine coverage, describe KAB regarding the influenza vaccine, and determine factors associated with influenza vaccine uptake within the total Canadian population and risk groups.

METHODOLOGY

Survey Sampling

The survey was conducted by Léger Marketing, with the full quantitative methodology described elsewhere (9). Briefly, a stratified regional sampling approach was used, with survey respondents from each province and territory selected using random digit dialling of landlines and known cellphone-only household numbers. Approximately 27.5% of the final sample was represented by cellphone-only households, to reflect the proportion of Canadian households that are cellphone-only (10). Léger utilized soft quotas to ensure a good distribution of respondents by region, sex, and language.

Sample weights were provided by Léger to adjust for region, sex, age, language (mother tongue), education, presence of minor children in the household, and whether the respondent lives in a cellphone-only household in order to appropriately reflect the total Canadian population.

Data Collection

Interviews were conducted between January 5 and February 22, 2018, using computer-assisted telephone interviews. A total of 2857 adults were interviewed regarding their influenza vaccine uptake for the 2017–2018 season, reasons for vaccination or non-vaccination, KAB regarding influenza vaccination, and select demographic information. Respondents who were unsure about their vaccination status (n=7) were excluded from subsequent analyses, resulting in a final analytical data set of 2850 respondents.

Statistical Analysis

Vaccine coverage was estimated as the number of survey respondents who reported they received the influenza vaccine in the 2017–2018 season, expressed as a weighted proportion of the survey respondents who provided a definitive response (i.e. reported did or did not receive the vaccine). Simple weighted proportions and 95% confidence intervals were calculated for categorical variables. Chi-squared tests with a p -value <0.05 were used to determine significant differences in influenza vaccination coverage between sexes within each risk group.

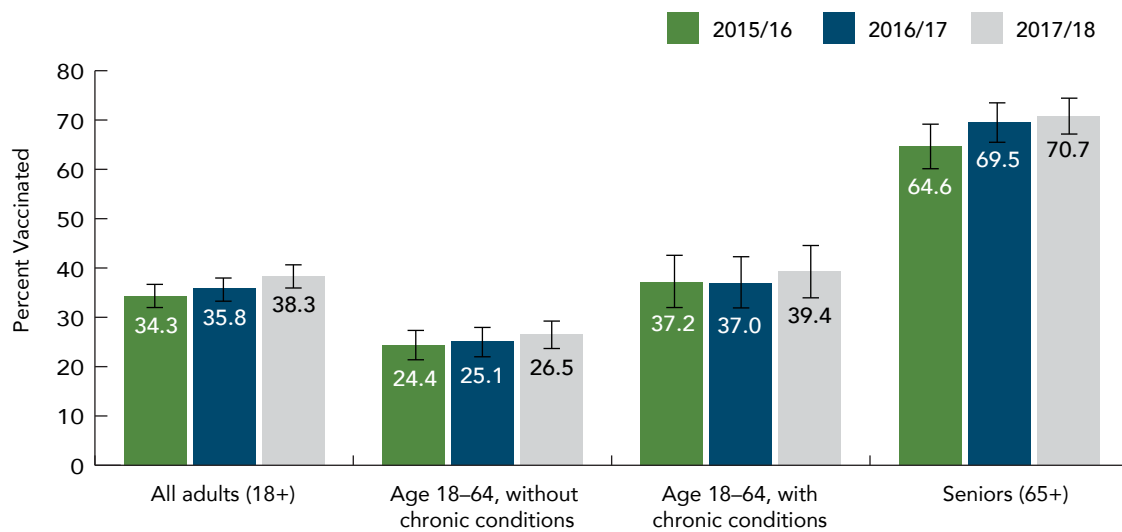
The association between encounters with promotional messaging sources for the influenza vaccine and vaccine uptake was measured using simple and multiple logistic regression. Potential confounding factors were chosen based on existing literature. Factors with a p -value <0.1 in the simple logistic regression were retained in the multiple logistic regression as long as their p -value remained <0.1 . Unadjusted and adjusted odds ratio and 95% confidence intervals were estimated.

RESULTS

1. Vaccine coverage

A total of 2850 adult respondents were included in the 2017–2018 Seasonal Influenza Vaccination Coverage Survey. Overall, estimates for 2017–2018 do not appear to have varied from previous cycles of the survey (Figure 1.1) (11,12).

FIGURE 1.1. Seasonal influenza vaccine coverage, by risk group and influenza season, Seasonal Influenza Vaccination Coverage Survey, Canada, 2015–2016 to 2017–2018.



Approximately four in ten (38.3%) adults aged 18 years and older reported receiving the 2017–2018 influenza vaccine (Figure 1.1). Consistent with previous influenza vaccination coverage estimates in Canada (11,12) and in the USA (13–15), the proportion of vaccinated respondents was highest among seniors aged 65 years and older (70.7%). In contrast, vaccine uptake was lower among those aged 18–64 years with CMC (39.4%) and lowest in those without CMC (26.5%).

Although national vaccination coverage goals for those at high risk (80%) remain unmet, vaccine uptake among seniors aged 65 years and older is approaching this goal (7).

Overall, vaccine uptake was significantly higher in females (41.3%) than in males (35.2%, $p=0.009$) (Table 1.1).

TABLE 1.1. Influenza vaccine coverage among adults aged 18 years and older (n=2850), by sex and risk group, Seasonal Influenza Vaccination Coverage Survey, Canada, 2017–2018.

AGE GROUP (YEARS)	COMBINED		MALE		FEMALE		p
	n	VACCINE COVERAGE, % (95% CI)	n	VACCINE COVERAGE, % (95% CI)	n	VACCINE COVERAGE, % (95% CI)	
All adults (≥18 years)	2850	38.3 (36.0–40.6)	1144	35.2 (31.8–38.5)	1706	41.3 (38.2–44.3)	0.009*
18–64	2143	29.7 (27.1–32.2)	911	26.7 (23.0–30.3)	1232	32.6 (29.1–36.1)	0.024*
18–64 with CMC	511	39.4 (34.1–44.6)	201	36.0 (28.0–44.0)	310	42.3 (35.4–49.2)	0.246
18–64 without CMC	1632	26.5 (23.6–29.4)	710	23.9 (19.8–28.0)	922	29.1 (25.1–33.1)	0.074
≥65	707	70.7 (67.1–74.4)	233	69.6 (63.3–75.8)	474	71.7 (67.5–75.8)	0.584

*Significant difference between males and females ($p < 0.05$).

n = number of respondents (unweighted).

CMC—Chronic medical condition(s).

CI—Confidence interval.

For those aged 18–64 years, a significant difference in vaccine uptake between females (32.6%) and males (26.7%, $p = 0.024$) was also observed. Although this significance was not maintained among those with or without CMC, this is likely due to small sample size. For example, a recent Canadian study found significance differences between males and females in these groups when using a larger sample (i.e. the 2013–2014 cycle of the Canadian Community Health Survey) (16).

Among seniors aged 65 years and older, a significant difference in uptake between females and males was not observed, consistent with other studies (16,17).

2. Month and place of vaccination

Among respondents who recalled their month of influenza vaccination (n=1149), the majority (79.0%) received the vaccine in October or November 2017 (Table 2.1). Vaccination early in the season allows time for the development of antibodies against the influenza virus. Optimal antibody levels, which correlate with vaccine protection, are generally achieved by two weeks following vaccination (1).

TABLE 2.1. Month of vaccination among vaccinated adults aged 18 years and older (n=1203)*, Seasonal Influenza Vaccination Coverage Survey, Canada, 2017–2018.

MONTH	n	PROPORTION VACCINATED IN THIS MONTH, % (95% CI)
September	68	5.8 (4.2–7.5)
October	407	34.0 (30.7–37.4)
November	505	45.0 (41.4–48.6)
December	137	13.0 (10.4–15.6)
January/February	32	2.2 (1.1–3.2)**

*54 respondents did not recall the month of vaccination during the 2017–2018 influenza season and were excluded from analysis.

**Coefficient of variation >16%; therefore, estimates should be interpreted with caution due to a higher level of error.

n = number of respondents (unweighted).

CI—Confidence interval.

Consistent with previous years, the most commonly reported places of vaccination among adults were pharmacies (34.2%) and doctor's offices (30.4%) (Table 2.2).

TABLE 2.2. Place of vaccination among vaccinated adults aged 18 years and older (n=1203)*, Seasonal Influenza Vaccination Coverage Survey, Canada, 2017–2018.

PLACE OF VACCINATION	n	PROPORTION VACCINATED IN THIS MONTH, % (95% CI)
Pharmacy	389	34.2 (30.9–37.5)
Doctor's office	381	30.4 (27.2–33.6)
Temporary vaccine clinic	130	10.7 (8.6–12.8)
CLSC/Community Health Centre	113	8.0 (6.1–9.9)
Work	90	9.5 (7.2–11.8)
Hospital	60	5.0 (3.4–6.7)**
Retirement residence	19	1.2 (0.7–1.8)**
Other	14	1.0 (0.4–1.6)**

*7 respondents did not recall their place of vaccination and were excluded from analysis.

**Coefficient of variation >16%; therefore, estimates should be interpreted with caution due to a higher level of error.

n = number of respondents (unweighted).

CI—Confidence interval.

3. Reasons for vaccination

Among adults who provided a reason for receiving the vaccine (n=1195), approximately four in ten (38.3%) did so because they wanted to prevent infection or to avoid getting sick (Table 3.1).

TABLE 3.1. Top three reasons for vaccination among vaccinated adults aged 18 years and older (n=1203)*, by risk group, Seasonal Influenza Vaccination Coverage Survey, Canada, 2017–2018.

	REASON	% (95% CI)
All adults (≥18 years) (n=1195)	1. To prevent infection/don't want to get sick	38.3 (34.9–41.7)
	2. Receive it yearly (no specific reason)	33.1 (29.8–36.4)
	3. If I don't, I can transmit to others (family, at-risk people, friends)	12.6 (10.4–14.9)
18–64 without CMC (n=487)	1. To prevent infection/don't want to get sick	41.5 (35.4–47.6)
	2. Receive it yearly (no specific reason)	25.6 (20.0–31.1)
	3. Required by workplace	19.1 (14.1–24.1)
18–64 with CMC (n=211)	1. Receive it yearly (no specific reason)	28.1 (20.7–35.6)
	2. To prevent infection/don't want to get sick	26.9 (19.6–34.3)
	3. At risk because of health condition	23.1 (16.4–29.9)
≥65 (n=497)	1. Receive it yearly (no specific reason)	43.6 (39.0–48.2)
	2. To prevent infection/don't want to get sick	40.8 (36.2–45.4)
	3. At risk because of age	14.5 (11.2–17.8)

NOTE: Respondents could provide more than one reason for vaccination.

*8 respondents did not provide a reason for vaccination during the 2017–2018 influenza season and were excluded from analysis.

n = number of respondents (unweighted).

CMC—Chronic medical condition(s).

CI—Confidence interval.

However, the non-specific reason of receiving it yearly was the most common reason for having received the influenza vaccine among those at high risk, including seniors (43.6%) and those aged 18–64 years with CMC (28.1%). This suggested that vaccinated respondents in both these groups have incorporated yearly influenza vaccination as a preventative health behaviour, potentially recognizing their increased risk for influenza-related complications (18).

4. Reasons for non-vaccination

Among adults who provided a reason for not receiving the 2017–2018 influenza vaccine (n=1621), the same three reasons were the most frequent across all groups. These were doubts about vaccine effectiveness (19.3%-25.0%), the perception that the vaccine is not needed or not necessary (18.7%-23.5%), and low perceived risk of getting the disease (14.5%-21.7%) (Table 4.1).

TABLE 4.1. Top three reasons for non-vaccination among non-vaccinated adults aged 18 years and older (n=1647)*, by risk group, Seasonal Influenza Vaccination Coverage Survey, Canada, 2017–2018.

	REASON	% (95% CI)
All adults (≥18 years (n=1621))	1. I don't need the flu shot/it isn't necessary	22.4 (19.8–25.0)
	2. I do not believe the flu shot works/it's not effective	20.2 (17.7–22.7)
	3. I never get the flu/I'm healthy	18.8 (16.3–21.3)
18–64 without CMC (n=1122)	1. I don't need the flu shot/it isn't necessary	23.5 (20.2–26.8)
	2. I do not believe the flu shot works/it's not effective	19.8 (16.8–22.8)
	3. I never get the flu/I'm healthy	19.6 (16.4–22.8)
18–64 with CMC (n=294)	1. I do not believe the flu shot works/it's not effective	19.3 (13.5–25.1)
	2. I don't need the flu shot/it isn't necessary	18.7 (13.3–24.1)
	3. I never get the flu/I'm healthy	14.5 (9.6–19.3)**
≥65 (n=205)	1. I do not believe the flu shot works/it's not effective	25.0 (18.8–31.2)
	2. I don't need the flu shot/it isn't necessary	21.8 (15.7–28.0)
	3. I never get the flu/I'm healthy	21.7 (15.6–27.8)

NOTE: Respondents could provide more than one reason for non-vaccination.

*26 respondents did not provide a reason for non-vaccination during the 2017–2018 influenza season and were excluded from analysis.

**Coefficient of variation >16%; therefore, estimates should be interpreted with caution due to a higher level of error.

n = number of respondents (unweighted).

CMC—Chronic medical condition(s).

CI—Confidence interval.

For those at increased risk for influenza-related complications (i.e. seniors and those aged 18–64 years with CMC), one of the most commonly cited reason for non-vaccination was the perception that the vaccine is not needed or not necessary (21.8% and 18.7%, respectively). Low perceived risk of influenza among unvaccinated respondents and recent media reports regarding low effectiveness of the influenza vaccine may be contributing towards this belief (19–22).

Among respondents who were prompted to clarify the response that they did not need the vaccine (n=265), the majority (97.7%) were able to specify (Table 4.2). The two most common clarifications provided were that they never get the flu or are healthy (32.0%) and lack of belief in vaccine effectiveness (24.1%).

TABLE 4.2. Clarification responses for “I don’t need the flu shot/it isn’t necessary” as a reason for non-vaccination among adults aged 18 years and older (n=265)*, Seasonal Influenza Vaccination Coverage Survey, Canada, 2017–2018.

CLARIFICATION RESPONSES	n	% (95% CI)
I never get the flu/I’m healthy	80	32.0 (24.8–39.1)
I do not believe the flu shot works/it’s not effective	75	24.1 (17.7–30.5)
I am not a person at high risk/It’s not recommended for me	50	23.0 (16.1–30.0)
I am not likely to get very sick from the flu	38	16.7 (10.6–22.7)**
Other	16	4.2 (1.6–6.8)**

*6 respondents did not know how to clarify “I don’t need the flu shot/it isn’t necessary” as a reason for non-vaccination during the 2017–2018 influenza season and were excluded from analysis.

**Coefficient of variation >16%; therefore, estimates should be interpreted with caution due to a higher level of error.

n = number of respondents (unweighted).

CMC—Chronic medical condition(s).

CI—Confidence interval.

5. Messages promoting the influenza vaccine

Every influenza season, public health agencies at all levels of government invest in promotional messaging to increase influenza vaccine uptake among Canadians. Among adults aged 18 years and older who knew if they encountered promotional messaging sources for the influenza vaccine (n=2800), approximately eight in ten (81.0%) reported encountering at least one promotional messaging source in the previous 12 months (Table 5.1).

TABLE 5.1. Proportion of vaccinated respondents by the number of encountered influenza vaccine promotional messaging sources in the previous 12 months (n=2850)*, Seasonal Influenza Vaccination Coverage Survey, Canada, 2017–2018.

PROMOTIONAL MESSAGING ENCOUNTERED	n	PROPORTION VACCINATED, % (95% CI)	p
None	499	33.3 (28.1–38.4)	
A few (1–2)	1289	37.5 (34.2–40.9)	0.176
Many (3+)	1012	42.5 (38.6–46.4)	0.006**

*50 respondents did not know or refused to say what sources of messages, if any, they have encountered promoting the influenza vaccine in the previous 12 months and were excluded from analysis.

**Significant difference when compared to those who have not encountered promotional messaging (p<0.05).

n = number of respondents (unweighted).

CI—Confidence interval.

Respondents who encountered three or more sources of promotional messaging in the previous 12 months had higher influenza vaccine uptake (42.5%, p=0.006) than those who encountered none (33.3%) (Table 5.1). However, when adjusted for other factors, having encountered at least three sources of promotional messaging only remained significantly associated with influenza vaccine uptake among those aged 18–64 years without CMC (Table 5.2).

TABLE 5.2. Association between the number of encountered influenza vaccine promotional messaging sources and influenza vaccine uptake among adults aged 18 years and older (n=2850)*, by risk group, Seasonal Influenza Vaccination Coverage Survey, 2017–2018.

AGE GROUP (YEARS)	PROPORTION, % (95% CI)	UNADJUSTED OR (95% CI)	ADJUSTED OR (95% CI)
Total population (n=2297)			
None (reference)	18.4 (16.2–20.5)	Reference	Reference
A few (1–2)	45.3 (42.6–48.0)	1.36 (1.00–1.85)	1.23 (0.88–1.73) ^a
Many (3+)	36.3 (33.7–38.9)	1.65 (1.20–2.27)	1.60 (1.13–2.26) ^{b**}
18–64, without CMC (n=1375)			
None (reference)	18.6 (15.7–21.5)	Reference	Reference
A few (1–2)	44.6 (40.9–48.2)	1.64 (1.01–2.65)	1.45 (0.89–2.38) ^b
Many (3+)	36.8 (33.3–40.3)	2.10 (1.30–3.40)	1.72 (1.05–2.81) ^{b**}
18–64, with CMC (n=431)			
None (reference)	19.7 (14.6–24.7)	Reference	Reference
A few (1–2)	42.7 (36.8–48.6)	0.79 (0.40–1.58)	–
Many (3+)	37.7 (31.9–43.5)	1.50 (0.74–3.02)	–
65+ (n=491)			
None (reference)	16.2 (12.5–20.0)	Reference	Reference
A few (1–2)	50.9 (46.1–55.7)	1.31 (0.68–2.52)	–
Many (3+)	32.9 (28.4–37.4)	1.30 (0.65–2.59)	–

*553 respondents were unsure or refused to answer factors considered in univariate and multivariate logistic regression modelling and were excluded from analysis.

** $p < 0.05$.

^a Adjusted for age, CMC, and having been advised by HCP.

^b Adjusted for age, education, and having been advised by HCP.

CI—Confidence interval.

OR—Odds ratio.

Vaccine uptake among those who reported having encountered multiple promotional messaging sources appears to highlight the importance of cues to action and knowledge for those aged 18–64 years without CMC as they fit into the Theory of Planned Behaviour model to alter vaccination behaviour (20,23). Using multiple promotional sources as part of an overall communication strategy may help improve vaccination uptake in this historically under-vaccinated demographic.

No association was found between encountering multiple promotional messaging sources and influenza vaccine uptake for seniors and those aged 18–64 with CMC. While this may be a reflection of the smaller size of these groups, it could also be suggestive that other factors such as frequency of health system interaction and advice by a health care provider may play a larger role in influencing vaccine uptake among these two risk groups (24,25).

Among adults aged 18 years and older who reported encountering promotional messaging about the influenza vaccine (n=2301), the top three encountered sources of promotional messaging for those aged 18–64 years, regardless of CMC status, were TV ads (52.3–63.2%), printed posters or brochures (43.0–43.5%), and radio ads (37.5–40.2%). Conversely, among seniors aged 65 years and older, the most commonly encountered sources of promotional messaging were TV ads (78.9%), printed newspapers or magazine ads (35.2%), and radio ads (27.2%) (Table 5.3).

TABLE 5.3. Top three sources in the previous 12 months among respondents who reported encountering promotional messaging about influenza vaccine (n=2301), by risk group, Seasonal Influenza Vaccination Coverage Survey, Canada, 2017–2018.

	REASON	% (95% CI)
All adults (≥18 years (n=2301))	1. Television ad	60.1 (57.4–62.8)
	2. Printed posters or brochures	39.8 (37.1–42.4)
	3. Radio ad	35.8 (33.2–38.4)
18–64 without CMC (n=1309)	1. Television ad	52.3 (48.5–56.0)
	2. Printed posters or brochures	43.5 (39.8–47.2)
	3. Radio ad	37.5 (33.9–41.0)
18–64 with CMC (n=418)	1. Television ad	63.2 (57.3–69.1)
	2. Printed posters or brochures	43.0 (37.0–48.9)
	3. Radio ad	40.2 (34.2–46.1)
≥65 (n=574)	1. Television ad	78.9 (75.4–82.5)
	2. Printed newspaper/magazine ad or article	35.2 (31.0–39.4)
	3. Radio ad	27.2 (23.3–31.1)

NOTE: respondents can provide more than one response.

**Coefficient of variation >16% therefore caution should be taken when interpreting estimates due to higher level of error

n=number of respondents (unweighted)

CI—Confidence interval.

CMC—Chronic medical condition(s).

Taken as a whole, these results suggested the importance of utilizing a range of communication methods to effectively reach all demographics. The emphasis on a variety of sources of promotional communication on one's decision to receive the influenza vaccine has also been noted in both European and American studies (26,27).

STRENGTHS AND LIMITATIONS

The major strength of this survey was the timely reporting of seasonal influenza vaccination coverage across Canada. The timeliness of this survey allows Canada to meet its international reporting obligations and help identify priorities for future vaccination program planning. Additionally, the Seasonal Influenza Vaccination Coverage Survey is flexible in allowing question modules to be added or removed on an annual basis in light of changing priorities.

Though consistent with previous cycles (11,12), limitations of this survey included the relatively low response rate of 20.2%, below the 44.9% achieved by a similar survey in the USA (28). This response rate can increase the potential for non-response bias as survey respondents may differ from those who chose not to complete the survey.

Vaccination history was self-reported which may lead to an under-or over-estimation of vaccine uptake. However, recent studies have found self-reported vaccination status to be a validated measure of vaccine exposure when medical records or registry data are not available (29,30). Additionally, survey respondents were interviewed within six months of the beginning of the seasonal influenza vaccination campaign to further mitigate recall bias.

There may be recall bias in the association observed between encountering public health messaging and vaccine uptake if vaccinated respondents were more likely to recall public health messaging about vaccination than those not vaccinated.

Finally, there was an increased risk of misclassification bias for questions regarding reasons for vaccination or non-vaccination when interviewers assigned unprompted responses to a pre-existing list. Assigned responses were reviewed to ensure proper classification.

CONCLUSION

Adult influenza vaccine coverage estimated from the 2017–2018 Seasonal Influenza Vaccination Coverage Survey has remained similar to previous influenza seasons. Moreover, the national vaccination coverage goals (80%) for those who are at increased risk for influenza-related complications, including both seniors and those 18–64 years of age with CMC, remain unmet. The most common reported reasons for vaccination was to prevent infection or to avoid getting sick, whereas the most common reason for non-vaccination was the perception that the vaccine was not needed or not necessary.

Promotional messaging for the influenza vaccine remains an important strategy in increasing knowledge regarding the risks of influenza infection in addition to providing cues to action to receive the influenza vaccine. Data from this survey supports current evidence that has associated encountering multiple sources of promotional messaging for the influenza vaccine with increased vaccine uptake.

Overall, this report highlighted the need for increased influenza vaccine uptake in Canada as a whole, and among its high-risk populations.

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