Health Reports

Sociodemographic disparities in COVID-19 vaccine uptake and vaccination intent in Canada

by Mireille Guay, Aubrey Maquiling, Ruoke Chen, Valérie Lavergne, Donalyne-Joy Baysac, Jackie Kokaua, Catherine Dufour, Eve Dubé, Shannon E. MacDonald, and Nicolas L. Gilbert

Release date: December 21 2022

Statistics Canada   Statistique Canada

Canada

How to obtain more information

For information about this product or the wide range of services and data available from Statistics Canada, visit our website, www.statcan.gc.ca.

You can also contact us by

Email at infostats@statcan.gc.ca

Telephone, from Monday to Friday, 8:30 a.m. to 4:30 p.m., at the following numbers:

- Statistical Information Service   1-800-263-1136
- National telecommunications device for the hearing impaired   1-800-363-7629
- Fax line   1-514-283-9350

Standards of service to the public

Statistics Canada is committed to serving its clients in a prompt, reliable and courteous manner. To this end, Statistics Canada has developed standards of service that its employees observe. To obtain a copy of these service standards, please contact Statistics Canada toll-free at 1-800-263-1136. The service standards are also published on www.statcan.gc.ca under "Contact us" > "Standards of service to the public."

Note of appreciation

Canada owes the success of its statistical system to a long-standing partnership between Statistics Canada, the citizens of Canada, its businesses, governments and other institutions. Accurate and timely statistical information could not be produced without their continued co-operation and goodwill.

Sociodemographic disparities in COVID-19 vaccine uptake and vaccination intent in Canada

by Mireille Guay, Aubrey Maquiling, Ruoke Chen, Valérie Lavergne, Donalyne-Joy Baysac, Jackie Kokaua, Catherine Dufour, Eve Dubé, Shannon E. MacDonald, and Nicolas L. Gilbert

ABSTRACT

Background
This study's objective was to examine sociodemographic disparities in COVID-19 vaccine uptake and vaccination intent in the Canadian provinces by identifying factors associated with vaccine uptake in seniors prioritized for vaccination at the time of the survey and vaccination intent in all adults.

Data and methods
A cross-sectional survey of Canadian adults was conducted in all provinces from mid-April to mid-May 2021. In addition to sociodemographic characteristics, respondents (n=10,678) provided information on their COVID-19 vaccination status or their intent to get vaccinated. Logistic regression models were fitted using sociodemographic factors as explanatory variables and vaccination status (unvaccinated versus at least one dose) or vaccination intent (unlikely versus likely or already vaccinated) as outcomes. To account for vaccine prioritization groups, multiple regression models were adjusted for province of residence, age, Indigenous identity and health care worker status.

Results
Seniors with a lower household income (less than $60,000) and those living in smaller communities (fewer than 100,000 inhabitants) had higher odds of being unvaccinated. Among Canadian adults, the odds of being unlikely to get vaccinated were higher for males (adjusted odds ratio [AOR] 1.3), individuals younger than 60 (AOR between 3.3 and 5.1), non-health care workers (AOR 3.3), those with less than a high school education (AOR 3.4) or a household income of less than $30,000 (AOR 2.7) and individuals who do not identify as South Asian, Chinese, Black, Filipino, Arab, Latin American, Southeast Asian, West Asian, Korean or Japanese (AOR 1.7).

Interpretation
COVID-19 vaccine uptake (80%) and vaccination intent (95%) were high among Canadians; however, relative disparities were observed among specific groups. Continued efforts targeted toward these groups are essential in reducing potential inequity in access or service provision.

Keywords
COVID-19; vaccine; vaccination coverage; intention; health equity; Canada.

AUTHORS

Mireille Guay, Aubrey Maquiling, Ruoke Chen, Valérie Lavergne, Donalyne-Joy Baysac and Nicolas L. Gilbert are with the Vaccine Rollout Task Force, Public Health Agency of Canada, Ontario, Canada. Nicolas L. Gilbert is also with the École de santé publique de l'Université de Montréal, Quebec, Canada. Jackie Kokaua and Catherine Dufour are with the Centre for Social Data Integration and Development; Social, Health and Labour Statistics; Statistics Canada; Ontario; Canada. Eve Dubé is with the Institut national de santé publique du Québec, Quebec, Canada, and the Département d'anthropologie de l'Université Laval, Quebec, Canada. Shannon E. MacDonald is with the Faculty of Nursing, University of Alberta, Alberta, Canada.

What is already known on this subject?

- Previous studies during different stages of the COVID-19 vaccination campaign and across different provinces have shown that vaccine hesitancy was mostly associated with younger age groups, lower income, lower level of education and being a member of a racialized population.

- Besides increasing overall knowledge and awareness surrounding vaccination, identification of the social conditions and characteristics of the unvaccinated or vaccine-hesitant subpopulations provides insights on fundamental determinants of health. These underline the importance of designing context- and population-specific interventions to be able to directly address barriers faced by low-uptake groups and to increase the chances of successful and lasting improvement in health disparities.

What does this study add?

- While previous studies focused on inequalities in COVID-19 vaccine uptake in specific provinces, this study highlights the sociodemographic disparities in all provinces just before the height of the COVID-19 vaccination campaign in summer 2021 to represent non-vaccination and vaccine hesitancy in Canada.

- COVID-19 non-vaccination among seniors was greater in those with a household income of less than $60,000 and in smaller-sized communities (fewer than 100,000 inhabitants). This study is one of few that show a difference in vaccine uptake between those living in more populated communities and those living in less populated communities in Canada.

- Although the vast majority of adults in the provinces had a positive attitude toward COVID-19 vaccination, some population groups, such as males, younger individuals, those who were less educated, those who had a lower household income and those who were not self-identifying as South Asian, Chinese, Black, Filipino, Arab, Latin American, Southeast Asian, West Asian, Korean or Japanese or not a healthcare worker, had greater adjusted odds of being unlikely to get vaccinated. By understanding the characteristics of these groups, vaccine promotion efforts can be directed accordingly to mitigate the barriers of vaccine acceptance.

Canada's COVID-19 vaccination campaign began on December 14, 2020, with the arrival of a limited number of doses that were prioritized for high-risk populations identified by Canada's National Advisory Committee on Immunization (NACI), such as the elderly, residents and staff of congregate living settings, frontline health care workers, and Indigenous populations.[1] As vaccines became more widely available, provinces and territories considered NACI advice and assessed their local situation to determine their vaccine rollout plans. COVID-19 vaccine prioritization therefore varied by province or territory, with the elderly being among the first to be vaccinated, followed by priority age groups identified by decreasing 5- or 10-year age bands. By mid-April 2021, most provinces had started vaccinating adults aged 60 years and older, except for New Brunswick (which began on April 27, 2021), Nova Scotia (April 19, 2021), and Newfoundland and Labrador (May 3, 2021). Following the establishment of the vaccination campaigns, evidence of COVID-19 vaccine effectiveness has started to emerge worldwide.[2-4] In Canada, studies have shown up to 95% protection against symptomatic infection and severe outcomes with various vaccine products and dose intervals.[5-8] Therefore, ensuring equitable distribution and high uptake of COVID-19 vaccines is critical to protecting the population from infection, thereby reducing transmission and the risks associated with COVID-19 morbidity and mortality.[9,10]

Vaccine hesitancy, defined by the World Health Organization as "a delay in acceptance or refusal of safe vaccines despite availability of vaccine services," has been on the rise over the last decade and is recognized as a global threat.[11] As with all vaccines, there is a range of factors that contribute to COVID-19 vaccine hesitancy, such as doubts about the safety and effectiveness of approved and available vaccines.[12] Access barriers are also major challenges to vaccine uptake. Despite believing in the value of getting vaccinated, some people do not do so because of a lack of time and scheduling limitations, a lack of access and capacity to navigate the technologies and online service platforms, and a lack of transportation to reach vaccination services.[13,14]

By May 1, 2021, 41% of individuals aged 18 and older and 77% of those aged 60 and older had received at least one dose. While the majority of Canadian seniors had already received at least one dose, the rollout of COVID-19 vaccines may not have sufficiently addressed the needs of the population, as social inequities contribute to vaccine accessibility and uptake.[15] Previous Canadian studies showed that females, Indigenous people, racialized populations, individuals with a lower level of education and essential non-health care workers had lower intentions of getting vaccinated,[16,17] while being male, being older (older than 60 years), having a university-level education, having or living with someone with chronic medical conditions (CMCs) and working with patients infected with COVID-19 were significantly associated with acceptance of COVID-19

vaccines.[12,17,18] In other countries, being Black or from a one-parent household were factors associated with lower COVID-19 vaccine uptake.[19,20]

Given the disproportionate health and economic impacts COVID-19 has had on racialized populations and those with a lower socioeconomic status[21], understanding the differences in COVID-19 vaccine uptake among different population groups and the drivers of COVID-19 vaccine hesitancy is crucial for improving vaccine acceptance and ensuring equitable vaccine uptake to avoid worsening inequalities in COVID-19-related burdens.[22,23]

The COVID-19 Vaccination Coverage Survey (CVCS) was developed to measure COVID-19 vaccination coverage in the Canadian provinces and territories and to compare vaccination coverage levels for various sociodemographic and economic subgroups during the early stages of the vaccination campaign (March to May 2021). Using CVCS data, this study's objective was to examine sociodemographic disparities in COVID-19 vaccine uptake and vaccination intent by identifying the social and economic determinants associated with vaccine uptake among seniors aged 60 years and older (i.e., those eligible for vaccination at the time of the survey) and the determinants of vaccination intent in the entire adult population.

Data and methods

Study population

The CVCS was designed by the Public Health Agency of Canada (PHAC) and Statistics Canada and was funded solely by PHAC.[24] It was a cross-sectional, voluntary survey consisting of two cycles. The first cycle of the CVCS took place between March 15 and April 12, 2021, and targeted Canadians aged 18 years and older living in the three territorial capitals; the second cycle was conducted in the 10 provinces between April 12 and May 12, 2021. According to the information available on provincial websites, individuals 60 years and older were eligible to receive their first dose by May 2021, and individuals 18 years and older were eligible by June 2021. The CVCS target population excluded people living on reserves or in other Indigenous settlements, in institutions and in collective dwellings. The present study focused on analyzing the data collected from the second cycle of the CVCS.

Survey description

The CVCS is a sample survey with a cross-sectional design. The sample was stratified by province of residence, and a simple random sample of dwellings was independently selected from the Dwelling Universe File[25] within each province. Invitation letters were sent out by mail, and one person per household was randomly selected to participate in the survey. Respondents could complete the survey questionnaire in either official language (English or French), and the primary method of collection was self-response via electronic questionnaire. In case of non-response, computer-

assisted telephone interviewing was used to follow up with the selected individuals to encourage participation and maximize response rate. Sampling weights based on gender, age and province of residence were produced for each respondent to create nationally representative estimates.[24] A total of 10,678 respondents completed the Cycle 2 survey questionnaire, yielding a response rate of 59.2%.

The CVCS questionnaire was reviewed and tested by Statistics Canada. It collected information on COVID-19 vaccine uptake by asking respondents whether they have been vaccinated against COVID-19. For those who were unvaccinated, a subsequent question on their intention to be vaccinated was asked using a four-point ordinal response scale: very likely, somewhat likely, somewhat unlikely or very unlikely. Because of the very small proportion of respondents in the last two categories, they were collapsed and considered to reflect those who were "unlikely to get vaccinated." Additionally, sociodemographic characteristics of the participants, such as gender, age, education, pre-pandemic household income, marital status, country of birth, Indigenous identity and population groups, were collected using Statistics Canada's multiple-choice standardized questions. Belonging to a population group is defined as individuals who self-identify using one of the response categories set out in the Employment Equity Act, specifically, South Asian, Chinese, Black, Filipino, Arab, Latin American, Southeast Asian, West Asian, Korean and Japanese. In addition, information on community size was obtained by linking the respondent's postal code with Statistics Canada's Postal CodeOM Conversion File Plus (PCCF+ version 7D based on 2016 Census data).

Main objectives

Two separate logistic regression analyses were conducted to examine (1) the sociodemographic determinants associated with self-reported COVID-19 non-vaccination among seniors and (2) the sociodemographic determinants associated with the intent to not get vaccinated against COVID-19 in all adults aged 18 years and older. For the first objective, only adults aged 60 and older were included in the analyses, as they were prioritized for COVID-19 vaccination and were the only group eligible to be vaccinated across all provinces at the time of the survey.

Quantitative variables

Outcome variables

The two outcome variables were COVID-19 vaccination status and COVID-19 vaccination intent. The former was categorized as "not vaccinated" and "received at least one dose," and the latter was categorized as "unlikely to get vaccinated" (combining those who reported themselves to be "somewhat" or "very" unlikely to get vaccinated) and "vaccinated or likely

to get vaccinated." Vaccination intent was measured using a four-point likelihood scale.

Control variables

To control for differences in provincial vaccine rollout plans and vaccination eligibility at the time of the survey, province of residence, age, occupation in the health care sector and Indigenous identity—factors used to define eligibility

criteria—were considered as covariates in the multiple regression models.

Independent variables

Sociodemographic factors such as gender, level of education, household income before tax, CMCs, marital status, country of birth, population groups and community size were included as independent variables. Variables included in the models have been previously demonstrated to be related to the modelled

Table 1

Characteristics of survey respondents in the full sample and among seniors (aged 60 and older), all provinces, April to May 2021[1]

Sociodemographic factors	Full sample (n=10,678)		Seniors (n=4,624)	
	frequency	percent	frequency	percent
Province	**10,678**	**100**	**4,624**	**100**
British Columbia	1,063	10.0	459	9.9
Alberta	1,002	9.4	362	7.8
Saskatchewan	806	7.5	335	7.2
Manitoba	968	9.1	386	8.3
Ontario	2,048	19.2	808	17.5
Quebec	1,455	13.6	681	14.7
New Brunswick	779	7.3	360	7.8
Nova Scotia	923	8.6	438	9.5
Prince Edward Island	815	7.6	402	8.7
Newfoundland and Labrador	819	7.7	393	8.5
Gender	**10,662**	**100**	**4,618**	**100**
Female	5,986	56.1	2,639	57.1
Male	4,676	43.9	1,979	42.9
Age group	**10,657**	**100**	**4,609**	**100**
18 to 29	979	9.2	…	…
30 to 39	1,516	14.2	…	…
40 to 49	1,735	16.3	…	…
50 to 59	1,818	17.1	…	…
60 to 64	1,147	10.7	1,147	24.9
65 to 69	1,132	10.6	1,132	24.6
70 to 79	1,594	15.0	1,594	34.6
80 and older	736	6.9	736	16.0
Level of education[2]	**10,612**	**100**	**4,587**	**100**
Less than secondary	910	8.6	702	15.3
Secondary	2,506	23.6	1,313	28.6
Postsecondary	3,757	35.4	1,549	33.8
University	3,439	32.4	1,023	22.3

… not applicable

[1] Results are unweighted and only represent respondents in the sample.

[2] The highest certificate, diploma or degree completed is the classification used for the level of education. "Postsecondary" education includes College, CEGEP, apprenticeship, trades, or other non-university certificate or diploma. "University" education includes Bachelor's degree or above.

[3] The Indigenous group includes off-reserve First Nations people, Métis or Inuit.

[4] Individuals who self-identify using one of the response categories set out in the Employment Equity Act, specifically, South Asian, Chinese, Black, Filipino, Arab, Latin American, Southeast Asian, West Asian, Korean and Japanese.

[5] Chronic medical conditions leading to a higher risk of severe outcome from COVID-19 include obesity, heart disease, diabetes, liver disease, chronic kidney disease, Alzheimer's disease, chronic lung disease, immunocompromised or immunosuppressed.

[6] The "no" category includes those employed in sectors other than health care and those who are not employed or retired.

[7] Cut-offs for the community size variable are those available in the Postal Code Conversion File Plus.

Source: Public Health Agency of Canada and Statistics Canada, COVID-19 Vaccine Coverage Survey, Cycle 2 (April 12 to May 12, 2021).

Table 1
Characteristics of survey respondents in the full sample and among seniors (aged 60 and older), all provinces, April to May 2021[1] (continued)

Sociodemographic factors	Full sample (n=10,678)		Seniors (n=4,624)	
	frequency	percent	frequency	percent
Household income	**9,795**	**100**	**4,129**	**100**
<$30,000	1,440	14.7	903	21.9
$30,000 to <$60,000	2,414	24.6	1,381	33.4
$60,000 to <$90,000	2,013	20.6	864	20.9
$90,000 to <$120,000	1,381	14.1	468	11.3
$120,000 to <$150,000	863	8.8	209	5.1
≥$150,000	1,684	17.2	304	7.4
Marital status	**10,639**	**100**	**4,602**	**100**
Married or common law	6,262	58.9	2,611	56.7
Never married	2,086	19.6	410	8.9
Widowed, separated or divorced	2,291	21.5	1,581	34.4
Indigenous identity[3]	**10,651**	**100**	**4,608**	**100**
Indigenous	320	3.0	102	2.2
Non-Indigenous	10,331	97.0	4,506	97.8
Population groups	**10,552**	**100**	**4,573**	**100**
Yes[4]	1,590	15.1	329	7.2
No	8,962	84.9	4,244	92.8
Country of birth	**10,650**	**100**	**4,610**	**100**
Canada	8,460	79.4	3,841	83.3
Other	2,190	20.6	769	16.7
Chronic medical condition[5]	**10,572**	**100**	**4,581**	**100**
At least one	3,232	30.6	1,899	41.5
None	7,340	69.4	2,682	58.5
Health care worker[6]	**10,586**	**100**	**4,577**	**100**
Yes	1,013	9.6	156	3.4
No	9,573	90.4	4,421	96.6
Community size[7]	**10,653**	**100**	**4,617**	**100**
1,500,000 or more	2,100	19.7	777	16.8
500,000 to 1,499,999	1,993	18.7	737	16.0
100,000 to 499,999	2,726	25.6	1,133	24.5
10,000 to 99,999	1,787	16.8	870	18.8
Fewer than 10,000	2,047	19.2	1,100	23.8

... not applicable

[1] Results are unweighted and only represent respondents in the sample.

[2] The highest certificate, diploma or degree completed is the classification used for the level of education. "Postsecondary" education includes College, CEGEP, apprenticeship, trades, or other non-university certificate or diploma. "University" education includes Bachelor's degree or above.

[3] The Indigenous group includes off-reserve First Nations people, Métis or Inuit.

[4] Individuals who self-identify using one of the response categories set out in the Employment Equity Act, specifically, South Asian, Chinese, Black, Filipino, Arab, Latin American, Southeast Asian, West Asian, Korean and Japanese.

[5] Chronic medical conditions leading to a higher risk of severe outcome from COVID-19 include obesity, heart disease, diabetes, liver disease, chronic kidney disease, Alzheimer's disease, chronic lung disease, immunocompromised or immunosuppressed.

[6] The "no" category includes those employed in sectors other than health care and those who are not employed or retired.

[7] Cut-offs for the community size variable are those available in the Postal Code Conversion File Plus.

Source: Public Health Agency of Canada and Statistics Canada, COVID-19 Vaccine Coverage Survey, Cycle 2 (April 12 to May 12, 2021).

outcome and are considered by the authors to conceptually have a potential association with the outcome. For variables that had categories with largely unequal sample sizes, the largest category was used as a reference to avoid any problems associated with using a small group as a reference group. In other cases, the reference category was selected as the normative group, that is, the group from which the most logical or important comparisons can be drawn. When there was no obvious norm and samples sizes were similar, the highest or lowest category (e.g., education, income, age or community size) or the category with the lowest odds to provide odds ratios

(ORs) greater than 1 was selected for easier interpretation. (See Table 1 for the definition of the categories for each variable.)

Statistical analysis

To describe the study sample, categorical independent variables were summarized using unweighted frequencies and proportions. Additionally, weighted proportions of unvaccinated seniors were estimated and stratified by the sociodemographic characteristics listed above. Weighted prevalence estimates (percentages) of vaccination intent among all adults aged 18 years and older were also calculated. Confidence intervals (CIs) for prevalence proportions were adjusted using the Wilson score interval.[26] Associations between sociodemographic factors and COVID-19 vaccine uptake or vaccination intent were identified using simple and

Table 2

Unadjusted and adjusted associations between sociodemographic factors and vaccine uptake among seniors (aged 60 and older): The odds of being unvaccinated versus having at least one dose, all provinces, April to May 2021

	Sample size[1]	Percent not vaccinated			Simple logistic regression				Multiple logistic regression[2]			
			95% confidence interval[3]			95% confidence interval[4]				95% confidence interval[4]		
	n	percent	from	to	Odds ratio	from	to	p-value	Adjusted odds ratio	from	to	p-value
Overall	4,624	20	18	21								
Province												
British Columbia	459	26	22	31	4.6 *	1.9	11.6	<0.001	7.1 *	2.7	19.0	<0.001
Alberta	362	21	16	38	3.5 *	1.3	9.9	0.004	4.2 *	1.3	13.7	0.004
Saskatchewan†	335	7	5	11	1.0	...	...	...	1.0	...	...	...
Manitoba	386	19	15	24	3.0 *	1.1	7.9	0.011	3.6 *	1.3	10.3	0.004
Ontario	808	20	17	23	3.1 *	1.3	7.7	0.002	4.6 *	1.8	11.9	<0.001
Quebec	681	13	11	16	1.9	0.8	4.9	0.402	2.3	0.9	6.3	0.172
New Brunswick	360	32	27	39	6.2 *	2.4	16.1	<0.001	6.5 *	2.4	18.1	<0.001
Nova Scotia	438	29	24	34	5.3 *	2.1	13.0	<0.001	5.7 *	2.2	14.8	<0.001
Prince Edward Island	402	39	34	44	8.2 *	3.4	20.2	<0.001	8.9 *	3.4	23.6	<0.001
Newfoundland and Labrador	393	28	23	33	4.9 *	2.0	12.3	<0.001	4.9 *	1.9	13.1	<0.001
Age group												
60 to 64	1,147	66	61	69	7.3 *	4.2	12.6	<0.001	11.2 *	5.8	21.7	<0.001
65 to 69	1,132	78	74	81	4.0 *	2.2	7.2	<0.001	5.3 *	2.7	10.3	<0.001
70 to 79	1,594	89	87	91	1.6	0.9	2.9	0.150	1.9	1.0	3.6	0.052
80 and older†	736	93	90	95	1.0	...	...	...	1.0	...	...	...
Health care worker												
Yes	156	14	6	31	0.7	0.2	1.5	0.533	0.4	0.1	1.4	0.149
No†	4,421	20	18	21	1.0	...	...	...	1.0	...	...	...
Indigenous identity												
Indigenous[5]	102	22E	12	36	1.1	0.5	2.6	0.776	0.8	0.3	1.9	0.601
Non-Indigenous†	4,506	20	18	21	1.0	...	...	...	1.0	...	...	...
Gender												
Female	2,639	18	16	21	0.8	0.7	1.0	0.096	0.8 *	0.6	1.0	0.043
Male†	1,979	21	19	24	1.0	...	...	...	1.0	...	...	...

... not applicable

E use with caution

† reference category

* significantly different from reference category (p < 0.05)

[1] Sample sizes for proportions and simple logistic regression models do not always sum up to overall n=4,624 because of missing values in sociodemographic factors.

[2] The sample size for the multiple logistic regression is n=4,449. This model includes all variables listed in the table.

[3] Wilson score interval for binomial proportions.

[4] The 95% confidence intervals for odds ratios were adjusted using the Tukey–Kramer method for multiple comparisons.

[5] Indigenous includes off-reserve First Nations people, Métis or Inuit.

[6] The highest certificate, diploma or degree completed is the classification used for the level of education. "Postsecondary" education includes College, CEGEP, apprenticeship, trades, or other non-university certificate or diploma. "University" education includes Bachelor's degree or above.

[7] individuals who self-identify using one of the response categories set out in the Employment Equity Act, specifically, South Asian, Chinese, Black, Filipino, Arab, Latin American, Southeast Asian, West Asian, Korean and Japanese.

[8] Chronic medical conditions leading to a higher risk of severe outcome from COVID-19 include obesity, heart disease, diabetes, liver disease, chronic kidney disease, Alzheimer's disease, chronic lung disease, immunocompromised or immunosuppressed.

Source: Public Health Agency of Canada and Statistics Canada, COVID-19 Vaccine Coverage Survey, Cycle 2 (April 12 to May 12, 2021).

Table 2
Unadjusted and adjusted associations between sociodemographic factors and vaccine uptake among seniors (aged 60 and older): The odds of being unvaccinated versus having at least one dose, all provinces, April to May 2021 (continued)

	Sample size[1]	Percent not vaccinated			Simple logistic regression				Multiple logistic regression[2]			
			95% confidence interval[3]		Odds ratio	95% confidence interval[4]		p-value	Adjusted odds ratio	95% confidence interval[4]		p-value
	n	percent	from	to		from	to			from	to	
Level of education[6]												
Less than secondary	702	22	18	26	1.3	0.9	2.0	0.374	1.2	0.7	2.1	0.763
Secondary	1,313	17	14	19	0.9	0.6	1.4	0.976	0.8	0.5	1.2	0.414
Postsecondary	1,549	23	19	26	1.4	0.9	2.0	0.117	1.1	0.7	1.8	0.901
University[†]	1,023	17	15	21	1.0	…	…	…	1.0	…	…	…
Household income												
<$30,000	903	24	21	29	1.8	0.8	3.8	0.258	3.9 *	1.6	9.3	<0.001
$30,000 to <$60,000	1,381	19	16	22	1.3	0.6	2.7	0.934	2.3 *	1.0	5.3	0.043
$60,000 to <$90,000	864	19	15	23	1.3	0.6	2.8	0.977	1.9	0.8	4.4	0.299
$90,000 to <$120,000	468	22	16	28	1.5	0.6	3.6	0.778	1.8	0.7	4.5	0.439
$120,000 to <$150,000	209	16	11	24	1.1	0.4	3.0	1.000	1.2	0.4	3.7	0.998
≥$150,000[†]	304	15	11	22	1.0	…	…	…	1.0	…	…	…
Marital status												
Married or common law[†]	2,611	20	17	22	1.0	…	…	…	1.0	…	…	…
Never married	410	26	21	33	1.4	1.0	2.2	0.089	1.1	0.6	1.7	0.965
Widowed, separated or divorced	1,581	17	15	20	0.8	0.6	1.1	0.301	0.9	0.6	1.3	0.849
Population groups												
Yes[7]	329	21	17	27	1.1	0.8	1.6	0.432	1.2	0.7	2.1	0.501
No[†]	4,244	19	17	21	1.0	…	…	…	1.0	…	…	…
Country of birth												
Canada[†]	3,841	20	18	22	1.0	…	…	…	1.0	…	…	…
Other	769	19	16	23	1.0	0.8	1.3	0.912	1.1	0.7	1.6	0.782
Chronic medical condition[8]												
At least one	1,899	18	16	21	0.9	0.7	1.1	0.307	1.0	0.7	1.2	0.719
None[†]	2,682	20	18	23	1.0	…	…	…	1.0	…	…	…
Community size												
1,500,000 or more[†]	777	14	12	17	1.0	…	…	…	1.0	…	…	…
500,000 to 1,499,999	737	16	13	20	1.2	0.7	1.9	0.878	1.4	0.7	2.8	0.68
100,000 to 499,999	1,133	20	17	24	1.5	1.0	2.4	0.080	1.7	0.9	2.9	0.113
10,000 to 99,999	870	26	21	30	2.1 *	1.3	3.3	<0.001	2.5 *	1.4	4.6	<0.001
Fewer than 10,000	1,100	25	21	29	2.0 *	1.3	3.1	<0.001	2.4 *	1.3	4.2	<0.001

… not applicable

E use with caution

† reference category

* significantly different from reference category (p < 0.05)

[1] Sample sizes for proportions and simple logistic regression models do not always sum up to overall n=4,624 because of missing values in sociodemographic factors.

[2] The sample size for the multiple logistic regression is n=4,449. This model includes all variables listed in the table.

[3] Wilson score interval for binomial proportions.

[4] The 95% confidence intervals for odds ratios were adjusted using the Tukey–Kramer method for multiple comparisons.

[5] Indigenous includes off-reserve First Nations people, Métis or Inuit.

[6] The highest certificate, diploma or degree completed is the classification used for the level of education. "Postsecondary" education includes College, CEGEP, apprenticeship, trades, or other non-university certificate or diploma. "University" education includes Bachelor's degree or above.

[7] individuals who self-identify using one of the response categories set out in the Employment Equity Act, specifically, South Asian, Chinese, Black, Filipino, Arab, Latin American, Southeast Asian, West Asian, Korean and Japanese.

[8] Chronic medical conditions leading to a higher risk of severe outcome from COVID-19 include obesity, heart disease, diabetes, liver disease, chronic kidney disease, Alzheimer's disease, chronic lung disease, immunocompromised or immunosuppressed.

Source: Public Health Agency of Canada and Statistics Canada, COVID-19 Vaccine Coverage Survey, Cycle 2 (April 12 to May 12, 2021).

multiple logistic regression models. From these models, ORs were calculated and multiple comparison tests with Tukey–Kramer adjustment were performed to identify statistically significant differences in vaccine uptake or vaccination intent.

Simple and multiple models were fitted using the complete case analysis method as the proportion of missing cases was very low (less than 4%) and these cases had the same distribution of all the variables as the complete cases (data not

shown). For the multiple logistic regression models, multicollinearity was assessed by performing chi-square associations between all independent variables (data not shown). While some associations were present between some independent variables, there was no evidence of inflated standard errors or severe multicollinearity in the models. Given the complex survey design, adequate design-adjusted variances were estimated using the bootstrap resampling method (1,000 samples). The data were analyzed in SAS Enterprise Guide 7.1 (SAS version 9.4), and the SURVEYFREQ and SURVEYLOGISTIC procedures were exclusively used to ensure the complex survey design was accounted for in the analysis.

Results

Sample characteristics

More than half (56.1%) of the full sample (N=10,678) of respondents were female, and 43.2% of them were 60 years of age or older. The vast majority (79.4%) were born in Canada and more than half (58.9%) were married or living in common law. Close to half (45.2%) of the respondents had a pre-pandemic before-tax household income between $30,000 and $90,000 and most (67.8%) of them had a postsecondary education or higher. Finally, 15.5% self-identified as being part of a population group (Table 1).

Vaccination status among seniors aged 60 years and older

Overall, a large majority (80%) of adults aged 60 years and older had received at least one dose of a COVID-19 vaccine at the time of the survey (Table 2).

In the adjusted multiple logistic regression model, some groups had greater odds of being unvaccinated. At the time of the survey, seniors in all provinces except Quebec had higher odds of being unvaccinated (compared with seniors in Saskatchewan). Seniors aged 60 to 69 years had 5.3 (95% CI: 2.7 to 10.3) to 11.2 (95% CI: 5.8 to 21.7) times higher odds of being unvaccinated than seniors aged 80 years and older. The observed increasing trend with decreasing age group was expected since the oldest age groups were the first to be vaccinated during the initial vaccine rollout. Moreover, an increasing trend was observed with decreasing income. Compared with seniors with household incomes of $150,000 or greater, the odds of being unvaccinated were greater for those with a household income of less than $60,000 (AOR: 2.3, 95% CI: 1.0 to 5.3 and AOR: 3.9, 95% CI: 1.6 to 9.3 for those with less than $60,000 and less than $30,000, respectively). Furthermore, seniors in smaller communities (fewer than 100,000 inhabitants) had 2.4 (95% CI: 1.3 to 4.2) to 2.5 (95% CI: 1.4 to 4.6) times higher odds of being unvaccinated than those living in larger communities of 1,500,000 inhabitants or more. Results for Indigenous identity and population groups

could not be broken down further because of limited sample sizes (Table 2).

Associations observed between vaccination coverage and the four covariates listed at the top of Table 2 should be interpreted with caution, as the differences could be explained by differences in provincial vaccine rollout plans and vaccination eligibility at the time of the survey and not by sociodemographic inequality.

Vaccination intent among all adults 18 years and older

At the time of the survey, 95% of adults aged 18 years and older stated that they had been vaccinated (45%) or were likely to be vaccinated in the future (49%) (Appendix Table A).

In the adjusted multiple logistic regression analysis, the odds of being unlikely to get vaccinated for individuals younger than 60 years were 3.3 (95% CI: 1.6 to 6.9) to 5.1 (95% CI: 2.5 to 10.7) times greater than for individuals who were 70 years or older. An increasing trend was observed with decreasing age (Table 3). In addition, non-health care workers had almost 3.3 (95% CI: 1.7 to 5.0) times greater odds of being unlikely to get vaccinated compared with health care workers. The odds for individuals who completed less than a secondary education were 3.4 (95% CI: 1.6 to 7.2) times greater than for those with a university education. Individuals with a household income of less than $30,000 had 2.7 (95% CI: 1.0 to 7.0) times greater odds of being unlikely to get vaccinated than those with a household income greater than or equal to $150,000. An increasing trend was observed with decreasing household income. Finally, the odds for males were 1.3 (95% CI: 1.0 to 1.7) times greater than for females, and the odds for people not belonging to a population group were 1.7 (95% CI: 1.0 to 3.3) times greater than for those part of a population group.

Sensitivity analyses

Several sensitivity analyses were conducted to test the robustness of the models. First, seniors residing in New Brunswick, Nova Scotia, and Newfoundland and Labrador became eligible for vaccination during, rather than before, the study collection period. A sensitivity analysis showed that the results for vaccination status among seniors were not affected by the removal of these three provinces (data not shown). Second, as seniors (60 years and older) and non-seniors (aged 18 to 59 years) had different vaccine uptake during the study period, determinants of non-vaccination were also examined in non-seniors as the original model included only seniors. The same models were applied to non-seniors, and the results showed that all independent variables were significantly associated with non-vaccination except for marital status, population groups and country of birth (Appendix Table B). Likewise, the sociodemographic determinants of being unlikely to get vaccinated were compared between seniors and non-seniors (Appendix Table C). In seniors, the sociodemographic determinant of being unlikely to get vaccinated was community size. For non-seniors, the sociodemographic determinants of being unlikely to get vaccinated were gender, health care

worker status, education and self-identification in a population group. The lack of association between sociodemographic factors and vaccination intent observed among seniors could be attributable to low sample sizes and decreased statistical power (Appendix Table C). Lastly, because exact income was not available, income categories were used and income adjusted for household size could not be computed. However, as a sensitivity analysis, household size was included as an additional variable in the models, and no major changes in the findings were observed (data not shown).

Table 3
Unadjusted and adjusted associations between sociodemographic factors and vaccination intent among adults (18 years and older): The odds of being unlikely to get vaccinated versus being likely or already vaccinated, all provinces, April to May 2021

| | Sample size[1] | Percent unlikely to be vaccinated | | | Simple logistic regression | | | | Multiple logistic regression[2] | | | |
| | | | 95% confidence interval[3] | | Odds ratio | 95% confidence interval[4] | | p-value | Adjusted odds ratio | 95% confidence interval[4] | | p-value |
	n	percent	from	to	ratio	from	to	p-value	odds ratio	from	to	p-value
Overall	10,653	5	5									
Province												
British Columbia	1,061	6	4	8	0.9	0.4	1.9	1.000	1.2	0.5	3.1	0.999
Alberta	601	6	4	8	0.9	0.4	2.0	1.000	1.2	0.5	3.2	0.999
Saskatchewan[†]	805	7	5	9	1.0	...	...	...	1.0	...	...	...
Manitoba	965	8	6	10	1.2	0.5	2.6	1.000	1.6	0.6	4.2	0.844
Ontario	2,043	5	4	6	0.7	0.3	1.4	0.805	1.0	0.4	2.2	1.000
Quebec	1,453	5	4	7	0.7	0.3	1.6	0.949	0.9	0.4	2.3	1.000
New Brunswick	777	5	4	8	0.8	0.4	1.8	0.997	0.8	0.3	2.0	0.998
Nova Scotia	922	5	3	8	0.8	0.3	1.9	0.996	0.8	0.3	2.2	1.000
Prince Edward Island	814	5	3	8	0.7	0.3	1.9	0.992	0.7	0.2	2.1	0.988
Newfoundland and Labrador	815	4	2	6	0.5	0.2	1.3	0.486	0.5	0.2	1.4	0.515
Age group												
18 to 29	975	7	5	9	2.6 *	1.3	5.4	0.001	4.0 *	1.5	10.7	0.001
30 to 39	1,509	7	5	9	2.6 *	1.4	4.8	<0.001	5.1 *	2.5	10.7	<0.001
40 to 49	1,735	7	5	9	2.7 *	1.4	4.9	<0.001	5.0 *	2.5	10.0	<0.001
50 to 59	1,817	5	4	6	1.9	1.0	3.5	0.064	3.3 *	1.6	6.9	<0.001
60 to 69	2,271	3	2	4	1.1	0.6	2.0	1.000	1.2	0.6	2.4	0.987
70 and older†	2,325	3	2	4	1.0	...	...	...	1.0	...	...	...
Health care worker												
Yes	1,013	2	1	3	0.3 *	0.2	0.6	<0.001	0.3 *	0.2	0.6	0.001
No[†]	9,551	6	5	6	1.0	...	...	...	1.0	...	...	...
Indigenous identity												
Indigenous[5]	320	8	5	13	1.7	1.0	3.0	0.063	1.2	0.6	2.2	0.592
Non-Indigenous[†]	10,308	5	4	6	1.0	...	...	...	1.0	...	...	...
Gender												
Female	5,973	4	3	5	0.7 *	0.5	0.9	0.002	0.8 *	0.6	1.0	0.040
Male[†]	4,664	6	5	7	1.0	...	...	...	1.0	...	...	...

... not applicable

† reference category

* significantly different from reference category (p < 0.05)

[1] Sample sizes for proportions and simple logistic regression models do not always sum up to total n=10,678 because of missing values in predictor and outcome variables.

[2] The sample size for the multiple logistic regression is n=10,286. This model includes all variables listed in the table.

[3] Wilson score interval for binomial proportions.

[4] The 95% confidence intervals for odds ratios were adjusted using the Tukey–Kramer method for multiple comparisons.

[5] Indigenous includes off-reserve First Nations people, Métis or Inuit.

[6] The highest certificate, diploma or degree completed is the classification used for the level of education. "Postsecondary" education includes College, CEGEP, apprenticeship, trades, or other non-university certificate or diploma. "University" education includes Bachelor's degree or above.

[7] individuals who self-identify using one of the response categories set out in the Employment Equity Act, specifically, South Asian, Chinese, Black, Filipino, Arab, Latin American, Southeast Asian, West Asian, Korean and Japanese.

[8] Chronic medical conditions leading to a higher risk of severe outcome from COVID-19 include obesity, heart disease, diabetes, liver disease, chronic kidney disease, Alzheimer's disease, chronic lung disease, immunocompromised or immunosuppressed.

Source: Public Health Agency of Canada and Statistics Canada, COVID-19 Vaccine Coverage Survey, Cycle 2 (April 12 to May 12, 2021).

Table 3
Unadjusted and adjusted associations between sociodemographic factors and vaccination intent among adults (18 years and older): The odds of being unlikely to get vaccinated versus being likely or already vaccinated, all provinces, April to May 2021 (continued)

	Sample size[1]	Percent unlikely to be vaccinated			Simple logistic regression				Multiple logistic regression[2]			
			95% confidence interval[3]		Odds ratio	95% confidence interval[4]			Adjusted odds ratio	95% confidence interval[4]		
	n	percent	from	to	Odds ratio	from	to	p-value	Adjusted odds ratio	from	to	p-value
Level of education[6]												
Less than secondary	908	9	6	12	3.1 *	1.7	5.7	<0.001	3.4 *	1.6	7.2	<0.001
Secondary	2,499	6	5	8	2 *	1.2	3.4	0.002	1.5	0.9	2.7	0.198
Postsecondary	3,751	6	5	7	1.9 *	1.2	3.1	0.002	1.7	1.0	2.8	0.060
University†	3,433	3	2	4	1.0	…	…	…	1.0	…	…	…
Household income												
<$30,000	1,438	7	5	9	2.4 *	1.2	5.0	0.008	2.7 *	1.0	7.0	0.037
$30,000 to <$60,000	2,412	5	3	8	2.0	1.0	4.1	0.084	2.2	0.9	5.6	0.134
$60,000 to <$90,000	2,011	6	4	8	2.0	1.0	1.0	0.084	2.0	0.8	4.6	0.215
$90,000 to <$120,000	1,377	4	2	5	1.2	0.5	2.8	0.998	1.2	0.5	3.2	0.996
$120,000 to <$150,000	863	6	5	7	1.5	0.5	4.7	0.932	1.4	0.4	4.8	0.980
≥$150,000†	1,684	3	2	4	1.0	…	…	…	1.0	…	…	…
Marital status												
Married or common law†	6,253	4	4	5	1.0	…	…	…	1.0	…	…	…
Never married	2,081	8	6	10	1.9 *	1.3	2.8	<0.001	1.4	0.8	2.5	0.291
Widowed, separated or divorced	2,283	4	3	5	1.0	0.7	1.4	1.000	1.0	0.7	1.6	0.981
Population groups												
Yes[7]	1,585	4	3	6	0.7	0.5	1.1	0.150	0.6 *	0.3	1.0	0.040
No†	8,947	5	5	6	1.0	…	…	…	1.0	…	…	…
Country of birth												
Canada†	8,445	6	5	6	1.0	…	…	…	1.0	…	…	…
Other	2,182	4	3	6	0.8	0.6	1.1	0.173	1.2	0.8	1.8	0.499
Chronic medical condition[8]												
At least one	3,225	4	3	5	0.8	0.6	0.6	0.091	0.9	0.6	1.2	0.370
None†	7,330	5	5	6	1.0	…	…	…	1.0	…	…	…
Community size												
1,500,000 or more†	2,094	4	3	5	1.0	…	…	…	1.0	…	…	…
500,000 to 1,499,999	1,988	5	4	6	1.2	0.7	2.1	0.889	0.9	0.4	1.9	0.998
100,000 to 499,999	2,717	6	4	8	1.4	0.8	2.7	0.474	1.3	0.6	2.9	0.874
10,000 to 99,999	1,784	6	5	8	1.6	0.9	2.6	0.126	1.4	0.6	3.0	0.786
Fewer than 10,000	2,045	7	6	9	1.9 *	1.1	3.3	0.021	1.6	0.7	3.5	0.463

… not applicable

† reference category

* significantly different from reference category (p < 0.05)

[1] Sample sizes for proportions and simple logistic regression models do not always sum up to total n=10,678 because of missing values in predictor and outcome variables.

[2] The sample size for the multiple logistic regression is n=10,286. This model includes all variables listed in the table.

[3] Wilson score interval for binomial proportions.

[4] The 95% confidence intervals for odds ratios were adjusted using the Tukey–Kramer method for multiple comparisons.

[5] Indigenous includes off-reserve First Nations people, Métis or Inuit.

[6] The highest certificate, diploma or degree completed is the classification used for the level of education. "Postsecondary" education includes College, CEGEP, apprenticeship, trades, or other non-university certificate or diploma. "University" education includes Bachelor's degree or above.

[7] individuals who self-identify using one of the response categories set out in the Employment Equity Act, specifically, South Asian, Chinese, Black, Filipino, Arab, Latin American, Southeast Asian, West Asian, Korean and Japanese.

[8] Chronic medical conditions leading to a higher risk of severe outcome from COVID-19 include obesity, heart disease, diabetes, liver disease, chronic kidney disease, Alzheimer's disease, chronic lung disease, immunocompromised or immunosuppressed.

Source: Public Health Agency of Canada and Statistics Canada, COVID-19 Vaccine Coverage Survey, Cycle 2 (April 12 to May 12, 2021).

Discussion

Vaccination status among seniors 60 years and older

According to the CVCS, seniors in all provinces except Quebec had higher odds of being unvaccinated (compared with seniors in Saskatchewan). This was expected as provinces rolled out vaccines for this age group at different times. Saskatchewan and Quebec lowered the vaccination eligibility age to 60 years and older in late March to early April 2021, a few weeks earlier than other provinces.[27-29]

Significant differences in COVID-19 non-vaccination among seniors were found. Those with a household income of less than $60,000 had lower coverage than those earning at least $150,000. The association between lower household income and being unvaccinated suggests a lower vaccine uptake in people of lower socioeconomic status. However, data from this survey provide no insight on the causal mechanisms underlying this association. Few Canadian studies have yet to cover income disparities in COVID-19 vaccine uptake. However, in Canada, some parallels were observed between COVID-19 vaccine uptake and vaccination against influenza, where lower income was a significant predictor of non-vaccination.[30,31]

A cross-sectional study in Wales, United Kingdom, that targeted individuals aged 50 years and older found lower rates of vaccination among ethnic minority groups (e.g., Black ethnic group).[30] In contrast, among individuals aged 60 years and older in Canada, this study (when adjusted for other sociodemographic factors) found no significant difference in the odds of being unvaccinated when comparing those who were part of population groups with those who were not.[30] While some studies have shown that specific ethnic minority groups had higher or lower vaccine uptake compared with White-,[13,30] the small sample sizes in the CVCS of seniors who self-identified as part of a population group prevented further breakdown, thereby obscuring any potential differences. Further research on COVID-19 vaccination coverage with larger samples of racialized populations in the Canadian context would be needed to ascertain the current situation.

The study in Wales, United Kingdom also found that the odds of being vaccinated against COVID-19 were lower for males compared with females.[30] Although not statistically significant, the current study showed that senior males had higher odds of being unvaccinated, aligning with this previous finding. In Canada, no gender differences were observed in influenza vaccination coverage.[31] The association between community size and vaccination coverage showed a clear dose-response relationship in the CVCS, with a lower proportion of vaccinated seniors living in smaller communities. This aligns with previous findings in Canada, where health care workers living in rural British Columbia had lower vaccination rates compared with health care workers in urban centres.[32] Similarly, lower COVID-19 vaccination rates in rural areas were observed in the United States.[33] The level of education, health care infrastructure and political views were the reasons

put forward by the authors to explain this difference in the United States.

Vaccination intent among all adults 18 years and older

In the adjusted intent model, the odds of being unlikely to get vaccinated were significantly greater in individuals who were male, younger (younger than 60 years of age), less educated, not part of a population group, not a health care worker and in lower-income households. Similar evidence was found for age and education in recent Canadian studies.[12,18,34,35] People part of a population group, Indigenous people and essential non-health care workers also had lower adjusted odds of intending to receive a COVID-19 vaccine.[17] However, in the present study, Indigenous identity did not present a statistically significant association with vaccination intent, and, in contrast, the odds of being unlikely to get vaccinated were greater in people not part of a population group than in people who were. Recent studies conducted in the United States found that ethnic groups, particularly Asian and Hispanic people, were more likely to accept COVID-19 vaccines than White people, with Asian people having the lowest levels of hesitancy.[36,37] With NACI recommending that health care workers be prioritized to receive a vaccine in Canada,[38] this may in part explain the present study's findings of higher vaccine uptake and vaccination intent among health care workers. Conversely, studies found higher vaccine hesitancy in non White ethnic populations;[39,40] therefore, further investigation is warranted to examine the association between COVID-19 vaccination intent and racialized populations, especially as it may vary across these groups.

According to the CVCS results, males had higher odds of being unlikely to get vaccinated against COVID-19. This contrasts with some findings observed in other studies conducted in Canada and other countries that females had a lower vaccination intent.[12,16,17,20,36,40] In a study conducted in Saskatchewan, being a recent immigrant (born outside Canada and living in the country for less than 20 years) was associated with a greater likelihood of vaccine hesitancy.[16] Conversely, in the present study, no significant association was observed with country of birth at the national level. Moreover, there was no strong association between being unlikely to get vaccinated and having a CMC in the simple or the multiple regression models. Nevertheless, a recent study from Quebec demonstrated that having, or living with someone with, CMCs and increased risk perceptions of COVID-19 remained one of the strongest predictors of COVID-19 vaccination intent.[12] This potential difference between Canada and Quebec might be in part because of the high mortality rate seen in Quebec during the first wave of the pandemic,[41] increasing the perceived risks of COVID-19 among Quebecers.[12]

Strengths and limitations

As with any large-scale survey, the CVCS has several strengths and limitations that must be considered when interpreting the

results. The major strengths of the survey were the sufficiently large sample size and the high response rate of 59.2%. These allowed for analysis by various sociodemographic factors. Analyses were conducted using calibrated sampling weights to ensure the estimates were representative of all Canadians living in the 10 provinces.

Some study limitations need to be acknowledged. According to the CVCS sampling frame, approximately 95.4% of the dwellings had a mailing address. The small proportion of the population without a mailing address, which may differ from the rest of the target population, was therefore excluded from the sampling frame.

Like many other Statistics Canada surveys, the CVCS excluded First Nations communities on reserve and institutionalized individuals. Exclusion of the latter group could impact the ability to generalize the findings on determinants of COVID-19 non-vaccination in the entire population aged 60 years and older. The territories were also excluded from the analysis, and this could impact coverage of Indigenous people. Interviews were conducted only in English or French, excluding respondents who are not fluent in either official language. This limitation could affect the representation of some population groups in the CVCS results because the language barrier could prevent them from participating. These populations may have differences in access to, or utilization of, health care services from that of other Canadian adults.

The measures in the CVCS are self-reported and may also be subject to recall bias and social desirability bias. However, recall bias is less likely to occur in the present study given that data collection ended less than five months after the beginning of the COVID-19 vaccine rollout plans. Despite a satisfactory response rate, response bias cannot be ruled out. Indeed, those with greater interest in the topic would be more likely to respond to the survey. The survey estimates are adjusted to account for non-response through the survey weights.

However, to the extent that non-responding households and people differ from the rest of the sample, residual selection bias cannot be completely eliminated.

It is conceivable that other factors not measured in this survey could also be associated with the modelled outcomes. Further research is warranted to explore other potential determinants.

Conclusion

The present study highlighted Canadians' positive attitudes toward vaccination. By May 2021, the majority of the adult population was either vaccinated with at least one dose (45%) or stated to be likely to receive a COVID-19 vaccine in the future (49%). In the CVCS, those who were male, were younger, were not part of a population group, not a health care worker and had a lower level of education or household income were associated with being unlikely to be vaccinated against COVID-19. Continued efforts to reach vaccine hesitant groups and promote vaccine uptake are essential to protecting all Canadians against the disease.

Acknowledgements

Appendix Table A

Weighted proportions for intent to get vaccinated by sociodemographic factors among adults (aged 18 years and older), all provinces, April to May 2021

	Vaccinated				Not vaccinated, likely				Not vaccinated, unlikely			
			95% confidence interval[1]				95% confidence interval[1]				95% confidence interval[1]	
	n	%	from	to	n	%	from	to	n	%	from	to
Overall	5,542	45	44	47	4,609	49	48	51	502	5	5	6
Province												
British Columbia	548	46	43	50	459	48	45	52	54	6	4	8
Alberta	542	46	43	49	397	48	45	52	59	6	4	8
Saskatchewan	518	54	50	57	240	40	36	43	47	7	5	9
Manitoba	491	42	39	45	421	50	47	54	53	8	6	10
Ontario	1,081	45	43	47	872	51	48	53	90	5	4	6
Quebec	839	47	45	50	551	48	45	50	63	5	4	7
New Brunswick	362	40	36	43	371	55	51	59	44	5	4	8
Nova Scotia	414	36	33	39	473	59	56	62	35	5	3	8
Prince Edward Island	348	33	30	37	435	62	58	65	31	5	3	8
Newfoundland and Labrador	399	43	40	47	390	53	49	57	26	4	2	6
Age												
18 to 29	173	17	14	20	739	77	73	80	63	7	5	9
30 to 39	361	26	23	29	1,039	67	64	71	109	7	5	9
40 to 49	548	34	31	37	1,076	59	56	63	111	7	5	9
50 to 59	805	45	42	49	927	50	46	53	85	5	4	6
60 to 69	1,544	71	68	74	656	26	23	29	71	3	2	4
70 and older	2,099	91	89	92	163	7	5	8	63	3	2	4
Health care worker												
Yes	800	83	79	86	187	16	12	19	26	2	1	3
No	4,689	41	40	42	4,392	53	52	55	470	6	5	6
Indigenous identity[2]												
Indigenous	165	53	44	61	127	39	31	48	28	8	5	13
Non-Indigenous	5,363	45	44	46	4,475	50	48	51	470	5	4	6
Gender												
Male	2,245	40	38	42	2,171	54	52	56	248	6	5	7
Female	3,292	51	49	53	2,431	45	43	47	250	4	3	5
Level of education[3]												
Less than secondary	592	59	53	64	249	32	27	38	67	9	6	12
Secondary	1,314	42	39	45	1,041	52	49	55	144	6	5	8
Postsecondary	1,886	45	42	47	1,681	50	47	52	184	6	5	7
University	1,710	46	44	48	1,622	51	49	53	101	3	2	4
Household income												
<$30,000	809	46	43	50	527	47	42	51	102	7	5	9
$30,000 to <$60,000	1,353	50	47	53	940	44	41	47	119	6	5	7
$60,000 to <$90,000	984	39	36	42	934	55	52	58	93	6	4	8
$90,000 to <$120,000	666	44	40	48	664	52	49	56	47	4	2	5
$120,000 to <$150,000	380	41	37	46	454	54	50	59	29	5	3	8
≥$150,000	840	46	43	49	798	51	48	54	46	3	2	4
Marital status												
Never married	677	24	22	27	1,260	68	65	71	144	8	6	10
Married or common law	3,303	50	48	52	2,708	46	44	47	242	4	4	5
Widowed, separated or divorced	1,542	65	62	68	631	31	28	33	110	4	3	5
Chronic medical condition[4]												
At least one	2,009	59	57	62	1,088	36	34	39	128	4	3	5
None	3,484	41	39	42	3,479	54	52	56	367	5	5	6
Country of birth												
Canada	4,527	47	46	49	3,514	47	46	49	404	6	5	6
Other	1,000	41	38	43	1,087	55	52	58	95	4	3	6
Population groups												
Yes[5]	600	34	31	37	923	62	59	65	62	4	3	6
No	4,887	50	48	51	3,638	45	44	47	422	5	5	6
Community size												
1,500,000 or more	1,131	45	42	47	890	51	49	54	73	4	3	5
500,000 to 1,499,999	1,029	43	40	46	869	53	50	55	90	5	4	6
100,000 to 499,999	1,356	42	39	45	1,251	52	49	56	110	6	4	6
10,000 to 99,999	881	49	45	53	805	44	40	48	98	6	5	8
Fewer than 10,000	1,132	53	49	56	786	40	37	44	127	7	6	9

[1] Wilson score interval for proportions.

[2] Indigenous includes off-reserve First Nations people, Métis or Inuit.

[3] The highest certificate, diploma or degree completed is the classification used for the level of education. "Postsecondary" education includes College, CEGEP, apprenticeship, trades, or other non-university certificate or diploma. "University" education includes Bachelor's degree or above.

[4] Chronic medical conditions leading to a higher risk of severe outcome from COVID-19 include obesity, heart disease, diabetes, liver disease, chronic kidney disease, Alzheimer's disease, chronic lung disease, immunocompromised or immunosuppressed.

[5] individuals who self-identify using one of the response categories set out in the Employment Equity Act, specifically, South Asian, Chinese, Black, Filipino, Arab, Latin American, Southeast Asian, West Asian, Korean and Japanese.

Source: Public Health Agency of Canada and Statistics Canada, COVID-19 Vaccine Coverage Survey, Cycle 2 (April 12 to May 12, 2021).

Appendix Table B

Unadjusted and adjusted associations between sociodemographic factors and vaccine uptake among non-seniors (18 to 59 years old): The odds of being unvaccinated versus having at least one dose, all provinces, April to May 2021

	Sample size	% not vaccinated			Simple logistic regression				Multiple logistic regression			
			95% confidence interval[1]				95% confidence interval[2]			Adjusted odds ratio	95% confidence interval[2]		
	n	%	from	to	Odds ratio	from	to	p-value			from	to	p-value
Province												
British Columbia	604	67	62	71	1.2	0.7	1.9	0.982	2.0 *	1.0	3.8	0.038
Alberta	640	66	62	70	1.1	0.7	1.7	0.996	1.5	0.8	2.9	0.582
Saskatchewan[†]	471	63	58	67	1.0	…	…	…	1.0	…	…	…
Manitoba	582	74	70	78	1.7 *	1.0	2.6	0.020	2.6 *	1.2	5.6	0.004
Ontario	1,239	70	68	73	1.4	1.0	2.0	0.112	2.0 *	1.2	3.5	0.002
Quebec	774	72	69	76	1.5 *	1.0	2.3	0.025	2.6 *	1.4	4.9	<0.001
New Brunswick	419	76	72	80	1.9 *	1.2	3.1	0.002	2.8 *	1.4	5.6	<0.001
Nova Scotia	485	83	80	86	2.9 *	1.7	4.9	<0.001	5.4 *	2.7	10.9	<0.001
Prince Edward Island	413	81	76	85	2.4 *	1.4	4.2	<0.001	3.9 *	1.8	8.5	<0.001
Newfoundland and Labrador	426	74	69	79	1.7 *	1.0	2.8	0.048	3.6 *	1.7	7.5	<0.001
Age												
18 to 29	979	84	80	86	4.2 *	3.0	6.0	<0.001	5.8 *	3.7	9.0	<0.001
30 to 39	1,516	74	71	77	2.4 *	1.8	3.2	<0.001	4.0 *	2.8	5.9	<0.001
40 to 49	1,735	66	63	69	1.6 *	1.3	2.1	<0.001	2.1 *	1.6	2.8	<0.001
50 to 59[†]	1,818	55	51	58	1.0	…	…	…	1.0	…	…	…
Health care worker												
Yes	857	18	15	21	0.1 *	0.0	0.1	<0.001	0.0 *	0.0	0.1	<0.001
No[†]	5,151	78	77	80	1.0	…	…	…	1.0	…	…	…
Indigenous identity												
Indigenous[3]	218	57	46	67	0.6	0.4	0.9	0.080	0.4 *	0.2	0.9	0.021
Non-Indigenous[†]	5,824	71	71	72	1.0	…	…	…	1.0	…	…	…
Gender												
Female	3,347	64	61	66	0.5 *	0.5	0.6	<0.001	0.7 *	0.6	0.9	<0.001
Male[†]	2,696	77	74	79	1.0	…	…	…	1.0	…	…	…
Level of education[4]												
Less than secondary	208	78	69	84	2.0 *	1.1	3.7	0.021	1.8	0.9	3.6	0.153
Secondary	1,192	82	78	84	2.5 *	1.8	3.5	<0.001	1.8 *	1.3	2.6	<0.001
Postsecondary	2,208	70	68	73	1.3 *	1.1	1.7	0.005	1.5 *	1.1	2.0	0.002
University[†]	2,416	64	61	66	1.0	…	…	…	1.0	…	…	…
Household income												
<$30,000	537	79	74	84	2.6 *	1.5	4.3	<0.001	1.8 *	1.0	3.1	0.046
$30,000 to <$60,000	1,033	76	72	80	2.1 *	1.4	3.1	<0.001	1.5	0.9	2.5	0.122
$60,000 to <$90,000	1,149	78	75	82	2.4 *	1.7	3.5	<0.001	2.1 *	1.3	3.2	<0.001
$90,000 to <$120,000	913	68	64	72	1.4	1.0	2.0	0.114	1.2	0.8	1.9	0.804
$120,000 to <$150,000	654	68	63	73	1.4	0.9	2.1	0.149	1.1	0.7	1.8	0.992
≥$150,000[†]	1,380	60	56	64	1.0	…	…	…	1.0	…	…	…
Marital status												
Married or common law[†]	3,650	65	63	67	1.0	…	…	…	1.0	…	…	…
Never married	1,676	81	78	83	2.3 *	1.8	1.3	<0.001	1.1	0.8	1.5	0.678
Widowed, separated or divorced	710	65	59	70	1.0	0.7	2.9	0.997	1.0	0.7	1.5	0.989
Population groups												
Yes[5]	1,261	74	71	77	1.3 *	1.1	1.6	0.004	1.2	0.9	1.7	0.138
No[†]	4,717	69	67	70	1.0	…	…	…	1.0	…	…	…
Country of birth												
Canada[†]	4,618	69	67	70	1.0	…	…	…	1.0	…	…	…
Other	1,421	74	71	77	1.2	1.0	1.5	0.046	1.2	0.9	1.6	0.176
Chronic medical condition[6]												
At least one	1,333	62	58	66	0.6 *	0.5	0.8	<0.001	0.7 *	0.6	0.9	0.003
None[†]	4,657	72	70	74	1.0	…	…	…	1.0	…	…	…
Community size												
1,500,000 or more[†]	1,323	69	66	72	1.0	…	…	…	1.0	…	…	…
500,000 to 1,499,999	1,255	72	68	75	1.1	0.8	1.5	0.804	1.6	1.0	2.5	0.051
100,000 to 499,999	1,593	77	73	80	1.5 *	1.1	2.0	0.012	2.1 *	1.4	3.1	<0.001
10,000 to 99,999	917	68	63	73	1.0	0.6	1.4	0.997	1.6	1.0	2.6	0.053
Fewer than 10,000	947	65	60	69	0.8	0.6	1.2	0.544	1.2	0.7	1.9	0.906

… not applicable

[†] reference category

* significantly different from reference category (p < 0.05)

[1] Wilson score interval for binomial proportions.

[2] The 95% confidence intervals for odds ratios were adjusted using the Tukey–Kramer method for multiple comparisons.

[3] Indigenous includes off-reserve First Nations people, Métis or Inuit.

[4] The highest certificate, diploma or degree completed is the classification used for the level of education. "Postsecondary" education includes College, CEGEP, apprenticeship, trades, or other non-university certificate or diploma. "University" education includes Bachelor's degree or above.

[5] individuals who self-identify using one of the response categories set out in the Employment Equity Act, specifically, South Asian, Chinese, Black, Filipino, Arab, Latin American, Southeast Asian, West Asian, Korean and Japanese.

[6] Chronic medical conditions leading to a higher risk of severe outcome from COVID-19 include obesity, heart disease, diabetes, liver disease, chronic kidney disease, Alzheimer's disease, chronic lung disease, immunocompromised or immunosuppressed.

Source: Public Health Agency of Canada and Statistics Canada, COVID-19 Vaccine Coverage Survey, Cycle 2 (April 12 to May 12, 2021).

Appendix Table C

Unadjusted and adjusted associations between sociodemographic factors and vaccination intent among seniors (60 years and older) and non-seniors (18 to 59 years old): The odds of being unlikely to get vaccinated versus being likely or already vaccinated, all provinces, April to May 2021

	Sample size	% unlikely to get vaccinated			Simple logistic regression				Multiple logistic regression			
			95% confidence interval[1]		Odds ratio	95% confidence interval[2]		p-value	Adjusted odds ratio	95% confidence interval[2]		p-value
	n	%	from	to		from	to			from	to	
Overall	6,041	6	5	7	...	...	...	...	...	...	...	...
Province												
British Columbia	604	7	4	10	0.8	0.3	2.1	1.000	1.2	0.4	3.7	1.000
Alberta	638	7	5	10	0.8	0.3	2.1	1.000	2.3	0.5	4.0	0.998
Saskatchewan[†]	470	8	6	11	1.0	...	...	...	1.0	...	...	...
Manitoba	582	10	7	14	1.3	0.5	3.1	0.997	2.0	0.7	5.9	0.634
Ontario	1,236	6	4	7	0.7	0.3	1.5	0.901	1.0	0.4	2.7	1.000
Quebec	772	6	5	9	0.8	0.3	1.9	0.997	1.0	0.3	3.0	1.000
New Brunswick	417	5	3	9	0.7	0.2	1.9	0.963	0.7	0.2	2.1	0.978
Nova Scotia	484	6	4	10	0.8	0.3	2.4	1.000	0.8	0.2	2.8	1.000
Prince Edward Island	413	6	4	10	0.8	0.2	2.3	0.999	0.8	0.2	3.0	1.000
Newfoundland and Labrador	425	5	3	7	0.6	0.2	1.7	0.790	0.5	0.1	1.7	0.718
Age												
18 to 29	975	7	5	9	1.4	0.8	2.6	0.439	1.2	0.5	2.7	0.944
30 to 39	1,509	7	5	9	1.4	0.8	2.3	0.363	1.5	0.8	2.7	0.275
40 to 49	1,735	7	5	9	1.4	0.8	2.4	0.335	1.5	0.8	2.6	0.304
50 to 59[†]	1,817	5	4	6	1.0	...	...	...	1.0	...	...	...
60 to 64	...	...	...	...	...	...	...	...	...	...	...	...
65 to 69	...	...	...	...	...	...	...	...	...	...	...	...
70 to 79	...	...	...	...	...	...	...	...	...	...	...	...
80 and older[†]	...	...	...	...	...	...	...	...	...	...	...	...
Health care worker												
Yes	857	2	1	3	0.3 *	0.1	0.5	<0.001	0.3 *	0.2	0.6	0.001
No[†]	5,141	7	5	8	1.0	...	...	...	1.0	...	...	...
Indigenous identity												
Indigenous[3]	218	11	6	17	1.8	1.0	3.4	0.052	1.3	0.7	2.6	0.386
Non-Indigenous[†]	5,814	6	5	7	1.0	...	...	...	1.0	...	...	...
Gender												
Female	3,340	5	4	6	0.6 *	0.4	0.8	<0.001	0.7 *	0.5	1.0	0.024
Male[†]	2,691	8	6	9	1.0	...	...	...	1.0	...	...	...
Education[4]												
Less than secondary	207	16	10	25	5.4 *	2.3	12.9	<0.001	3.8 *	1.4	10.4	0.003
Secondary	1,190	8	6	11	2.5 *	1.4	4.5	<0.001	1.7	0.9	3.2	0.144
Postsecondary	2,205	7	6	9	2.3 *	1.3	3.8	<0.001	1.9 *	1.1	3.3	0.026
University[†]	2,413	3	3	5	1.0	...	...	...	1.0	...	...	...
Household income												
<$60,000	1,569	9	7	11	2.5 *	1.4	4.5	<0.001	2.1	0.9	4.9	0.087
$60,000 to <$120,000	2,059	6	5	8	1.7	0.9	3.0	0.117	1.6	0.8	3.1	0.364
≥$120,000[†]	2,034	4	3	5	1.0	...	...	...	1.0	...	...	...
Marital status												
Married or common law[†]	3,646	5	4	6	1.0	...	...	...	1.0	...	...	...
Never married	1,672	8	6	10	1.1	0.7	1.8	0.837	1.0	0.5	1.7	0.989
Widowed, separated or divorced	709	6	4	8	1.6 *	1.1	2.4	0.014	1.4	0.8	2.7	0.363
Population groups												
Yes[5]	1,243	4	3	6	0.6 *	0.4	1.0	0.033	0.5 *	0.3	0.9	0.031
No[†]	4,712	7	6	8	1.0	...	...	...	1.0	...	...	...
Country of birth												
Canada[†]	4,613	7	6	8	1.0	...	...	...	1.0	...	...	...
Other	1,416	5	4	7	0.8	0.5	1.1	0.162	1.3	0.8	2.2	0.304
Chronic medical condition[6]												
At least one	1,329	5	4	7	0.8	0.6	1.2	0.363	0.8	0.5	1.2	0.302
None[†]	4,653	6	5	8	1.0	...	...	...	1.0	...	...	...
Community size												
1,500,000 or more[†]	1,319	5	4	7	1.0	...	...	...	1.0	...	...	...
500,000 to 1,499,999	1,253	5	4	7	1.1	0.6	2.0	0.932	0.8	0.3	1.8	0.932
100,000 to 499,999	1,589	8	5	10	1.6	0.8	3.1	0.842	1.4	0.6	3.4	0.842
10,000 to 99,999	916	7	5	10	1.5	0.8	2.9	0.997	1.1	0.4	2.9	0.997
Fewer than 10,000	946	10	7	13	2.1	1.1	4.1	0.774	1.5	0.6	3.7	0.774

... not applicable

F too unreliable to be published

† reference category

* significantly different from reference category (p < 0.05)

[1] Wilson score interval for binomial proportions.

[2] The 95% confidence intervals for odds ratios were adjusted using the Tukey–Kramer method for multiple comparisons.

[3] Indigenous includes off-reserve First Nations people, Métis or Inuit.

[4] The highest certificate, diploma or degree completed is the classification used for education. "Postsecondary" education includes College, CEGEP, apprenticeship, trades, or other non-university certificate or diploma. "University" education includes Bachelor's degree or above.

[5] individuals who self-identify using one of the response categories set out in the Employment Equity Act, specifically, South Asian, Chinese, Black, Filipino, Arab, Latin American, Southeast Asian, West Asian, Korean and Japanese.

[6] Chronic medical conditions leading to a higher risk of severe outcome from COVID-19 include obesity, heart disease, diabetes, liver disease, chronic kidney disease, Alzheimer's disease, chronic lung disease, immunocompromised or immunosuppressed.

Source: Public Health Agency of Canada and Statistics Canada, COVID-19 Vaccine Coverage Survey, Cycle 2 (April 12 to May 12, 2021).

Appendix Table C

Unadjusted and adjusted associations between sociodemographic factors and vaccination intent among seniors (60 years and older) and non-seniors (18 to 59 years old): The odds of being unlikely to get vaccinated versus being likely or already vaccinated, all provinces, April to May 2021 (continued)

	Sample size	% unlikely to get vaccinated			Simple logistic regression				Multiple logistic regression			
			95% confidence interval[1]			95% confidence interval[2]			Adjusted	95% confidence interval[2]		
	n	%	from	to	Odds ratio	from	to	p-value	odds ratio	from	to	p-value
Overall	4,611	3	2	3	…	…	…	…	…	…	…	…
Province												
British Columbia	457	3	2	6	0.9	0.2	4.1	1.000	1.6	0.3	7.9	0.995
Alberta	360	4	3	7	1.2	0.3	5.4	1.000	1.1	0.2	7.0	1.000
Saskatchewan[†]	335	4	2	7	1.0	…	…	…	1.0	…	…	…
Manitoba	383	2	1	6	0.7	0.1	5.4	1.000	0.7	0.1	6.5	1.000
Ontario	806	2	2	4	0.7	0.2	2.9	0.998	0.9	0.2	4.1	1.000
Quebec	681	2	1	3	0.6	0.1	2.6	0.975	0.7	0.1	3.8	0.999
New Brunswick	360	5	3	9	1.5	0.3	6.7	0.997	1.8	0.4	9.0	0.980
Nova Scotia	438	3	2	6	0.8	0.2	4.6	1.000	0.7	0.1	4.7	1.000
Prince Edward Island	401	3	1	5	0.8	0.1	4.5	1.000	0.6	0.1	3.9	0.996
Newfoundland and Labrador	390	2	1	4	0.6	0.1	3.4	0.995	0.6	0.1	3.5	0.995
Age												
18 to 29	…	…	…	…	…	…	…	…	…	…	…	…
30 to 39	…	…	…	…	…	…	…	…	…	…	…	…
40 to 49	…	…	…	…	…	…	…	…	…	…	…	…
50 to 59[†]	…	…	…	…	…	…	…	…	…	…	…	…
60 to 64	1,142	3	2	5	1.2	0.5	3.1	0.929	1.9	0.6	5.3	0.432
65 to 69	1,129	2	1	4	0.8	0.3	2.2	0.948	1.0	0.3	3.0	1.000
70 to 79	1,593	3	2	4	1.0	0.4	2.5	1.000	1.3	0.5	3.5	0.925
80 and older[†]	732	3	2	5	1.0	…	…	…	1.0	…	…	…
Health care worker												
Yes	156	F	…	…	…	…	…	…	…	…	…	…
No[†]	4,409	3	2	3	1.0	…	…	…	1.0	…	…	…
Indigenous identity												
Indigenous[3]	102	F	…	…	…	…	…	…	…	…	…	…
Non-Indigenous[†]	4,493	3	2	3	1.0	…	…	…	1.0	…	…	…
Gender												
Female	2,633	3	2	4	1.2	0.7	1.8	0.531	1.1	0.6	1.9	0.716
Male[†]	1,972	3	2	4	1.0	…	…	…	1.0	…	…	…
Education[4]												
Less than secondary	701	5	3	8	2.7	1.0 *	7.1	0.036	1.9	0.6	5.7	0.481
Secondary	1,308	3	2	4	1.3	0.5	3.5	0.884	1.0	0.3	3.0	1.000
Postsecondary	1,546	2	1	3	1.1	0.4	2.8	0.996	0.7	0.2	2.1	0.825
University[†]	1,020	2	1	3	1.0	…	…	…	1.0	…	…	…
Household income												
<$60,000	2,281	3	2	4	1.8	0.4	7.6	0.733	1.4	0.3	6.2	0.933
$60,000 to <$120,000	1,329	2	1	3	0.8	0.2	3.8	0.986	0.6	0.1	2.8	0.820
≥$120,000[†]	513	2	1	4	1.0	…	…	…	1.0	…	…	…
Marital status												
Married or common law[†]	2,606	2	2	3	1.0	…	…	…	1.0	…	…	…
Never married	409	4	2	8	1.9	0.7	5.4	0.321	1.4	0.4	4.5	0.803
Widowed, separated or divorced	1,574	3	2	5	1.5	0.8	2.7	0.242	1.2	0.6	2.4	0.845
Population groups												
Yes[5]	326	2	1	4	0.7	0.2	2.0	0.506	0.9	0.2	4.0	0.929
No[†]	4,234	3	2	3	1.0	…	…	…	1.0	…	…	…
Country of birth												
Canada[†]	3,831	3	2	4	1.0	…	…	…	1.0	…	…	…
Other	766	2	1	3	0.6	0.3	1.2	0.156	0.8	0.3	1.8	0.564
Chronic medical condition[6]												
At least one	1,896	3	2	4	1.3	0.8	2.0	0.334	1.2	0.7	2.0	0.447
None[†]	2,676	2	2	3	1.0	…	…	…	1.0	…	…	…
Community size												
1,500,000 or more[†]	775	1	1	2	1.0	…	…	…	1.0	…	…	…
500,000 to 1,499,999	734	3	2	5	2.6	0.8	9.0	0.204	2.7	0.6	12.2	0.382
100,000 to 499,999	1,128	2	1	3	1.3	0.3	4.8	0.990	1.2	0.3	5.2	0.997
10,000 to 99,999	868	5	3	8	4.3 *	1.4	13.5	0.005	3.7 *	1.1	13.2	0.035
Fewer than 10,000	1,099	4	2	6	3.1	1.0	9.6	0.061	2.9	0.8	10.6	0.152

… not applicable

F too unreliable to be published

† reference category

* significantly different from reference category (p < 0.05)

[1] Wilson score interval for binomial proportions.

[2] The 95% confidence intervals for odds ratios were adjusted using the Tukey–Kramer method for multiple comparisons.

[3] Indigenous includes off-reserve First Nations people, Métis or Inuit.

[4] The highest certificate, diploma or degree completed is the classification used for education. "Postsecondary" education includes College, CEGEP, apprenticeship, trades, or other non-university certificate or diploma. "University" education includes Bachelor's degree or above.

[5] individuals who self-identify using one of the response categories set out in the Employment Equity Act, specifically, South Asian, Chinese, Black, Filipino, Arab, Latin American, Southeast Asian, West Asian, Korean and Japanese.

[6] Chronic medical conditions leading to a higher risk of severe outcome from COVID-19 include obesity, heart disease, diabetes, liver disease, chronic kidney disease, Alzheimer's disease, chronic lung disease, immunocompromised or immunosuppressed.

Source: Public Health Agency of Canada and Statistics Canada, COVID-19 Vaccine Coverage Survey, Cycle 2 (April 12 to May 12, 2021).

References

1. National Advisory Committee on Immunization. Recommendations on the use of COVID-19 vaccines. Ottawa (ON): Public Health Agency of Canada; 2021 [updated 2022 Jan 6; cited 2022 Jun 20]. Available from: https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-4-active-vaccines/page-26-covid-19-vaccine.html.

2. Harder T, Koch J, Vygen-Bonnet S, Külper-Schiek W, Pilic A, Reda S, et al. Efficacy and effectiveness of COVID-19 vaccines against SARS-CoV-2 infection: interim results of a living systematic review, 1 January to 14 May 2021. Euro surveillance. 2021;26(28):2100563. DOI: 10.2807/1560-7917.ES.2021.26.28.2100563.

3. McDonald I, Murray SM, Reynolds CJ, Altmann DM, Boyton RJ. Comparative systematic review and meta-analysis of reactogenicity, immunogenicity and efficacy of vaccines against SARS-CoV-2. npj Vaccines. 2021;6:74. DOI: 10.1038/s41541-021-00336-1.

4. Tregoning JS, Flight KE, Higham SL, Wang Z, Pierce BF. Progress of the COVID-19 vaccine effort: viruses, vaccines and variants versus efficacy, effectiveness and escape. Nature Reviews Immunology. 2021;21:626-36. DOI: 10.1038/s41577-021-00592-1.

5. Skowronski DM, Setayeshgar S, Zou M, Prystajecky N, Tyson JR, Sbihi H, et al. Comparative single-dose mRNA and ChAdOx1 vaccine effectiveness against SARS-CoV-2, including variants of concern: test-negative design, British Columbia, Canada. The Journal of Infectious Diseases. 2022;226(1):485-96. DOI: 10.1093/infdis/jiac023.

6. Skowronski DM, Febriani Y, Ouakki M, Setayeshgar S, El Adam S, Zou M, et al. Two-dose SARS-CoV-2 vaccine effectiveness with mixed schedules and extended dosing intervals: test-negative design studies from British Columbia and Quebec, Canada. Clinical Infectious Diseases. 2022:ciac290. [Online ahead of print]. DOI: 10.1093/cid/ciac290.

7. Chung H, He S, Nasreen S, Sundaram ME, Buchan SA, Wilson SE, et al. Effectiveness of BNT162b2 and mRNA-1273 covid-19 vaccines against symptomatic SARS-CoV-2 infection and severe covid-19 outcomes in Ontario, Canada: test negative design study. BMJ. 2021;374:n1943. DOI: 10.1136/bmj.n1943.

8. Nasreen S, Chung H, He S, Brown KA, Gubbay JB, Buchan SA, et al. Effectiveness of COVID-19 vaccines against symptomatic SARS-CoV-2 infection and severe outcomes with variants of concern in Ontario. Nature Microbiology. 2022;7(3):379-85. DOI: 10.1038/s41564-021-01053-0.

9. Holtkamp N, Kolbe, A., and Beleche, T. COVID-19 Vaccination Associated with Reductions in COVID-19 Mortality and Morbidity in the United States, and an Approach to Valuing these Benefits. Washington (DC): Office of the Assistant Secretary for Planning and Evaluation, U.S. Department of Health and Human Services; 2021 [updated 2021 Dec 15; cited 2022 Jun 20]. Available from: https://aspe.hhs.gov/reports/economic-health-benefits-covid-19-vaccination#:~:text=Our%20estimates%20suggest%20that%20COVID,observed%20in%20COVID%2D19%20outcomes.

10. Eyre DW, Taylor D, Purver M, Chapman D, Fowler T, Pouwels KB, et al. Effect of Covid-19 Vaccination on Transmission of Alpha and Delta Variants. New England Journal of Medicine. 2022;386(8):744-56. DOI: 10.1056/NEJMoa2116597.

11. Macdonald N, SAGE Working Group on Vaccine Hesitancy. Vaccine hesitancy: Definition, scope and determinants. Vaccine. 2015;33(34):4161–4. DOI: 10.1016/j.vaccine.2015.04.036.

12. Dubé E, Dionne M, Pelletier C, Hamel D, Gadio S. COVID-19 vaccination attitudes and intention among Quebecers during the first and second waves of the pandemic: findings from repeated cross-sectional surveys. Human Vaccines & Immunotherapeutics. 2021;17(11):3922-32. DOI: 10.1080/21645515.2021.1947096.

13. Kirksey L, Milam AJ, Curry CW, Sorour AA. Vaccine hesitance and vaccine access in minority communities. Cleveland Clinic Journal of Medicine. 2021;89(9). DOI: 10.3949/ccjm.88a.ccc079.

14. Ismail SJ, Tunis MC, Zhao L, Quach C. Navigating inequities: a roadmap out of the pandemic. BMJ Global Health. 2021;6(1):e004087. DOI: 10.1136/bmjgh-2020-004087.

15. Iveniuk J, Leon S. An uneven recovery: Measuring COVID-19 vaccine equity in Ontario. Toronto (ON): Wellesley Institute; 2021 [updated 2022 Apr 16; cited 2022 Jun 20]. Available from: https://www.wellesleyinstitute.com/wp-content/uploads/2021/04/An-uneven-recovery-Measuring-COVID-19-vaccine-equity-in-Ontario.pdf.

16. Muhajarine N, Adeyinka DA, McCutcheon J, Green K, Fahlman M, Kallio N. COVID-19 vaccine hesitancy and refusal and associated factors in an adult population in Saskatchewan, Canada: Evidence from predictive modelling. PloS one. 2021;16(11):e0259513. DOI: 10.1371/journal.pone.0259513.

17. Ogilvie GS, Gordon S, Smith LW, Albert A, Racey CS, Booth A, et al. Intention to receive a COVID-19 vaccine: results from a population-based survey in Canada. BMC Public Health. 2021;21(1):1017. DOI: 10.1186/s12889-021-11098-9.

18. Dzieciolowska S, Hamel D, Gadio S, Dionne M, Gagnon D, Robitaille L, et al. Covid-19 vaccine acceptance, hesitancy, and refusal among Canadian healthcare workers: A multicenter survey. American Journal of Infection Control. 2021;49(9):1152-7. DOI: 10.1016/j.ajic.2021.04.079.

19. Barry V, Dasgupta, S., Weller, D. L., Kriss, J. L., Cadwell, B. L., Rose, C., Pingali, C., Musial, T., Sharpe, J. D., Flores, S. A., Greenlund, K. J., Patel, A., Stewart, A., Qualters, J. R., Harris, L., Barbour, K. E., & Black, C. L. Patterns in COVID-19 Vaccination Coverage, by Social Vulnerability and Urbanicity - United States, December 14, 2020-May 1, 2021. Morbidity and mortality weekly report (MMWR). 2021;70(22):818-24. DOI: 10.15585/mmwr.mm7022e1.

20. Robertson E, Reeve KS, Niedzwiedz CL, Moore J, Blake M, Green M, et al. Predictors of COVID-19 vaccine hesitancy in the UK household longitudinal study. Brain, Behavior, and Immunity. 2021;94:41-50. DOI: 10.1016/j.bbi.2021.03.008.

21. MacDonald N, Comeau J, Dubé È, Graham J, Greenwood M, Harmon S, et al. Royal society of Canada COVID-19 report: Enhancing COVID-19 vaccine acceptance in Canada. FACETS. 2021;6:1184-246. DOI: 10.1139/facets-2021-0037.

22. Bambra C, Riordan R, Ford J, Matthews F. The COVID-19 pandemic and health inequalities. Journal of Epidemiology and Community Health. 2020;74(11):964. DOI: 10.1136/jech-2020-214401.

23. Paremoer L, Nandi S, Serag H, Baum F. Covid-19 pandemic and the social determinants of health. BMJ. 2021;372:n129. DOI: 10.1136/bmj.n129.

24. Statistics Canada. COVID-19 Vaccination Coverage Survey (CVCS) Ottawa (ON): Government of Canada, ; 2021 [updated 2021 Jul 8; cited 2022 Jun 20]. Available from: https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=5347#a3.

25. Statistics Canada. Methodology of the Canadian Labour Force Survey. Ottawa (ON): Government of Canada; 2017 [updated 2017 Dec 21; cited 2022 Jun 20]. Report No.: 71-526-X. Available from: https://www150.statcan.gc.ca/n1/en/pub/71-526-x/71-526-x2017001-eng.pdf?st=65X1O_-f.

26. Curtin L, Kruszon-Moran D, Carroll M, Li X. Estimation and Analytic Issues for Rare Events in NHANES. Proceedings of the Survey Research Methods Section American Statistical Association. 2006:2893–903.

27. Government of Saskatchewan. COVID-19 Update For March 30: 184,436 Vaccines Administered, 164 New Cases, 201 Recoveries, One New Death [Press release]. 2021 [updated 2021 Mar 30; cited 2022 Jun 20]. Available from: https://www.saskatchewan.ca/government/news-and-media/2021/march/30/covid19-update-for-march-30-184436-vaccines-administered-164-new-cases-201-recoveries-one-new-death.

28. CBC News. COVID-19 in Quebec: What you need to know Monday. 2021 [updated 2021 Mar 22; cited 2022 Jun 20]. Available from: https://www.cbc.ca/news/canada/montreal/covid-19-in-quebec-need-to-know-march-22-1.5958721.

29. Minister for Health and Social Services. Pandémie de la COVID-19 – La vaccination s'accélère au Québec et est élargie à plus de groupes prioritaires [Press release]. 2021 [updated 2021 Apr 7; cited 2022 jun 20]. Available from: https://www.msss.gouv.qc.ca/ministere/salle-de-presse/communique-2748/

30. Perry M, Akbari A, Cottrell S, Gravenor MB, Roberts R, Lyons RA, et al. Inequalities in coverage of COVID-19 vaccination: A population register based cross-sectional study in Wales, UK. Vaccine. 2021;39(42):6256–61. DOI: 10.1016/j.vaccine.2021.09.019.

31. Farmanara N, Sherrard L, Dube E, Gilbert NL. Determinants of non-vaccination against seasonal influenza in Canadian adults: findings from the 2015-2016 Influenza Immunization Coverage Survey. Canadian Journal of Public Health. 2018;109(3):369-78. DOI: 10.17269/s41997-018-0018-9.

32. Yassi A, Barker S, Lockhart K, Taylor D, Harris D, Hundal H, et al. COVID-19 infection and vaccination rates in healthcare workers in British Columbia, Canada: A Longitudinal Urban versus Rural Analysis of the Impact of the Vaccine Mandate. medRxiv [Preprint]. 2022 [cited 2022 Jun 20]. DOI: 10.1101/2022.01.13.22269078. Available from: https://www.medrxiv.org/content/10.1101/2022.01.13.22269078v1

33. Sun Y, Monnat SM. Rural-urban and within-rural differences in COVID-19 vaccination rates. Journal of Rural Health. 2021. [Online ahead of print]. DOI: 10.1111/jrh.12625.

34. Benham J, Atabati O, Oxoby R, Mourali M, Shaffer B, Sheikh H, et al. COVID-19 Vaccine Attitudes and Beliefs: A Canadian National Cross-Sectional Survey and Cluster Analysis. JMIR Public Health and Surveillance. 2021;7(12):e30424. DOI: 10.2196/30424.

35. Lavoie KL, Gosselin-Boucher V, Stojanovic J, Gupta S, Gagne M, Joyal-Desmarais K, et al. Understanding national trends in COVID-19 vaccine hesitancy in Canada – April 2020 to March 2021. BMJ Open. 2022;12(4):e059411. DOI: 10.1136/bmjopen-2021-059411.

36. Liu R, Li GM. Hesitancy in the time of coronavirus: Temporal, spatial, and sociodemographic variations in COVID-19 vaccine hesitancy. SSM - Population Health. 2021;15:100896. DOI: 10.1016/j.ssmph.2021.100896.

37. Malik AA, McFadden SM, Elharake J, Omer SB. Determinants of COVID-19 vaccine acceptance in the US. EClinicalMedicine. 2020;26:100495. DOI: 10.1016/j.eclinm.2020.100495.

38. National Advisory Committee on Immunization. Preliminary guidance on key populations for early COVID-19 immunization. Ottawa (ON): Public Health Agency of Canada; 2020 [updated 2021 Dec 23; cited 2022 Jun 20]. Available from: https://www.canada.ca/en/public-health/news/2020/11/cpho-statement-on-nacis-preliminary-guidance-on-key-populations-for-early-covid-19-vaccination.html.

39. Gerretsen P, Kim J, Caravaggio F, Quilty L, Sanches M, Wells S, et al. Individual determinants of COVID-19 vaccine hesitancy. PLOS ONE. 2021;16(11):e0258462. DOI: 10.1371/journal.pone.0258462.

40. Aw J, Seng JJ, Seah SS, Low LL. COVID-19 Vaccine Hesitancy—A Scoping Review of Literature in High-Income Countries. Vaccines. 2021;9(8). DOI: 10.3390/vaccines9080900.

41. Public Health Agency of Canada. COVID-19 epidemiology update. Ottawa (ON): Public Health Agency of Canada; 2022 [updated 2022 Jun 11; cited 2022 Jun 20]. Available from: https://health-infobase.canada.ca/covid-19/epidemiological-summary-covid-19-cases.html#a2.