



National epidemiological analysis of the association of COVID-19 vaccination and incidence of COVID-19 cases in Canada, January to August 2021 – Supplemental material

Public Health Agency of Canada, COVID-19 Surveillance, Vaccine Coverage and Information System, Vaccine Effectiveness Surveillance Program, and Public Health Risk Science/National Microbiology Laboratory Teams

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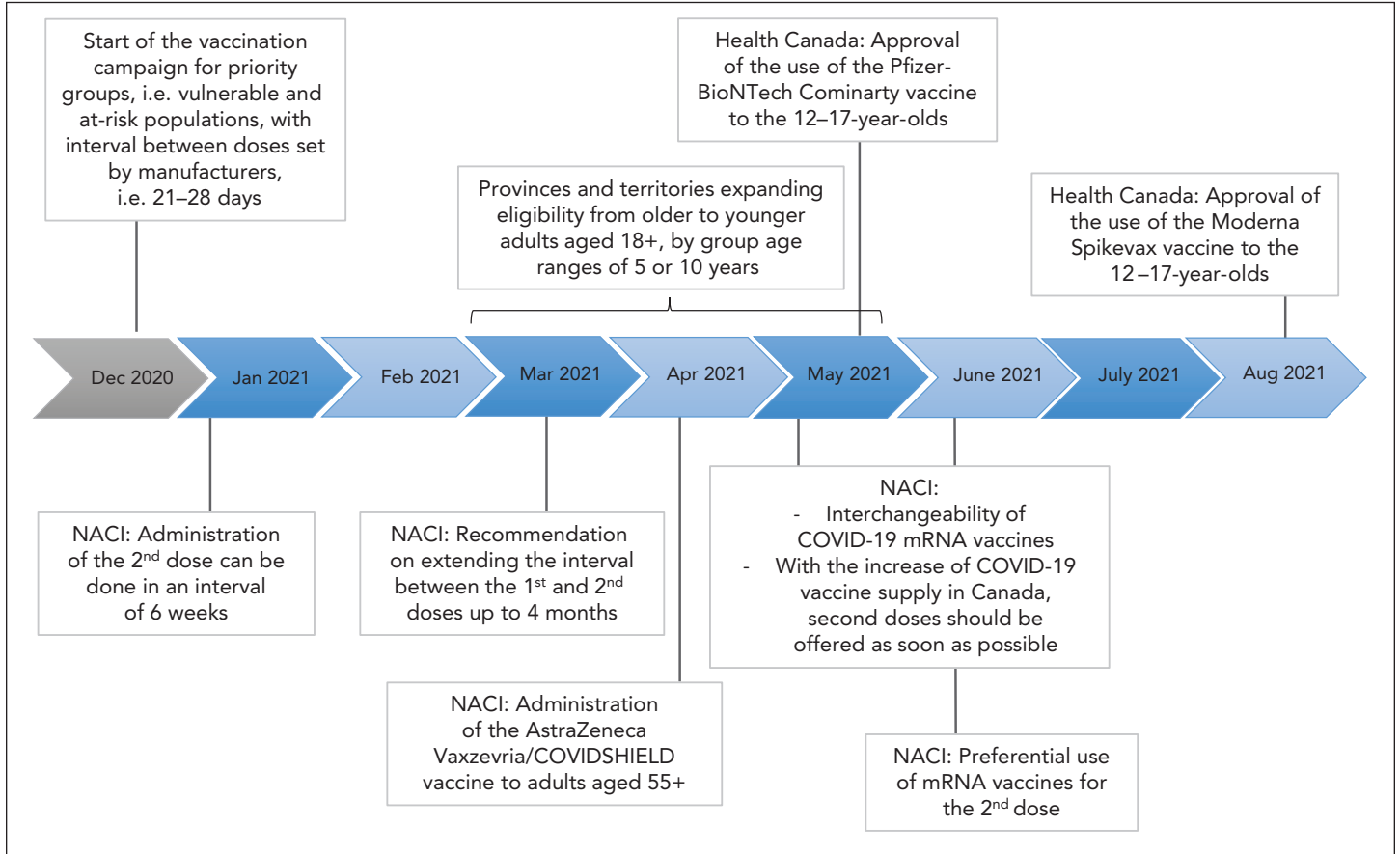
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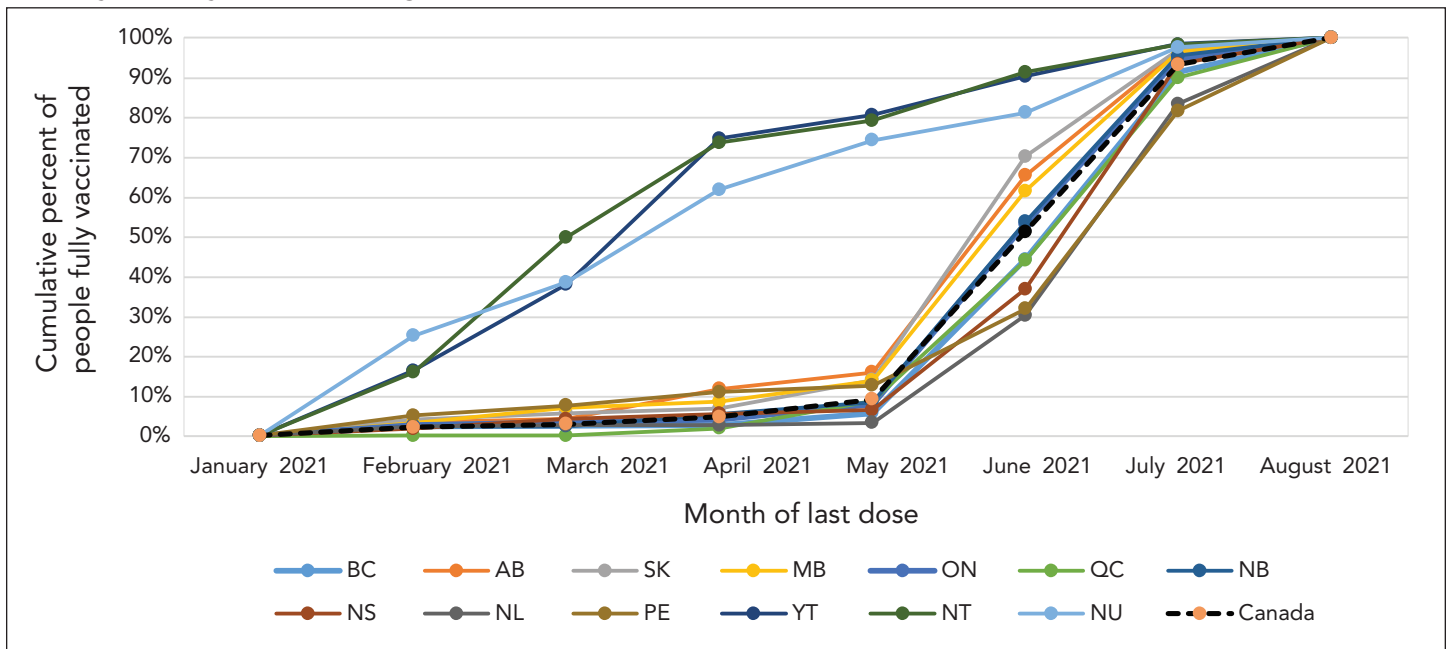


Figure S1: Timeline of relevant vaccine program in Canada for those 12 years of age and older, December 2020 to August 2021



Abbreviations: COVID-19, coronavirus disease 2019; mRNA, messenger ribonucleic acid; NACI, National Advisory Committee on Immunization

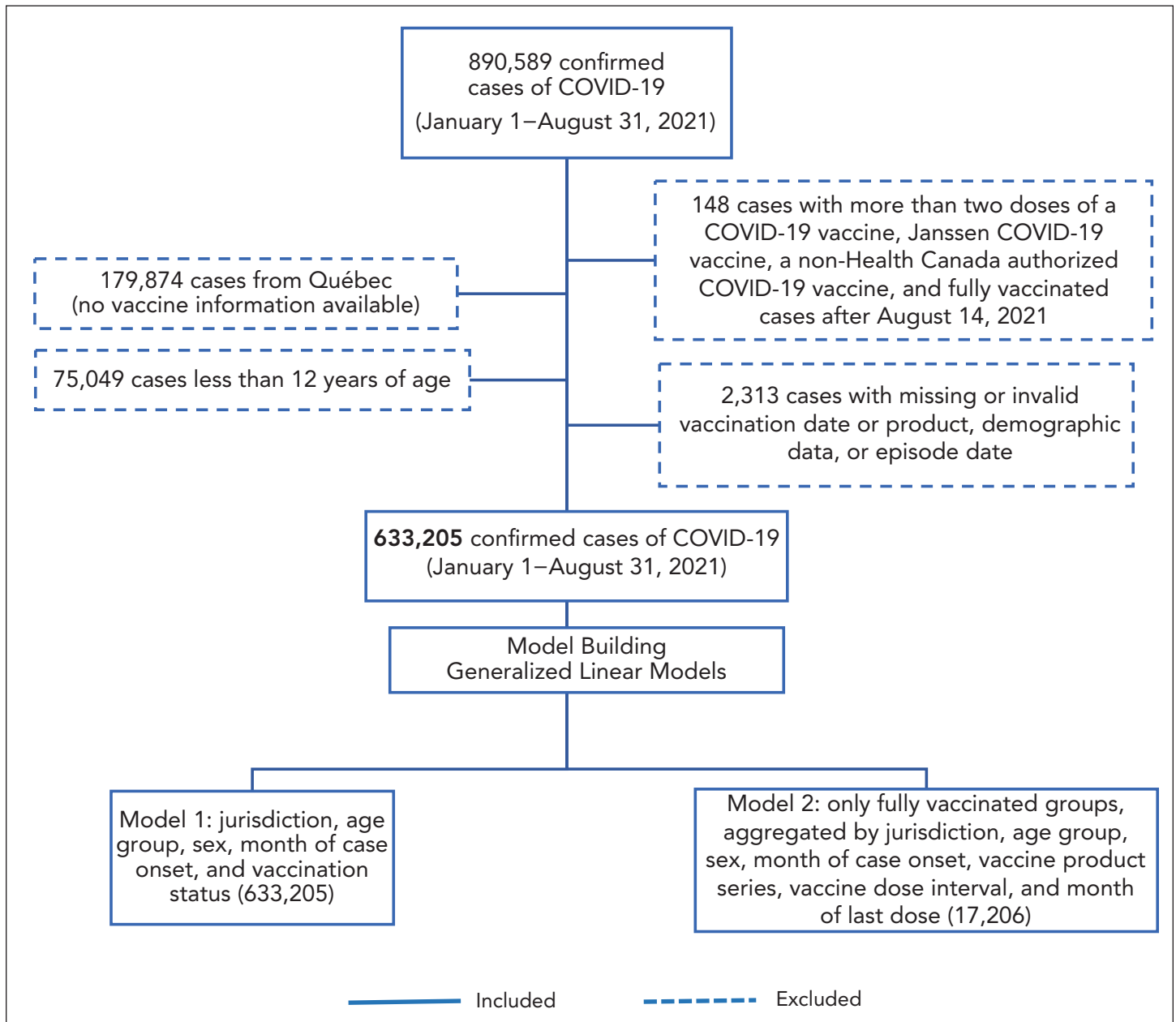
Figure S2: Cumulative percent distribution of “fully vaccinated” individuals by month of last dose and Province/Territory, January 1, 2021 to August 14, 2021



Abbreviations: AB, Alberta; BC, British Columbia; MB, Manitoba; NB, New Brunswick; NL, Newfoundland and Labrador; NS, Nova Scotia; NT, Northwest Territories; NU, Nunavut; ON, Ontario; PE, Prince Edward Island; QC, Québec; SK, Saskatchewan; YT, Yukon



Figure S3: Description of case population for analysis



Abbreviation: COVID-19, coronavirus disease 2019



Table S1: Number and percent of those 12 years of age and older who were “fully vaccinated” by jurisdiction, age group and sex in Canada, as of August 14, 2021

Characteristic		Number of people fully vaccinated	Population denominator ^a	Percent of the population fully vaccinated
Jurisdiction	British Columbia	3,362,882	4,644,749	72%
	Alberta	2,574,330	3,791,830	68%
	Saskatchewan	669,148	996,896	67%
	Manitoba	886,595	1,176,028	75%
	Ontario	9,559,696	13,038,032	73%
	Québec	5,495,849	7,532,471	73%
	New Brunswick	505,175	701,879	72%
	Nova Scotia	660,205	884,353	75%
	Newfoundland and Labrador	321,192	467,760	69%
	Prince Edward Island	98,320	145,431	68%
	Yukon	29,695	37,365	79%
	Northwest Territories	26,265	36,575	72%
	Nunavut	20,314	29,429	69%
	Canada	24,209,666	33,482,798	72%
Age group (years)	12–17	1,426,616	2,468,388	58%
	18–29	3,493,530	5,937,511	59%
	30–39	3,416,022	5,364,512	64%
	40–49	3,505,986	4,893,655	72%
	50–59	4,004,938	5,129,992	78%
	60–69	4,088,607	4,840,528	84%
	70–79	2,771,935	3,134,330	88%
	80+	1,502,032	1,713,882	88%
	12+	24,209,666	33,482,798	72%
Sex	Female	12,651,452	16,913,928	75%
	Male	11,533,984	16,568,870	70%
	Other or unknown	24,230	Not available	Not available
	All sexes	24,209,666	33,482,798	72%

^a Denominator used for Provinces and Nunavut are Statistics Canada population estimates as of July 1, 2021, population size estimates as of June 30, 2021, provided by Yukon Bureau of Statistics for Yukon and population size estimates as of August 1, 2021, provided by the Government of Northwest Territories for Northwest Territories



Table S2: Number and percent of those 12 years of age and older who were “fully vaccinated” by dose interval, month of last dose and vaccine schedule in Canada, as of August 14, 2021

Characteristic		Dose interval										Total N (100%)
		0–28 days		29–49 days		50–77 days		78+ days		Unknown		
		n	%	n	%	n	%	n	%	n	%	
Jurisdiction	British Columbia	12,699	<1%	240,740	7%	2,437,099	72%	672,344	20%	0	0	3,362,882
	Alberta	127,204	5%	1,068,470	42%	1,156,296	45%	222,360	9%	0	0	2,574,330
	Saskatchewan	30,969	5%	193,800	29%	356,061	53%	88,318	13%	0	0	669,148
	Manitoba	122,953	14%	340,511	38%	349,207	39%	73,924	8%	0	0	886,595
	Ontario	578,077	6%	2,706,713	28%	4,343,628	45%	1,931,278	20%	0	0	9,559,696
	Québec	82,295	1%	522,984	10%	3,046,173	55%	1,844,397	34%	0	0	5,495,849
	New Brunswick	22,542	4%	160,090	32%	242,045	48%	80,498	16%	0	0	505,175
	Nova Scotia	54,782	8%	196,869	30%	295,549	45%	113,005	17%	0	0	660,205
	Newfoundland and Labrador	9,222	3%	29,107	9%	174,158	54%	108,494	34%	211	<1%	321,192
	Prince Edward Island	9,883	10%	6,172	6%	72,063	73%	10,202	10%	0	0	98,320
	Yukon	8,703	29%	19,846	67%	812	3%	334	1%	0	0	29,695
	Northwest Territories	3,584	14%	20,542	78%	1,372	5%	767	3%	0	0	26,265
	Nunavut	14,445	71%	5,147	25%	508	3%	92	<1%	122	1%	20,314
Canada	1,077,358	4%	5,510,991	23%	12,474,971	52%	5,146,013	21%	333	<1%	24,209,666	
Age group (years)	12–17	116,320	8%	760,752	53%	538,157	38%	11,376	1%	11	<1%	1,426,616
	18–29	189,144	5%	1,380,485	40%	1,602,090	46%	321,721	9%	90	<1%	3,493,530
	30–39	166,266	5%	1,192,210	35%	1,694,092	50%	363,394	11%	60	<1%	3,416,022
	40–49	136,933	4%	840,480	24%	2,096,231	60%	432,296	12%	46	<1%	3,505,986
	50–59	136,899	3%	651,385	16%	2,542,567	63%	674,041	17%	46	<1%	4,004,938
	60–69	106,949	3%	315,959	8%	2,481,309	61%	1,184,364	29%	26	<1%	4,088,607
	70–79	74,532	3%	206,411	7%	1,252,387	45%	1,238,577	45%	28	<1%	2,771,935
	80+	150,315	10%	163,309	11%	268,138	18%	920,244	61%	26	<1%	1,502,032
12+	1,077,358	4%	5,510,991	23%	12,474,971	52%	5,146,013	21%	333	<1%	24,209,666	
Month of last dose	January 2021	117,644	96%	4,747	4%	1	<1%	0	<1%	6	<1%	122,398
	February 2021	175,308	39%	268,630	60%	1,195	<1%	1	<1%	49	<1%	445,183
	March 2021	123,613	68%	53,502	29%	3,044	2%	2,034	1%	5	<1%	182,198
	April 2021	77,716	18%	251,352	58%	21,174	5%	85,616	20%	23	<1%	435,881
	May 2021	81,980	8%	195,904	18%	321,849	30%	482,849	45%	8	<1%	1,082,590
	June 2021	166,608	2%	1,816,267	18%	5,568,988	55%	2,617,754	26%	112	<1%	10,169,729
	July 2021	235,687	2%	2,620,010	26%	5,718,791	56%	1,565,951	15%	101	<1%	10,140,540
August 2021	98,802	6%	300,579	18%	839,929	51%	391,808	24%	29	<1%	1,631,147	
Vaccine schedule	Pfizer-Pfizer	720,798	5%	3,318,206	22%	7,841,172	51%	3,410,788	22%	104	<1%	15,291,068
	Moderna-Moderna	290,073	7%	1,222,478	29%	2,027,432	48%	685,764	16%	181	<1%	4,225,928
	Mixed mRNA	64,698	3%	916,591	36%	1,136,892	45%	397,720	16%	46	<1%	2,515,947
	Mixed AstraZeneca-mRNA combination	432	<1%	27,105	2%	1,105,493	68%	481,459	30%	2	<1%	1,614,491
	AstraZeneca-AstraZeneca	1,357	<1%	26,611	5%	363,982	65%	170,282	30%	0	0	562,232

Abbreviation: mRNA, messenger ribonucleic acid



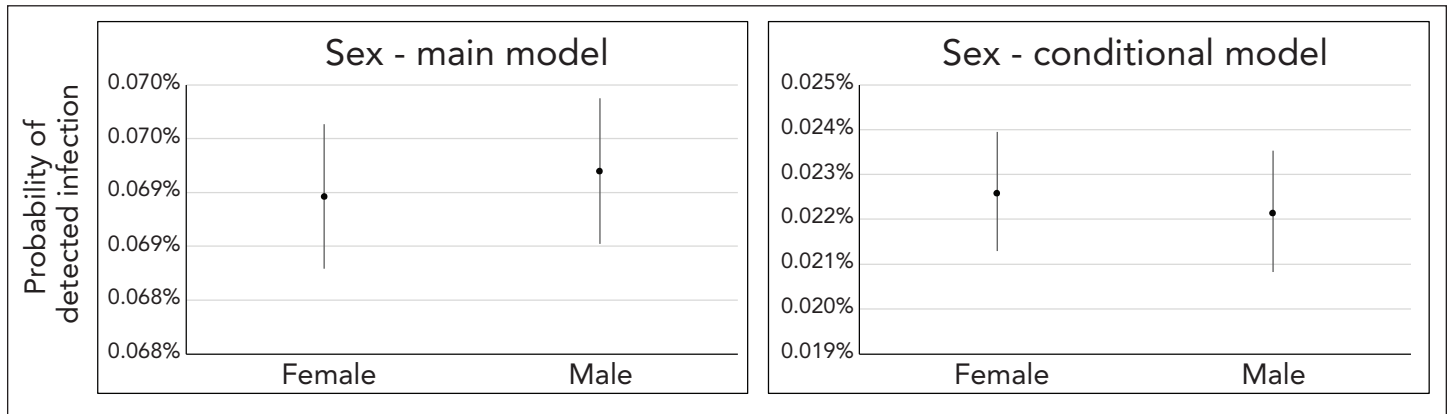
Table S3: Predicted effects of variables included in model 1 on probability of becoming a detected COVID-19 case, after controlling for all other variables

Variable		Predicted effect	Variable-level p-value (chi-square)
Province	Alberta	0.126% (0.125%–0.127%)	<0.001
	British Columbia	0.081% (0.080%–0.082%)	
	Manitoba	0.086% (0.085%–0.087%)	
	Ontario	0.094% (0.093%–0.095%)	
	Saskatchewan	0.123% (0.121%–0.125%)	
	Atlantic jurisdictions ^a	0.011% (0.010%–0.011%)	
Age group (years)	12–17	0.077% (0.076%–0.078%)	<0.001
	18–29	0.114% (0.113%–0.116%)	
	30–39	0.091% (0.090%–0.092%)	
	40–49	0.086% (0.085%–0.087%)	
	50–59	0.074% (0.073%–0.075%)	
	60–69	0.050% (0.049%–0.050%)	
	70–79	0.038% (0.037%–0.038%)	
	80+	0.054% (0.053%–0.055%)	
Sex	Female	0.069% (0.068%–0.070%)	0.18
	Male	0.069% (0.069%–0.070%)	
Month of episode	January	0.097% (0.096%–0.098%)	<0.001
	February	0.049% (0.049%–0.050%)	
	March	0.085% (0.084%–0.086%)	
	April	0.168% (0.166%–0.169%)	
	May	0.092% (0.091%–0.094%)	
	June	0.024% (0.024%–0.025%)	
	July	0.026% (0.026%–0.027%)	
	August	0.131% (0.130%–0.133%)	
Vaccination status	Fully vaccinated	0.023% (0.023%–0.024%)	<0.001
	Not fully vaccinated	0.204% (0.203%–0.206%)	

Abbreviation: COVID-19, coronavirus disease 2019

^a Newfoundland and Labrador, New Brunswick, Prince Edward Island and Nova Scotia

Figure S4: Effect of sex on the predicted probability of “fully vaccinated” individuals becoming a detected COVID-19 case in the main model 1, and the model 2 (conditional on full-vaccination status)^a



Abbreviation: COVID-19, coronavirus disease 2019

^a Solid points and vertical solid lines show the effect and 95% prediction interval



Table S4: Predicted effects of variables included in model 2 on probability of becoming a detected COVID-19 case, after controlling for all other variables

Variable		Predicted effect	Variable-level p-value (chi square)
Province	Alberta	0.056% (0.053%–0.059%)	<0.001
	British Columbia	0.045% (0.042%–0.047%)	
	Manitoba	0.016% (0.014%–0.017%)	
	Ontario	0.020% (0.019%–0.021%)	
	Saskatchewan	0.054% (0.050%–0.058%)	
	Atlantic jurisdictions ^a	0.003% (0.002%–0.004%)	
Age group (years)	12–17	0.012% (0.010%–0.013%)	<0.001
	18–29	0.045% (0.042%–0.048%)	
	30–39	0.036% (0.033%–0.038%)	
	40–49	0.030% (0.028%–0.032%)	
	50–59	0.023% (0.022%–0.025%)	
	60–69	0.019% (0.018%–0.020%)	
	70–79	0.014% (0.013%–0.015%)	
	80+	0.018% (0.016%–0.019%)	
Sex	Female	0.023% (0.021%–0.024%)	0.22
	Male	0.022% (0.021%–0.024%)	
Month of episode	January	0.017% (0.007%–0.038%)	<0.001
	February	0.028% (0.023%–0.035%)	
	March	0.033% (0.029%–0.037%)	
	April	0.055% (0.050%–0.060%)	
	May	0.034% (0.031%–0.037%)	
	June	0.009% (0.008%–0.009%)	
	July	0.009% (0.008%–0.010%)	
	August	0.042% (0.040%–0.045%)	
Months since last dose	0	0.003% (0.003%–0.003%)	<0.001
	1	0.018% (0.017%–0.019%)	
	2	0.032% (0.030%–0.034%)	
	3	0.052% (0.048%–0.056%)	
	4	0.067% (0.062%–0.073%)	
	5	0.068% (0.061%–0.076%)	
	6	0.081% (0.074%–0.089%)	
	7	0.043% (0.037%–0.051%)	
Dose interval	0–28 days	0.036% (0.034%–0.039%)	<0.001
	29–49 days	0.022% (0.021%–0.023%)	
	50–77 days	0.019% (0.017%–0.020%)	
	78+ days	0.017% (0.016%–0.018%)	
Vaccine product series	AstraZeneca-AstraZeneca	0.048% (0.044%–0.053%)	<0.001
	Moderna-Moderna	0.018% (0.017%–0.019%)	
	Pfizer-Pfizer	0.021% (0.020%–0.023%)	
	AstraZeneca-mRNA	0.020% (0.019%–0.022%)	
	Mixed mRNA	0.015% (0.014%–0.016%)	

Abbreviation: COVID-19, coronavirus disease 2019

^a Newfoundland and Labrador, New Brunswick, Prince Edward Island and Nova Scotia