Table 1S: Data sources and general descriptors by pandemic phase

Pandemic Phase	Study Descriptors	Canadian Blood Services (CBS)	Héma-Québec (HQ)	Alberta Precision Laboratories (ABPL)	Manitoba Seroprevalence (MBSC)	Saskatchewan Seroprevalence (SKPH)	Canadian Partnership for Tomorrow's Health (CanPath)	Action to beat Coronavirus (Ab-C)
Pre-Vaccine Phase (2020-03-01 to 2021-01-01)	Reporting Scale	Monthly	One Period	One period	Quarterly	Monthly	NA	Two periods
	% Female	44	45	45	50	57.6	NA	58
	Age range	17- 60+	18-70+	0-80+	1-60+	0-80+	NA	18+
Vaccine roll-out Phase (2021-01-01 to 2021-12-14)	Reporting Scale	Monthly	Monthly	One period	Monthly	Monthly	Monthly	Two periods
	% Female	40	45	NA	50	66	67	59
	Age range	17- 60+	18-70+	0-80+	1-60+	0-80+	22-93	18+
Omicron Waves (2021-12-15 to 2022-09-30)	Reporting Scale	Weekly	Monthly	Bi-Monthly	Monthly	Monthly	Monthly	One estimate
	% Female	43	32	55	50	67	67	59
	Age range	17- 60+	18-60+	0-80+	1-60+	0-80+	22-93	18+

Table 2S: Data sources and Anti-Nucleocapsid estimate (infection-acquired seroprevalence) descriptors by pandemic phase

Pandemic Phase	Study Descriptors	Canadian Blood Services (CBS)	Héma-Québec (HQ)	Alberta Precision Laboratories (ABPL)	Manitoba Seroprevalence (MBSC)	Saskatchewan Seroprevalence (SKPH)	Canadian Partnership for Tomorrow's Health (CanPath)	Action to beat Coronavirus (Ab-C)
Pre-Vaccine Phase (2020-03-01 to 2021-01-01)	Assay used	Abbott (1)	NA	Abbott Architect, confirmed by DiaSorin (2, 3)	Abbott	Abbott	NA	NA
	Assay Sensitivity/ Specificity	92.7% / 99.9%	NA	71-100% / ≥98% *	99.4% / 99.6%	69.7% / 97.6%	NA	NA
	No. of estimates contributed*	80	NA	33	5	8	NA	NA
	Total No. of blood samples	130511	NA	82944	5418	10202	NA	NA
Vaccine roll-out Phase (2021-01-01 to 2021-12-14)	Assay used	Roche (Anti-N) (4)	ELISA-HQ (5)	Abbott Architect, confirmed by DiaSorin (2, 6)	Abbott	Abbott	ELISA-based	ELISA-based (7)
	Assay Sensitivity/ Specificity	99.5% / 99.8%	98.9% / 98.5%	71-100% / ≥98% *	99.4% / 99.6%	69.7% / 97.6%	92.3 / 99.4	92% / 99%
	No. of estimates contributed	130	11	1	7	19	45	6
	Total No. of blood samples	146680	2554	11049	6548	2607	24,702	12004
Omicron Waves (2021-12-15 to 2022-09-30)	Assay used	Roche	ELISA-HQ (Anti-N) (5)**	Abbott Architect, confirmed by DiaSorin (2)	Abbott	Abbott	ELISA-based	ELISA-based (8, 9)
	Assay Sensitivity/ Specificity	99.5% / 99.8%	NA	71-100% / ≥98% *	99.4% / 99.6%	69.7% / 97.6%	87.6 / 90.4	92% / 99%

No. of estimates contributed	458	21	32	31	39	44	1
Total No. of blood samples	327,484	2509	33,800	5632	9077	17,123	5031

*71% Sensitivity refers to samples 0-14 days from positive PCR. 100% Sensitivity refers to those >21 days from positive PCR. Reported sensitivity and specificity refers to the Abbott Architect assay only. Sensitivity and specificity for Abbott Architect confirmed by Diasorin is unknown.

Table 3S: Data sources and Anti-Spike estimate (vaccine-induced seroprevalence) descriptors by pandemic phase

Pandemic Phase	Study Descriptors	Canadian Blood Services (CBS)	Héma-Québec (HQ)	Alberta Precision Laboratories (ABPL)	Manitoba Seroprevalence (MBSC)	Saskatchewan Seroprevalence (SKPH)	Canadian Partnership for Tomorrow's Health (CanPath)	Action to beat Coronavirus (Ab-C)
Pre-Vaccine Phase (2020-03-01 to 2021-01-01)	Assay used	NA	ELISA-HQ (Anti-RBD) (10)	NA	NA	DiaSorin	NA	ELISA-based (11)
	Sensitivity/ Specificity	NA	98.9% / 98.5% (12)	NA	NA	95.3% / 100%	NA	98.5%/ 98.8%
	No. of estimates contributed*	NA	1	NA	NA	8	NA	10
	Total No. of blood samples	NA	7691	NA	NA	10202	NA	19898
Vaccine roll-out Phase (2021-01-01 to 2021-12-14)	Assay used	Roche	ELISA-HQ (Anti-RBD) (10)	Abbott (Anti-RBD) (13)	NA	DiaSorin	NA	NA
	Sensitivity/ Specificity	99.5% / 99.8%	98.9% / 98.5% (12)	71-100% / 98%	NA	95.3% / 100%	98.5%/ 98.8%	NA

	No. of estimates contributed	90	1	6	NA	3	45	NA
	Total No. of blood samples	182320	2554	67888	NA	2608	24,702	NA
Omicron Waves (2021-12-15 to 2022-09-30)	**Assay used**	Roche	ELISA-HQ (Anti-RBD) (10)	Abbott (Anti-RBD) (13)	Diasorin	DiaSorin	ELISA-based	NA
	Sensitivity/ Specificity	99.5% / 99.8%	98.9% / 98.5% (12)	71-100% / 98%	95.7% / 98.9%	95.3% / 100%	99.8% / 98.9%	NA
	No. of estimates contributed	77	1	4	6	7	44	NA
	Total No. of blood samples	252634	567	34074	5632	9077	17,123	NA

Supplemental Figures

Figure S1. SARS-CoV-2 infection-acquired and vaccine-induced seroprevalence in Canada (March 2020 to end of February 2023): anti-nucleocapsid and anti-spike seropositivity for all age groups, combined, by region on the logit y-scale.

Each point represents a seroprevalence estimate from a project at the mid-point of a sample collection period, all age groups, combined. Infection-acquired seropositivity was measured as anti-nucleocapsid or anti-spike seropositivity prior to Jan 2021 but only anti-nucleocapsid seropositivity after Dec 2020. The solid and dashed black lines respectively represent the population-weighted mean of the anti-N and anti-S seroprevalence Bayesian model estimates. The grey bands represent the 95% credible intervals. For the purposes of plotting, contributed seroprevalence estimates equal to 0 or 1 were replaced with 0.001 and 0.999, respectively. For modelling, however, the number of participants seropositive and denominators were used, and zeros were not altered.
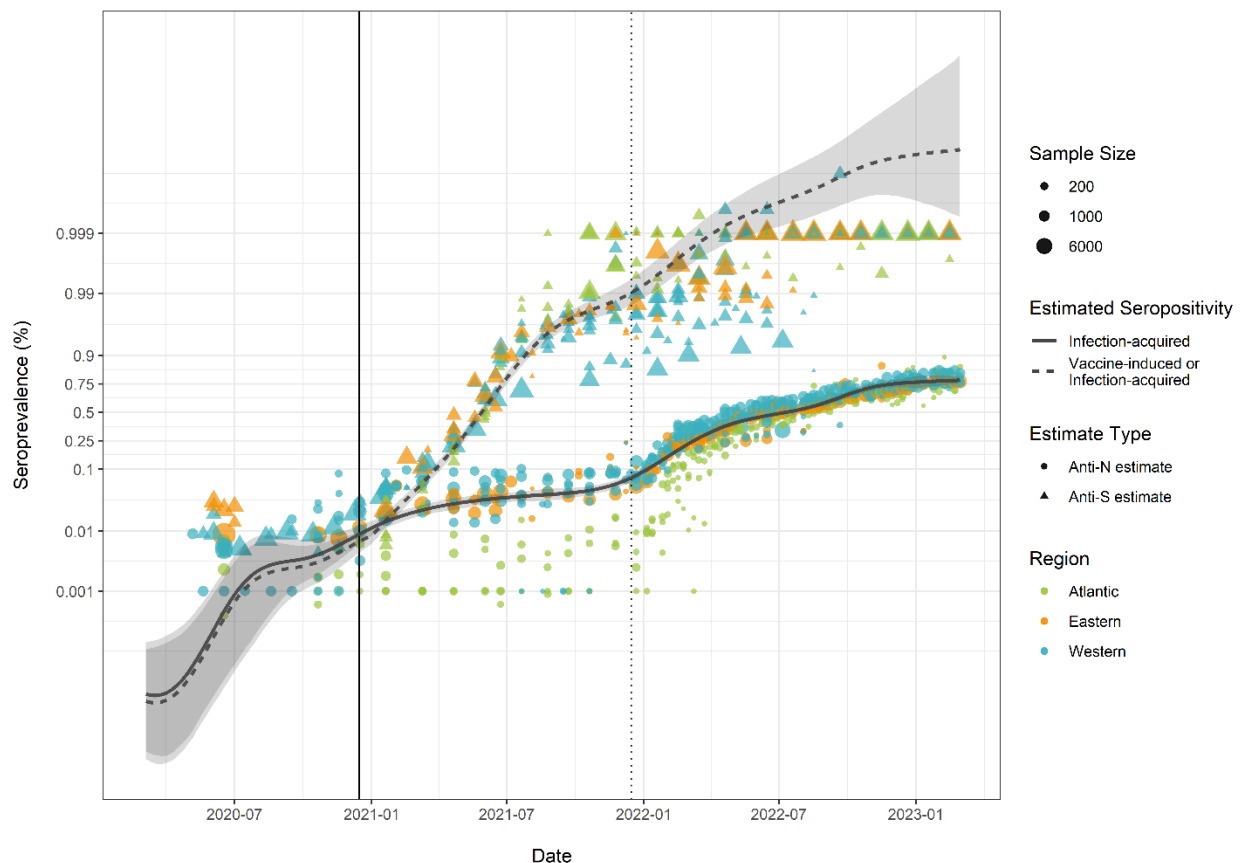
Figure S2. Age differences in infection-acquired seroprevalence: anti-nucleocapsid seropositivity estimates by median age (March 2020 to March 2023)

Each point represents a seroprevalence estimate from a project that stratified estimates for age groups, generally separating children and adults and spanning 30 years or less. Each estimate is plotted at the mid-point of the sample collection period and coloured for the corresponding age group. The colored trend lines represent the average anti-N seroprevalence estimated from a Bayesian hierarchical model that accounts for sample size. See the methods section for details of the statistical model.
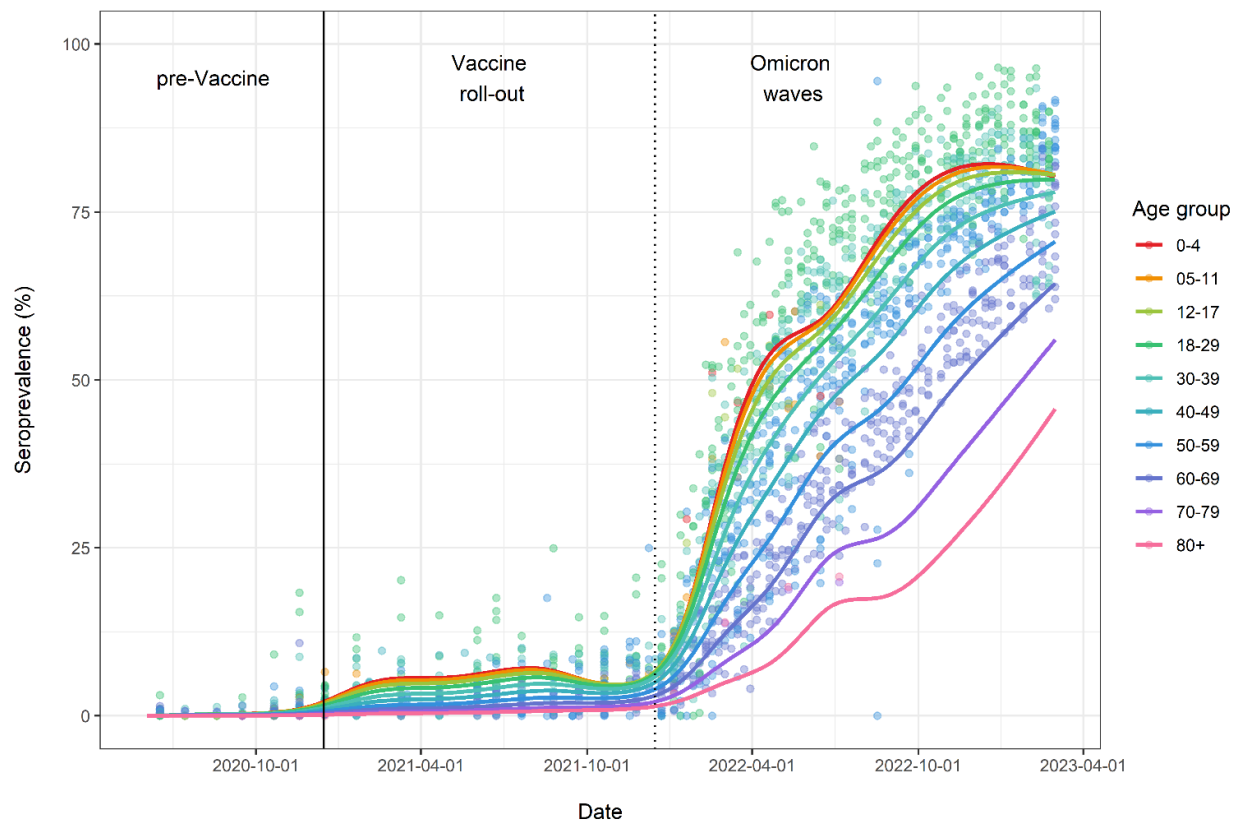
Figure S3. Age differences in infection-acquired seroprevalence: anti-nucleocapsid seropositivity estimates by age group and province (March 2020 to March 2023)

Each point represents a seroprevalence estimate from a project that sampled from a particular province and stratified estimates for age groups, generally separating children and adults and spanning 30 years or less. Each estimate is plotted at the mid-point of the sample collection period and coloured for the corresponding age group. The colored trend lines represent the average anti-N seroprevalence estimated from a Bayesian hierarchical model that accounts for sample size. The colored bands represent the 95% credible intervals. See the methods section for details of the statistical model.
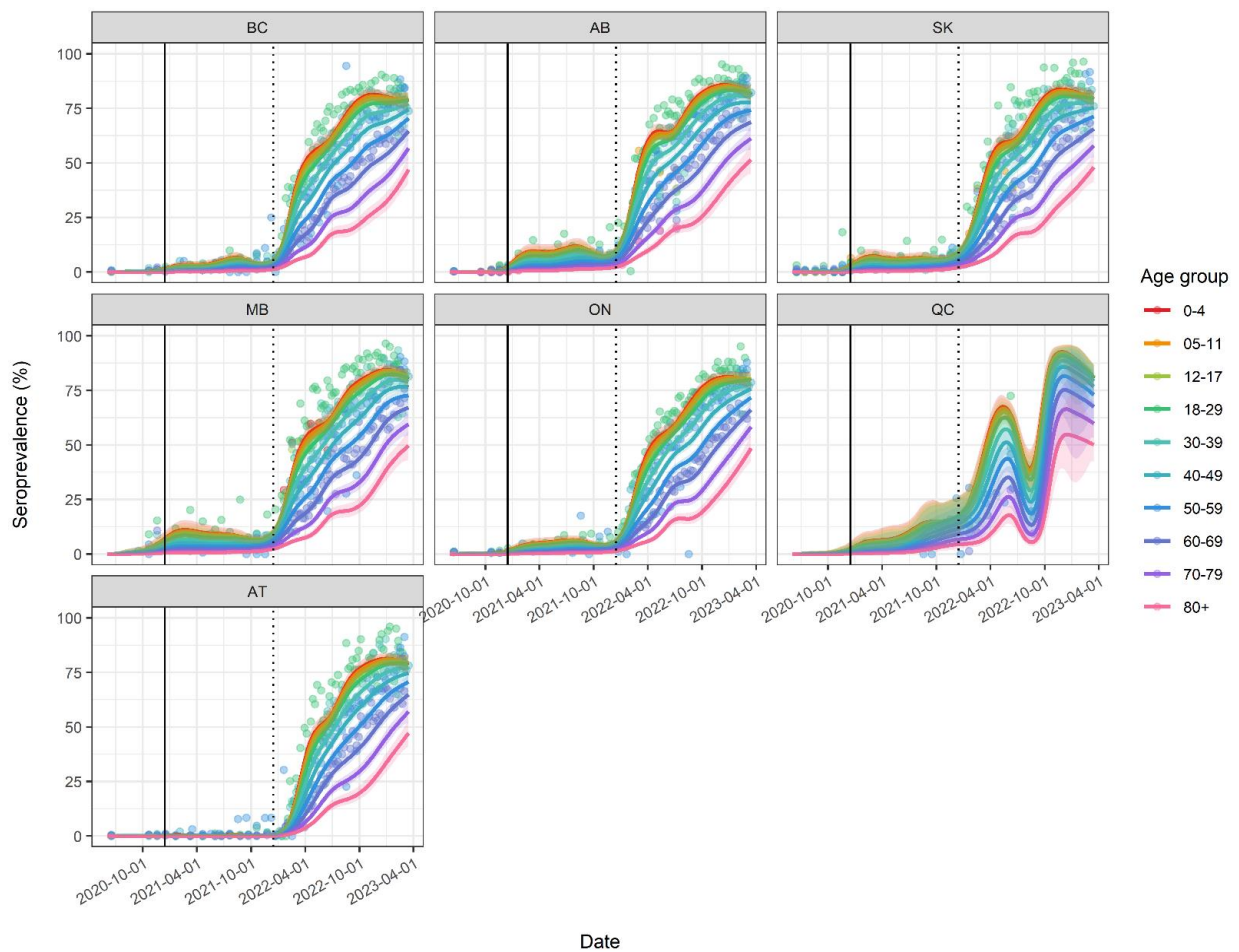
References

1.   Saeed S, Drews SJ, Pambrun C, Yi QL, Osmond L, O'Brien SF. SARS-CoV-2 seroprevalence among blood donors after the first COVID-19 wave in Canada. Transfusion. 2021;61(3):862-72.

2.   Charlton CL, Nguyen LT, Bailey A, Fenton J, Plitt SS, Marohn C, et al. Pre-Vaccine Positivity of SARS-CoV-2 Antibodies in Alberta, Canada during the First Two Waves of the COVID-19 Pandemic. Microbiol Spectr. 2021;9(1):e0029121.

3.   Charlton CL, Nguyen LT, Bailey A, Fenton J, Plitt SS, Marohn C, et al. Pre-vaccine positivity of SARS-CoV-2 antibodies in Alberta, Canada during the first two waves of the COVID-19 pandemic. Microbiology Spectrum. 2021;9(1):e00291-21.

4.   O'Brien SF, Caffrey N, Yi Q-L, Bolotin S, Janjua NZ, Binka M, et al. Cross-Canada Variability in Blood Donor SARS-CoV-2 Seroprevalence by Social Determinants of Health. Microbiology Spectrum. 2023:e03356-22.

5.   Bazin R, Rochette S, Perreault J, Fournier M-J, Grégoire Y, Boivin A, et al. Development and use of a method based on the anti-N reactivity of longitudinal samples to better estimate SARS-CoV-2 seroprevalence in a vaccinated population. medRxiv. 2022:2022.08. 15.22278798.

6.   Kanji JN, Nguyen LT, Plitt SS, Charlton CL, Fenton J, Braun S, et al. Seropositivity to SARS-CoV-2 in Alberta, Canada in a post-vaccination period (March 2021–July 2021). Infectious Diseases. 2022;54(9):666-76.

7.   Tang X, Sharma A, Pasic M, Brown P, Colwill K, Gelband H, et al. Assessment of SARS-CoV-2 seropositivity during the first and second viral waves in 2020 and 2021 among Canadian adults. JAMA Network Open. 2022;5(2):e2146798-e.

8.   Brown PE, Fu SH, Bansal A, Newcombe L, Colwill K, Mailhot G, et al. Omicron BA. 1/1.1 SARS-CoV-2 infection among vaccinated Canadian adults. New England Journal of Medicine. 2022;386(24):2337-9.

9.   Colwill K, Galipeau Y, Stuible M, Gervais C, Arnold C, Rathod B, et al. A scalable serology solution for profiling humoral immune responses to SARS-CoV-2 infection and vaccination. Clin Transl Immunology. 2022;11(3):e1380.

10.   Lewin A, Therrien R, De Serres G, Grégoire Y, Perreault J, Drouin M, et al. SARS-CoV-2 seroprevalence among blood donors in Québec, and analysis of symptoms associated with seropositivity: a nested case-control study. Canadian Journal of Public Health. 2021;112(4):576-86.

11.   Investigators AtbcApblcS, Jha P. COVID Seroprevalence, Symptoms and Mortality During the First Wave of SARS-CoV-2 in Canada. MedRxiv. 2021:2021.03. 04.21252540.

12.   Lewin A, Therrien R, De Serres G, Grégoire Y, Perreault J, Drouin M, et al. SARS-CoV-2 seroprevalence among blood donors in Québec, and analysis of symptoms associated with seropositivity: a nested case-control study. Can J Public Health. 2021;112(4):576-86.

13.   Kanji JN, Nguyen LT, Plitt SS, Charlton CL, Fenton J, Braun S, et al. Seropositivity to SARS-CoV-2 in Alberta, Canada in a post-vaccination period (March 2021–July 2021). Infectious Diseases. 2022;54(9):666-76.