



**Canadian  
Blood  
Services** BLOOD  
PLASMA  
STEM CELLS  
ORGANS  
& TISSUES

COVID-19 Seroprevalence Report

# **COVID-19 Seroprevalence Report**

**March 11<sup>th</sup>, 2022**

**Report #18: January 2022 Survey**

**The advance of Omicron**

# Summary

January 2022

January 1 - January 31 2022 (n=32,505)

**•Humoral Immunity (Based on results from the Spike antibody assay):**

- Spike antibody results indicate a SARS-CoV-2 humoral response to vaccination or natural infection. Because people are advised to be vaccinated irrespective of past infection, those with Nucleocapsid and Spike antibody positive results together likely have been infected and may or may not have been vaccinated.
- The (adjusted) proportion of blood donors with humoral immunity for SARS-CoV-2 was 98.89% (95% CI 98.73, 99.06%) (based on results from the Spike antibody assay). This was predominantly driven by vaccination.
- Spike antibody concentrations were high by September, but gradually decreased. A peak in values followed by decline is expected after vaccination. Concentrations increased in all age groups by January likely due to third vaccine dose administration.

**•Natural Infections (Based on results from the Nucleocapsid antibody assay):**

- Seroprevalence (natural infection) in January 2022 was 12.12% (95% CI 11.76, 12.48), higher than December 2021 at 6.39% (95% CI 6.01, 6.76) ( $P < 0.001$ ). There was a gradual increase over the 31 day reporting period from 7.16% (6.62, 7.71) to 10.09% (9.46, 10.71) to 12.65% (11.84, 13.45) to 16.30% (95% CI 15.51, 17.09) consistent with emergence of the Omicron variant.
- Consistent with previous surveys, donors aged 17-24 years old had the highest seroprevalence rate (22.22% (95% CI 20.93, 23.51%)) compared to other age groups. However, the seroprevalence rate increased in all age groups compared to December.
- Seroprevalence rates increased in January compared to December in almost all provinces.
- Racialized groups have a higher seroprevalence rate (18.29% (95% CI 17.27, 19.32)) compared to white donors (10.73% (95% CI 10.34, 11.12%)).
- Among repeat tested donors, new infections in unvaccinated donors have increased from June 1.53% (1.14, 2.00) to 3.93% (3.13, 4.86%) in December and more than doubled in January to 9.04% (95% CI 8.19, 9.95).
- Potential breakthrough infections remained low from June to December, but increased from 0.71% (95% CI 0.45, 1.06) in December to 5.28% (95% CI 4.74, 5.87) in January.

December 2021

December 14 - December 30 2021 (n=16,816)

•**Humoral Immunity (Based on results from the Spike antibody assay):**

- Spike antibody results indicate a SARS-CoV-2 humoral response to vaccination or natural infection. Because people are advised to be vaccinated irrespective of past infection, those with Nucleocapsid and Spike antibody positive results together likely have been infected and may or may not have been vaccinated.
- The (adjusted) proportion of blood donors with humoral immunity for SARS-CoV-2 98.58% (95% CI 98.34, 98.82%) (based on results from the Spike antibody assay). This was predominantly driven by vaccination.
- Spike antibody concentrations were high by September, but gradually decreased. A peak in values followed by decline is expected after vaccination. By December, concentrations increased in older age groups likely due to administration of third doses consistent with policies to vaccinate older age groups earlier.

•**Natural Infections (Based on results from the Nucleocapsid antibody assay):**

- Seroprevalence (natural infection) in December was 6.39% (95% CI 6.01, 6.76), higher than November at 5.08% (95% CI 4.58, 5.50) ( $P < 0.001$ ). There was a gradual increase over the 17 day reporting period from 5.60% (5.03, 6.18) to 6.55% (5.95, 7.15) to 7.51% (6.63, 8.39) consistent with emergence of the Omicron variant.
- Consistent with previous surveys, donors aged 17-24 years old had the highest seroprevalence rate (11.37% (95% CI 9.99, 12.75%)) compared to other age groups.
- Seroprevalence rates remained similar to November in most provinces, however, rates increased in December in Alberta (12.94% (95% CI 11.62, 14.27%),  $P < 0.001$ ) and Ontario (5.43% (95% CI 4.94, 5.92%),  $P < 0.001$ ) compared to November.
- Racialized groups have a higher seroprevalence rate (10.40% (95% CI 9.32, 11.48%)) compared to white donors (5.21% (95% CI 4.81, 5.61%)).
- Among repeat tested donors, new infections in unvaccinated donors have increased since June 1.53% (1.14, 2.00) to 3.93% (3.13, 4.86%) in December but vaccine breakthrough infections are low, 0.71% (0.45, 1.06%).

November 2021

November 13 - November 24 2021 (n=9,018)

•**Humoral Immunity (Based on results from the Spike antibody assay):**

- Spike antibody results indicate a SARS-CoV-2 humoral response to vaccination or natural infection. Because people are advised to be vaccinated irrespective of past infection, those with Nucleocapsid and Spike antibody positive results together likely have been infected and may or may not have been vaccinated.
- The (adjusted) proportion of blood donors with humoral immunity for SARS-CoV-2 was 98.52% (95% CI 98.18, 98.86%), slightly higher than October (based on results from the Spike antibody assay) ( $P = 0.039$ ). This was predominantly driven by vaccination.
- Spike antibody concentrations were very high (>2500 U/mL) by July, but gradually decreasing in almost all age groups as the months progress with the greatest decrease in older age groups. A peak in values followed by decline is expected after vaccination. These results are consistent with policies to vaccinate older age groups earlier.

•**Natural Infections (Based on results from the Nucleocapsid antibody assay):**

- Seroprevalence (natural infection) in November was 5.08% (95% CI 4.58, 5.50), higher than October at 4.26% (95% CI 3.85, 4.68%) ( $P = 0.014$ ).
- Consistent with previous surveys, donors aged 17-24 years old had the highest seroprevalence rate (9.35% (95% CI 7.62, 11.07%)) compared to other age groups.
- Racialized groups have a higher seroprevalence rate (8.28% (95% CI 6.82, 9.74%)) compared to white donors (4.56% (95% CI 4.05, 5.07%)).
- Among repeat tested donors, new infections in unvaccinated donors have increased since June 1.53% (1.14, 2.00) to 3.19% (2.42, 4.13) in November but vaccine breakthrough infections are low, 0.6% (0.37, 0.93).

October 2021

October 14 - October 23 2021 (n=9,627)

**•Humoral Immunity (Based on results from the Spike antibody assay):**

- Spike antibody results indicate a SARS-CoV-2 humoral response to vaccination or natural infection. Because people are advised to be vaccinated irrespective of past infection, those with Nucleocapsid and Spike antibody positive results together likely have been infected and may or may not have been vaccinated.
- The proportion of blood donors with humoral immunity for SARS-CoV-2 was 98.01% (95% CI 97.65, 98.36%), slightly higher than September (based on results from the Spike antibody assay). This was predominantly driven by vaccination.
- Spike antibody concentrations were very high (>2500 AU/mL) by July, but began to decrease in older individuals by September. In October values are still very high but gradually decreasing in all age groups. A peak in values followed by decline is expected after vaccination. These results are consistent with policies to vaccinate older age groups earlier.
- Similar to past reports, donors living in affluent neighbourhoods had higher seroprevalence rates, 99.25% (95% CI 98.72, 99.79%) compared to those living in the most materially deprived neighbourhoods, 97.13% (95% CI 95.64, 98.61%).
- Of 25,100 donors tested on 2 or more occasions since January 2021, the most common (55.2%) test profile was presumed unvaccinated to vaccinated (N negative S negative on their first tested donation and N negative S positive on their last tested donation). There were 15 presumed breakthrough infections (donors who were N negative S positive on their first tested donation and N positive S positive on their last tested donation).

**•Natural Infections (Based on results from the Nucleocapsid antibody assay):**

- Seroprevalence (natural infection) in October was 4.26% (95% CI 3.85, 4.68%) similar to September, 2021 at 4.38% (95% CI 3.96, 4.81%).
- Consistent with previous surveys, donors aged 17-24 years old had the highest seroprevalence rate (7.50% (95% CI 5.98, 9.01%)) compared to other age groups.
- Racialized groups have a higher seroprevalence rate (6.18% (95% CI 4.92, 7.45%)) compared to white donors (3.85% (95% CI 3.40, 4.31%)).

September 2021

September 14 - September 24 2021 (n=9,363)

• **Humoral Immunity (Based on results from the Spike antibody assay):**

- Spike antibody results indicate a SARS-CoV-2 humoral response to vaccination or natural infection. Because people are advised to be vaccinated irrespective of past infection, those with Nucleocapsid and Spike antibody positive results together likely have been infected and may or may not have been vaccinated.
- The proportion of blood donors with humoral immunity for SARS-CoV-2 was 97.03% (95% CI 96.62, 97.44%), slightly higher than August (based on results from the Spike antibody assay). This was predominantly driven by vaccination.
- Spike antibody concentrations were very high (>2500 AU/mL) by July, but are beginning to decrease in older individuals by September. A peak in values followed by decline is expected after vaccination. These results are consistent with policies to vaccinate older age groups earlier.
- Similar to past reports, donors living in affluent neighbourhoods had higher seroprevalence rates, 97.56% (95% CI 96.83, 98.28%) compared to those living in the most materially deprived neighbourhoods, 94.72% (95% CI 92.93, 96.51%).
- Of 21,727 donors tested on 2 or more occasions since January 2021, the most common (54.0%) test profile was presumed unvaccinated to vaccinated (N negative S negative on their first tested donation and N negative S positive on their last tested donation). There were 12 presumed breakthrough infections (donors who were N negative S positive on their first tested donation and N positive S positive on their last tested donation).

• **Natural Infections (Based on results from the Nucleocapsid antibody assay):**

- Seroprevalence (natural infection) in September was 4.38% (95% CI 3.96, 4.81%) similar to August, 2021 at 4.43% (95% CI 3.99, 4.86%).
- Consistent with previous surveys, donors aged 17-24 years old had the highest seroprevalence rate (8.70% (95% CI 7.06, 10.34%)) compared to other age groups. Rates in the 60+ age group increased significantly in September (2.78% (95% CI 2.13, 3.43%)) compared to August (1.61% (95% CI 1.09, 2.12%)) while other age groups did not change.
- Racialized groups have a higher seroprevalence rate (7.61% (95% CI 6.24, 8.97%)) compared to white donors (3.65% (95% CI 3.20, 4.10%)).

August 2021

August 15 - August 26 2021 (n=9,109)

• **Humoral Immunity (Based on results from the Spike antibody assay):**

- Spike antibody results indicate a SARS-CoV-2 humoral response to vaccination or natural infection. Because people are advised to be vaccinated irrespective of past infection, those with Nucleocapsid and Spike antibody positive results together likely have been infected and may or may not have been vaccinated.
- The proportion of blood donors with humoral immunity for SARS-CoV-2 was 96.09% (95% CI 95.63, 96.54) slightly up from July (based on results from the Spike antibody assay). This was predominantly driven by vaccination.
- Median spike antibody concentrations increased in July compared to previous months ( $P < 0.001$ ) but increased even further in August ( $P < 0.001$ ).
- Similar to past reports, donors living in affluent neighbourhoods had higher seroprevalence rates, 98.25% (95% CI 97.56, 98.95%) compared to those living in the most materially deprived neighbourhoods, 93.41% (95% CI 91.45, 95.37%).
- Of 17,762 donors tested on 2 or more occasions since January 2021, the most common (52.9%) test profile was presumed unvaccinated to vaccinated (N negative S negative on their first tested donation and N negative S positive on their last tested donation). There were 11 presumed breakthrough infections (donors who were N negative S positive on their first tested donation and N positive S positive on their last tested donation).

• **Natural Infections (Based on results from the Nucleocapsid antibody assay):**

- Seroprevalence (natural infection) in August was 4.43% (95% CI 3.99, 4.86%) similar to July, 2021 at 4.08% (95% CI 3.65, 4.51%).
- Consistent with previous surveys, donors aged 17-24 years old had the highest seroprevalence rate (8.44% (95% CI 6.80, 10.09%)) compared to other age groups. Rates in this age group were highest in Manitoba at 24.95% (95% CI 13.53, 36.37%).
- Racialized groups have a higher seroprevalence rate (11.14% (95% CI 9.14, 13.15%)) compared to white donors (3.30% (95% CI 2.86, 3.74%)). Natural infection rates in racialized donors also increased significantly compared to July. Compared to previous reports, the gap between those in materially deprived vs. affluent neighbourhoods has begun to widen likely due to the 4th wave, 7.85% (95% CI 5.87, 9.83%) vs 3.27% (95% CI 2.52, 4.02%).

July 2021

July 14 - July 23 2021 (n=8,457)

•**Humoral Immunity (Based on results from the Spike antibody assay):**

- Spike antibody results indicate a SARS-CoV-2 humoral response to vaccination or natural infection. Because people are advised to be vaccinated irrespective of past infection, those with Nucleocapsid and Spike antibody positive results together likely have been infected and may or may not have been vaccinated.
- The proportion of blood donors with humoral immunity for SARS-CoV-2 was 94.69% (95% CI 94.16, 95.22) a significant increase from June (based on results from the Spike antibody assay). This was predominantly driven by vaccination.
- Median Spike antibody concentrations increased in June compared to previous months ( $P < 0.001$ ) but increased more in July ( $P < 0.001$ ).
- The seroprevalence of white donors (95.04% (95% CI 94.44, 95.64%)) was not different from racialized groups (93.82% (95% CI 92.48, 95.15%)), this gap has closed compared to earlier surveys. Similar to past reports, donors living in affluent neighbourhoods had higher seroprevalence rates, 96.72% (95% CI 95.82, 97.61%) compared to those living in the most materially deprived neighbourhoods, 92.94% (95% CI 90.89, 95.00%).
- Of 14, 201 donors tested on 2 or more occasions since January 2021 the most common (51.2%) test profile was N negative S negative on their first tested donation and N negative S positive on their last tested donation, most likely due to vaccination. There were 5 donors who were N negative S positive on their first tested donation and N positive S positive on their last tested donation, potentially breakthrough infections.

•**Natural Infections (Based on results from the Nucleocapsid antibody assay):**

- Seroprevalence (natural infection) in July was 4.08% (95% CI 3.65, 4.51%), decreased from June, 2021.
- Natural seroprevalence in most provinces except Alberta plateaued, likely due to widescale vaccination and social restrictions.
- Consistent with previous surveys, donors aged 17-24 years old had the highest seroprevalence rate (6.71% (95% CI 5.17, 8.25%)) compared to other age groups, however, this number has decreased since June, 2021.
  - Rates in this age group were highest in Alberta at 11.88% (95% CI 6.80, 16.97%) and British Columbia at 9.91% (95% CI 5.44, 14.37%). Since June, 2021 these rates have decreased or stayed very similar in almost every province with the exception of British Columbia where they have increased.
- Racialized groups had a higher seroprevalence rate (7.29% (95% CI 5.95, 8.63%)) compared to white donors (3.33% (95% CI 2.87, 3.78%)). Compared to previous reports, the gap between those in materially deprived vs. affluent neighbourhoods is closing, 4.62% (95% CI 3.03, 6.22%) vs 3.87% (95% CI 3.02, 4.71%). However, those living in more socially deprived settings (had lower social contact) had lower seroprevalence rates compared to those that were least deprived, 3.35% (95% CI 2.39, 4.30%) vs. 5.63% (95% CI 4.47, 6.80%).



June 2021

June 14 - June 29 2021 (n=16,884)

•**Humoral Immunity (Based on results from the Roche S assay):**

- Roche S results indicate a SARS-CoV-2 humoral response to vaccination or natural infection. Because people are advised to be vaccinated irrespective of past infection, those with Roche N and S positive results together likely have been infected and may or may not have been vaccinated.
- The proportion of blood donors with humoral immunity for SARS-CoV-2 was 90.78% (95% CI 90.32, 91.25) a significant increase from May (based on results from the Roche S assay). This was predominantly driven by vaccination.
- The proportion of blood donors with presumed vaccine-induced humoral immunity to SARS-CoV-2 was 86.05% (95% CI 85.50, 86.59%), a significant increase from May (based on results from the Roche S-only assay).
- White donors did not have different seroprevalence rates (Roche S, primarily vaccine-induced) (90.81% (95% CI 90.25, 91.35%)) compared to other racialized groups (91.37% (95% CI 90.27, 92.47%)), this gap has closed compared to previous surveys. However, white donors had higher seroprevalence rates (Roche S-only, presumed vaccine induced) (86.87% (95% CI 86.26, 87.49%)), compared to other racialized groups (83.14% (95% CI 81.72, 84.56%)) with a decreased difference between these two groups compared to May. Similarly, donors living in affluent neighbourhoods had higher seroprevalence rates (Roche S, primarily vaccine-induced), 93.68% (95% CI 92.90, 94.46%) compared to those living in the most materially deprived neighbourhoods, 88.33% (95% CI 86.60, 90.06%).

•**Natural Infections (Based on results from the Roche N assay):**

- Seroprevalence (natural infection) in June was 4.5% (95% CI 4.19, 4.83%), increased from May, 2021.
- Natural infections in most provinces except Alberta plateaued, likely due to widescale vaccination.
- Consistent with previous surveys, donors aged 17-24 years old had the highest seroprevalence rate (9.3% (95% CI 8.04, 10.57%)) compared to other age groups.
  - Rates in this age group were highest in Alberta at 17.53% (95% CI 13.23, 21.82%), Saskatchewan at 14.26% (95% CI 6.66, 21.87%), and Manitoba at 15.56% (95% CI 8.46, 22.65%).
- Racialized groups had a higher seroprevalence rate (7.95% (95% CI 6.95, 8.95%)) compared to white donors (3.72% (95% CI 3.38, 4.06%)). Those living in materially deprived vs. affluent neighbourhoods had a higher rate of natural infections, 6.95% (95% CI 5.62, 8.27%) vs 4.26% (95% CI 3.66, 4.87%).

May 2021

May 22 -June 4 2021 (n=17,001)

- The proportion of blood donors with humoral immunity for SARS-CoV-2 was 63.9% (95% CI 63.2, 64.6) a significant increase from April (based on results from the Roche S assay). This was predominantly driven by vaccination.

- **Vaccine-Induced Humoral Immunity (Reactive to Roche S-only):**

- The proportion of blood donors with vaccine-induced humoral immunity to SARS-CoV-2 was 59.8% (95% 59.1, 60.6), a significant increase from April.
- White donors had higher seroprevalence rates (vaccine-induced) (61.8% (95% CI 60.9, 62.7) compared to other racialized groups (48.9% (95% CI 47.1, 50.7%). Similarly, donors living in affluent neighbourhoods also had higher seroprevalence rates 64.8% (95% CI 63.4, 66.2%) compared to those living in the most materially deprived neighbourhoods, 56.6% (95% CI 54.0, 59.1%).

- **Natural Infections (Based on results from the Roche N assay):**

- Seroprevalence (natural infection) in May was 4.0% (95% CI 3.7, 4.3), increased from April, 2021.
- Natural infections in most provinces except Ontario and Alberta plateaued, likely due to widescale vaccination.
- Consistent with previous surveys donors aged 17-24 years old had the highest seroprevalence rate (7.0% (95% CI 5.9, 8.1)) compared to other age groups.
  - Rates in this age group were highest in Alberta 12.7% (95% CI 9.0, 16.4) and Manitoba 11.3% (95% CI 5.2, 17.4).
- Racialized groups had a higher seroprevalence rate (7.4% (95% CI 6.5, 8.3)) compared to white donors (3.3% (95% CI 2.9, 3.6)). Those living in materially deprived vs. affluent neighbourhoods had a higher rate of natural infections 5.7% (95% CI 4.5, 6.8) vs 3.1% (95% CI 2.6, 3.6).

April 2021

April 13-April 30 2021 (n=16,931)

- The proportion of blood donors with humoral immunity to SARS-CoV-2 was 26.9% (95% CI 26.2, 27.6) a significant increase from March (based on results from the Roche S assay). This was predominantly driven by vaccination.

- **Vaccine-Induced Humoral Immunity (Reactive to Roche S-only):**

- The proportion of blood donors with vaccine-induced humoral immunity to SARS-CoV-2 was 23.6% (95% CI 23.0, 24.3), a significant increase from March.
- Vaccine inequity emerged in April 2021.
- White donors had higher seroprevalence rates (vaccine-induced) (25.0% (95% CI 24.3, 25.8) compared to other racialized groups (17.9% (95% CI 16.5, 19.3%). Similarly, donors living in affluent neighbourhoods also had higher seroprevalence rates 26.9% (95% CI 25.6, 28.2%) compared to those living in the most materially deprived neighbourhoods, 20.9% (95% CI 18.8, 23.0%).

- **Natural Infections (Based on results from the Roche N assay):**

- Seroprevalence (natural infection) in April was 3.2% (95% CI 3.0, 3.5), similar to March 2021.
- Natural infections in most provinces except Ontario decreased or plateaued, likely due to widescale vaccination.
- Consistent with previous surveys donors aged 17-24 years old had the highest seroprevalence rate (5.4% (95% CI 4.4, 6.3)) compared to other age groups.
- Rates in this age group were significantly higher in Alberta 8.9% (95% CI 5.7, 12.0) and Manitoba 15.0% (95% CI 7.9, 22.0) compared to the full sample.
- Racialized groups had a higher seroprevalence rate (5.3% (95% CI 4.4, 6.1)) compared to white donors (2.8 (95% CI 2.5, 3.1)). Those living in materially deprived vs. affluent neighbourhoods had a higher rate of natural infections 4.6% (95% CI 3.5, 5.7) vs 2.7% (95% CI 2.2, 3.2).

## March 2021

February 27-March 13, 2021 (n=16,873)

- Serological testing using the Roche nucleocapsid (N) and the Roche spike (S) total antibody assays allows us to monitor trends in natural infection transmission and vaccine-induced seropositivity.
- Overall, as of March 2021 adjusted seroprevalence by the Roche S assay (proxy for humoral immunity, vaccine or natural infection immunity) was 9.9% (95% CI 9.4, 10.3). The fraction of the population naturally exposed as opposed to developing immunity post-vaccination varied across Canada.
- Adjusted seroprevalence by the Roche S assay alone (N negative, proxy for vaccine-induced immunity) was 6.8% (95% 6.4, 7.16) a significant increase from January.
- Using self-reported vaccine history the Roche S assay alone had a sensitivity of 96.1% to identify vaccination (after 2 weeks)
- Despite broader access to COVID-19 vaccines, seroprevalence by the Roche N assay (proxy for natural infections) continued to increase from January (2.2% (95% 2.1, 2.4) to March (3.3% (95% CI 3.0, 3.5))
- Consistent with previous surveys, donors aged 17-24 years old demonstrated the highest seroprevalence rate (natural infection immunity) 6.37% (5.31, 7.44) compared to other age groups. Rates in this age group were significantly higher in Alberta 14.7% (95% CI 10.8, 18.6) and Manitoba 20.8% (95% CI 12.3, 28.0) than for the full sample.
- The disparities in natural infection immunity seroprevalence rates between racialized groups and white donors and those living in materially deprived vs. affluent neighbourhoods narrowed for the first time since November 2020 when disparities began to widen.

## January 2021 (Roche)

January 1-27, 2021 (n=33,400 Roche)

- In order to evaluate seroprevalence in the vaccine era, residual blood is now tested using the Roche Elecsys® Anti-SARS-CoV-2 Spike (S) (semi-quantitative) and N (qualitative) assays. All vaccines will produce antibodies to S but not N, and natural infection will usually produce antibodies to S and N.
- In January 2021, seroprevalence estimates were higher by the Roche S assay (2.78% (95% CI 2.58, 2.97%) compared to either nucleocapsid assays. Seroprevalence by the Roche N assay was 2.24% (95% CI 2.08, 2.41) comparable to the Abbott N (1.99% (95% CI 1.84, 2.15)).
- **New:** 511 (1.5%) of donors self-reported vaccination against COVID-19 in the last 3 months in January 2021.

## January 2021

### January 1-27, 2021 (n=34,921)

---

- Seroprevalence in January was 1.99% (95% CI 1.84, 2.15)
- Across Canada seroprevalence remained the highest in Manitoba (3.92% (95% CI 2.92, 4.93)) and lowest in PEI (0%)
- Seroprevalence increased significantly in Ontario (1.16% vs 1.82%) and in Alberta (2.12% to 3.41%) from December 2020 until January 2021
- Consistent with previous surveys, donors aged 17-24 years old the highest seroprevalence rate (3.45% (95% CI 2.87, 4.02)).
- Disparities by socioeconomic status and racialized groups widened. Donors living in the most materially deprived neighbourhoods were nearly 4-times more likely to be positive than those living in affluent neighbourhoods (4.04% compared with 1.17%) . Racialized groups of donors were two time more likely to be positive than self identified white donors (3.37% compared to 1.66%)
- Detailed comparison with the previous survey (December 2020) is included.

## December 2020

### December 10-23, 2020 (n=16,961)

---

- Seroprevalence in December was 1.37% (95% CI 1.18, 1.56)
- Regional variation: Across Canada seroprevalence remained the highest in Manitoba (3.02% (95% CI 1.75, 4.29)) however this was a significant decrease from the last report.
- Donors aged 17-24 years old remained the age group with the highest seroprevalence (2.75% (95% CI 2.01, 3.49))
- Disparities by socioeconomic status widened, donors living in the most materially deprived neighbourhoods were 3-times more likely to be positive than those living in affluent neighbourhoods (2.2% compared with 0.72%)
- **New:** Longitudinal data on repeat donors illustrating waning S/co ratios over time

## November 2020

### November 7-25, 2020 (n=17,049)

- Seroprevalence in November was 1.51% (95% CI 1.31, 1.71)
- Regional variation: Seroprevalence increased mostly in Western Canada. Highest rates were observed in the Prairies; Manitoba's rate increased to 8.56% (95% CI 6.51, 10.62) and Saskatchewan's rate increased to 4.2% (95% CI 2.3, 5.8). There was a slight decrease in Ontario to 0.77% (95% CI 0.56, 0.97%) and PEI remained at 0.
- Donors aged 17-24 years old had the highest seroprevalence rates 2.97% (95% CI 2.20, 3.37%) while donors 40-59 years old 1.09% (95% CI 0.80, 1.38%) had the lowest rates.
- New: Revised time series (Additional data from the correlates of immunity study from April until Aug 31, 2020 are included in this report)
- Comparison of Wave 1 (May-July) to November 2020

## October 2020

### October 12-31, 2020 (n=16,811)

- Seroprevalence increased significantly in October to 0.88% (95% CI 0.73, 1.04) (p=0.04).
- Regional variation: Manitoba's seroprevalence rate increased to 2.96% (95% CI 1.70, 4.23), the highest in Canada. Ontario remained stable at 0.87% (0.65, 1.08)
- New: Heat maps to illustrate inter-provincial variation (by economic regions)
- Disparities widen: Donors that self-identified as white (0.75%; 95% CI 0.61, 0.92) had significantly lower seroprevalence compared to other racialized groups (1.82%; 95% CI 1.21, 2.62)

## Wave 1

### May 9, 2020- July 21, 2020 (n=74,642)

- Seroprevalence was estimated at 0.70% (95% CI 0.63, 0.77)
- Regional variation: Ontario, 0.88% (95% CI 0.78, 0.99) had the highest seroprevalence, very low seroprevalence in Atlantic provinces.
- Disparities: Donors that self-identified as white (0.66%; 95% CI 0.59, 0.74) had lower seroprevalence compared to racialized groups (1.09%; 95% CI 0.84, 1.34)

## Introduction

SARS-CoV-2 is responsible for the respiratory illness, coronavirus infection disease 2019 (COVID-19). Some people become extremely ill and can die from complications, while others experience mild symptoms or may not be aware of their infection at all. Early in the pandemic (by late March 2020) strict physical distancing measures were implemented. As a result, the first wave of the epidemic in Canada peaked by the end of April 2020 and plateaued during the summer. A resurgence of cases began in late September 2020, peaking in January 2021 (the second wave). This was followed by a third wave that emerged in many regions across Canada in March 2021, which then subsided in late April. A fourth wave of this epidemic began in early August 2021 and subsided by the end of October. Finally, in mid-December 2021, a fifth wave began. As of January 31, 2022, 3,055,826 cases of COVID-19 had been reported in Canada.

Beginning in January 2021, the dominant variant of concern (VOC) in Canada was Alpha (B.1.1.7). Alpha remained the dominant VOC in the Canadian population until late June 2021 when Delta (B.1.617.2) became dominant. Beginning in mid-December 2021, a new more contagious VOC named Omicron (B.1.1.529) has become the most dominant VOC in the Canadian population. By late December 2021 public health testing facilities were overwhelmed and restrictions on testing were implemented in many jurisdictions. Because many people with symptoms were not being tested, as well as those infected but without symptoms, the reported cases underestimate the infection rate. Surveillance studies that monitor SARS-CoV-2 antibodies are important to understand what proportion of the population have detectable antibodies (the seroprevalence) and to monitor trajectories over the course of the pandemic. This information improves mathematical models to predict the course of infection and can inform public health policies.

Antibody concentrations typically peak within a month of vaccination and then gradually decrease. Antibody concentrations can be much higher after a second or third dose of vaccine, or when an infection occurs pre- or post-vaccination. More than 82% of the eligible (5 and older) population had received two doses as of January 30, 2022. Starting in November 2021, some Canadians became eligible for a third dose. By January 30, 2022, over 49% of the eligible population (18 and older) had received a third dose. Monitoring spike (vaccine) antibody concentrations and the proportion of people with omicron variant infection provides data for mathematical models to estimate the status of humoral immunity.

In partnership with the COVID-19 Immunity Task Force, Canadian Blood Services is testing residual blood for SARS-CoV-2 antibodies from blood donors. This report tracks SARS-CoV-2 seroprevalence distinguishing natural and likely vaccine induced humoral immunity. We present seroprevalence rates based on two Roche total Ig- assays that detect Spike (S) and Nucleocapsid (N) antibodies and monitor the concentration of S antibodies. We assess temporal changes and evaluate differences by geographical regions, age groups, racialized groups, and socioeconomic status.

## Methods

### Population

Canadian Blood Services has blood collection sites in all large cities and many smaller urban centres in all provinces except Quebec. People in rural areas may have less opportunity to donate and donations are not collected in the northern territories. Blood donors are reasonably representative of healthy Canadians between the ages of 17 and about 60.

### Blood donor eligibility

Before each donation, blood donors must answer screening questions to ensure that they are in good health and do not have risk factors for infections that may be transmitted to blood recipients. There is no evidence that SARS-CoV-2 can be transmitted through blood transfusion, but it is important to ensure other donors and staff are safe while in the blood clinic. Donors are asked if they have had COVID-19 or been in contact with someone who has. Donors are deferred if they have been in contact with someone who was infected or if they have had the infection for 2 weeks after symptoms disappear (3 weeks if hospitalized). Donors also have their temperature checked before they enter the clinic, and their hemoglobin level is checked before they can donate.

### Blood samples

Just before a donor gives their blood donation, several small tubes of blood are collected for infectious disease screening. An extra sample is taken, known as the retention sample, in case extra testing is required (80% of these retention samples are not needed for operational testing). For this study retention samples were aliquoted and frozen at -20°C or colder, starting on May 9, 2020.

### Periodicity

All retention samples were tested for SARS-CoV-2 antibodies until July 21, 2020 (Wave 1). From August 2020 until December 2020, only samples from approximately the last two weeks of each month were tested (except samples from August and September which were stored but not tested). In January 2021 a larger sample was tested, in February samples were stored but not tested. As of March, testing of approximately 2 weeks per month resumed. Beginning in July 2021 the sample size was reduced to include about 300 samples per age/region grouping plus extra repeat tested donors. In December samples from 2 weeks were tested without sorting in order to be able to report more quickly. Seroprevalence estimates also include an additional 1,500 residual blood tests from the correlates of immunity study from April 2020 to January 2021. These were tested on a battery of assays (orthogonal testing) including the Abbott IgG Assay which is reported until January 2021.



		2020											
		March	April	May	June	July	August	September	October	November	December		
Seroprevalence <sup>1</sup>				14,541	51,963	21,594	17,000	17,000	16,811	17,049	16,961		
Correlates of Immunity Study <sup>2</sup>													
		2021											
		January	February	March	April	May	June	July	August	September	October	November	December
Seroprevalence <sup>1</sup>		34,921	17,000	16,873	16,931	17,001	16,884	8,457	9,109	9,363	9,627	9,018	16,816
Correlates of Immunity Study <sup>2</sup>													
		2022											
		January	February	March									
Seroprevalence <sup>1</sup>		32,505											
Orthogonal Testing <sup>2</sup>													

<sup>1</sup> Samples tested with the **Abbott SARS-CoV-2 IgG Assay until January 2021** (residual blood from August 2020, September 2020 and February 2021 are aliquoted but have not been tested). As of January 2021, all samples were tested using the Roche Elecsys® Anti-SARS-CoV-2 assays (S and N).

<sup>2</sup> Orthogonal Testing (PI: S. Drews (CIHR 2020) sampling 1,500 samples per month until and including January 2021 (Abbott tested); this study is known as the “Correlates of Immunity Study”

### SARS-CoV-2 antibody testing

Two assays were used. The Roche Elecsys® Anti-SARS-CoV-2 spike semi-quantitative immunoassay detects total antibodies (including IgA, IgM and IgG) to the SARS-CoV-2 spike (S) protein (**Spike antibody**). The Elecsys® Anti-SARS-CoV-2 qualitative immunoassay detects total antibodies (including IgA, IgM and IgG) to SARS-CoV-2 using a recombinant protein, nucleocapsid (N) antigen (**Nucleocapsid antibody**). At a concentration of  $\geq 0.8$  U/mL, the Spike antibody assay was assumed to have sensitivity of 98.8% and specificity of 99.6%. At a concentration of  $\geq 1.0$  U/mL, the Nucleocapsid antibody assay was assumed to have sensitivity of 99.5% and specificity of 99.8%<sup>1</sup>. All testing was conducted at Canadian Blood Services laboratories in Ottawa.

Samples from January to August were tested neat and at a 1:10 dilution for Spike antibody, however, by June many samples were above the maximum detection level when diluted. From September onwards samples were tested up to a 1:400 dilution.

Serological testing using the Nucleocapsid, and Spike antibody assay allows trends in natural infection transmission and vaccine-induced seropositivity to be monitored<sup>2</sup>. In this report the dual terms Spike antibody/ humoral immunity (by vaccine or natural infection) and Nucleocapsid antibody/ proxy for natural infection will be used interchangeably. This is to ease interpretation for readers, with the caveat that these interpretations do not reflect the complexity of adaptive immunity.

### Ethical issues

All data were de-identified by the information technology team at Canadian Blood Services by providing a random identification number. Demographic variables and vaccination history were

extracted from the Canadian Blood Services donor database (e.g., donation date, birth year, sex, racialized groups, Forward Sortation Area of residential postal code) and linked to the test data. In the donor pamphlet “What you must know to donate blood” which donors must read before each donation, and in the pamphlet entitled “What happens to your blood donation?” donors were informed that their blood will be tested for routine infectious disease markers and other tests as required. Information about the study was made available on the website in late June 2020 prior to commencing testing. Donors were not informed of their results because confirmatory/supplemental testing was not carried out. This study was approved by the Canadian Blood Services Research Ethics Board.

### **Data management and analysis**

De-identified demographic data were analysed by the Canadian Blood Services Epidemiology & Surveillance Department. Socioeconomic status was estimated by quintiles of the Pampalon Material and Social Deprivation Indices (MSDI). MSDI was derived from 2016 Statistics Canada census, aggregated from postal codes to the dissemination area (DA) level (the smallest geographic unit available in the Canadian census, consisting of 400–700 persons). Because blood donors tend to live in areas close to a blood clinic there will be higher concentrations of donors in certain areas compared with the general population, and lower concentrations in other areas. To make inference to the general population, weighting factors were applied based on the donor’s residential Forward Sortation Area (FSA), age group and sex. Data were weighted based on Statistics Canada data (catalogue # 98-400-X2016008). For FSAs with few donors, several FSAs were combined, generally to include at least 500 donors. For data with no FSA recorded or if not in a province where blood is collected (0.2% of samples) weighting was based on FSA of the blood centre.

The seroprevalence was calculated as the number of positive samples divided by all samples tested. Ninety-five percent confidence intervals were calculated based on the Exact method. The adjusted seroprevalence and confidence intervals present the weighted data adjusted for sensitivity and specificity of the assay using the Rogan-Gladen equation<sup>3</sup>. SARS-CoV-2 seroprevalence was stratified by geography (regions, province and selected metropolitan cities), sex, age groups, self-reported ethnicity, and social and material deprivation indices.

Temporal trends by monthly intervals were evaluated by demographic variables. Statistical comparisons between groups were carried out using logistic regression.

Beginning in November some donors would be receiving their third dose of vaccine. Concentration of spike antibody relative to time since most recent vaccination beginning in November 2021 was evaluated using the donor history questionnaire asking about vaccination in last 3 months for which the date of last vaccination is sometimes recorded.

Donors who donated more than once since testing began with the Roche assay in January 2021 and whose samples were selected for seroprevalence testing (at least two samples tested per donor) were included in a separate dataset for analysis and are referred to as “repeat donors”. At monthly intervals, beginning with June 2021, donations from repeat donors were evaluated for potential incident infections. If a donor was S positive and N negative on their previous

donation (presumed vaccinated) before the month being observed and then was S positive N positive on their following donation in the corresponding month (eg. June), this was considered a potential incident breakthrough infection. Percent incidence for each month was calculated by dividing the number of new incident infections (S positive N positive) in that month by the total number of donors who tested S positive N negative on their previous donation prior to the corresponding month. This same approach was used to evaluate incident cases among donors who were S negative and N negative (presumed unvaccinated) on their previous donation who then were S positive N positive on their following donation in the corresponding month.

## Results

Between January 1 and 31 2022, a total of 32,505 unique donors were tested for SARS-CoV-2 antibodies.

Table 1 compares adjusted seroprevalence rates by different assays (**Nucleocapsid and Spike antibody**) by sociodemographic variables for all Canadian provinces (except Quebec and territories). Overall adjusted seroprevalence by Spike antibody (a proxy of humoral immunity) was 98.89% (95% CI 98.73, 99.06%). The adjusted seroprevalence by Nucleocapsid antibody (proxy for natural infection) was 12.12% (95% CI 11.76, 12.48%) (please refer to points of interpretation). There was a gradual increase over the 31 day reporting period from 7.16% (6.62, 7.71) to 10.09% (9.46, 10.71) to 12.65% (11.84, 13.45) to 16.30% (95% CI 15.51, 17.09) consistent with emergence of the Omicron variant.

Figure 1 illustrates temporal trends of SARS-CoV-2 seroprevalence from April 4, 2020, until January 31, 2022, by monthly intervals. The discontinuation of the line in January 2021 represents the transition from the Abbott assay to the Roche assay. The largest increase in seroprevalence was seen in the Roche S assay, from early-March 2021 onwards, mirroring wider vaccine roll out. Figure 2 (A-E) stratifies seroprevalence by regions. Most of the humoral immunity was induced by vaccines (compared to natural infections) across the country. The largest increase in seroprevalence using Roche N was seen in January, 2022 consistent with the Omicron variant wave. Appendix Tables A1.1-A1.6 compare seroprevalence rates by sex, age groups and material deprivation in different regions.

Table 2A compares temporal changes in seroprevalence rates by natural infection (**Nucleocapsid antibody** between December 2021 and January 2022). Overall, the seroprevalence rate for natural infections was higher in January (12.12% (95% CI 11.76, 12.48) compared to December 6.39% (95% CI 6.01, 6.76%) ( $P < 0.001$ ), and natural infections increased compared to the previous month across almost all demographics. Donors aged 17-24 years old continued to have the highest seroprevalence rate at 22.22% (95% CI 20.93, 23.51%) compared to other age groups.

Table 2B illustrates increases in seroprevalence by **Spike antibody** (proxy for humoral immunity), in many sociodemographic variables between December and January. In January, nearly all sociodemographic groups had at least 98% seroprevalence.

After vaccination an increase in antibody concentration followed by gradual decline is expected. From September, 2021 to January, 2022 dilution of high concentration spike antibody samples permitted measurement of antibody concentrations as high as 100,000 U/mL. Figure 3 illustrates distributions of log transformed S antibody concentrations by age group from September to January.

From June to October 2021 the percentage of incident breakthrough infections varied by month with no clear trend (See Table 3). Breakthrough infections were rare. In December 2021 there were 0.71% (0.45, 1.06) of donors who were S and N positive but S positive N negative on their previous donation, and in January this increased to 5.28% (95% CI 4.74, 5.87). Table 4 shows the percentage of incident cases by month in likely unvaccinated donors. Since June the percentage slowly increased to 3.93% (3.13, 4.86) in December then increasing much further to 9.04% (95% CI 8.19, 9.95) in January.

Figure 4 shows regional weekly trends since December 2021 for Nucleocapsid. Figures 5A-H illustrate temporal trends of seroprevalence by Nucleocapsid and Spike antibody results by sociodemographic variables (ethnicity, age, material deprivation, and social deprivation) from January 2021 to January 2022. Differences in natural infections between white and racialized groups were seen from January 2021 to January 2022 with racialized groups having higher natural infection rates. Other sociodemographic variables had significant differences at various months corresponding to the vaccine roll out across Canada with evident trends in certain groups having increased Spike and/or Nucleocapsid antibodies compared to others. Tables A 1.1 to A 1.6 show selected demographic results for January by region (Nucleocapsid and Spike), and additional weekly breakdown of Nucleocapsid results are shown in Tables A 2.1 and A 2.2

## Conclusion

Widescale COVID-19 vaccine rollouts are evident by high seroprevalence rates across Canada. Overall, as of January 2022, adjusted seroprevalence by the Spike antibody assay (proxy for humoral immunity) was 98.89% (95% CI 98.73, 99.06%). While humoral immunity was largely driven by vaccination, the fraction of the population naturally exposed varied across Canada but has increase sharply over January. Among repeat tested donors, breakthrough infections in unvaccinated donors have increased slowly since June and more substantially in January 2022.

## Points for Interpretation

1. Blood donors are a healthy sub-set of the adult Canadian population. Important points to keep in mind with regard to representativeness of the sample are:
  - blood donors self-select to donate blood therefore those who choose not to donate blood for whatever reason are not included in the sample.
  - Blood donations are collected from people aged 17 years and older, however there are relatively few donations from elderly donors.

- Blood donations are collected in larger cities and many smaller urban areas, but people in rural areas may be under-represented. Canadian Blood Services does not collect blood in the northern territories or the province of Quebec.
2. Data were weighted for age, sex, and location to more closely reflect the Canadian population. For example, the Nucleocapsid antibody assay unweighted SARS-CoV-2 seroprevalence for the full sample was 11.45% (95% CI 11.10, 11.80), and after weighting factors applied it was 12.23% (95% CI 11.88, 12.59), then after the weighted seroprevalence was adjusted for sensitivity and specificity, 12.12% (95% CI 11.76, 12.48). Using the Spike antibody assay, the unweighted SARS-CoV-2 seroprevalence for the full sample was 97.67% (95% CI 97.50, 97.84), and after weighting factors applied it was 97.72% (95% CI 97.55, 97.88), then after the weighted seroprevalence was adjusted for sensitivity and specificity, 98.89% (95% CI 98.73, 99.06).
  3. The sensitivity and specificity of the Roche assays are very good, but it is still possible that some true positives may be missed, and some positive results may be false. Confirmatory testing has not been performed. The seroprevalence was adjusted for sensitivity and specificity using a well-established mathematical formula.
  4. Different seroprevalence rates by the assays reflect different isotypes being measured. The Roche assay identifies IgA, IgG and IgM antibodies. The Abbott assay measured IgG. Detection of Nucleocapsid antibodies is likely a marker of natural infection while Spike antibodies can be induced by either natural infection or by vaccines.
  5. Seroprevalence results reflect measurement of humoral immunity. The exact mechanisms of protective immunity against SARS-CoV-2 remains unknown. The protection at particular levels of Spike antibody is unknown. Quantitative results from the Spike antibody assay will be valuable to inform policy regarding booster shots as the science evolves.
  6. As of September 2021, the dilution for higher concentration (>250 U/mL) was increased from 1:10 to 1:400. This allows antibody concentration to be measured as high as 100,000 U/mL rather than 2,500 U/mL. It is possible that values between 160 and 320 U/mL may be less accurate because they are at the lower end of sensitivity of the assay.
  7. SARS-CoV-2 antibody signals wane over time.
  8. Spike antibodies reflect SARS-CoV-2 humoral response. Most Spike antibody positive results are related to vaccination. However, some Spike antibody positives may be due to natural infection (with or without N antibodies). Donors with both Spike and Nucleocapsid antibodies are assumed to have had a natural infection; however, they may have also been vaccinated before or after the infection.

Due to a variety of biological factors, donors may have variable antibody responses to different binding sites on the SARS-CoV-2 virus (e.g., Spike, receptor binding domain of Spike, nucleocapsid protein). In January the most common positive antibody profile was positive on Spike antibody and negative on Nucleocapsid antibody (see below).

**Diagnostic phenotypes in January 2022 (unadjusted)**

	<b>Nucleocapsid Antibody</b>	<b>Spike Antibody</b>	<b>Total N (%)</b>
	Negative	Negative	723 (2.2%)
	Negative	Positive	28,061 (86.3%)
	Positive	Negative	33 (0.1%)
	Positive	Positive	3,688 (11.3%)
<b>Total</b>			<b>32,505</b>

Disclaimer: Canadian Blood Services is providing this report of the study results on an "as is" basis and makes no representations or warranties, express or implied, including with regards to the accuracy, reliability or validity of the information or its fitness for a particular purpose. The use of this report and/or any study results is the responsibility of the user. Canadian Blood Services assumes no liability resulting from any such use. This report may not be reproduced without permission from Canadian Blood Services.

**References**

1. <https://diagnostics.roche.com/global/en/products/params/electsys-anti-sars-cov-2-s.html>
2. Whitaker HJ, Elgohari S, Rowe C, Otter AD, Brooks T, Linley E, et al., Impact of COVID-19 vaccination program on seroprevalence in blood donors in England, 2021, Journal of Infection (2021), doi: <https://doi.org/10.1016/j.jinf.2021.04.037>
3. Lang Z, Reiczigel J. Confidence limits for prevalence of disease adjusted for estimated sensitivity and specificity. Preventive Veterinary Medicine. 2014:113;13-2

**Table 1.** Comparing SARS-CoV-2 seroprevalence by sociodemographic variables by Nucleocapsid and Spike antibody results in January 2022

	Nucleocapsid Antibody Results (proxy for natural infection)				Spike Antibody Results (proxy for humoral immunity by either natural infection or vaccination)			
	Crude		Adjusted		Crude		Adjusted	
	Number Tested	Number Positive	Percent Positive	95% Confidence Interval	Number Tested	Number Positive	Percent Positive	95% Confidence Interval
<b>Sex</b>								
Female	13,912	1,537	11.31	10.82, 11.79	13,912	13,638	99.23	99.02, 99.44
Male	18,593	2,184	12.98	12.45, 13.51	18,593	18,111	98.54	98.28, 98.79
<b>Age</b>								
17-24	2,412	531	22.22	20.93, 23.51	2,412	2,370	99.46	99.05, 99.87
25-39	8,856	1,319	15.42	14.62, 16.22	8,856	8,639	98.65	98.30, 99.00
40-59	11,876	1,294	10.91	10.33, 11.49	11,876	11,579	98.66	98.37, 98.95
60+	9,361	577	6.30	5.79, 6.80	9,361	9,161	99.15	98.85, 99.44
<b>Province</b>								
British Columbia	5,305	587	11.82	10.97, 12.66	5,305	5,184	98.83	98.43, 99.23
Alberta	6,741	1,050	16.78	15.72, 17.84	6,741	6,543	98.03	97.53, 98.52
Saskatchewan	1,553	167	11.53	9.75, 13.30	1,553	1,517	98.76	97.91, 99.62
Manitoba	2,001	301	16.26	14.36, 18.16	2,001	1,942	98.00	97.09, 98.90
Ontario	13,085	1,494	12.13	11.62, 12.64	13,085	12,792	99.08	98.86, 99.31
New Brunswick	1,192	28	2.43	1.38, 3.47	1,192	1,167	99.13	98.19, 100.00
Nova Scotia	1,712	76	3.80	2.66, 4.95	1,712	1,695	100.00	99.40, 100.00
Prince Edward Island	400	6	1.52	0.00, 3.45	400	397	99.44	97.48, 100.00
Newfoundland	516	12	2.10	0.93, 3.26	516	512	100.00	99.30, 100.00
<b>Metro area</b>								
Vancouver	3,024	437	14.83	13.65, 16.00	3,024	2,966	99.40	98.96, 99.84
Calgary	2,501	382	15.97	14.12, 17.82	2,501	2,448	99.20	98.49, 99.91
Edmonton	2,280	298	13.91	12.22, 15.60	2,280	2,225	98.74	97.98, 99.50

COVID-19 Seroprevalence Report  
January Survey

Ottawa	1,608	126	7.61	6.03, 9.18	1,608	1,599	100.00	99.94, 100.00
Toronto	3,672	603	16.33	15.42, 17.23	3,672	3,615	99.78	99.49, 100.00
Winnipeg	1,328	140	10.79	8.70, 12.88	1,328	1,304	99.30	98.38, 100.00
<b>Ethnicity<sup>1,2</sup></b>								
White	24,932	2,539	10.73	10.34, 11.12	24,932	24,346	98.83	98.64, 99.02
Indigenous	440	38	8.80	6.11, 11.50	440	428	98.61	97.10, 100.00
Asian	1,484	180	12.89	11.25, 14.52	1,484	1,471	100.00	99.96, 100.00
Other racialized groups	3,199	680	22.03	20.64, 23.41	3,199	3,139	99.47	99.03, 99.90
<b>Social Deprivation<sup>3</sup></b>								
1 (least deprived)	6,012	805	14.07	13.18, 14.96	6,012	5,855	98.65	98.25, 99.06
2	6,123	698	11.89	11.06, 12.71	6,123	5,972	98.64	98.23, 99.04
3	5,832	588	10.52	9.73, 11.32	5,832	5,721	99.30	98.95, 99.65
4	5,419	575	11.34	10.49, 12.19	5,419	5,304	99.14	98.76, 99.52
5 (most deprived)	5,414	579	11.46	10.60, 12.31	5,414	5,292	98.99	98.60, 99.39
<b>Material Deprivation<sup>3</sup></b>								
1 (least deprived)	8,641	919	11.27	10.58, 11.95	8,641	8,509	99.82	99.57, 100.00
2	7,120	789	11.47	10.71, 12.23	7,120	6,984	99.27	98.94, 99.60
3	5,795	623	11.26	10.44, 12.08	5,795	5,641	98.57	98.16, 98.99
4	4,622	536	12.35	11.41, 13.28	4,622	4,491	98.28	97.80, 98.76
5 (most deprived)	2,622	378	15.18	13.84, 16.51	2,622	2,519	97.40	96.69, 98.11
<b>Total</b>	<b>32,505</b>	<b>3,721</b>	<b>12.12</b>	<b>11.76, 12.48</b>	<b>32,505</b>	<b>31,749</b>	<b>98.89</b>	<b>98.73, 99.06</b>

<sup>1</sup> Self reported ethnicity was missing for 2450 (7.5%) donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 11.94% (95% CI 10.63, 13.26); and Spike antibody was 97.63% (95% CI 96.88, 98.38).

<sup>2</sup> Combining all racialized groups together resulted in adjusted SARS-CoV-2 seroprevalence of 18.29% (95% CI 17.27, 19.32) by the Nucleocapsid antibody assay, and 99.71% (95% CI 99.39, 100.00) by Spike antibody.

<sup>3</sup> Postal Codes were missing for 3,705 (11.4%) of donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 14.00% (95% CI 12.86, 15.14) and Spike antibody was 98.53% (95% CI 98.00, 99.06).



**Table 2a.** Changes in SARS-CoV-2 seroprevalence by **Nucleocapsid Antibody assay (proxy for natural infection)** by sociodemographic variables between December 2021 and January 2022

	December 2021 (crude)		December 2021 (adjusted)		January 2022 (crude)		January 2022 (adjusted)		
	Number Tested	Number Positive	Percent Positive	95% Confidence Interval	Number Tested	Number Positive	Percent Positive	95% Confidence Interval	P-Value*
<b>Sex</b>									
Female	6,997	484	5.91	5.41, 6.42	13,912	1,537	11.31	10.82, 11.79	<0.0001
Male	9,819	708	6.89	6.33, 7.45	18,593	2,184	12.98	12.45, 13.51	<0.0001
<b>Age</b>									
17-24	1,576	204	11.37	9.99, 12.75	2,412	531	22.22	20.93, 23.51	<0.0001
25-39	4,418	383	8.04	7.20, 8.88	8,856	1,319	15.42	14.62, 16.22	<0.0001
40-59	6,520	425	5.72	5.11, 6.33	11,876	1,294	10.91	10.33, 11.49	<0.0001
60+	4,302	180	3.58	3.04, 4.13	9,361	577	6.30	5.79, 6.80	<0.0001
<b>Province</b>									
British Columbia	3,390	208	5.83	4.98, 6.69	5,305	587	11.82	10.97, 12.66	<0.0001
Alberta	3,455	450	12.94	11.62, 14.27	6,741	1,050	16.78	15.72, 17.84	<0.0001
Saskatchewan	882	64	7.00	5.03, 8.98	1,553	167	11.53	9.75, 13.30	0.0018
Manitoba	807	61	8.18	6.21, 10.14	2,001	301	16.26	14.36, 18.16	<0.0001
Ontario	7,178	402	5.43	4.94, 5.92	13,085	1,494	12.13	11.62, 12.64	<0.0001
New Brunswick	185	2	0.45	0.00, 1.22	1,192	28	2.43	1.38, 3.47	0.0161
Nova Scotia	649	3	0.25	0.00, 0.79	1,712	76	3.80	2.66, 4.95	<0.0001
Prince Edward Island	134	0	.	.	400	6	1.52	0.00, 3.45	0.2114
Newfoundland	136	2	0.96	0.00, 2.12	516	12	2.10	0.93, 3.26	0.2216

COVID-19 Seroprevalence Report  
January Survey

<b>Metro area</b>									
Vancouver	1,821	133	7.20	5.90, 8.50	3,024	437	14.83	13.65, 16.00	<0.0001
Calgary	1,203	112	9.12	7.17, 11.06	2,501	382	15.97	14.12, 17.82	<0.0001
Edmonton	984	74	7.59	5.60, 9.58	2,280	298	13.91	12.22, 15.60	<0.0001
Ottawa	521	11	2.27	1.08, 3.46	1,608	126	7.61	6.03, 9.18	<0.0001
Toronto	2,891	234	7.78	6.90, 8.67	3,672	603	16.33	15.42, 17.23	<0.0001
Winnipeg	535	32	6.34	4.19, 8.50	1,328	140	10.79	8.70, 12.88	0.0064
<b>Ethnicity<sup>1,2</sup></b>									
White	12,432	751	5.21	4.81, 5.61	24,932	2,539	10.73	10.34, 11.12	<0.0001
Indigenous	196	12	4.84	1.79, 7.89	440	38	8.80	6.11, 11.50	0.0848
Asian	931	59	6.81	5.15, 8.47	1,484	180	12.89	11.25, 14.52	<0.0001
Other racialized groups	2,022	263	12.58	11.12, 14.05	3,199	680	22.03	20.64, 23.41	<0.0001
<b>Social Deprivation<sup>3</sup></b>									
1 (least deprived)	3,224	248	7.15	6.24, 8.06	6,012	805	14.07	13.18, 14.96	<0.0001
2	3,250	221	6.19	5.35, 7.03	6,123	698	11.89	11.06, 12.71	<0.0001
3	2,924	181	5.44	4.60, 6.28	5,832	588	10.52	9.73, 11.32	<0.0001
4	2,773	217	6.95	5.99, 7.91	5,419	575	11.34	10.49, 12.19	<0.0001
5 (most deprived)	2,692	152	4.91	4.08, 5.74	5,414	579	11.46	10.60, 12.31	<0.0001
<b>Material Deprivation<sup>3</sup></b>									
1 (least deprived)	4,403	236	5.06	4.39, 5.74	8,641	919	11.27	10.58, 11.95	<0.0001
2	3,588	208	5.13	4.39, 5.86	7,120	789	11.47	10.71, 12.23	<0.0001
3	3,113	208	5.69	4.86, 6.51	5,795	623	11.26	10.44, 12.08	<0.0001
4	2,326	216	8.20	7.08, 9.33	4,622	536	12.35	11.41, 13.28	<0.0001

COVID-19 Seroprevalence Report  
January Survey

5 (most deprived)	1,433	151	9.32	7.87, 10.77	2,622	378	15.18	13.84, 16.51	<0.0001
<b>Total</b>	<b>16,816</b>	<b>1192</b>	<b>6.39</b>	<b>6.01, 6.76</b>	<b>32,505</b>	<b>3,721</b>	<b>12.12</b>	<b>11.76, 12.48</b>	<b>&lt; 0.0001</b>

\*P-value reflects the difference between December and January results.

<sup>1</sup> In December, self reported ethnicity was missing for 1,235 (7.3%) donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 8.20% (95% CI 6.61, 9.78). In January, self reported ethnicity was missing for 2450 (7.5%) donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 11.94% (95% CI 10.63, 13.26).

<sup>2</sup> In December, combining all racialized groups together resulted in adjusted SARS-CoV-2 seroprevalence of 10.40% (95% CI 9.32, 11.48) by the Nucleocapsid antibody assay. In January, combining all racialized groups together resulted in adjusted SARS-CoV-2 seroprevalence of 18.29% (95% CI 17.27, 19.32) by the Nucleocapsid antibody assay.

<sup>3</sup> In December, postal codes were missing for 1,953 (11.6%) of donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 8.23% (95% CI 6.97, 9.50). In January, postal codes were missing for 3,705 (11.4%) of donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 14.00% (95% CI 12.86, 15.14).

**Table 2b.** Changes in SARS-CoV-2 seroprevalence using **Spike antibody results (proxy for natural infection or vaccine induced immunity)** by sociodemographic variables between December 2021 and January 2022

	December 2021 (crude)		December 2021 (adjusted)		January 2022 (crude)		January 2022 (adjusted)		P-Value*
	Number Tested	Number Positive	Percent Positive	95% Confidence Interval	Number Tested	Number Positive	Percent Positive	95% Confidence Interval	
<b>Sex</b>									
Female	6,997	6,812	98.58	98.24, 98.92	13,912	13,638	99.23	99.02, 99.44	0.0009
Male	9,820	9,551	98.58	98.23, 98.93	18,593	18,111	98.54	98.28, 98.79	0.8361
<b>Age</b>									
17-24	1,576	1,551	99.54	98.99, 100.00	2,412	2,370	99.46	99.05, 99.87	0.8158
25-39	4,418	4,289	98.21	97.68, 98.74	8,856	8,639	98.65	98.30, 99.00	0.1659
40-59	6,521	6,334	98.44	98.01, 98.86	11,876	11,579	98.66	98.37, 98.95	0.3911
60+	4,302	4,189	98.66	98.20, 99.11	9,361	9,161	99.15	98.85, 99.44	0.0656
<b>Province</b>									
British Columbia	3,390	3,314	98.99	98.46, 99.52	5,305	5,184	98.83	98.43, 99.23	0.6307
Alberta	3,455	3,334	97.79	97.07, 98.50	6,741	6,543	98.03	97.53, 98.52	0.5867
Saskatchewan	883	861	99.06	97.94, 100.00	1,553	1,517	98.76	97.91, 99.62	0.6871
Manitoba	807	780	97.77	96.47, 99.07	2,001	1,942	98.00	97.09, 98.90	0.7742
Ontario	7,178	6,988	98.49	98.14, 98.84	13,085	12,792	99.08	98.86, 99.31	0.0035
New Brunswick	185	181	99.49	98.25, 100.00	1,192	1,167	99.13	98.19, 100.00	0.6608
Nova Scotia	649	638	99.69	98.69, 100.00	1,712	1,695	100.00	99.40, 100.00	0.3519
Prince Edward Island	134	132	99.91	97.55, 100.00	400	397	99.44	97.48, 100.00	0.6223
Newfoundland	136	135	100.00	98.95, 100.00	516	512	100.00	99.30, 100.00	0.6406

COVID-19 Seroprevalence Report  
January Survey

<b>Metro area</b>									
Vancouver	1,821	1,794	99.70	99.09, 100.00	3,024	2,966	99.40	98.96, 99.84	0.4516
Calgary	1,203	1,171	98.70	97.65, 99.75	2,501	2,448	99.20	98.49, 99.91	0.4224
Edmonton	984	960	98.98	97.88, 100.00	2,280	2,225	98.74	97.98, 99.50	0.7258
Ottawa	521	512	99.20	98.12, 100.00	1,608	1,599	100.00	99.94, 100.00	0.0062
Toronto	2,891	2,830	98.87	98.37, 99.37	3,672	3,615	99.78	99.49, 100.00	0.0009
Winnipeg	535	526	99.68	98.60, 100.00	1,328	1,304	99.30	98.38, 100.00	0.6104
<b>Ethnicity<sup>1,2</sup></b>									
White	12,432	12,102	98.65	98.37, 98.93	24,932	24,346	98.83	98.64, 99.02	0.2916
Indigenous	196	184	94.95	91.55, 98.35	440	428	98.61	97.10, 100.00	0.0257
Asian	931	920	99.86	99.11, 100.00	1,484	1,471	100.00	99.96, 100.00	0.2511
Other racialized groups	2,023	1,963	98.12	97.36, 98.88	3,199	3,139	99.47	99.03, 99.90	0.0013
<b>Social Deprivation<sup>3</sup></b>									
1 (least deprived)	3,224	3,127	98.24	97.64, 98.83	6,012	5,855	98.65	98.25, 99.06	0.2444
2	3,251	3,166	98.83	98.31, 99.36	6,123	5,972	98.64	98.23, 99.04	0.5647
3	2,924	2,848	98.72	98.15, 99.29	5,832	5,721	99.30	98.95, 99.65	0.0769
4	2,773	2,703	98.65	98.05, 99.24	5,419	5,304	99.14	98.76, 99.52	0.1555
5 (most deprived)	2,692	2,623	98.51	97.90, 99.13	5,414	5,292	98.99	98.60, 99.39	0.1841
<b>Material Deprivation<sup>3</sup></b>									
1 (least deprived)	4,403	4,314	99.20	98.78, 99.62	8,641	8,509	99.82	99.57, 100.00	0.0089
2	3,589	3,487	98.56	98.02, 99.09	7,120	6,984	99.27	98.94, 99.60	0.0185
3	3,113	3,031	98.62	98.06, 99.18	5,795	5,641	98.57	98.16, 98.99	0.8961
4	2,326	2,248	97.92	97.19, 98.65	4,622	4,491	98.28	97.80, 98.76	0.4126

COVID-19 Seroprevalence Report  
January Survey

5 (most deprived)	1,433	1,387	97.96	97.08, 98.84	2,622	2,519	97.40	96.69, 98.11	0.3408
<b>Total</b>	16,817	16,363	98.58	98.34, 98.82	32,505	31,749	98.89	98.73, 99.06	0.034

\*P-value reflects the difference between December and January results.

<sup>1</sup> In December, self reported ethnicity was missing for 1,235 (7.3%) donors; Adjusted seroprevalence by the Spike antibody was 98.07% (95% CI 97.07, 99.08). In January, self reported ethnicity was missing for 2450 (7.5%) donors; Adjusted seroprevalence by the Spike antibody was 97.63% (95% CI 96.88, 98.38).

<sup>2</sup> In December, combining all racialized groups together resulted in adjusted SARS-CoV-2 seroprevalence of 98.50% (95% CI 97.92, 99.07) by Spike antibody. In January, combining all racialized groups together resulted in adjusted SARS-CoV-2 seroprevalence of 99.71% (95% CI 99.39, 100.00) by Spike antibody.

<sup>3</sup> In December, postal codes were missing for 1,953 (11.6%) of donors; Adjusted seroprevalence by the Spike antibody was 98.50% (95% CI 97.76, 99.24). In January, postal codes were missing for 3,705 (11.4%) of donors; Adjusted seroprevalence by the Spike antibody was 98.53% (95% CI 98.00, 99.06).

**Table 3.** SARS-CoV-2 incidence among anti-S positive donors by month from June 2021 – January 2022.

Month	Total donors tested	Repeat Donors	Previous S positive, N negative	S Positive, N Positive		
				N	%	95% CI
Jun	16884	4452	929	2	0.215	0.03, 0.78
Jul	8457	2853	1054	5	0.474	0.15, 1.10
Aug	9109	5400	2719	8	0.294	0.13, 0.58
Sep	9363	5728	2915	3	0.103	0.02, 0.30
Oct	9627	5898	3313	12	0.362	0.19, 0.63
Nov	9018	5290	3318	20	0.603	0.37, 0.93
Dec	16816	5560	3251	23	0.710	0.45, 1.06
Jan	32505	10804	6265	331	5.280	4.74, 5.87

Note: A donation was considered a potential breakthrough incident infection if donors tested S positive and N negative on their previous donation and then tested S positive and N positive on their following donation.

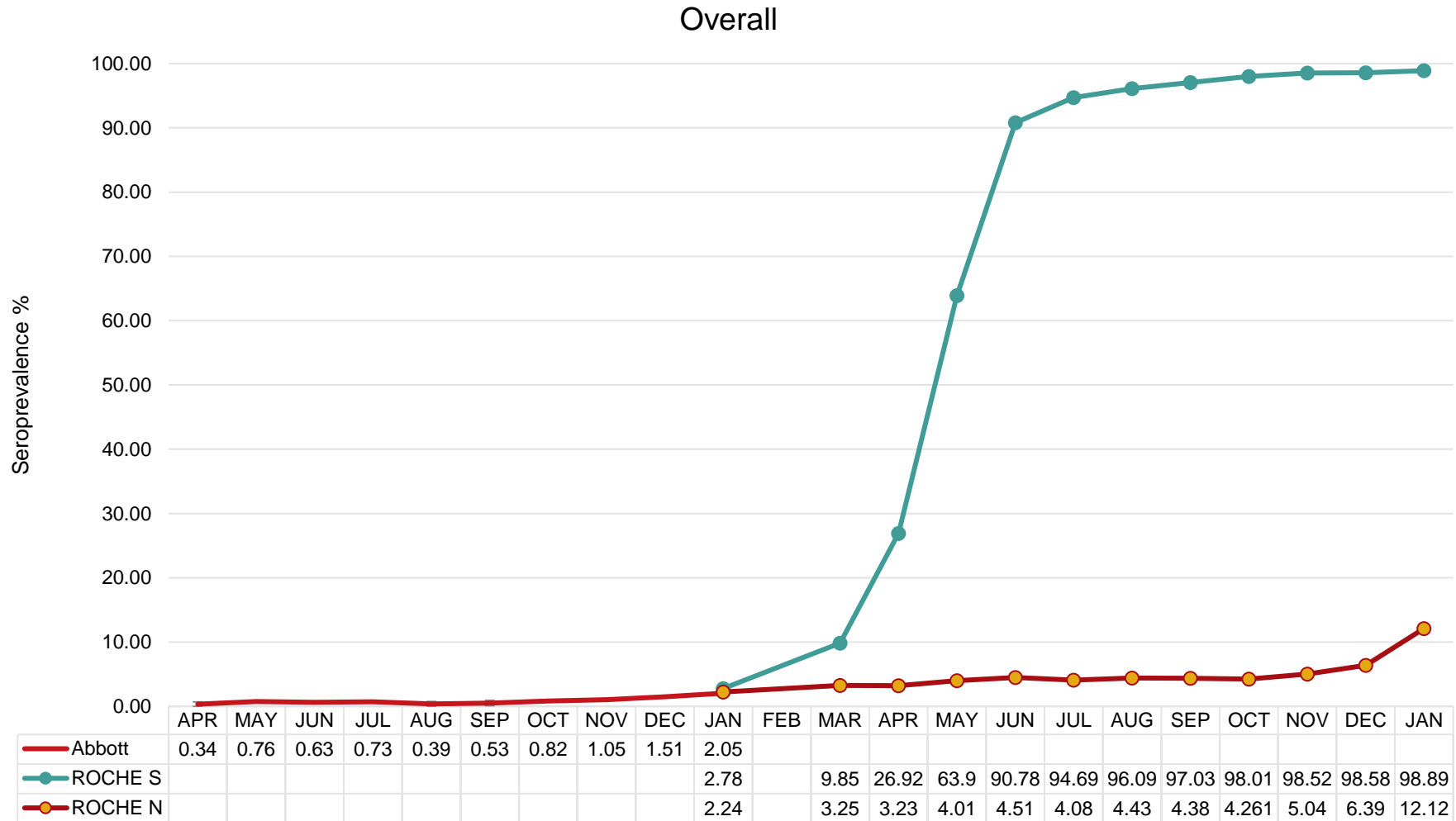
**Table 4.** SARS-CoV-2 incidence among anti-S negative donors by month from June 2021 – January 2022.

Month	Total donors tested	Repeat Donors	Previous S negative, N negative	S Positive, N Positive		
				N	%	95% CI
Jun	16884	4452	3409	52	1.53	1.14, 2.00
Jul	8457	2853	1697	24	1.41	0.91, 2.10
Aug	9109	5400	2487	29	1.17	0.78, 1.67
Sep	9363	5728	2628	53	2.02	1.51, 2.63
Oct	9627	5898	2385	61	2.56	1.96, 3.27
Nov	9018	5290	1754	56	3.19	2.42, 4.13
Dec	16816	5560	2063	81	3.93	3.13, 4.86
Jan	32505	10804	4182	378	9.04	8.19, 9.95

Note: A donation was considered a potential incident infection if donors tested S negative and N negative on their previous donation and then tested S positive and N positive on their following donation.

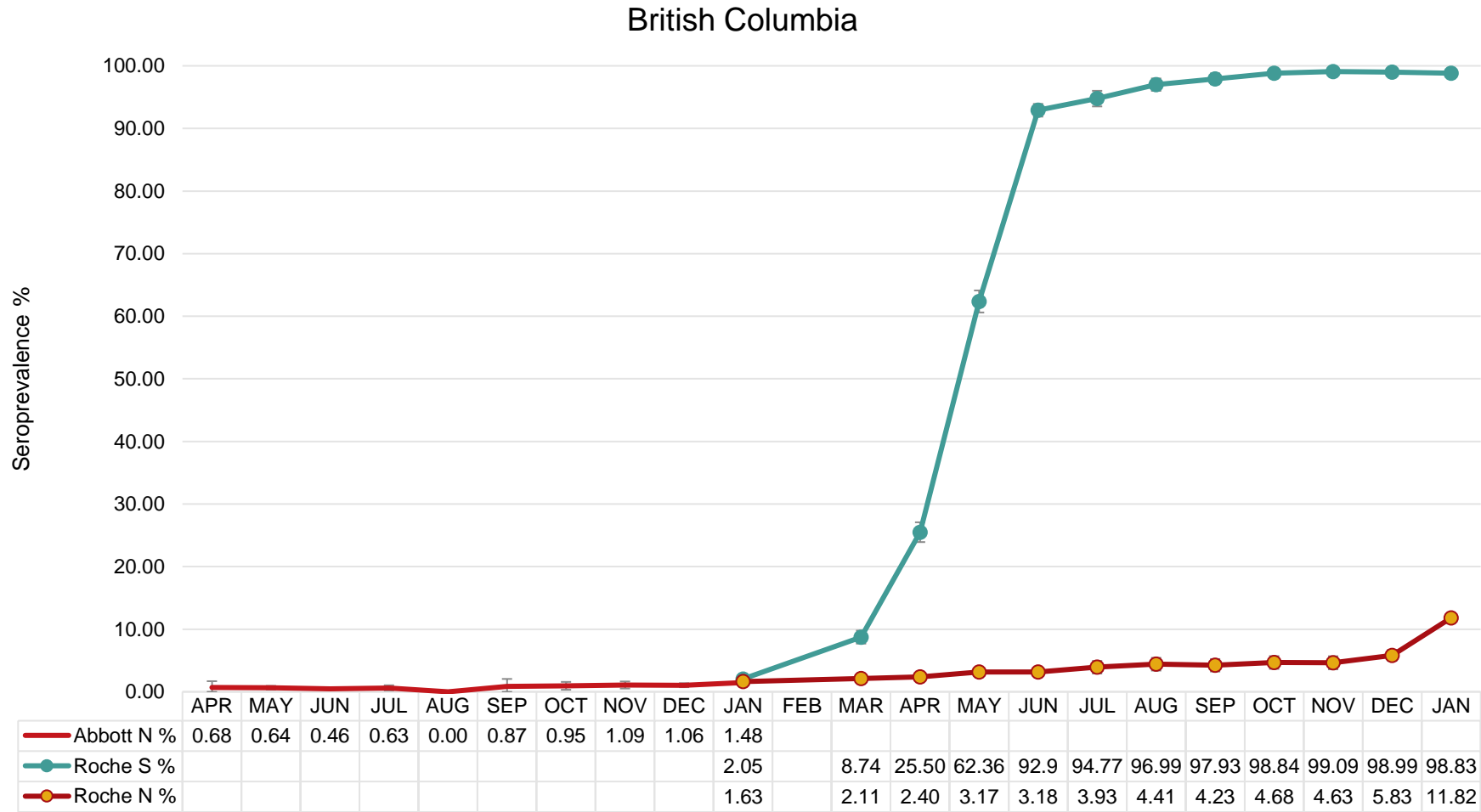


**Figure 1.** Overall temporal trends of SARS-CoV-2 seroprevalence by monthly intervals from April 2020-January 2022 (comparing results from Abbott N (until January 2021) followed by seroprevalence estimated by Roche N and Roche S results).

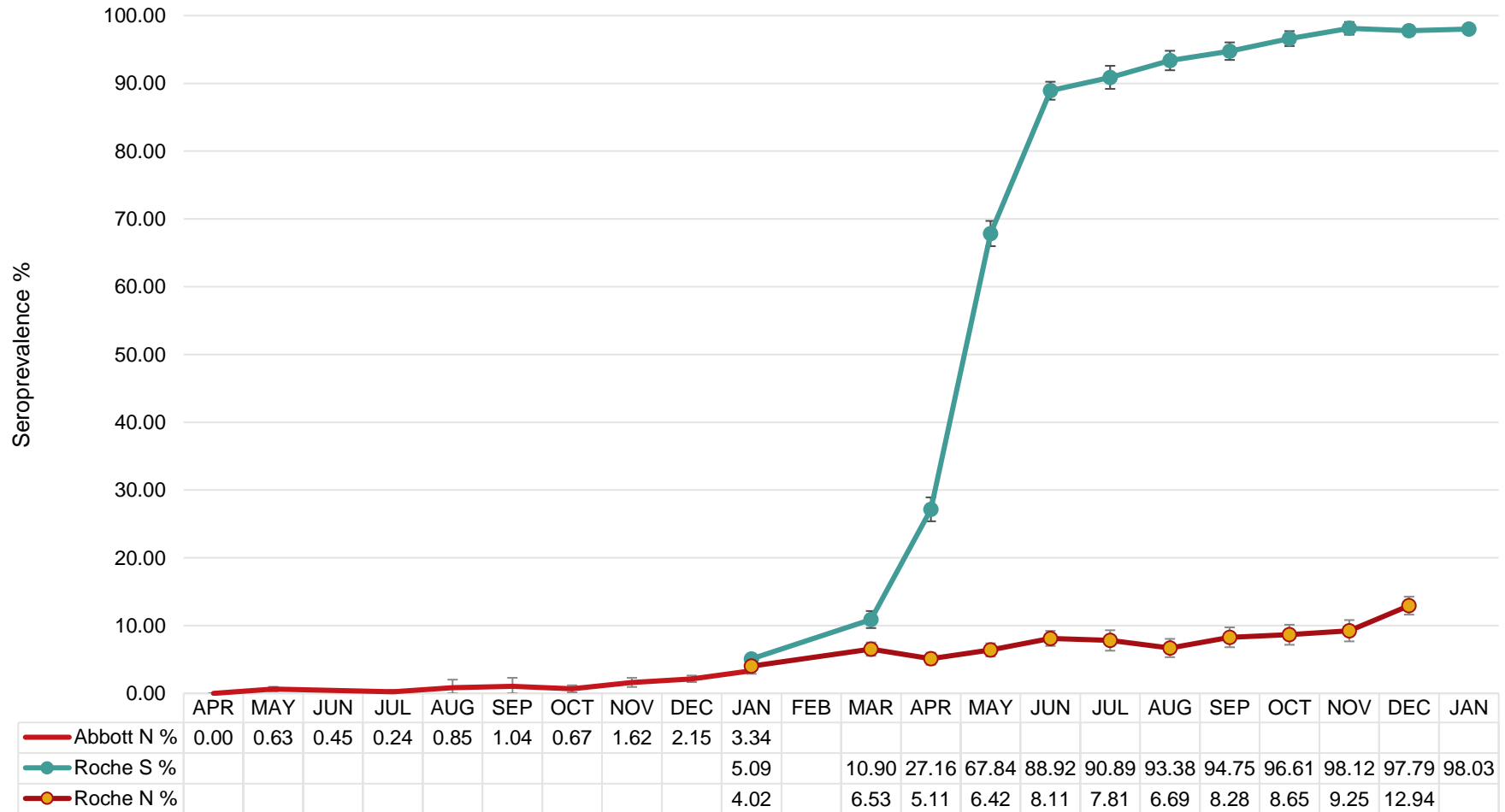


Notes: SARS-CoV-2 seroprevalence rates (95% CI), that have been weighted and adjusted for test characteristics. Data from the CIHR funded study (Correlates of Immunity) from April 9, 2020-January 31, 2021, have been included.

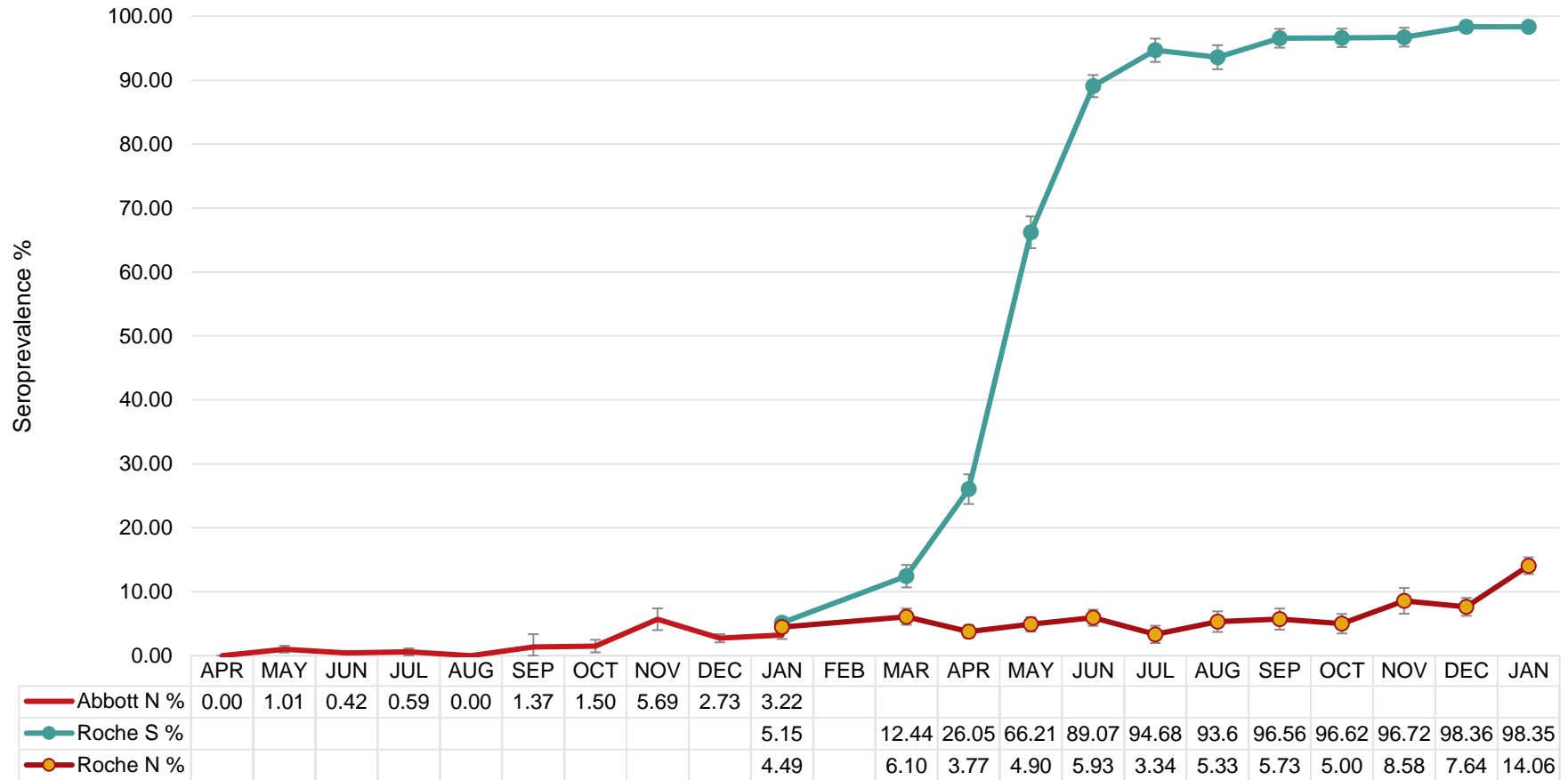
**Figure 2.** Regional temporal trends of SARS-CoV-2 seroprevalence monthly from April 2020-January 2022 (by Abbott N, Roche N and Roche S assays)



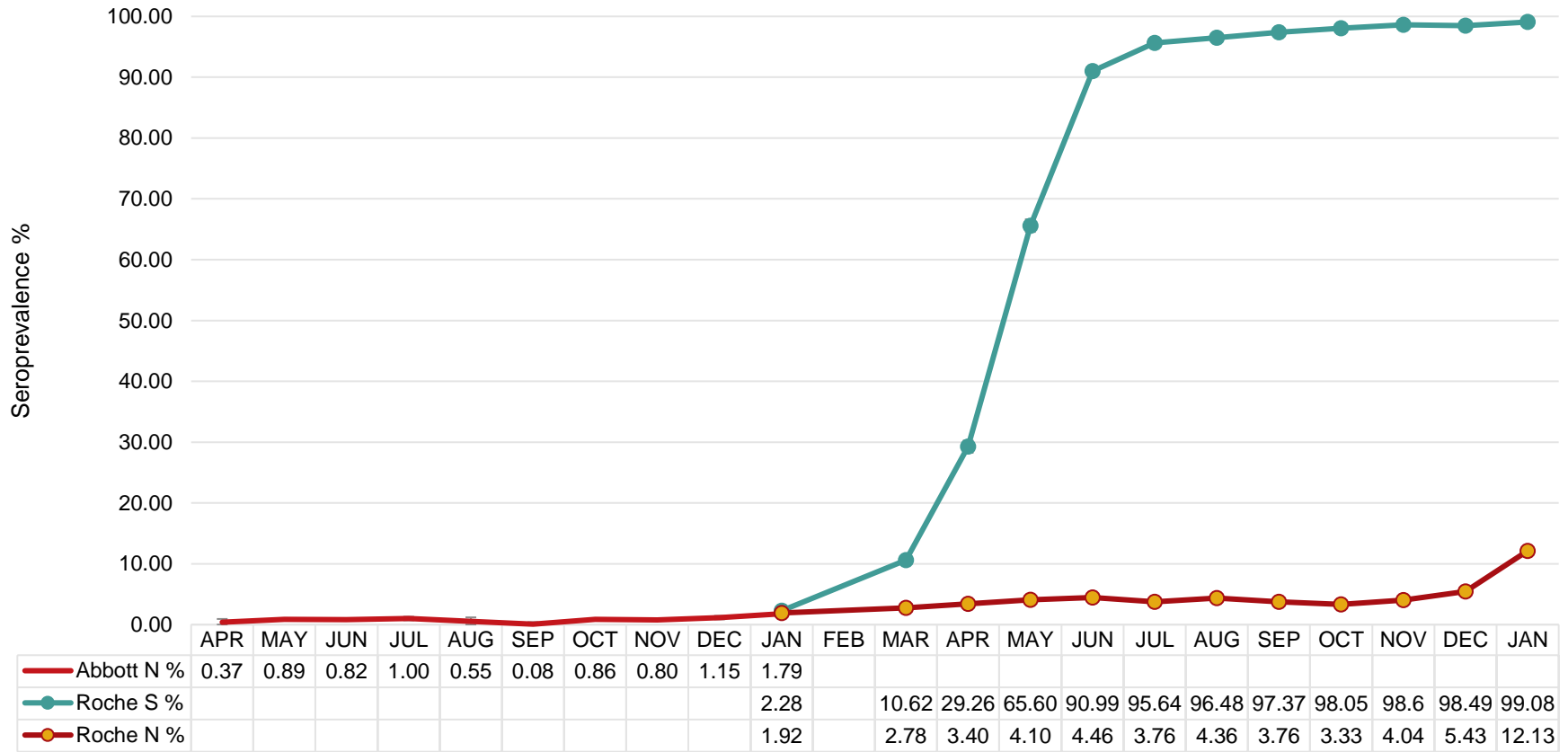
### Alberta



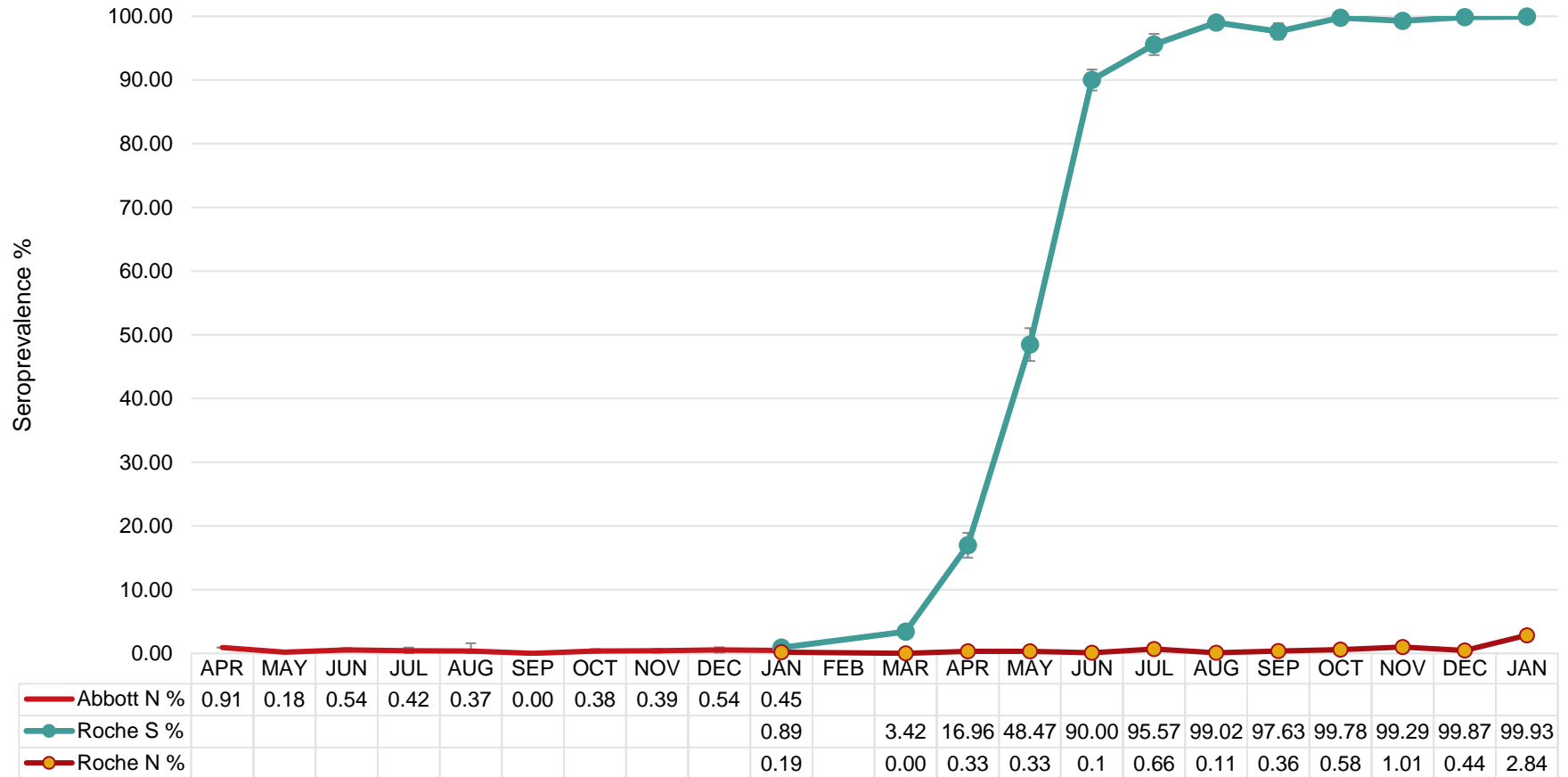
### Prairies



## Ontario

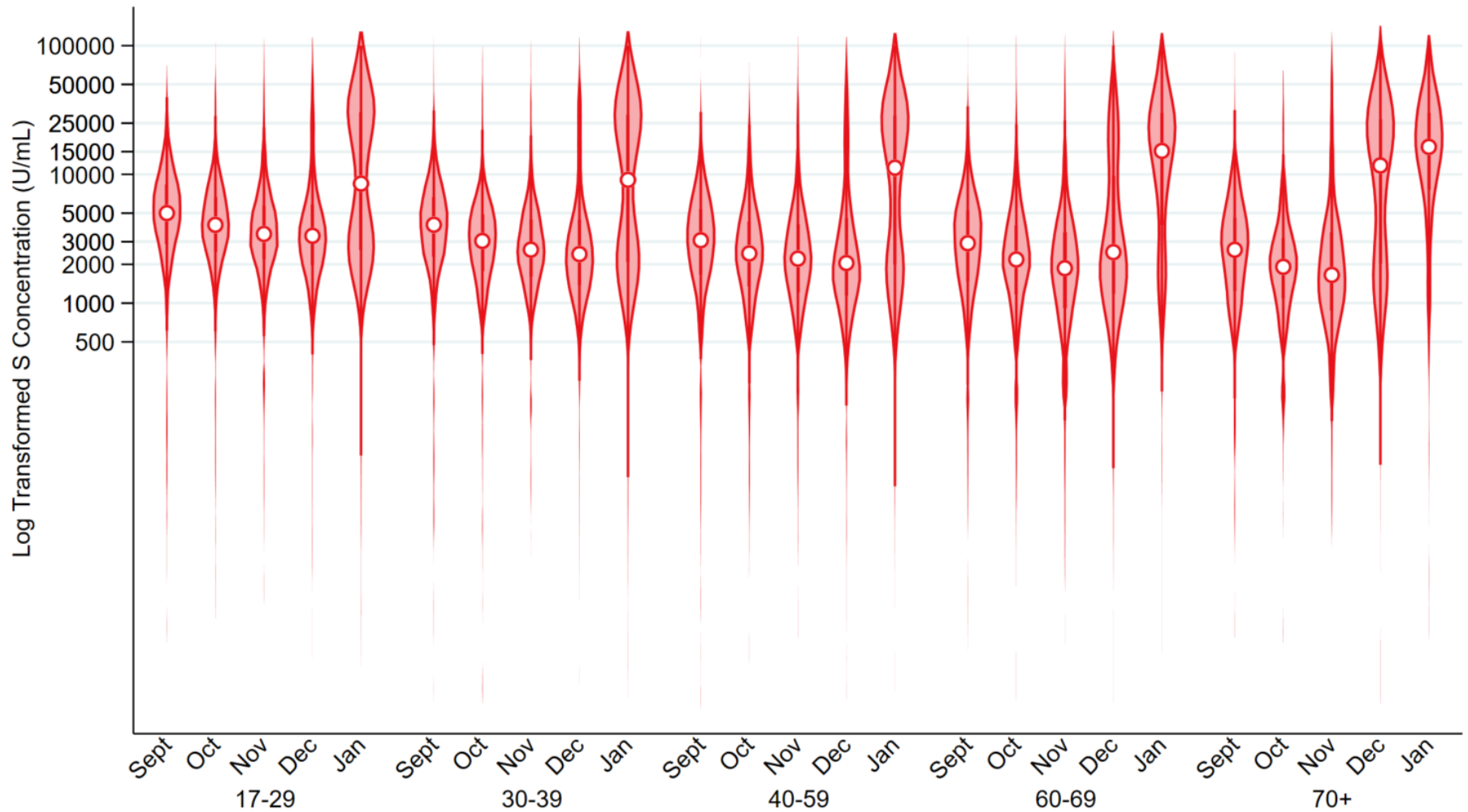


### Atlantic

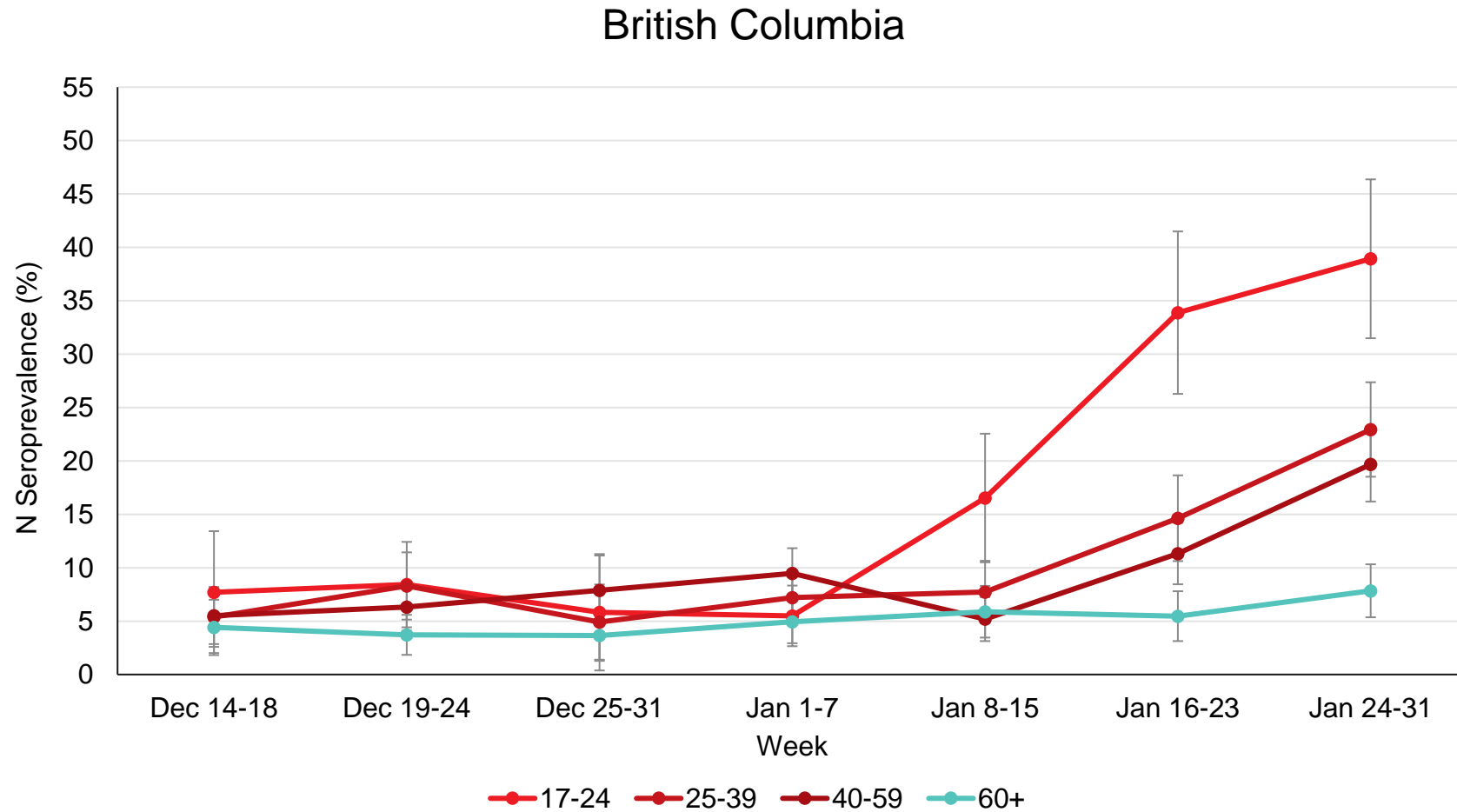


Note: SARS-CoV-2 seroprevalence rates (95% CI), that have been weighted and adjusted for test characteristics. Data from the CIHR funded study (Correlates of Immunity) from April 9, 2020-January 31, 2021, have been included.

**Figure 3.** Distributions of log transformed Spike antibody concentration results (U/mL) (white circle represents the median and the bar represents the IQR) in spike antibody seropositive donations from September to January 2022 (dilution method was changed in September to measure up to 100,000 U/mL) stratified by age group.

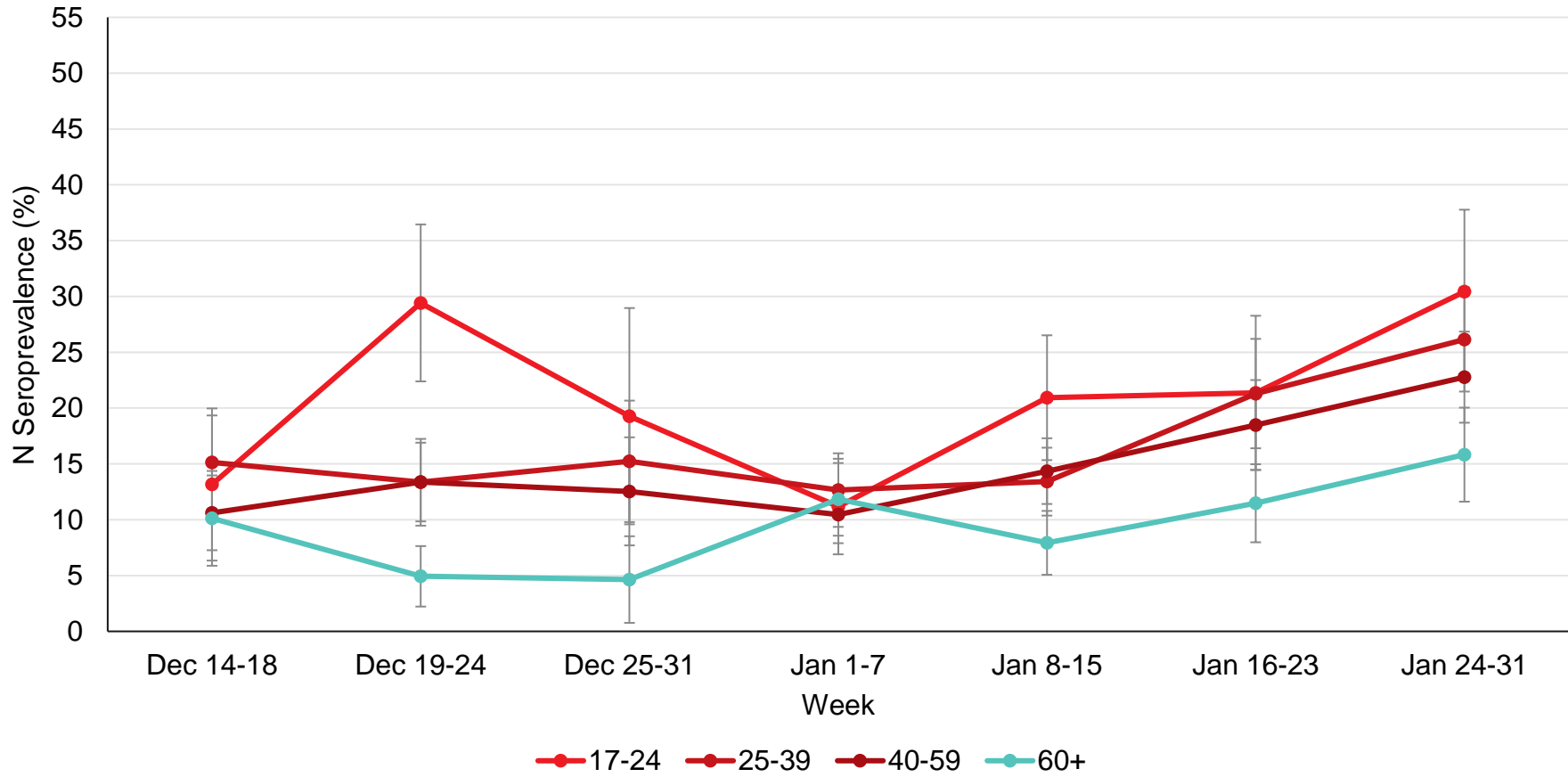


**Figure 4.** Regional temporal trends of SARS-CoV-2 Nucleocapsid (infection) seroprevalence weekly from December 2021-January 2022

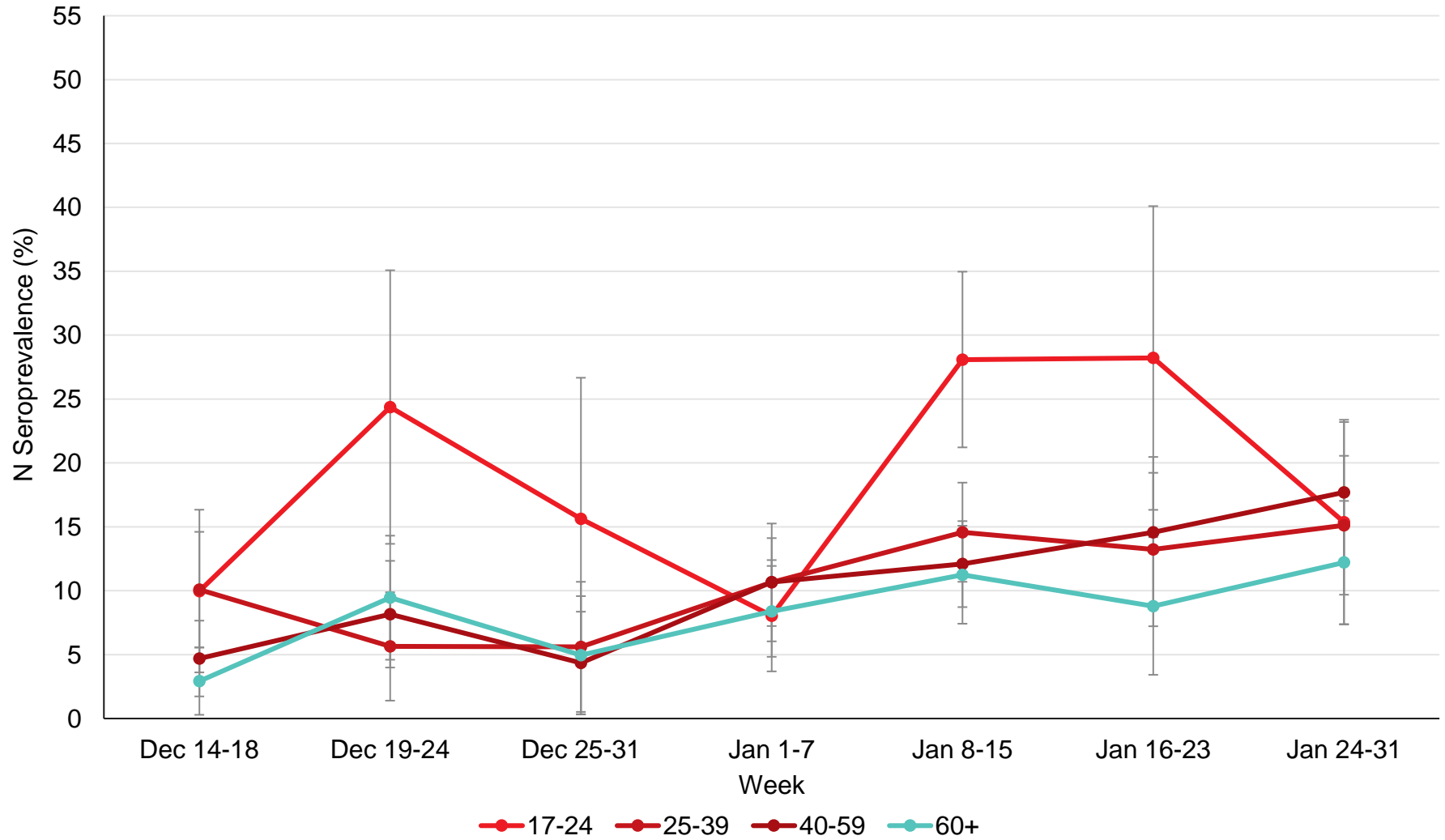




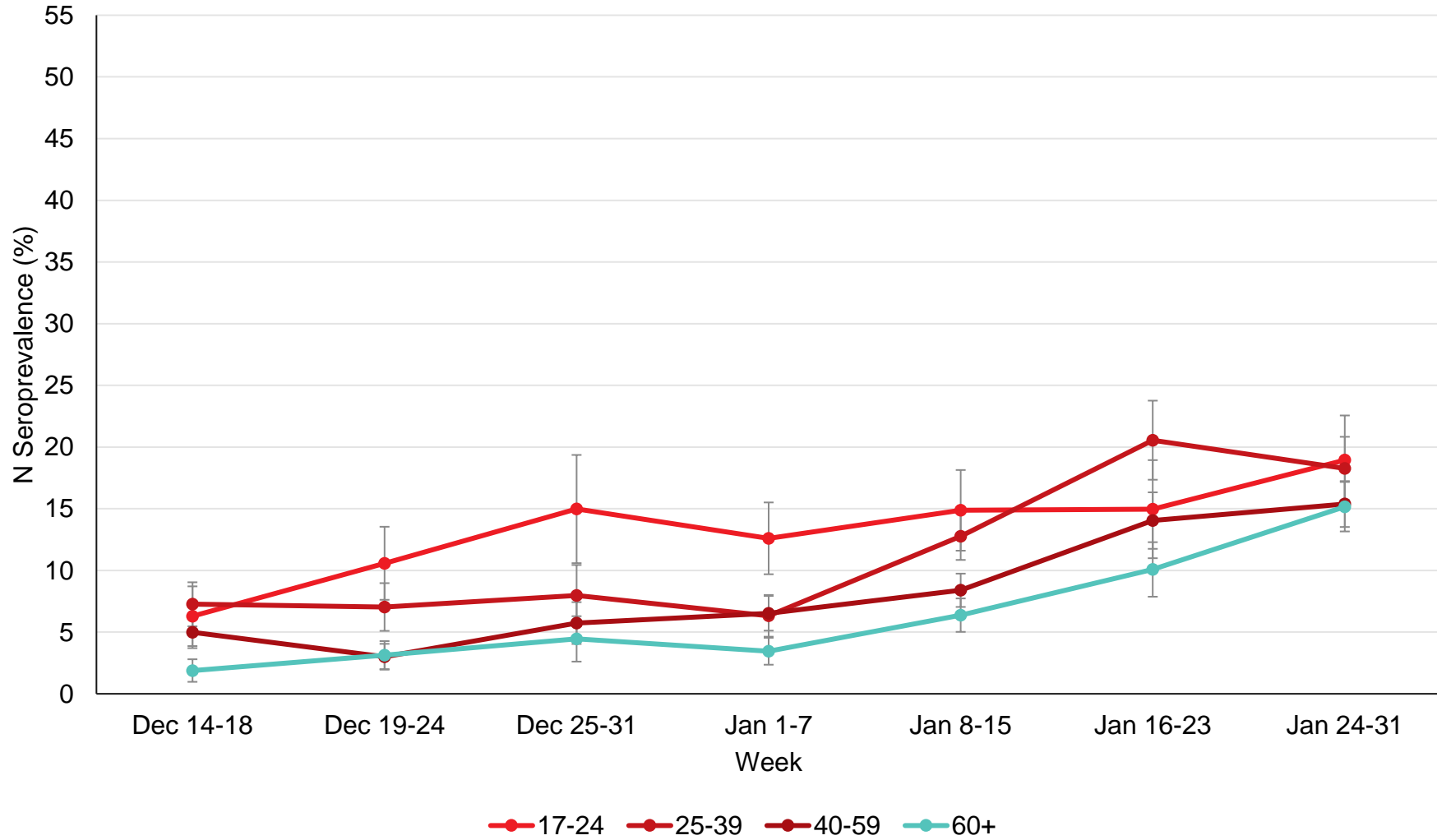
# Alberta



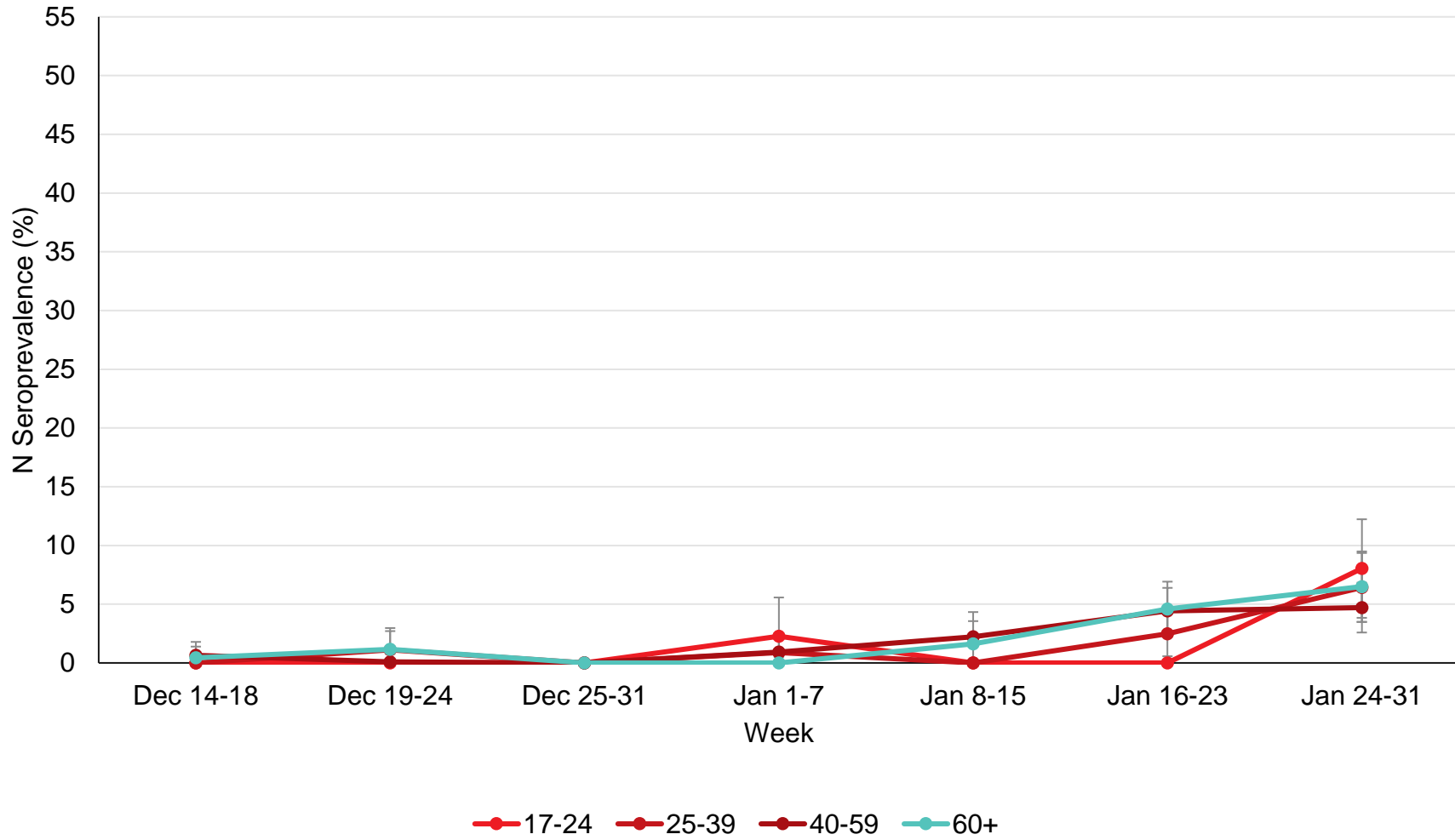
# Prairie



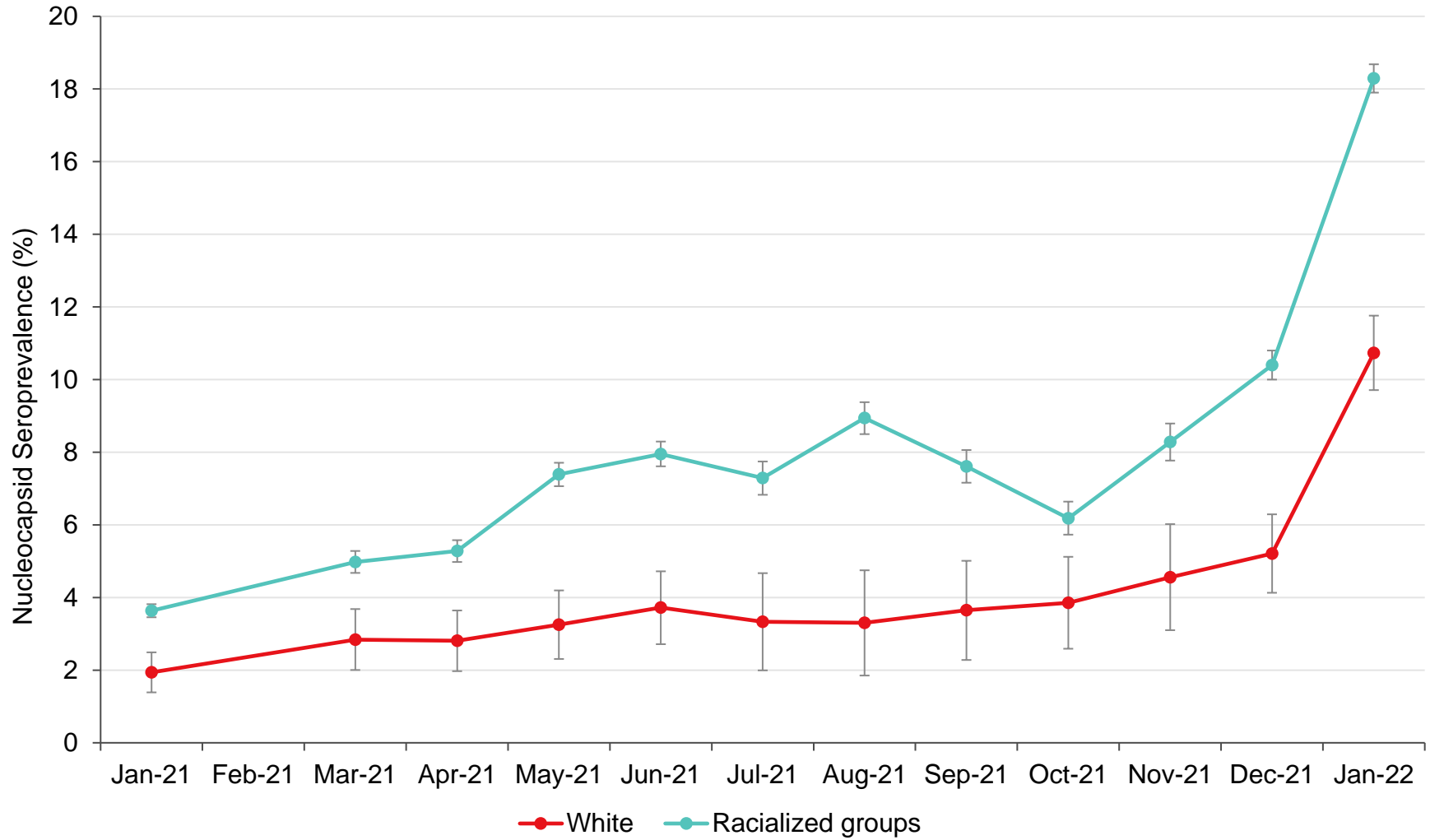
# Ontario



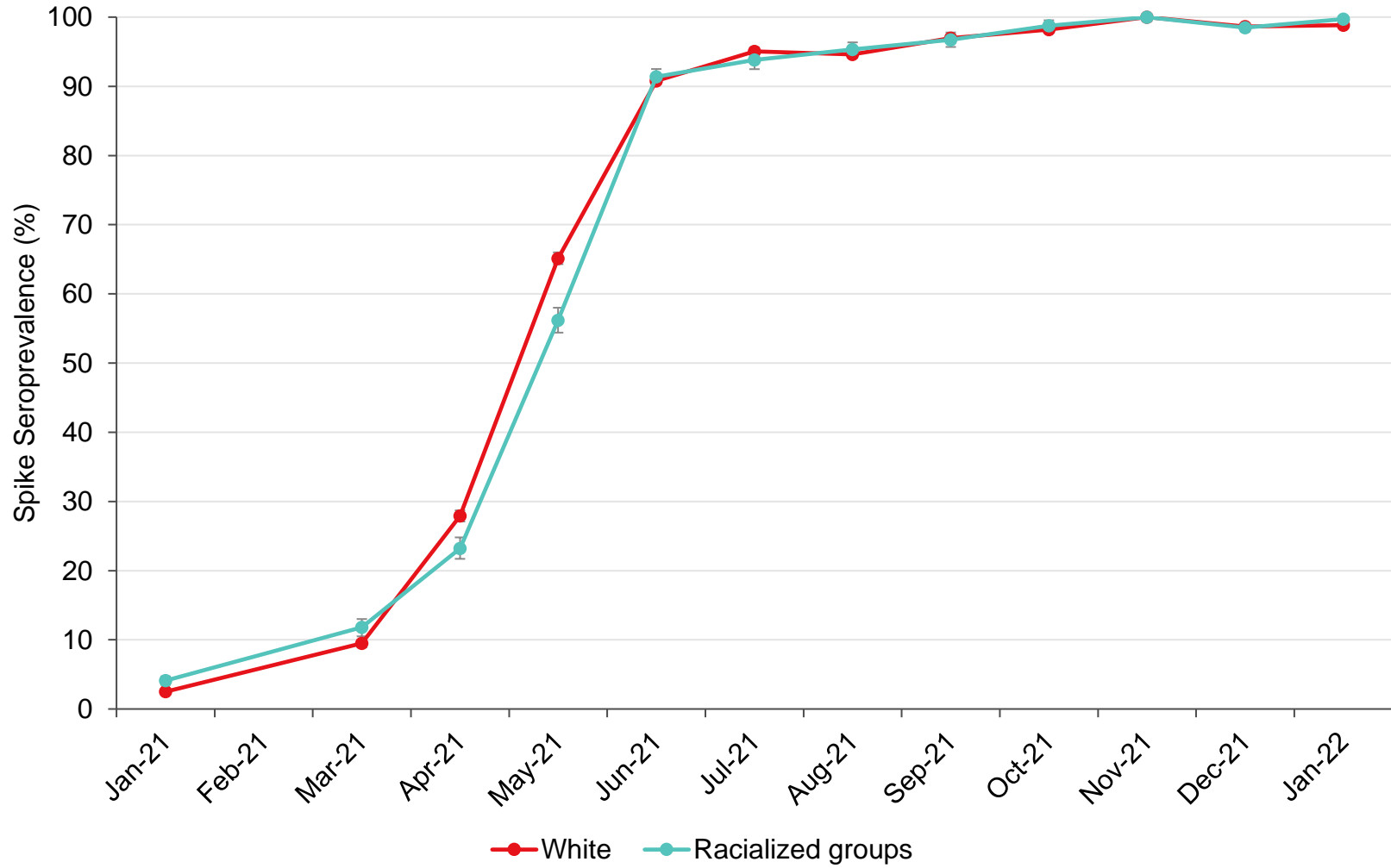
# Atlantic Canada



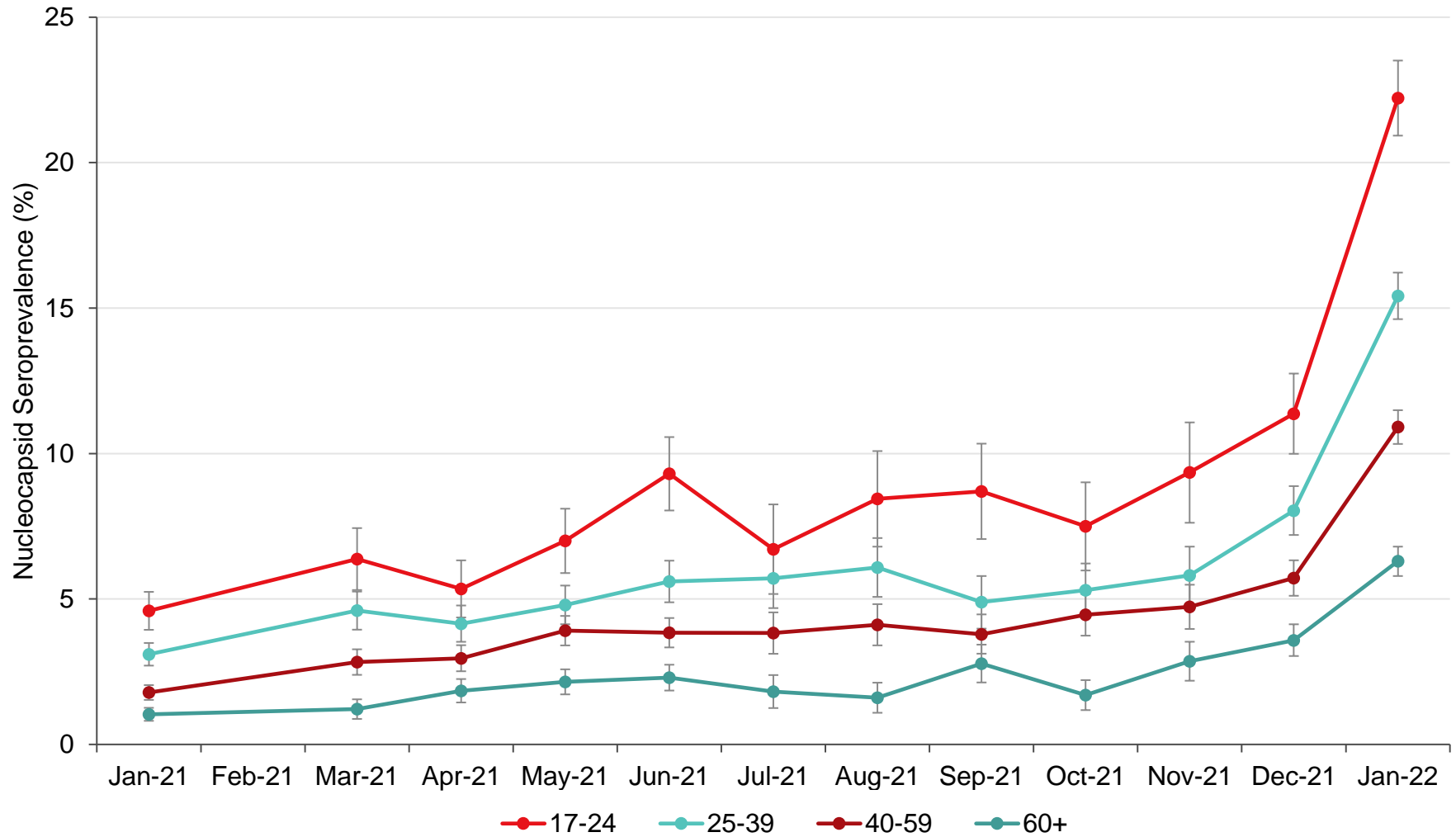
**Figure 5A.** Temporal trends of SARS-CoV-2 seroprevalence by monthly intervals from January 2021-January 2022 estimated by Nucleocapsid antibody results by ethnicity.



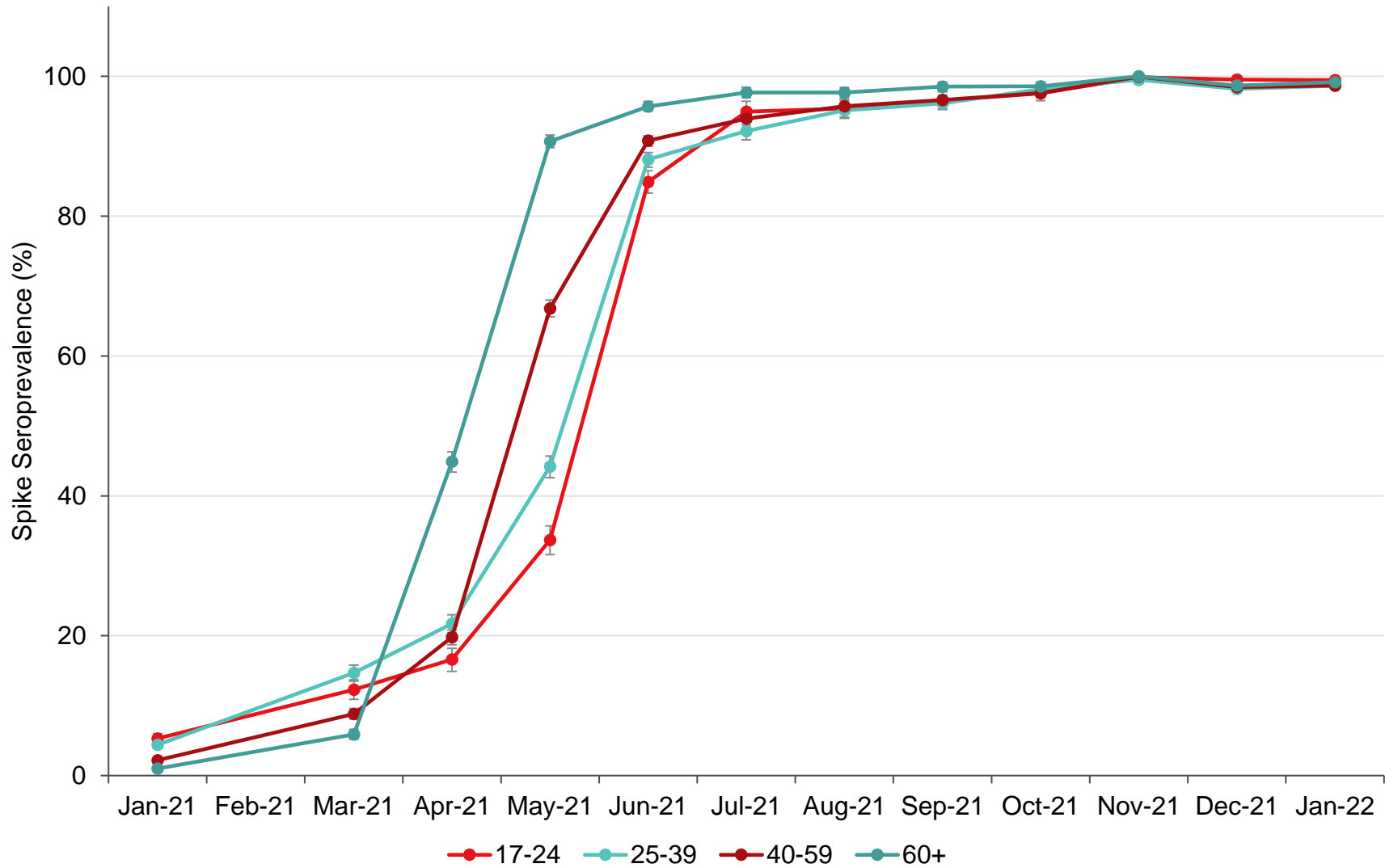
**Figure 5B.** Temporal trends of SARS-CoV-2 seroprevalence by monthly intervals from January 2021-January 2022 estimated by Spike antibody results by ethnicity.



**Figure 5C.** Temporal trends of SARS-CoV-2 seroprevalence by monthly intervals from January 2021-January 2022 estimated by Nucleocapsid antibody results by age group.

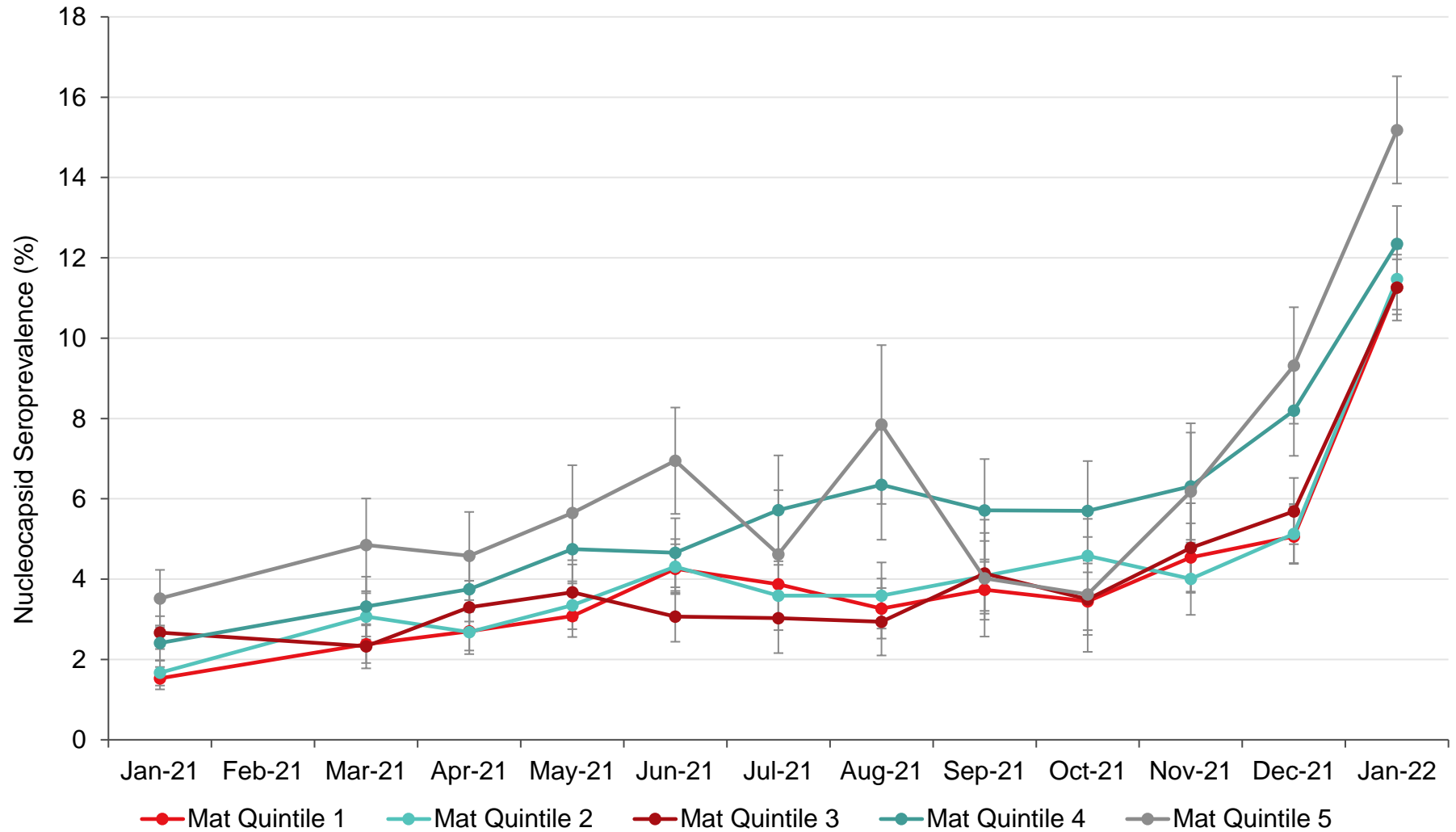


**Figure 5D.** Temporal trends of SARS-CoV-2 seroprevalence by monthly intervals from January 2021-January 2022 estimated by Spike antibody results by age group.

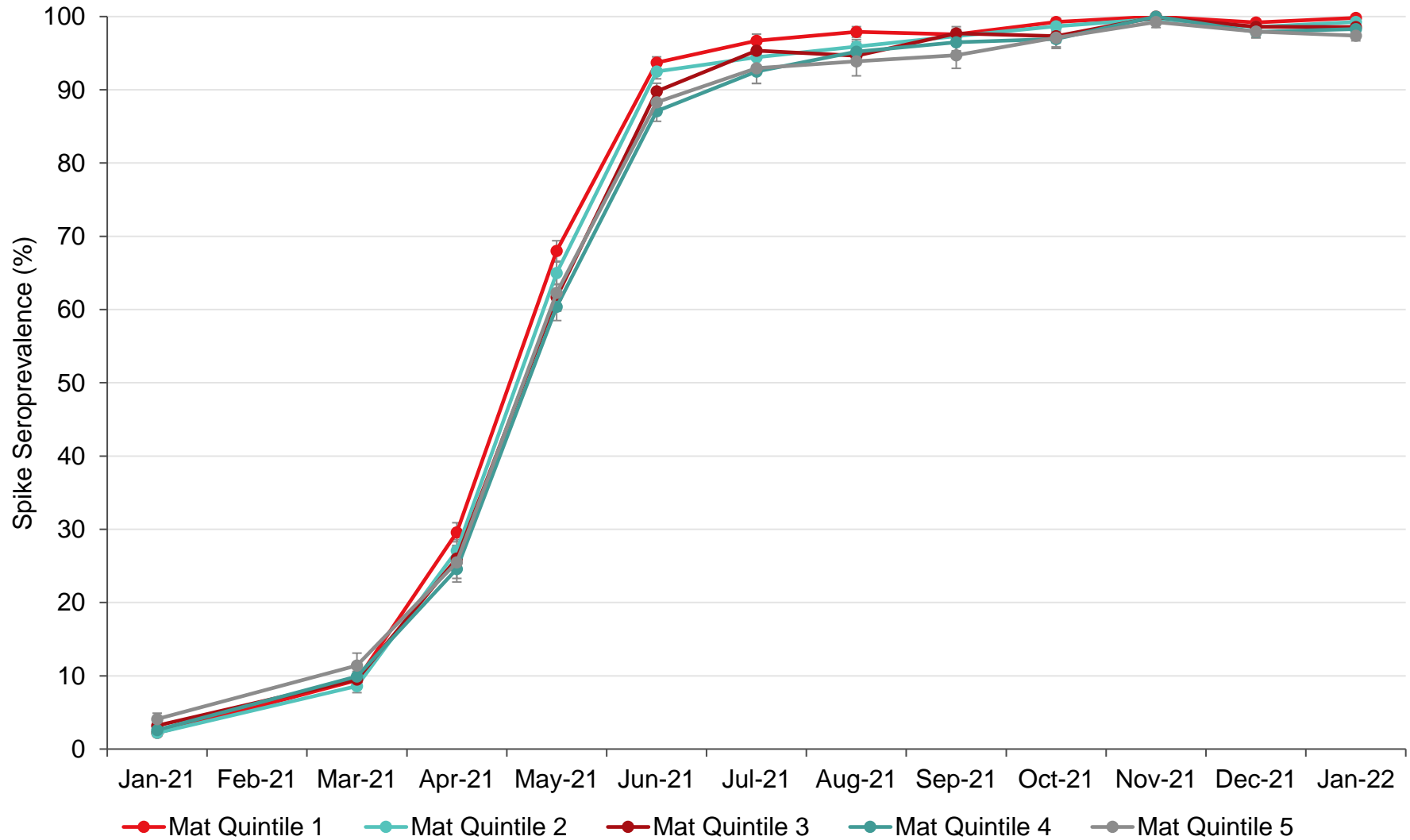




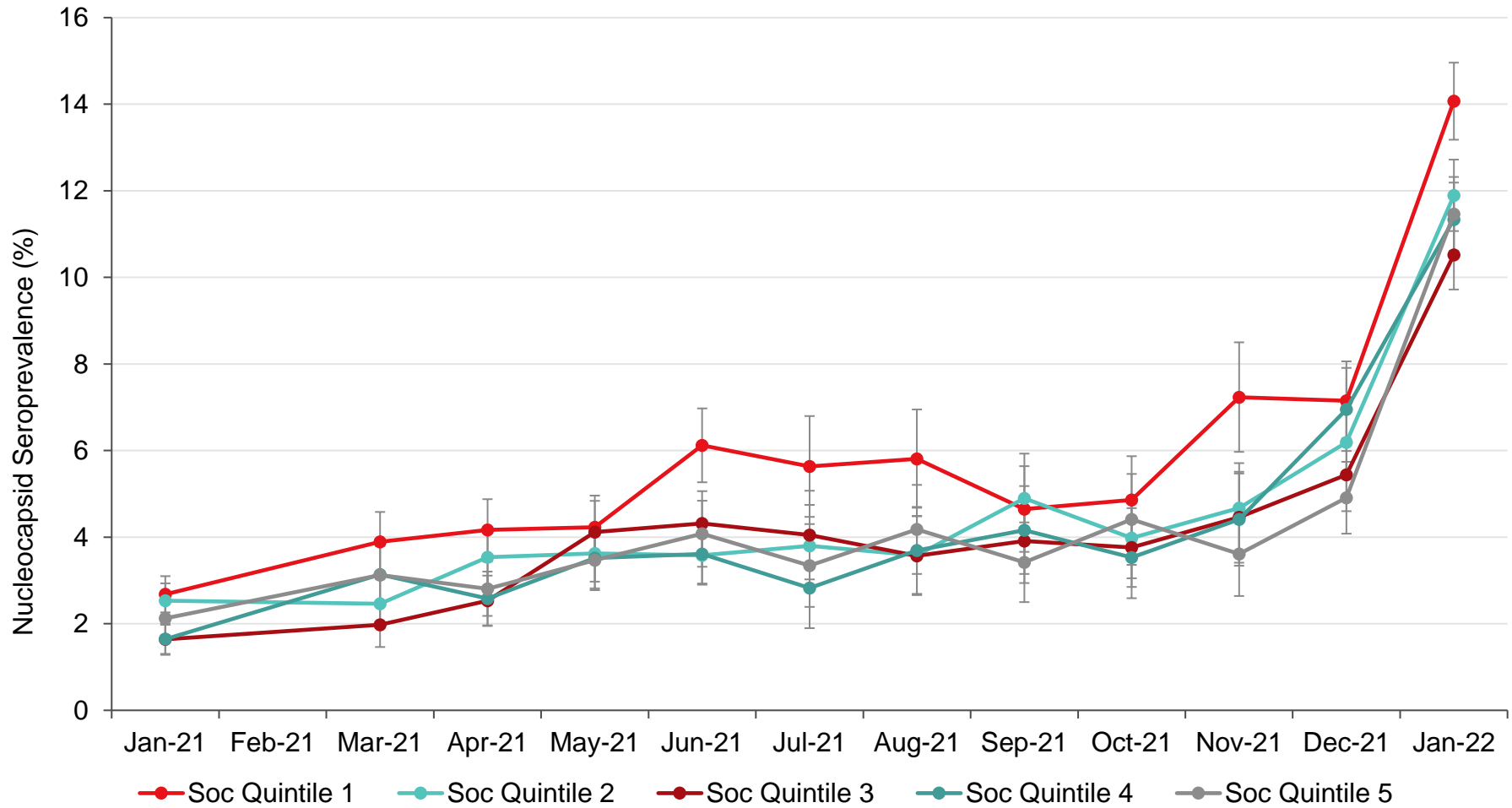
**Figure 5E.** Temporal trends of SARS-CoV-2 seroprevalence by monthly intervals from January 2021-January 2022 estimated by Nucleocapsid antibody results by material deprivation level (1 = least deprived and 5 = most deprived).



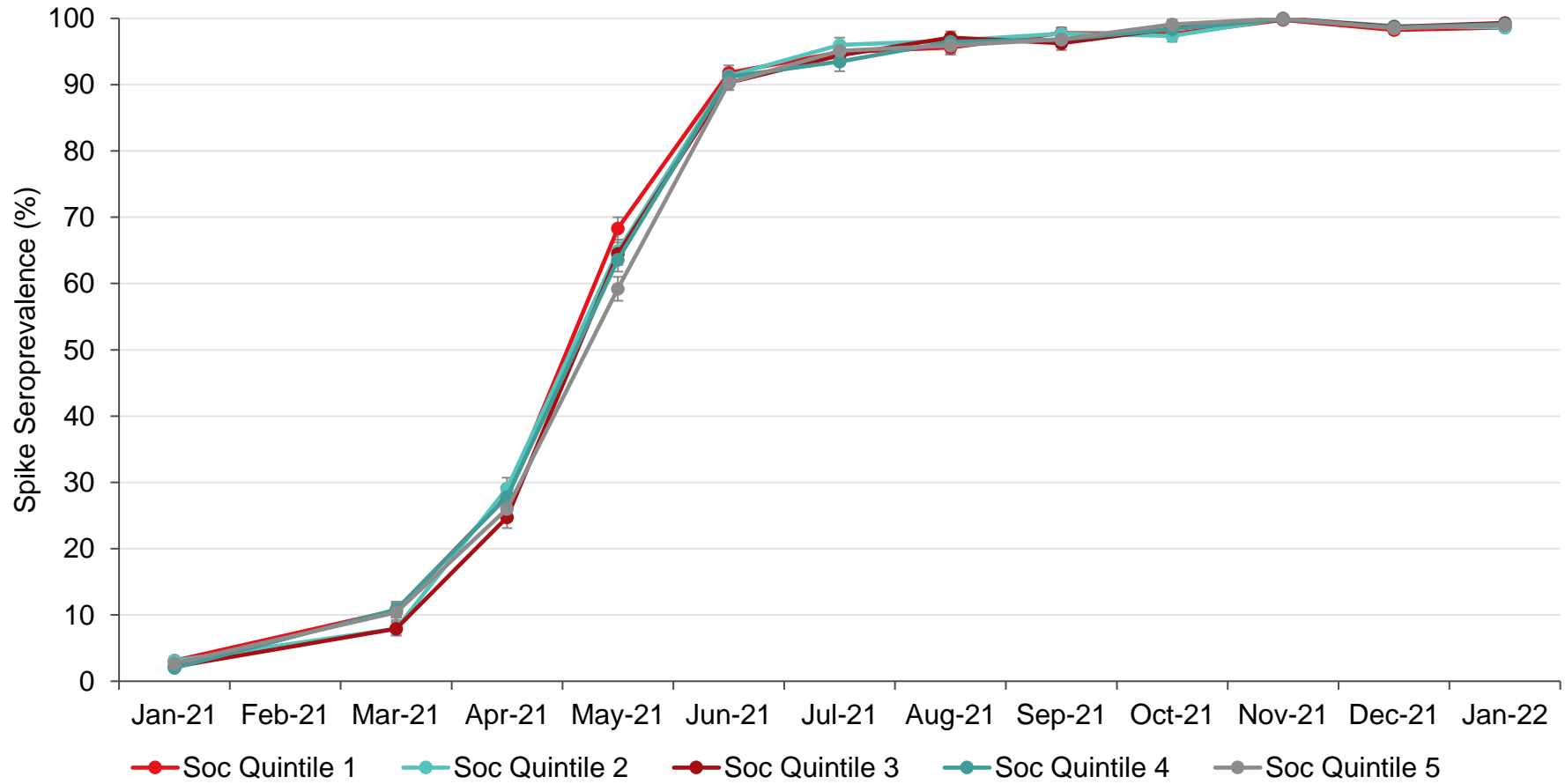
**Figure 5F.** Temporal trends of SARS-CoV-2 seroprevalence by monthly intervals from January 2021-January 2022 estimated by Spike antibody results by material deprivation level (1 = least deprived and 5 = most deprived).



**Figure 5G.** Temporal trends of SARS-CoV-2 seroprevalence by monthly intervals from January 2021-January 2022 estimated by Nucleocapsid antibody results by social deprivation level (1 = least deprived and 5 = most deprived).



**Figure 5H.** Temporal trends of SARS-CoV-2 seroprevalence by monthly intervals from January 2021-January 2022 estimated by Spike antibody results by social deprivation level (1 = least deprived and 5 = most deprived).



**Table A1.1 British Columbia SARS-CoV-2 seroprevalence, Nucleocapsid vs. Spike results in January 2022**

	Nucleocapsid Antibody Results (proxy for natural infection)				Spike Antibody Results (proxy for humoral immunity by either natural infection or vaccination)			
	Crude		Adjusted		Crude		Adjusted	
	Number Tested	Number Positive	Percent Positive	95% Confidence Interval	Number Tested	Number Positive	Percent Positive	95% Confidence Interval
<b>Sex</b>								
Female	2,260	235	11.01	9.87, 12.14	2,260	2,211	98.98	98.44, 99.51
Male	3,045	352	12.67	11.43, 13.92	3,045	2,973	98.67	98.09, 99.26
<b>Age</b>								
17-24	323	77	24.10	20.83, 27.36	323	319	99.80	98.91, 100.00
25-39	1,440	218	15.22	13.29, 17.14	1,440	1,408	98.98	98.18, 99.77
40-59	1,889	208	11.09	9.69, 12.48	1,889	1,844	98.57	97.86, 99.28
60+	1,653	84	5.31	4.24, 6.39	1,653	1,613	98.53	97.77, 99.29
<b>Material Deprivation<sup>1</sup></b>								
1 (least)	1,339	134	11.62	9.98, 13.26	1,339	1,315	99.36	98.67, 100.00
2	1,193	117	10.63	8.87, 12.38	1,193	1,175	99.73	99.05, 100.00
3	955	106	11.36	9.40, 13.32	955	924	98.00	96.92, 99.09
4	785	91	11.39	9.26, 13.53	785	765	98.13	96.97, 99.29
5 (most)	415	81	18.92	15.41, 22.44	415	400	97.43	95.71, 99.14
<b>Total</b>	<b>5,305</b>	<b>587</b>	<b>11.82</b>	<b>10.97, 12.66</b>	<b>5,305</b>	<b>5,184</b>	<b>98.83</b>	<b>98.43, 99.23</b>

<sup>1</sup>Postal codes were missing for 618 (11.6%) of donors therefore we couldn't calculate quintiles of Material Deprivation; 58/618 were positive by the Nucleocapsid antibody, adjusted SARS-CoV-2 seroprevalence among missing postal codes was 10.52% (95% CI 8.18, 12.85); and 605/618 were positive by the Spike antibody, adjusted SARS-CoV-2 seroprevalence was 99.19% (95% CI 98.13, 100.00).

**Table A1.2 Alberta SARS-CoV-2 seroprevalence, Nucleocapsid vs. Spike antibody results in January 2022**

	Nucleocapsid Antibody Results (proxy for natural infection)				Spike Antibody Results (proxy for humoral immunity by either natural infection or vaccination)			
	Crude		Adjusted		Crude		Adjusted	
	Number Tested	Number Positive	Percent Positive	95% Confidence Interval	Number Tested	Number Positive	Percent Positive	95% Confidence Interval
<b>Sex</b>								
Female	2,879	460	15.93	14.46, 17.40	2,879	2,807	98.39	97.72, 99.05
Male	3,862	590	17.64	16.11, 19.17	3,862	3,736	97.66	96.92, 98.41
<b>Age</b>								
17-24	547	146	26.90	23.38, 30.41	547	538	99.55	98.54, 100.00
25-39	1,948	368	18.95	16.91, 20.98	1,948	1,901	98.38	97.52, 99.24
40-59	2,473	398	16.90	15.10, 18.71	2,473	2,394	97.59	96.69, 98.49
60+	1,773	138	8.01	6.38, 9.64	1,773	1,710	97.37	96.22, 98.51
<b>Material Deprivation<sup>1</sup></b>								
1 (least)	2,476	358	15.37	13.62, 17.12	2,476	2,422	99.04	98.33, 99.75
2	1,338	203	16.03	13.67, 18.38	1,338	1,301	98.09	96.97, 99.20
3	954	131	14.71	12.10, 17.32	954	923	98.19	96.93, 99.45
4	637	125	21.85	18.30, 25.40	637	613	96.43	94.60, 98.27
5 (most)	309	61	21.88	16.54, 27.22	309	297	97.48	95.03, 99.93
<b>Total</b>	<b>6,741</b>	<b>1,050</b>	<b>16.78</b>	<b>15.72, 17.84</b>	<b>6,741</b>	<b>6,543</b>	<b>98.03</b>	<b>97.53, 98.52</b>

<sup>1</sup>Postal codes were missing for 1,027 (15.2%) of donors therefore we couldn't calculate quintiles of Material Deprivation; 172/1,027 were positive by the Nucleocapsid antibody, adjusted SARS-CoV-2 seroprevalence among missing postal codes was 17.70% (95% CI 14.96, 20.44); 987/1,027 were positive by the Spike antibody, adjusted SARS-CoV-2 seroprevalence was 96.84% (95% CI 95.38, 98.31).

**Table A1.3 Saskatchewan SARS-CoV-2 seroprevalence, Nucleocapsid vs. Spike antibody results in January 2022**

	Nucleocapsid Antibody Results (proxy for natural infection)				Spike Antibody Results (proxy for humoral immunity by either natural infection or vaccination)			
	Crude		Adjusted		Crude		Adjusted	
	Number Tested	Number Positive	Percent Positive	95% Confidence Interval	Number Tested	Number Positive	Percent Positive	95% Confidence Interval
<b>Sex</b>								
Female	637	70	11.27	8.81, 13.74	637	624	99.07	97.94, 100.00
Male	916	97	11.79	9.24, 14.34	916	893	98.45	97.16, 99.74
<b>Age</b>								
17-24	115	27	23.70	17.16, 30.24	115	114	99.87	98.10, 100.00
25-39	420	55	12.44	8.89, 16.00	420	409	98.05	96.17, 99.93
40-59	540	57	11.04	8.00, 14.08	540	529	99.35	98.05, 100.00
60+	478	28	5.59	3.15, 8.02	478	465	98.23	96.45, 100.00
<b>Material Deprivation<sup>1</sup></b>								
1 (least)	502	42	8.74	5.86, 11.61	502	489	98.19	96.45, 99.92
2	358	50	15.7	11.50, 19.91	358	352	99.55	98.07, 100.00
3	263	25	9.72	5.84, 13.60	263	255	98.40	96.24, 100.00
4	141	19	15.29	8.90, 21.68	141	138	98.69	95.91, 100.00
5 (most)	51	6	10.58	1.14, 20.03	51	51	96.93	91.01, 100.00
<b>Total</b>	<b>1,553</b>	<b>167</b>	<b>11.53</b>	<b>9.75, 13.30</b>	<b>1,553</b>	<b>1,517</b>	<b>98.76</b>	<b>97.91, 99.62</b>

<sup>1</sup>Postal codes were missing for 238 (15.3%) of donors therefore we couldn't calculate quintiles of Material Deprivation; 25/238 were positive by the Nucleocapsid antibody, adjusted SARS-CoV-2 seroprevalence among missing postal codes was 10.69% (95% CI 6.43, 14.95); 232/238 were positive by the Spike antibody, adjusted SARS-CoV-2 seroprevalence was 98.66% (95% CI 96.49, 100.00).

**Table A1.4 Manitoba SARS-CoV-2 seroprevalence, Nucleocapsid vs. Spike antibody results in January 2022**

	Nucleocapsid Antibody Results (proxy for natural infection)				Spike Antibody Results (proxy for humoral immunity by either natural infection or vaccination)			
	Crude		Adjusted		Crude		Adjusted	
	Number Tested	Number Positive	Percent Positive	95% Confidence Interval	Number Tested	Number Positive	Percent Positive	95% Confidence Interval
<b>Sex</b>								
Female	862	114	14.11	11.60, 16.62	862	843	98.89	97.81, 99.97
Male	1139	187	18.51	15.65, 21.37	1139	1099	97.06	95.59, 98.53
<b>Age</b>								
17-24	177	59	31.24	24.78, 37.69	177	168	96.68	93.78, 99.58
25-39	524	90	18.19	14.23, 22.14	524	501	96.35	94.14, 98.56
40-59	727	98	13.82	10.75, 16.89	727	709	98.48	97.03, 99.93
60+	573	54	10.10	7.14, 13.06	573	564	99.55	98.30, 100.00
<b>Material Deprivation<sup>1</sup></b>								
1 (least)	472	35	7.83	4.81, 10.86	472	466	99.83	98.52, 100.00
2	408	50	12.89	9.06, 16.73	408	403	99.78	98.43, 100.00
3	410	76	20.41	15.89, 24.94	410	396	97.46	95.32, 99.59
4	270	44	16.12	10.97, 21.28	270	260	97.24	94.50, 99.98
5 (most)	178	40	22.80	15.82, 29.78	178	164	93.34	88.86, 97.83
<b>Total</b>	<b>2,001</b>	<b>301</b>	<b>16.26</b>	<b>14.36, 18.16</b>	<b>2,001</b>	<b>1,942</b>	<b>98.00</b>	<b>97.09, 98.90</b>

<sup>1</sup>Postal codes were missing for 263 (13.1%) of donors therefore we couldn't calculate quintiles of Material Deprivation; 56/253 were positive by the Nucleocapsid antibody, adjusted SARS-CoV-2 seroprevalence among missing postal codes was 23.05% (95% CI 17.36, 28.74); 253/263 were positive by the Spike antibody, adjusted SARS-CoV-2 seroprevalence was 97.38% (95% CI 94.78, 99.97).



**Table A1.5 Ontario SARS-CoV-2 seroprevalence, Nucleocapsid vs. Spike antibody results in January 2022**

	Nucleocapsid Antibody Results (proxy for natural infection)				Spike Antibody Results (proxy for humoral immunity by either natural infection or vaccination)			
	Crude		Adjusted		Crude		Adjusted	
	Number Tested	Number Positive	Percent Positive	95% Confidence Interval	Number Tested	Number Positive	Percent Positive	95% Confidence Interval
<b>Sex</b>								
Female	5,580	601	11.34	10.66, 12.03	5,580	5,475	99.43	99.14, 99.71
Male	7,505	893	12.97	12.22, 13.72	7,505	7,317	98.72	98.37, 99.06
<b>Age</b>								
17-24	955	201	21.76	19.97, 23.55	955	937	99.27	98.68, 99.87
25-39	3,624	546	15.87	14.70, 17.04	3,624	3,532	98.71	98.22, 99.21
40-59	4,849	496	10.33	9.53, 11.13	4,849	4,732	98.89	98.50, 99.29
60+	3,657	251	6.92	6.18, 7.67	3,657	3,591	99.54	99.17, 99.92
<b>Material Deprivation<sup>1</sup></b>								
1 (least)	3,212	318	10.78	9.82, 11.74	3,212	3,180	100.00	100.00, 100.00
2	3,033	344	11.54	10.48, 12.60	3,033	2,973	99.27	98.81, 99.73
3	2,457	260	10.98	9.85, 12.11	2,457	2,391	98.59	98.02, 99.17
4	1,970	235	12.76	11.44, 14.09	1,970	1,910	98.44	97.79, 99.09
5 (most)	1,179	182	15.92	14.08, 17.77	1,179	1,130	97.26	96.27, 98.24
<b>Total</b>	<b>13,085</b>	<b>1494</b>	<b>12.13</b>	<b>11.62, 12.64</b>	<b>13,085</b>	<b>12,792</b>	<b>99.08</b>	<b>98.86, 99.31</b>

<sup>1</sup>Postal codes were missing for 1,234 (9.4%) of donors therefore we couldn't calculate quintiles of Material Deprivation; 155/1,234 were positive by the Nucleocapsid antibody, adjusted SARS-CoV-2 seroprevalence among missing postal codes was 14.47% (95% CI 12.71, 16.22); 1,208/1,234 were positive by the Spike antibody, adjusted SARS-CoV-2 seroprevalence was 99.02% (95% CI 98.29, 99.75).

**Table A1.6 Atlantic Provinces SARS-CoV-2 seroprevalence, Nucleocapsid vs. Spike antibody results in January 2022**

	Nucleocapsid Antibody Results (proxy for natural infection)				Spike Antibody Results (proxy for humoral immunity by either natural infection or vaccination)			
	Crude		Adjusted		Crude		Adjusted	
	Number Tested	Number Positive	Percent Positive	95% Confidence Interval	Number Tested	Number Positive	Percent Positive	95% Confidence Interval
<b>Sex</b>								
Female	1,694	57	2.65	1.80, 3.50	1,694	1,678	100.00	99.57, 100.00
Male	2,126	65	3.05	2.11, 3.99	2,126	2,093	99.60	98.92, 100.00
<b>Age</b>								
17-24	295	21	5.28	2.74, 7.81	295	294	100.00	98.92, 100.00
25-39	900	42	4.14	2.48, 5.81	900	888	99.91	98.98, 100.00
40-59	1,398	37	2.44	1.45, 3.43	1,398	1,371	99.08	98.19, 99.98
60+	1,227	22	1.67	0.80, 2.54	1,227	1,218	100.00	99.82, 100.00
<b>Material Deprivation<sup>1</sup></b>								
1 (least)	640	32	3.75	1.93, 5.57	640	637	100.00	99.09, 100.00
2	790	25	2.76	1.39, 4.12	790	780	99.83	98.89, 100.00
3	756	25	3.71	2.10, 5.32	756	752	100.00	99.59, 100.00
4	819	22	2.39	1.16, 3.63	819	805	99.59	98.61, 100.00
5 (most)	490	8	1.48	0.21, 2.75	490	477	98.91	97.42, 100.00
<b>Total</b>	<b>3,820</b>	<b>122</b>	<b>2.84</b>	<b>2.21, 3.48</b>	<b>3,820</b>	<b>3,771</b>	<b>99.93</b>	<b>99.51, 100.00</b>

<sup>1</sup>Postal codes were missing for 325 (8.5%) of donors therefore we couldn't calculate quintiles of Material Deprivation; 10/325 were positive by the Nucleocapsid antibody, adjusted SARS-CoV-2 seroprevalence among missing postal codes was 2.78% (95% CI 0.50, 5.06); 320/325 were positive by the Spike antibody, adjusted SARS-CoV-2 seroprevalence was 99.85% (95% CI 98.29, 100.00).

**Table A2.1.** Weekly SARS-CoV-2 seroprevalence by sociodemographic variables by Nucleocapsid results in January 2022.

	January 1-7			January 8-15			January 16-23			January 23-31		
	Adjusted			Adjusted			Adjusted			Adjusted		
	N Tested (N Positive)	Percent Positive	95% CI	N Tested (N Positive)	Percent Positive	95% CI	N Tested (N Positive)	Percent Positive	95% CI	N Tested (N Positive)	Percent Positive	95% CI
<b>Sex</b>												
Female	3839 (254)	6.27	5.55, 7.00	3951 (394)	10.02	9.16, 10.87	2675 (335)	11.89	10.79, 12.99	3547 (595)	16.25	15.15, 17.35
Male	5416 (415)	8.06	7.25, 8.88	5178 (487)	10.16	9.26, 11.07	3775 (497)	13.43	12.25, 14.61	4872 (802)	16.36	15.22, 17.50
<b>Age</b>												
17-24	744 (79)	9.55	7.88, 11.22	623 (106)	17.71	15.36, 20.05	467 (83)	16.75	14.23, 19.28	595 (135)	21.87	19.32, 24.42
25-39	2346 (184)	7.70	6.53, 8.88	2656 (301)	11.78	10.49, 13.07	1720 (269)	15.85	14.04, 17.66	2227 (426)	18.54	16.84, 20.25
40-59	3396 (250)	7.64	6.68, 8.60	3333 (309)	8.97	7.98, 9.97	2353 (302)	12.40	11.04, 13.75	3040 (499)	15.84	14.52, 17.17
60+	2769 (156)	5.02	4.16, 5.89	2517 (165)	6.68	5.68, 7.68	1910 (178)	8.36	7.09, 9.63	2557 (337)	12.69	11.36, 14.02
<b>Province</b>												
British Columbia	1756 (138)	7.14	5.93, 8.35	1192 (86)	7.30	5.87, 8.72	1115 (139)	13.00	11.15, 14.84	1315 (230)	18.90	16.90, 20.91
Alberta	1814 (204)	11.46	9.86, 13.06	2209 (284)	13.50	11.81, 15.18	1319 (223)	17.46	15.20, 19.72	1688 (365)	23.01	20.62, 25.41
Saskatchewan	356 (23)	6.30	3.51, 9.09	625 (84)	14.65	11.52, 17.78	245 (23)	10.86	6.74, 14.97	343 (37)	9.72	6.19, 13.24
Manitoba	565 (60)	11.30	8.70, 13.89	677 (98)	15.24	12.39, 18.08	314 (55)	18.47	13.11, 23.83	452 (88)	19.48	15.23, 23.72
Ontario	3593 (233)	6.36	5.56, 7.16	3615 (317)	9.60	8.74, 10.46	2414 (352)	14.59	13.22, 15.97	3697 (617)	16.34	15.20, 17.49
New Brunswick	333 (3)	0.92	0.00, 2.23	275 (5)	1.59	0.00, 3.40	347 (7)	1.73	0.41, 3.05	272 (13)	5.09	2.75, 7.43
Nova Scotia	535 (7)	0.99	0.00, 2.06	342 (4)	0.96	0.00, 2.33	441 (29)	5.81	3.79, 7.83	442 (37)	8.42	5.84, 11.00
Prince Edward Island	139 (1)	1.14	0.00, 4.07	77 (1)	0.90	0.00, 4.57	94 (2)	1.42	0.00, 3.68	113 (2)	1.90	0.00, 4.00
Newfoundland	164 (0)	.	.	117 (2)	1.48	0.00, 4.02	161 (2)	0.44	0.00, 1.69	97 (8)	6.18	1.82, 10.54
<b>Metro area</b>												
Vancouver	1048 (107)	9.89	7.92, 11.87	597 (50)	8.39	6.24, 10.54	705 (114)	16.85	14.31, 19.38	705 (166)	24.11	21.27, 26.94

COVID-19 Seroprevalence Report

Calgary	688 (66)	10.11	7.75, 12.47	705 (88)	12.15	9.05, 15.25	533 (87)	16.99	13.47, 20.51	681 (150)	23.18	19.19, 27.16
Edmonton	594 (61)	10.23	7.29, 13.17	809 (75)	10.27	7.77, 12.77	445 (69)	15.65	11.89, 19.41	560 (105)	20.03	16.07, 23.98
Ottawa	489 (18)	3.76	1.67, 5.85	238 (14)	5.40	1.91, 8.90	317 (34)	9.18	5.77, 12.58	581 (62)	10.54	7.97, 13.12
Toronto	866 (78)	8.69	7.08, 10.30	1264 (175)	14.59	13.03, 16.15	667 (136)	19.36	16.74, 21.98	900 (217)	22.27	19.93, 24.62
Winnipeg	341 (26)	7.10	4.22, 9.97	472 (39)	9.00	6.26, 11.74	226 (30)	12.81	7.35, 18.28	294 (45)	15.28	10.40, 20.17
<b>Ethnicity<sup>1,2</sup></b>												
White	7066 (442)	6.13	5.55, 6.72	7032 (600)	8.57	7.90, 9.23	5034 (582)	11.27	10.39, 12.14	6452 (956)	14.44	13.58, 15.30
Indigenous	122 (4)	1.74	0.00, 4.23	133 (11)	8.03	3.27, 12.80	87 (11)	12.14	5.43, 18.85	108 (13)	10.79	4.83, 16.75
Asian	415 (22)	4.41	2.31, 6.51	409 (36)	11.06	8.10, 14.02	289 (41)	13.91	10.09, 17.73	388 (84)	21.18	17.21, 25.15
Other racialized groups	924 (148)	16.31	13.87, 18.75	905 (170)	20.17	17.67, 22.67	589 (142)	24.10	20.76, 27.44	824 (231)	27.96	24.88, 31.03
<b>Social Deprivation<sup>3</sup></b>												
1 (least deprived)	1811 (160)	8.50	7.15, 9.84	1660 (182)	11.21	9.71, 12.72	1163 (201)	17.13	14.95, 19.31	1510 (275)	17.85	15.89, 19.81
2	1678 (131)	8.16	6.80, 9.51	1670 (147)	9.52	8.08, 10.95	1193 (126)	10.09	8.36, 11.81	1742 (304)	15.93	14.19, 17.67
3	1725 (127)	7.17	5.91, 8.43	1682 (130)	7.93	6.63, 9.22	1106 (128)	11.17	9.35, 12.99	1447 (213)	14.83	13.02, 16.64
4	1514 (91)	5.65	4.44, 6.87	1508 (144)	10.48	8.91, 12.04	1119 (117)	10.57	8.78, 12.37	1404 (231)	17.12	15.15, 19.09
5 (most deprived)	1503 (66)	3.91	2.89, 4.93	1529 (155)	10.31	8.75, 11.86	1102 (153)	13.47	11.50, 15.44	1407 (215)	16.18	14.27, 18.09
<b>Material Deprivation<sup>3</sup></b>												
1 (least deprived)	2285 (119)	4.85	3.93, 5.77	2466 (225)	9.65	8.45, 10.86	1848 (228)	12.11	10.61, 13.60	2279 (361)	16.46	14.90, 18.01
2	2001 (151)	7.42	6.22, 8.62	1943 (195)	10.59	9.20, 11.97	1367 (168)	11.32	9.62, 13.02	1996 (287)	13.69	12.16, 15.23
3	1722 (117)	6.82	5.59, 8.06	1652 (141)	8.60	7.26, 9.94	1090 (132)	11.41	9.55, 13.27	1457 (241)	15.97	14.08, 17.86
4	1378 (97)	6.96	5.58, 8.34	1360 (115)	9.25	7.73, 10.76	820 (115)	14.25	11.96, 16.53	1149 (219)	18.69	16.50, 20.88
5 (most deprived)	845 (91)	10.07	7.97, 12.16	628 (82)	13.19	10.56, 15.81	558 (82)	15.81	12.79, 18.82	629 (130)	20.17	17.19, 23.15
<b>Total</b>	<b>9255 (669)</b>	<b>7.16</b>	<b>6.62, 7.71</b>	<b>9129 (881)</b>	<b>10.09</b>	<b>9.46, 10.71</b>	<b>6450 (832)</b>	<b>12.65</b>	<b>11.84, 13.45</b>	<b>8419 (1397)</b>	<b>16.30</b>	<b>15.51, 17.09</b>

<sup>1</sup> In Week 1, self reported ethnicity was missing for 728 (7.9%) donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 7.76% (95% CI 5.81, 9.70). In Week 2, self reported ethnicity was missing for 650 (7.1%) donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 10.65% (95% CI 8.22, 13.07). In

Week 3, self reported ethnicity was missing for 451 (7.0%) donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 11.33% (95% CI 8.38, 14.29). In Week 4, self reported ethnicity was missing for 647 (7.7%) donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 17.86% (95% CI 14.86, 20.85).

<sup>2</sup> In Week 1, postal codes were missing for 1,024 (11.1%) of donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 10.29% (95% CI 8.35, 12.23). In Week 2, postal codes were missing for 1,080 (11.8%) of donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 11.72% (95% CI 9.81, 13.63). In Week 3, postal codes were missing for 767 (11.9%) of donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 13.91% (95% CI 11.44, 16.38). In Week 4, postal codes were missing for 909 (10.8%) of donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 15.80% (95% CI 13.37, 18.23).

**Table A2.2.** Weekly SARS-CoV-2 seroprevalence by province and age group by Nucleocapsid results in January 2022

	January 1-7			January 8-15			January 16-23			January 23-31		
	Adjusted			Adjusted			Adjusted			Adjusted		
	N Tested (N Positive)	Percent Positive	95% CI	N Tested (N Positive)	Percent Positive	95% CI	N Tested (N Positive)	Percent Positive	95% CI	N Tested (N Positive)	Percent Positive	95% CI
<b>British Columbia</b>												
17-24	137 (9)	5.49	2.65, 8.33	81 (11)	16.53	10.51, 22.55	69 (24)	33.88	26.28, 41.49	77 (29)	38.93	31.49, 46.37
25-39	485 (38)	7.21	4.83, 9.59	339 (30)	7.73	4.81, 10.65	307 (45)	14.64	10.62, 18.65	363 (83)	22.94	18.52, 27.37
40-59	624 (59)	9.47	7.10, 11.83	422 (24)	5.19	3.13, 7.25	420 (51)	11.33	8.45, 14.21	462 (87)	19.68	16.20, 23.16
60+	510 (32)	4.95	2.93, 6.97	350 (21)	5.88	3.46, 8.30	319 (19)	5.46	3.13, 7.80	413 (31)	7.84	5.36, 10.32
Total	1756 (138)	7.14	5.93, 8.35	1192 (86)	7.3	5.87, 8.72	1115 (139)	13	11.15, 14.84	1315 (230)	18.9	16.90, 20.91
<b>Alberta</b>												
17-24	144 (22)	11.18	6.90, 15.46	172 (35)	20.93	15.34, 26.52	95 (23)	21.37	14.46, 28.27	127 (41)	30.42	23.08, 37.77
25-39	481 (60)	12.66	9.36, 15.95	665 (90)	13.41	10.37, 16.45	338 (71)	21.30	16.40, 26.20	470 (120)	26.14	21.48, 30.81
40-59	697 (69)	10.46	7.90, 13.02	804 (114)	14.35	11.41, 17.30	465 (82)	18.48	14.46, 22.51	611 (133)	22.77	18.69, 26.85
60+	492 (53)	11.83	8.57, 15.08	568 (45)	7.93	5.07, 10.79	421 (47)	11.48	7.98, 14.97	480 (71)	15.83	11.62, 20.04
Total	1814 (204)	11.46	9.86, 13.06	2209 (284)	13.5	11.81, 15.18	1319 (223)	17.46	15.20, 19.72	1688 (365)	23.01	20.62, 25.41
<b>Saskatchewan</b>												
17-24	28 (1)	4.80	0.00, 10.96	49 (14)	29.93	18.81, 41.05	16 (5)	28.25	12.48, 44.02	21 (1)	6.24	0.00, 14.57
25-39	70 (7)	10.15	1.67, 18.64	174 (23)	12.76	6.92, 18.59	76 (8)	10.50	2.98, 18.02	81 (8)	11.23	3.44, 19.03
40-59	150 (11)	7.43	2.58, 12.29	234 (25)	11.48	6.76, 16.20	73 (4)	6.03	0.09, 11.96	107 (18)	15.65	7.58, 23.71
60+	108 (4)	3.45	0.00, 7.37	168 (22)	13.09	7.16, 19.03	80 (6)	7.43	0.90, 13.96	134 (10)	5.24	0.80, 9.68
Total	356 (23)	6.3	3.51, 9.09	625 (84)	14.65	11.52, 17.78	245 (23)	10.86	6.74, 14.97	343 (37)	9.72	6.19, 13.24
<b>Manitoba</b>												
17-24	63 (8)	9.52	3.87, 15.17	72 (21)	26.89	18.16, 35.62	20 (6)	28.18	10.09, 46.27	41 (9)	22.07	9.96, 34.17

COVID-19 Seroprevalence Report

25-39	135 (12)	10.85	5.36, 16.34	222 (34)	15.77	10.62, 20.92	90 (14)	16.21	6.77, 25.65	139 (26)	17.50	10.19, 24.81
40-59	217 (25)	12.55	7.92, 17.17	222 (29)	12.66	7.86, 17.46	120 (25)	21.81	12.43, 31.18	145 (27)	19.20	11.73, 26.67
60+	150 (15)	11.25	6.17, 16.33	161 (14)	9.59	4.65, 14.52	84 (10)	10.74	1.63, 19.84	127 (26)	20.98	12.00, 29.97
Total	565 (60)	11.3	8.70, 13.89	677 (98)	15.24	12.39, 18.08	314 (55)	18.47	13.11, 23.83	452 (88)	19.48	15.23, 23.72
<b>Ontario</b>												
17-24	300 (37)	12.60	9.69, 15.51	208 (25)	14.87	11.60, 18.14	173 (25)	14.96	10.99, 18.94	245 (48)	18.94	15.31, 22.56
25-39	936 (64)	6.32	4.63, 8.01	1051 (124)	12.77	10.85, 14.69	635 (122)	20.55	17.35, 23.76	916 (172)	18.27	15.70, 20.83
40-59	1253 (81)	6.52	5.12, 7.93	1349 (110)	8.39	7.04, 9.74	874 (121)	14.04	11.75, 16.33	1374 (213)	15.38	13.52, 17.24
60+	1104 (51)	3.45	2.36, 4.54	1007 (58)	6.37	5.02, 7.73	732 (84)	10.08	7.87, 12.29	1162 (184)	15.16	13.16, 17.17
Total	3593 (233)	6.36	5.56, 7.16	3615 (317)	9.6	8.74, 10.46	2414 (352)	14.59	13.22, 15.97	3697 (617)	16.34	15.20, 17.49
<b>Atlantic Canada</b>												
17-24	72 (2)	2.28	0.00, 5.57	41 (0)	.	.	94 (0)	.	.	84 (7)	8.04	3.84, 12.23
25-39	239 (3)	0.89	0.00, 2.48	205 (0)	.	.	274 (9)	2.47	0.57, 4.38	258 (17)	6.42	3.48, 9.36
40-59	455 (5)	0.92	0.00, 2.04	302 (7)	2.22	0.12, 4.33	401 (19)	4.42	2.45, 6.39	341 (21)	4.71	2.59, 6.83
60+	405 (1)	0.01	0.00, 0.51	263 (5)	1.63	0.00, 3.56	274 (12)	4.59	2.27, 6.92	241 (15)	6.50	3.50, 9.49
Total	1171 (11)	0.72	0.10, 1.35	811 (12)	1.28	0.29, 2.26	1043 (40)	3.3	2.28, 4.33	924 (60)	6.06	4.63, 7.49
<b>Overall Total</b>	9255 (669)	7.16	6.62, 7.71	9129 (881)	10.09	9.46, 10.71	6450 (832)	12.65	11.84, 13.45	8419 (1397)	16.30	15.51, 17.09