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COVID-19 Seroprevalence Report

# **COVID-19 Seroprevalence Report**

## **June 23rd, 2022**

### **Report #22: May 2022 Survey**

### **The advance of Omicron**

# Summary

May 2022

May 1 - May 31 2022 (n=31,764)

**•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 100.00% (95% CI 100.00, 100.00%) (based on results from the Spike antibody assay). This was predominantly driven by vaccination.
- Spike antibody concentrations were high by September 2021, but gradually decreased. A peak in values followed by decline is expected after vaccination. Concentrations increased in all age groups by February 2022 likely due to third vaccine dose administration. An increase in concentration in those over 60 is observed in May.

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

- Seroprevalence (natural infection) in May 2022 was 46.32% (95% CI 45.77, 46.87), higher than April 2022 (36.71% (95% CI 36.16, 37.26),  $P < 0.0001$ ). There was a gradual increase over May from 42.74% (95% CI 41.65, 43.84) to 46.11% (95% CI 45.00, 47.21) to 47.03% (95% CI 45.96, 48.10) to 48.96% (95% CI 47.87, 50.06) with the persistence of the Omicron variant.
- Consistent with previous surveys, donors aged 17-24 years old had the highest seroprevalence rate (64.47% (95% CI 62.96, 65.98) compared to other age groups. However, the seroprevalence rate increased in all age groups compared to April.
- Seroprevalence rates increased in May compared to April in all provinces except PEI.
- Racialized groups have a higher seroprevalence rate (54.35% (95% CI 53.12, 55.58)) compared to white donors (44.31% (95% CI 43.67, 44.95)).
- Among repeat tested donors, new infections in unvaccinated donors have increased from June 2021 1.53% (95% CI 1.14, 2.00) to 9.12% (95% CI 8.24, 10.07) in January 2022 and 46.83% (95% CI 44.57, 49.10) in May 2022
- Potential breakthrough infections remained low from June 2021 to December 2021, but increased from 5.19% (95% CI 4.68, 5.74) in January 2022 to 31.02% (95% CI 30.17, 31.88) in May 2022.

April 2022

April 1 - April 30 2022 (n=29,787)

•**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 99.74% (95% CI 99.60, 99.88%) (based on results from the Spike antibody assay). This was predominantly driven by vaccination.
- Spike antibody concentrations were high by September 2021, but gradually decreased. A peak in values followed by decline is expected after vaccination. Concentrations increased in all age groups by February 2022 likely due to third vaccine dose administration, but are now declining.

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

- Seroprevalence (natural infection) in April 2022 was 36.71% (95% CI 36.16, 37.26), higher than March 2022 (28.70% (95% CI 28.15, 29.26),  $P < 0.0001$ ). There was a gradual increase over April from 32.83% (95% CI 31.67, 33.98) to 35.54% (95% CI 34.47, 36.60) to 37.64% (95% CI 36.62, 38.65) to 40.04% (95% CI 38.90, 41.18) with the persistence of the Omicron variant.
- Consistent with previous surveys, donors aged 17-24 years old had the highest seroprevalence rate (55.37% (95% CI 53.76, 56.99) compared to other age groups. However, the seroprevalence rate increased in all age groups compared to March.
- Seroprevalence rates increased in April compared to March in all provinces.
- Racialized groups have a higher seroprevalence rate (45.06% (95% CI 43.77, 46.34)) compared to white donors (34.78% (95% CI 34.15, 35.42)).
- Among repeat tested donors, new infections in unvaccinated donors have increased from June 2021 1.53% (95% CI 1.14, 2.00) to 9.12% (95% CI 8.24, 10.07) in January 2022 and 37.19% (95% CI 35.14, 39.28) in April 2022
- Potential breakthrough infections remained low from June 2021 to December 2021, but increased from 5.19% (95% CI 4.68, 5.74) in January 2022 to 21.99 (95% CI 21.19, 22.80) in April 2022.

## March 2022

March 1 - March 31 2022 (n=26,026)

### •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 99.57% (95% CI 99.42, 99.73%) (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 February likely due to third vaccine dose administration, but were starting to decline in March.

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

- Seroprevalence (natural infection) in March 2022 was 28.70% (95% CI 28.15, 29.25), higher than February 2022 (23.68% (95% CI 23.18, 24.18)). ( $P < 0.0001$ ). There was a gradual increase over the 31 day reporting period from 27.02% (95% CI 25.95, 28.09) to 27.54% (95% CI 26.47, 28.61) to 30.68% (95% CI 29.61, 31.75) to 29.52% (95% CI 28.34, 30.69) consistent with the persistence of the Omicron variant.
- Consistent with previous surveys, donors aged 17-24 years old had the highest seroprevalence rate (44.27% (95% CI 42.54, 46.01) compared to other age groups. However, the seroprevalence rate increased in all age groups compared to February.
- Seroprevalence rates increased in March compared to February in all provinces with the exception of Prince Edward Island and Newfoundland and Labrador where sample sizes are smaller.
- Racialized groups have a higher seroprevalence rate (38.58% (95% CI 37.21, 39.95)) compared to white donors (26.27% (95% CI 25.65, 26.89)).
- Among repeat tested donors, new infections in unvaccinated donors have increased from June 1.53% (95% CI 1.14, 2.00) to 9.12% (95% CI 8.24, 10.07) in January and 29.49% (95% CI 27.57, 31.48) in March
- Potential breakthrough infections remained low from June to December, but increased from 5.19% (95% CI 4.68, 5.74) in January to 17.50 (95% CI 16.66, 18.37) in March.

## February 2022

February 1 - February 28 2022 (n=28,616)

### •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 99.60% (95% CI 99.45, 99.75%) (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 February likely due to third vaccine dose administration.

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

- Seroprevalence (natural infection) in February 2022 was 23.68% (95% CI 23.18, 24.18), higher than January 2022 (12.12% (95% CI 11.76, 12.48)). ( $P < 0.0001$ ). There was a gradual increase over the 28 day reporting period from 21.39% (20.31, 22.48) to 23.43% (22.41, 24.45) to 23.68% (22.77, 24.58) to 25.25% (95% CI 24.30, 26.20) consistent with emergence of the Omicron variant.
- Consistent with previous surveys, donors aged 17-24 years old had the highest seroprevalence rate (36.27% (95% CI 34.68, 37.86%)) compared to other age groups. However, the seroprevalence rate increased in all age groups compared to January.
- Seroprevalence rates increased in February compared to January in all provinces.
- Racialized groups have a higher seroprevalence rate (33.45% (95% CI 32.16, 34.73)) compared to white donors (21.17% (95% CI 20.62, 21.72%)).
- Among repeat tested donors, new infections in unvaccinated donors have increased from June 1.53% (1.14, 2.00) to 9.12% (95% CI 8.24, 10.07) in January, and more than doubled in February (23.71%, 95% CI 22.10, 25.37).
- Potential breakthrough infections remained low from June to December, but increased from 5.19% (95% CI 4.68, 5.74) in January to 15.56% (95% CI 14.72, 16.42) in February.

## 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 3.91% (3.11, 4.83%) in December and more than doubled in January to 9.012% (95% CI 8.24, 10.07).
- Potential breakthrough infections remained low from June to December, but increased from 0.74% (95% CI 0.48, 1.10) in December to 5.19% (95% CI 4.68, 5.74) 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 3.91% (3.11, 4.83%) in December but vaccine breakthrough infections are low, 0.74% (0.48, 1.10%).

## 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. In mid-December 2021, a fifth wave began and subsided somewhat over January but by late March a sixth wave had begun. As of May 28th, 2022, 3,865,867 cases of COVID-19 had been reported in Canada.

Beginning in January 2021, Alpha (B.1.1.7) began to establish itself as the primary variant of concern (VOC). In late June 2021, Delta (B.1.617.2) was transitioning to be the primary VOC. In mid-December 2021, a new more contagious VOC, Omicron (B.1.1.529) began to establish itself as a primary VOC. Peak timepoints when each VOC became dominant varied between provinces. 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 informs 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 85% of the eligible (5 and older) population had received two doses as of May 22nd, 2022. Starting in November 2021, some Canadians became eligible for a third dose. By May 22nd, 2022, 58.5% 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 and their hemoglobin level 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 and 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 2021 samples from 2 weeks were tested without sorting in order to be able to report more quickly, and as of January 2022 samples from all weeks of the month were tested. 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.

[illegible]

<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.

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, 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 May 1 and May 31, 2022, a total of 31,764 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 100.00% (95% CI 100.00, 100.00%). The adjusted seroprevalence by Nucleocapsid antibody (proxy for natural infection) was 46.32% (95% CI 45.77, 46.87) (please refer to points of interpretation). There was a gradual increase over the 30-day reporting period from 42.74% (95% CI 41.65, 43.84) to 46.11% (95% CI 45.00, 47.21) to 47.03% (95% CI 45.96, 48.10) to 48.96% (95% CI 47.87, 50.06) consistent with the persistence of the Omicron variant.

Figure 1 illustrates temporal trends of SARS-CoV-2 seroprevalence from April 4, 2020, until May 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 began in February 2022, and has continued to increase in May, 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 April 2022 and May 2022). Overall, the seroprevalence rate for natural infections was higher in May (46.32% (95% CI 45.77, 46.87) compared to April (36.71% (95% CI 36.16, 37.26)) ( $P < 0.0001$ ), and natural infections increased compared to the previous month across all demographics (except in Prince Edward Island). Donors aged 17-24 years old continued to have the highest seroprevalence rate at 64.47% (95% CI 62.96, 65.98) compared to other age groups.

Table 2B shows that the percentage of donors with **Spike antibody** (proxy for humoral immunity) is at least 99% seroprevalence in all sociodemographic groups and no longer increasing.

After vaccination an increase in antibody concentration followed by gradual decline is expected. From September 2021 to May 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 May.

From June to October 2021 the percentage of incident breakthrough infections were rare and varied by month with no clear trend (See Table 3). There was a small increase over November and December which increased in January-April and in May was 31.02% (95% CI 30.17, 31.88). Table 4 shows the percentage of incident cases by month in likely unvaccinated donors. Since June 2021 the percentage slowly increased to 3.91% (95% CI 3.11, 4.83) by December 2021 then increased much higher to 46.83% (95% CI 44.57, 49.10) by May 2022.

Figure 4 shows regional weekly trends since December 2021 for Nucleocapsid by age group. 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 May 2022. Differences in natural infections between white and racialized groups were seen from January 2021 to May 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 May by region (Nucleocapsid and Spike), and additional weekly breakdown of Nucleocapsid results are shown in Tables A 2.1 and A 2.2

## Conclusion

As of May 2022, adjusted seroprevalence by the Spike antibody assay (proxy for humoral immunity) was 100.00% (95% CI 100.00, 100.00). While humoral immunity was largely driven by vaccination, the fraction of the population naturally exposed has increase sharply since December consistent with the arrival of the Omicron variant. Among repeat tested donors, breakthrough infections in unvaccinated donors have increased slowly since June and more substantially by May 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 46.04% (95% CI 45.49, 46.59), and after weighting factors applied it was 46.20% (95% CI 45.65, 46.75), then after the weighted seroprevalence was adjusted for sensitivity and specificity, 46.32% (95% 45.77, 46.87). Using the Spike antibody assay, the unweighted SARS-CoV-2 seroprevalence for the full sample was 98.94% (95% CI 98.82, 99.05), and after weighting factors applied it was 99.01% (95% CI 98.90, 99.12), then after the weighted seroprevalence was adjusted for sensitivity and specificity, 100% (95% CI 100.00, 100.00).

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 May the most common positive antibody profile was positive on Spike antibody and negative on Nucleocapsid antibody (see below).

#### Diagnostic phenotypes in May 2022 (unadjusted)

	Nucleocapsid Antibody	Spike Antibody	Total N (%)
	Negative	Negative	255 (0.8%)
	Negative	Positive	16,886 (53.2%)
	Positive	Negative	83 (0.3%)
	Positive	Positive	14,540 (45.8%)
Total			31,764

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**Table 1.** Comparing SARS-CoV-2 seroprevalence by sociodemographic variables by Nucleocapsid and Spike antibody results in May 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	13,763	6,353	46.28	45.45, 47.12	13,763	13,652	100.00	100.00, 100.00
Male	18,001	8,270	46.06	45.33, 46.80	18,001	17,774	99.99	99.82, 100.00
<b>Age</b>								
17-24	2,464	1,601	64.47	62.96, 65.98	2,464	2,458	100.00	100.00, 100.00
25-39	8,515	4,692	55.74	54.63, 56.85	8,515	8,444	100.00	100.00, 100.00
40-59	11,725	5,627	47.87	46.93, 48.80	11,725	11,593	100.00	99.85, 100.00
60+	9,060	2,703	28.32	27.39, 29.26	9,060	8,931	99.76	99.51, 100.00
<b>Province</b>								
British Columbia	5,296	2,359	45.43	44.12, 46.74	5,296	5,241	100.00	99.89, 100.00
Alberta	6,020	3,241	55.79	54.36, 57.22	6,020	5,957	100.00	99.92, 100.00
Saskatchewan	1,349	652	50.03	47.23, 52.82	1,349	1,333	100.00	99.38, 100.00
Manitoba	1,651	814	50.96	48.36, 53.56	1,651	1,629	99.90	99.31, 100.00
Ontario	14,137	6,344	44.85	44.08, 45.63	14,137	13,975	100.00	99.98, 100.00
New Brunswick	1,305	536	42.33	39.05, 45.61	1,305	1,295	100.00	99.61, 100.00
Nova Scotia	1,388	479	34.52	31.71, 37.32	1,388	1,380	100.00	99.92, 100.00
Prince Edward Island	196	60	31.78	24.29, 39.27	196	195	99.64	97.67, 100.00
Newfoundland	422	138	33.00	29.29, 36.71	422	421	100.00	100.00, 100.00
<b>Metro area</b>								
Vancouver	2,731	1,363	49.39	47.64, 51.13	2,731	2,712	100.00	100.00, 100.00
Calgary	2,253	1,198	54.87	52.36, 57.38	2,253	2,239	100.00	100.00, 100.00
Edmonton	1,933	965	51.57	49.08, 54.06	1,933	1,918	100.00	99.92, 100.00

COVID-19 Seroprevalence Report  
May 2022 Survey

Ottawa	1,256	462	36.34	33.41, 39.27	1,256	1,253	100.00	100.00, 100.00
Toronto	4,869	2,332	46.67	45.50, 47.83	4,869	4,824	100.00	100.00, 100.00
Winnipeg	1,036	463	45.50	42.19, 48.80	1,036	1,031	100.00	99.98, 100.00
<b>Ethnicity<sup>1,2</sup></b>								
White	23,698	10,482	44.31	43.67, 44.95	23,698	23,433	100.00	100.00, 100.00
Indigenous	424	227	53.35	48.54, 58.15	424	423	100.00	99.78, 100.00
Asian	1,795	842	46.03	43.88, 48.18	1,795	1,785	100.00	100.00, 100.00
Other racialized groups	3,571	2,064	58.98	57.41, 60.55	3,571	3,554	100.00	100.00, 100.00
<b>Social Deprivation<sup>3</sup></b>								
1 (least deprived)	5,922	2,872	49.06	47.79, 50.33	5,922	5,862	100.00	99.89, 100.00
2	6,096	2,808	46.36	45.10, 47.61	6,096	6,031	100.00	99.95, 100.00
3	5,684	2,450	43.37	42.07, 44.68	5,684	5,620	100.00	99.86, 100.00
4	5,138	2,358	46.03	44.66, 47.40	5,138	5,086	100.00	99.79, 100.00
5 (most deprived)	5,127	2,272	44.44	43.07, 45.81	5,127	5,073	100.00	100.00, 100.00
<b>Material Deprivation<sup>3</sup></b>								
1 (least deprived)	7,769	3,389	43.54	42.43, 44.66	7,769	7,720	100.00	100.00, 100.00
2	6,898	3,162	46.21	45.02, 47.41	6,898	6,828	100.00	99.87, 100.00
3	5,788	2,683	46.66	45.36, 47.96	5,788	5,720	100.00	99.90, 100.00
4	4,651	2,147	46.48	45.05, 47.90	4,651	4,583	99.91	99.58, 100.00
5 (most deprived)	2,861	1,379	49.06	47.28, 50.84	2,861	2,821	99.88	99.47, 100.00
<b>Total</b>	<b>31,764</b>	<b>14,623</b>	<b>46.32</b>	<b>45.77, 46.87</b>	<b>31,764</b>	<b>31,426</b>	<b>100.00</b>	<b>100.00, 100.00</b>

<sup>1</sup> Self reported ethnicity was missing for 2,276 (7.2%) donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 44.39% (95% CI 42.30, 46.49); and Spike antibody was 99.26% (95% CI 98.68, 99.85).

<sup>2</sup> Combining all racialized groups together resulted in adjusted SARS-CoV-2 seroprevalence of 54.35% (95% CI 53.12, 55.58) by the Nucleocapsid antibody assay, and 100.00% (95% CI 100.00, 100.00) by Spike antibody.

<sup>3</sup> Postal Codes were missing for 3,797 (12.0%) of donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 49.28% (95% CI 47.67, 50.90) and Spike antibody was 100.00% (95% CI 99.81, 100.00).

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

April 2022 (crude)		April 2022 (adjusted)		May 2022 (crude)		May 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	12,628	4,538	34.94 34.18, 35.70	13,763	6,353	45.08	44.31, 45.85	<0.0001
Male	17,159	6,313	38.59 37.79, 39.38	18,001	8,270	47.63	46.84, 48.43	<0.0001
<b>Age</b>								
17-24	2,248	1,246	55.37 53.76, 56.99	2,464	1,601	64.47	62.96, 65.98	<0.0001
25-39	7,996	3,670	46.39 45.23, 47.54	8,515	4,692	55.74	54.63, 56.85	<0.0001
40-59	11,150	4,214	37.36 36.43, 38.30	11,725	5,627	47.87	46.93, 48.80	<0.0001
60+	8,393	1,721	19.26 18.41, 20.11	9,060	2,703	28.32	27.39, 29.26	<0.0001
<b>Province</b>								
British Columbia	4,662	1,676	36.32 35.01, 37.62	5,296	2,359	45.43	44.12, 46.74	<0.0001
Alberta	5,592	2,509	46.44 44.96, 47.91	6,020	3,241	55.79	54.36, 57.22	<0.0001
Saskatchewan	1,317	528	39.97 37.14, 42.80	1,349	652	50.03	47.23, 52.82	<0.0001
Manitoba	1,403	540	40.30 37.67, 42.92	1,651	814	50.96	48.36, 53.56	<0.0001
Ontario	14,103	4,913	34.89 34.12, 35.66	14,137	6,344	44.85	44.08, 45.63	<0.0001
New Brunswick	710	243	35.36 31.99, 38.73	1,305	536	42.33	39.05, 45.61	0.0038
Nova Scotia	1,287	262	20.78 18.29, 23.27	1,388	479	34.52	31.71, 37.32	<0.0001
Prince Edward Island	203	41	37.10 29.56, 44.64	196	60	31.78	24.29, 39.27	0.3277
Newfoundland	510	139	27.90 24.25, 31.56	422	138	33.00	29.29, 36.71	0.0558

COVID-19 Seroprevalence Report  
May 2022 Survey

<b>Metro area</b>									
Vancouver	2,614	1,036	39.53	37.80, 41.26	2,731	1,363	49.39	47.64, 51.13	<0.0001
Calgary	1,996	877	45.54	42.92, 48.16	2,253	1,198	54.87	52.36, 57.38	<0.0001
Edmonton	1,899	769	41.33	38.94, 43.71	1,933	965	51.57	49.08, 54.06	<0.0001
Ottawa	1,501	380	26.56	23.85, 29.27	1,256	462	36.34	33.41, 39.27	<0.0001
Toronto	5,074	1,871	36.53	35.38, 37.68	4,869	2,332	46.67	45.50, 47.83	<0.0001
Winnipeg	931	333	37.07	33.90, 40.25	1,036	463	45.50	42.19, 48.80	0.0003
<b>Ethnicity<sup>1,2</sup></b>									
White	22,335	7,779	34.78	34.15, 35.42	23,698	10,482	44.31	43.67, 44.95	<0.0001
Indigenous	379	160	42.75	37.80, 47.70	424	227	53.35	48.54, 58.15	0.0028
Asian	1,641	599	37.78	35.57, 39.99	1,795	842	46.03	43.88, 48.18	<0.0001
Other racialized groups	3,374	1,631	49.06	47.42, 50.70	3,571	2,064	58.98	57.41, 60.55	<0.0001
<b>Social Deprivation<sup>3</sup></b>									
1 (least deprived)	5,763	2,194	38.54	37.29, 39.79	5,922	2,872	49.06	47.79, 50.33	<0.0001
2	5,637	2,076	37.15	35.87, 38.42	6,096	2,808	46.36	45.10, 47.61	<0.0001
3	5,177	1,829	35.08	33.77, 36.39	5,684	2,450	43.37	42.07, 44.68	<0.0001
4	4,835	1,682	35.39	34.03, 36.74	5,138	2,358	46.03	44.66, 47.40	<0.0001
5 (most deprived)	4,857	1,706	35.18	33.82, 36.54	5,127	2,272	44.44	43.07, 45.81	<0.0001
<b>Material Deprivation<sup>3</sup></b>									
1 (least deprived)	7,499	2,528	33.69	32.60, 34.78	7,769	3,389	43.54	42.43, 44.66	<0.0001
2	6,521	2,329	35.86	34.67, 37.05	6,898	3,162	46.21	45.02, 47.41	<0.0001
3	5,534	2,002	36.11	34.84, 37.39	5,788	2,683	46.66	45.36, 47.96	<0.0001
4	4,205	1,550	37.25	35.81, 38.69	4,651	2,147	46.48	45.05, 47.90	<0.0001

COVID-19 Seroprevalence Report  
May 2022 Survey

5 (most deprived)	2,510	1,078	43.82	41.95, 45.69	2,861	1,379	49.06	47.28, 50.84	0.0001
<b>Total</b>	29,787	10,851	36.71	36.16, 37.26	31,764	14,623	46.32	45.77, 46.87	<0.0001

\*P-value reflects the difference between April and May results.

<sup>1</sup> In April, self reported ethnicity was missing for 2,058 (6.9%) donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 33.30% (95% CI 31.22, 35.37). In May, self reported ethnicity was missing for 2,276 (7.2%) donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 44.39% (95% CI 42.30, 46.49); and Spike antibody was 99.26% (95% CI 98.68, 99.85).

<sup>2</sup> In April, combining all racialized groups together resulted in adjusted SARS-CoV-2 seroprevalence of 45.06% (95% CI 43.77, 46.34) by the Nucleocapsid antibody assay. In May, combining all racialized groups together resulted in adjusted SARS-CoV-2 seroprevalence of 54.35% (95% CI 53.12, 55.58) by the Nucleocapsid antibody assay, and 100.00% (95% CI 100.00, 100.00) by Spike antibody.

<sup>3</sup> In April, postal codes were missing for 3,518 (11.8%) of donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 39.31% (95% CI 37.67, 40.95). In May, postal Codes were missing for 3,797 (12.0%) of donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 49.28% (95% CI 47.67, 50.90) and Spike antibody was 100.00% (95% CI 99.81, 100.00).

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

April 2022 (crude)		April 2022 (adjusted)		May 2022 (crude)		May 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	12,627	12,468	99.89 99.71, 100.00	13,763	13,652	100.00 100.00, 100.00		<0.0001
Male	17,159	16,869	99.58 99.37, 99.79	18,001	17,774	99.99 99.82, 100.00		0.0021
<b>Age</b>								
17-24	2,248	2,235	100.00 100.00, 100.00	2,464	2,458	100.00 100.00, 100.00		0.0296
25-39	7,996	7,901	99.99 99.73, 100.00	8,515	8,444	100.00 100.00, 100.00		0.0267
40-59	11,150	10,961	99.48 99.22, 99.73	11,725	11,593	100.00 99.87, 100.00		0.0002
60+	8,392	8,240	99.42 99.13, 99.70	9,060	8,931	99.87 99.63, 100.00		0.0165
<b>Province</b>								
British Columbia	4,662	4,586	99.60 99.26, 99.94	5,296	5,241	100.00 99.89, 100.00		0.0071
Alberta	5,592	5,506	99.72 99.36, 100.00	6,020	5,957	100.00 99.92, 100.00		0.0233
Saskatchewan	1,316	1,298	99.88 99.22, 100.00	1,349	1,333	100.00 99.38, 100.00		0.5476
Manitoba	1,403	1,385	99.96 99.37, 100.00	1,651	1,629	99.90 99.31, 100.00		0.6351
Ontario	14,103	13,874	99.63 99.42, 99.83	14,137	13,975	100.00 99.98, 100.00		0.0001
New Brunswick	710	703	100.00 99.45, 100.00	1,305	1,295	100.00 99.61, 100.00		0.8865
Nova Scotia	1,287	1,276	100.00 99.52, 100.00	1,388	1,380	100.00 99.92, 100.00		0.4563
Prince Edward Island	203	202	99.78 97.94, 100.00	196	195	99.64 97.67, 100.00		0.9171
Newfoundland	510	507	100.00 99.69, 100.00	422	421	100.00 100.00, 100.00		0.4910



COVID-19 Seroprevalence Report  
May 2022 Survey

<b>Metro area</b>									
Vancouver	2,614	2,571	99.49	99.02, 99.95	2,731	2,712	100.00	100.00, 100.00	0.0006
Calgary	1,996	1,972	100.00	99.45, 100.00	2,253	2,239	100.00	100.00, 100.00	0.1267
Edmonton	1,899	1,873	99.95	99.41, 100.00	1,933	1,918	100.00	99.92, 100.00	0.1251
Ottawa	1,501	1,492	100.00	99.76, 100.00	1,256	1,253	100.00	100.00, 100.00	0.1151
Toronto	5,074	5,005	99.77	99.49, 100.00	4,869	4,824	100.00	100.00, 100.00	0.0009
Winnipeg	931	922	100.00	99.51, 100.00	1,036	1,031	100.00	99.98, 100.00	0.3498
<b>Ethnicity<sup>1,2</sup></b>									
White	22,334	21,987	99.68	99.52, 99.85	23,698	23,433	100.00	100.00, 100.00	<0.0001
Indigenous	379	374	99.67	98.43, 100.00	424	423	100.00	99.78, 100.00	0.1188
Asian	1,641	1,634	100.00	100.00, 100.00	1,795	1,785	100.00	100.00, 100.00	0.3244
Other racialized groups	3,374	3,337	100.00	99.77, 100.00	3,571	3,554	100.00	100.00, 100.00	0.0010
<b>Social Deprivation<sup>3</sup></b>									
1 (least deprived)	5,763	5,681	99.82	99.51, 100.00	5,922	5,862	100.00	99.89, 100.00	0.0661
2	5,637	5,557	99.89	99.59, 100.00	6,096	6,031	100.00	99.95, 100.00	0.0773
3	5,177	5,109	99.99	99.69, 100.00	5,684	5,620	100.00	99.86, 100.00	0.4833
4	4,835	4,760	99.67	99.32, 100.00	5,138	5,086	100.00	99.79, 100.00	0.0527
5 (most deprived)	4,856	4,779	99.53	99.16, 99.89	5,127	5,073	100.00	100.00, 100.00	0.0004
<b>Material Deprivation<sup>3</sup></b>									
1 (least deprived)	7,499	7,433	100.00	100.00, 100.00	7,769	7,720	100.00	100.00, 100.00	0.3385
2	6,520	6,418	99.72	99.42, 100.00	6,898	6,828	100.00	99.87, 100.00	0.0304
3	5,534	5,452	99.76	99.45, 100.00	5,788	5,720	100.00	99.90, 100.00	0.0383
4	4,205	4,127	99.34	98.94, 99.74	4,651	4,583	99.91	99.58, 100.00	0.0307

COVID-19 Seroprevalence Report  
May 2022 Survey

5 (most deprived)	2,510	2,456	98.96	98.40, 99.52	2,861	2,821	99.88	99.47, 100.00	0.0085
<b>Total</b>	29,786	29,337	99.74	99.60, 99.88	31,764	31,426	100.00	100.00, 100.00	<0.0001

\*P-value reflects the difference between April and May results.

<sup>1</sup> In April, self reported ethnicity was missing for 2,058 (6.9%) donors; Adjusted seroprevalence by the Spike antibody was 98.49% (95% CI 97.77, 99.20). In May, self reported ethnicity was missing for 2,276 (7.2%) donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 44.39% (95% CI 42.30, 46.49); and Spike antibody was 99.26% (95% CI 98.68, 99.85).

<sup>2</sup> In April, combining all racialized groups together resulted in adjusted SARS-CoV-2 seroprevalence of 100.00% (95% CI 100.00, 100.00) by Spike antibody. In May, combining all racialized groups together resulted in adjusted SARS-CoV-2 seroprevalence of 54.35% (95% CI 53.12, 55.58) by the Nucleocapsid antibody assay, and 100.00% (95% CI 100.00, 100.00) by Spike antibody.

<sup>3</sup> In April, postal codes were missing for 3,518 (11.8%) of donors; Adjusted seroprevalence by the Spike antibody was 99.34% (95% CI 98.89, 99.80). In May, postal codes were missing for 3,797 (12.0%) of donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 49.28% (95% CI 47.67, 50.90) and Spike antibody was 100.00% (95% CI 99.81, 100.00).

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

Month	Total donors tested	Repeat Donors	Previous S positive, N negative	S Positive, N Positive		
				N	%	95% CI
Jun	16,884	4,452	929	2	0.22	0.03, 0.78
Jul	8,457	2,853	1,054	5	0.47	0.15, 1.10
Aug	9,109	5,400	2,719	8	0.29	0.13, 0.58
Sep	9,363	5,728	2,915	3	0.10	0.02, 0.30
Oct	9,627	5,898	3,313	12	0.36	0.19, 0.63
Nov	9,018	5,290	3,318	20	0.60	0.37, 0.93
Dec	16,817	5,560	3,241	24	0.74	0.48, 1.10
Jan	32,505	11,296	6,973	362	5.19	4.68, 5.74
Feb	28,616	10,200	7,065	1,099	15.56	14.72, 16.42
Mar	26,056	10,650	7,753	1,359	17.53	16.69, 18.39
Apr	29,786	14,128	10,365	2,279	21.99	21.19, 22.80
May	31,764	15,665	11,344	3,519	31.02	30.17, 31.88

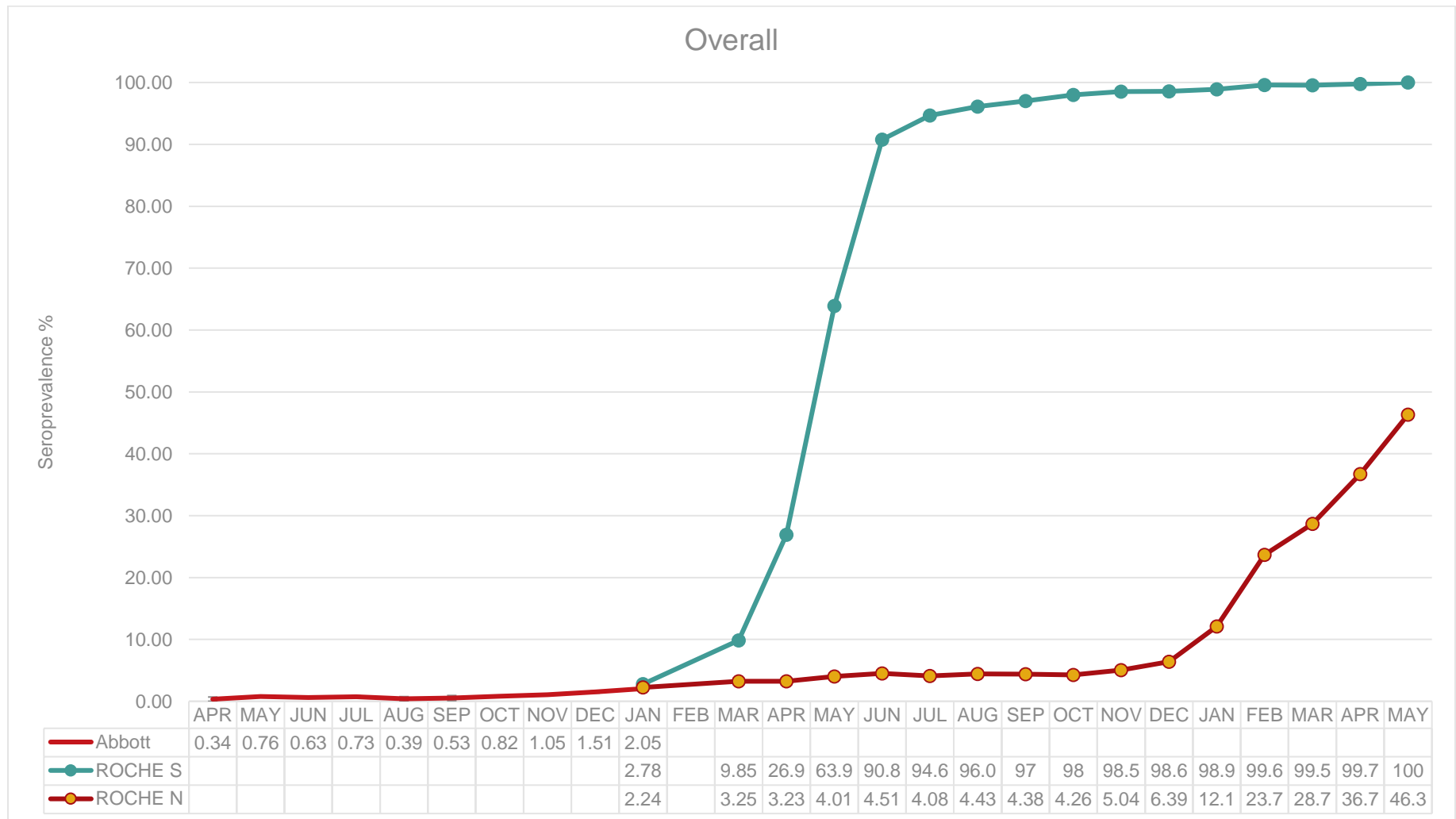
Note: A donation was considered a potential breakthrough incident infection if donors tested S positive and N negative on their previous donation and then tested S positive and N positive on their following donation.

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

Month	Total donors tested	Repeat Donors	Previous S negative, N negative	S Positive, N Positive		
				N	%	95% CI
Jun	16,884	4,452	3,409	52	1.53	1.14, 2.00
Jul	8,457	2,853	1,697	24	1.41	0.91, 2.10
Aug	9,109	5,400	2,487	29	1.17	0.78, 1.67
Sep	9,363	5,728	2,628	53	2.02	1.51, 2.63
Oct	9,627	5,898	2,385	61	2.56	1.96, 3.27
Nov	9,018	5,290	1,754	56	3.19	2.42, 4.13
Dec	16,817	5,560	2,073	81	3.91	3.11, 4.83
Jan	32,505	11,296	3,924	358	9.12	8.24, 10.07
Feb	28,616	10,200	2,666	632	23.71	22.10, 25.37
Mar	26,056	10,650	2,138	630	29.47	27.54, 31.45
Apr	29,786	14,128	2,143	797	37.19	35.14, 39.28
May	31,764	15,665	1,907	893	46.83	44.57, 49.10

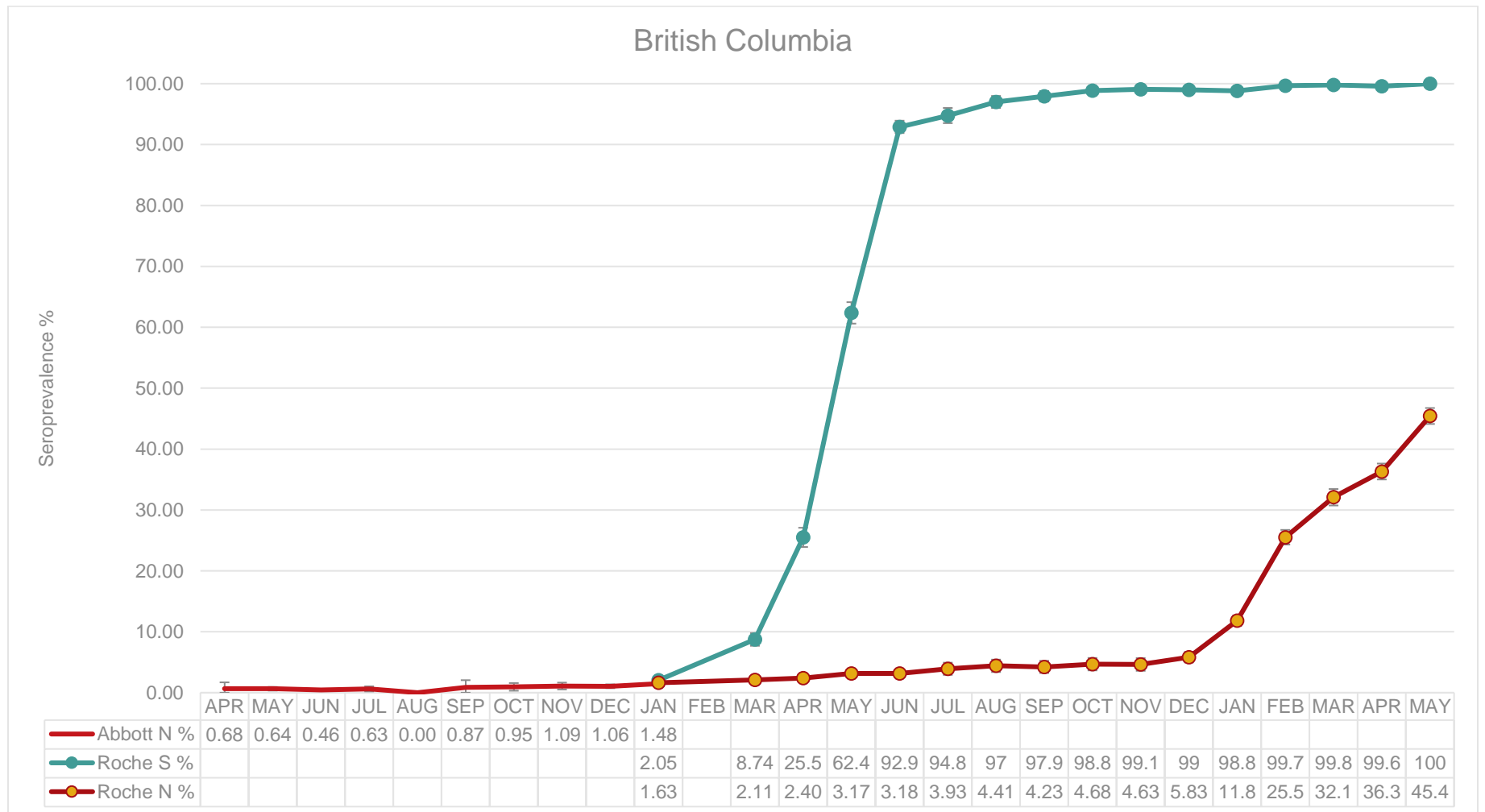
Note: A donation was considered a potential incident infection if donors tested S negative and N negative on their previous donation and then tested S positive and N positive on their following donation.

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

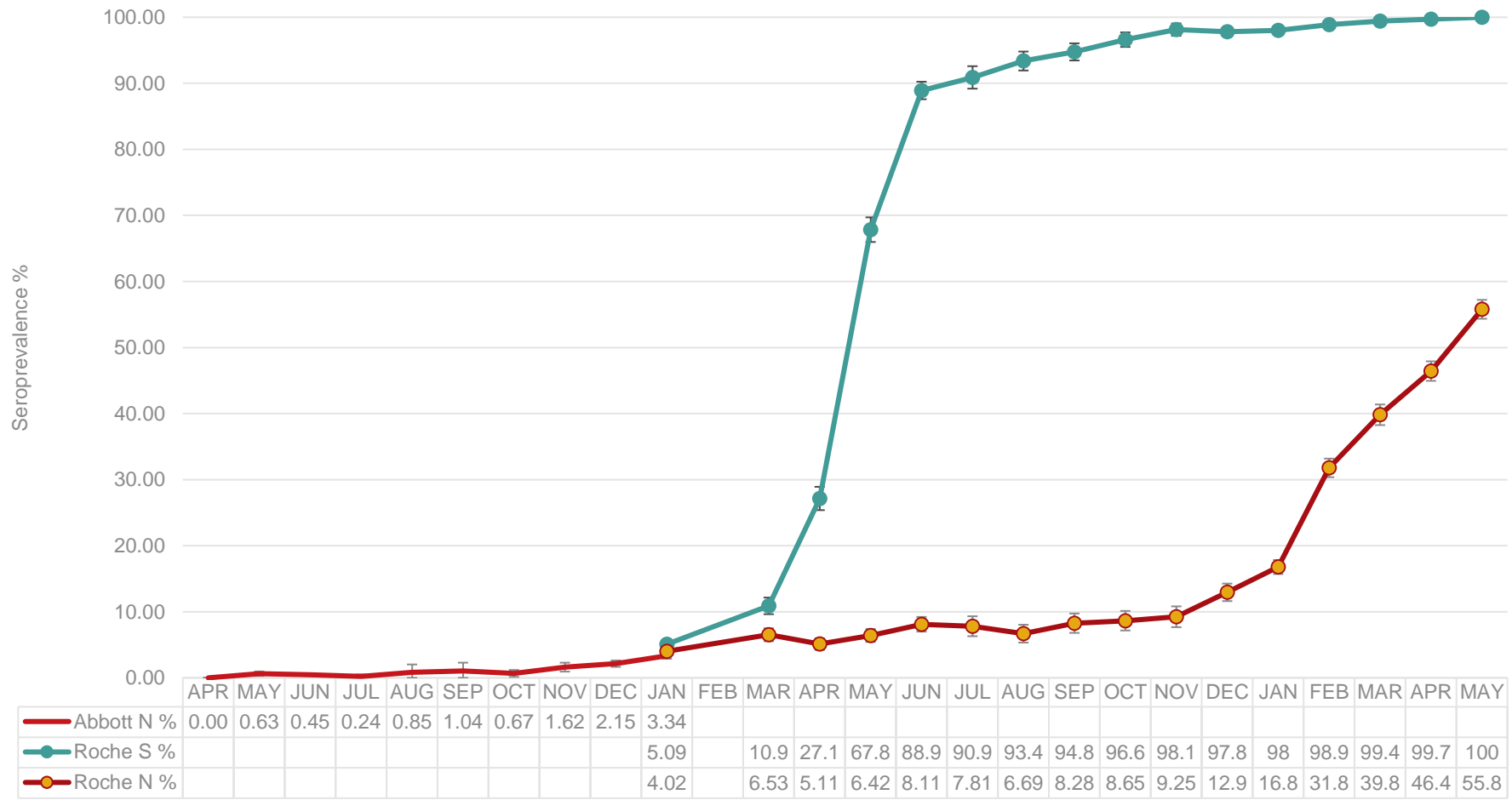


Notes: SARS-CoV-2 seroprevalence rates (95% CI), that have been weighted and adjusted for test characteristics. Data from the CIHR funded study (Correlates of Immunity) from April 9, 2020-January 31, 2021, have been included.

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

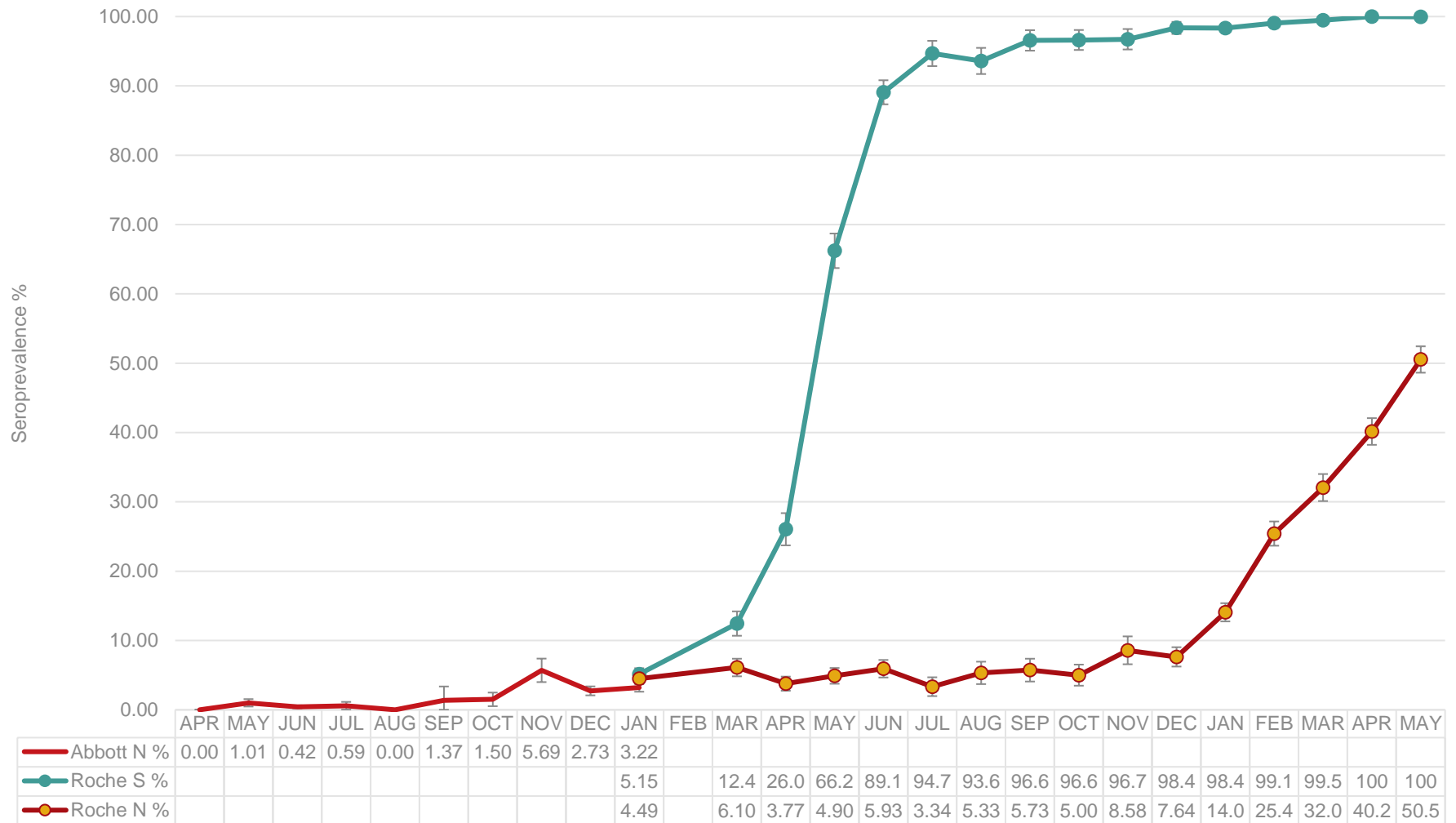


# Alberta

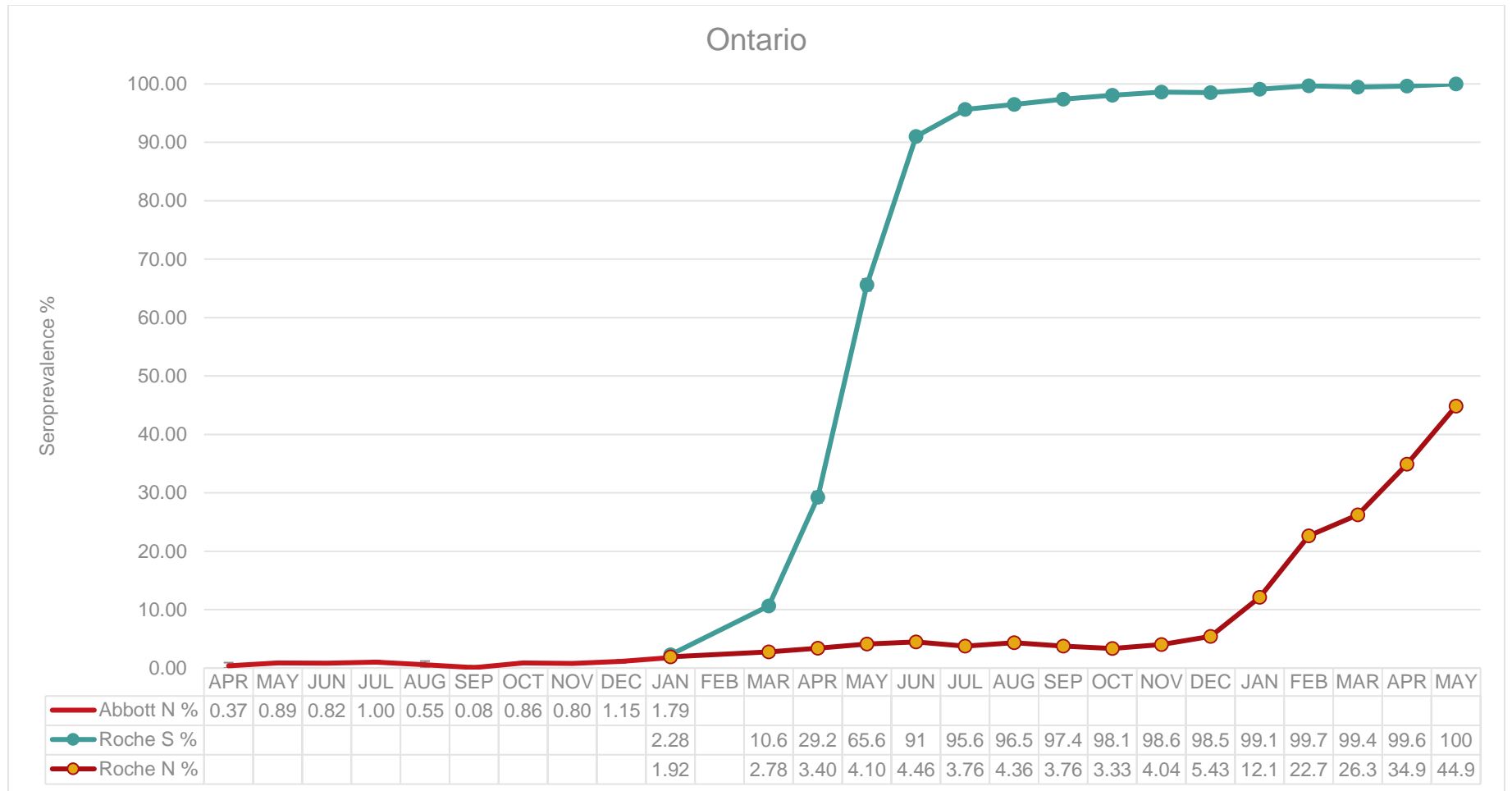


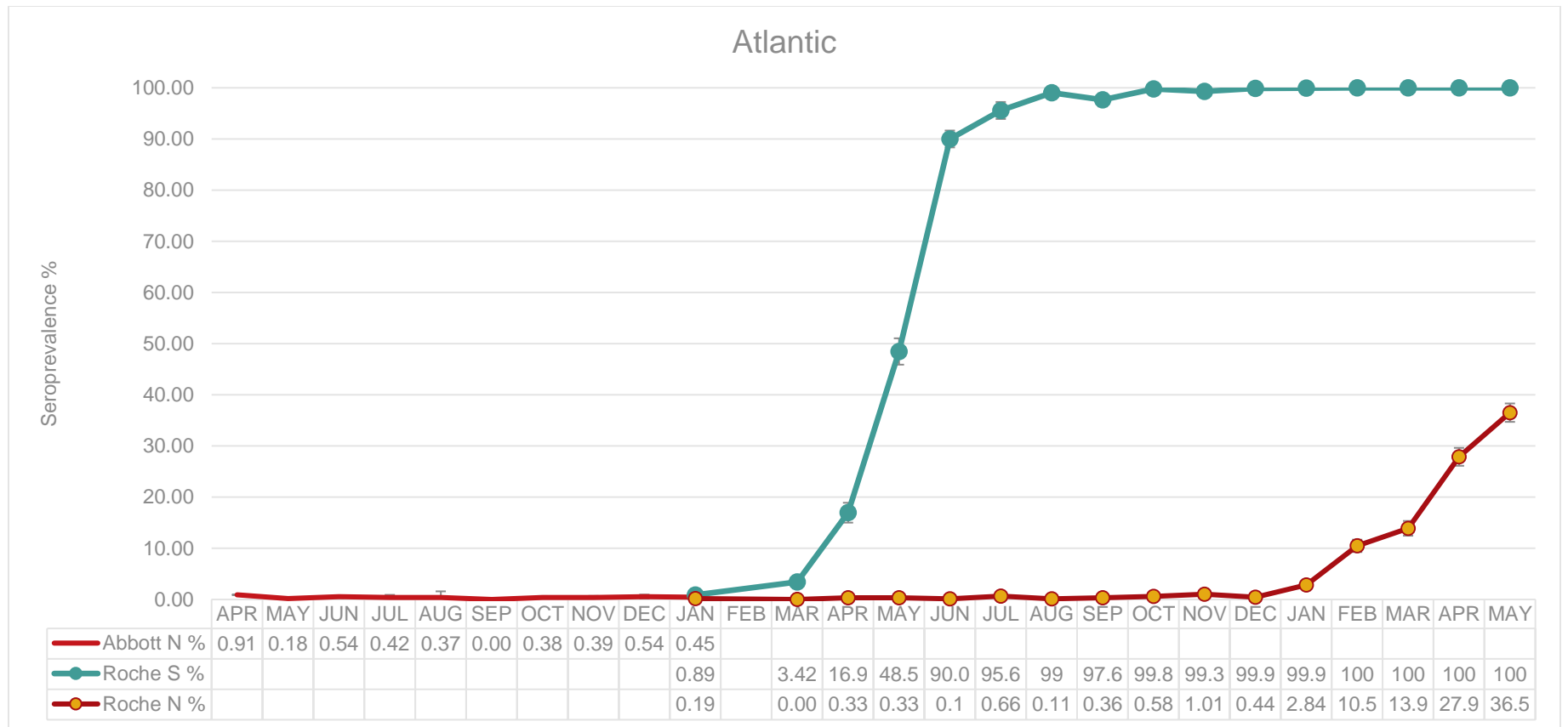
COVID-19 Seroprevalence Report  
May 2022 Survey

Prairies



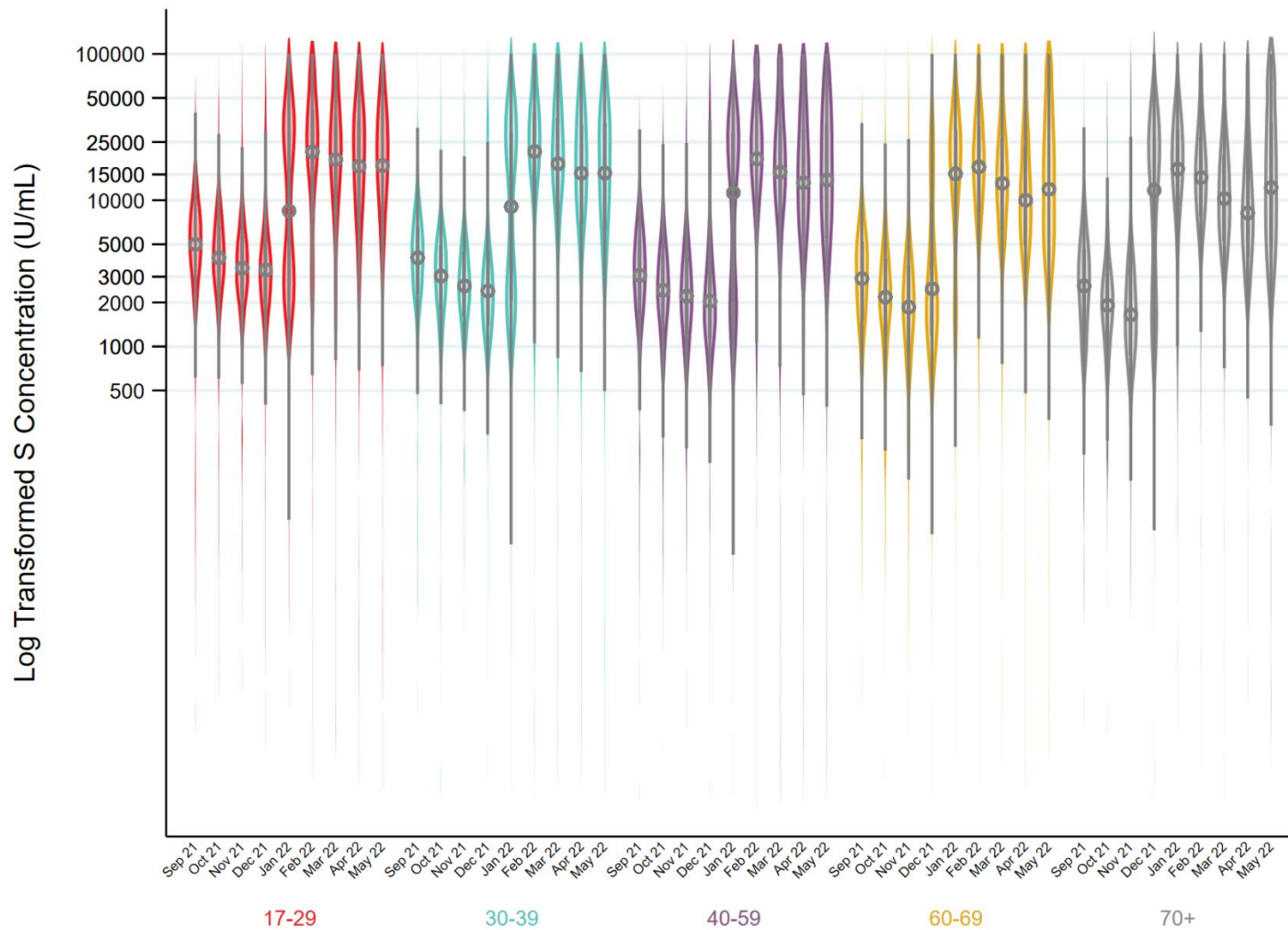


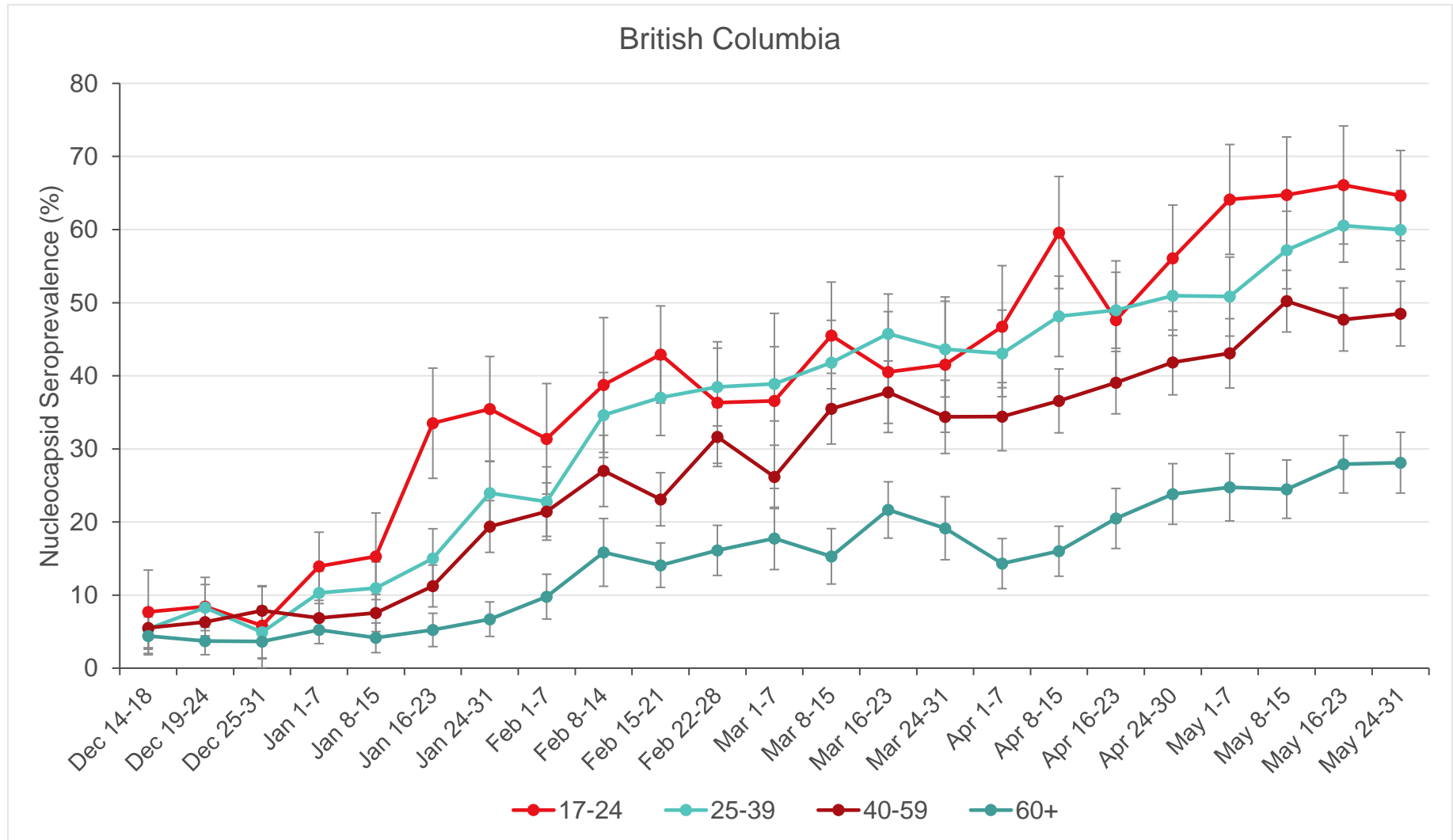


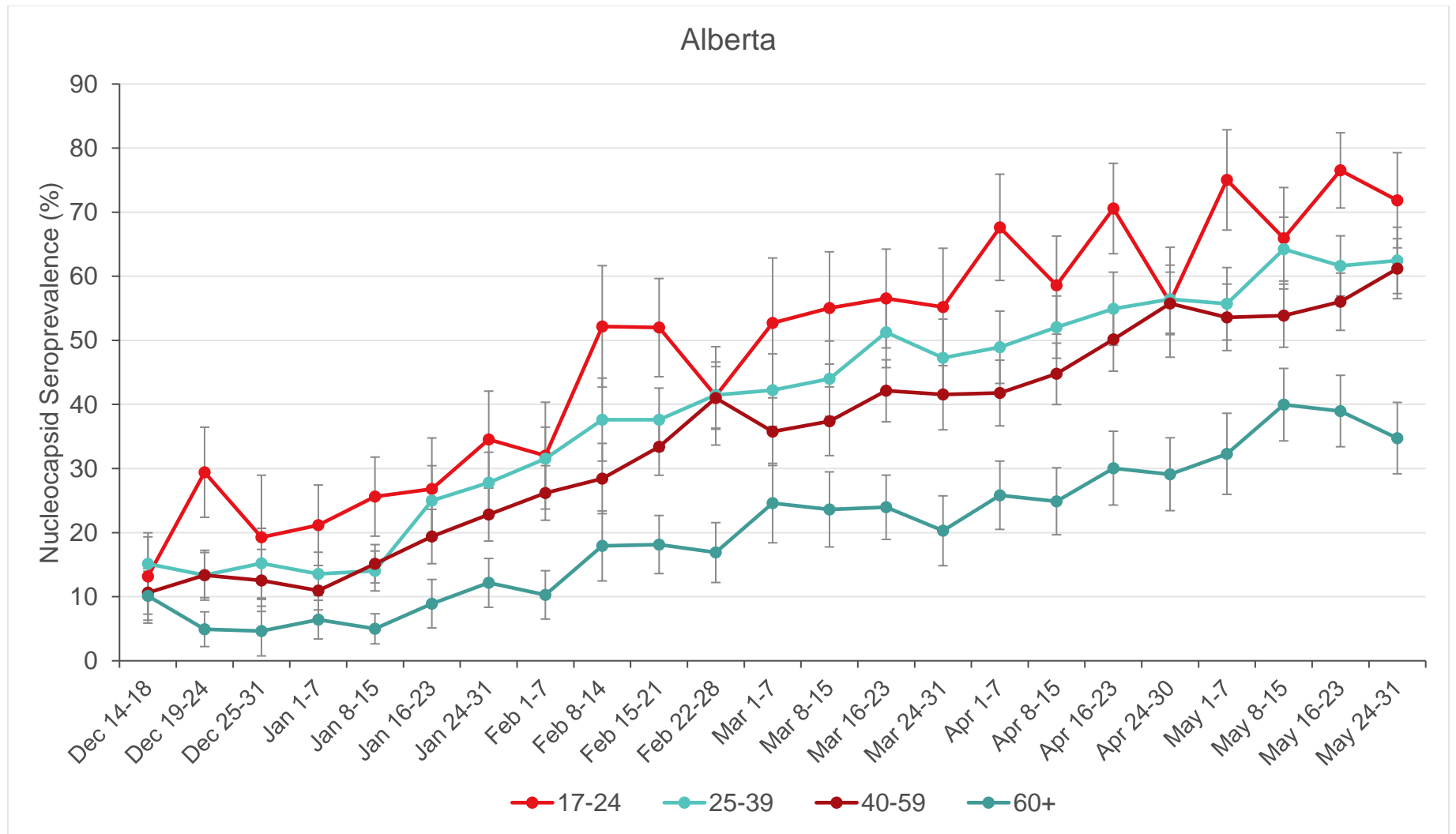


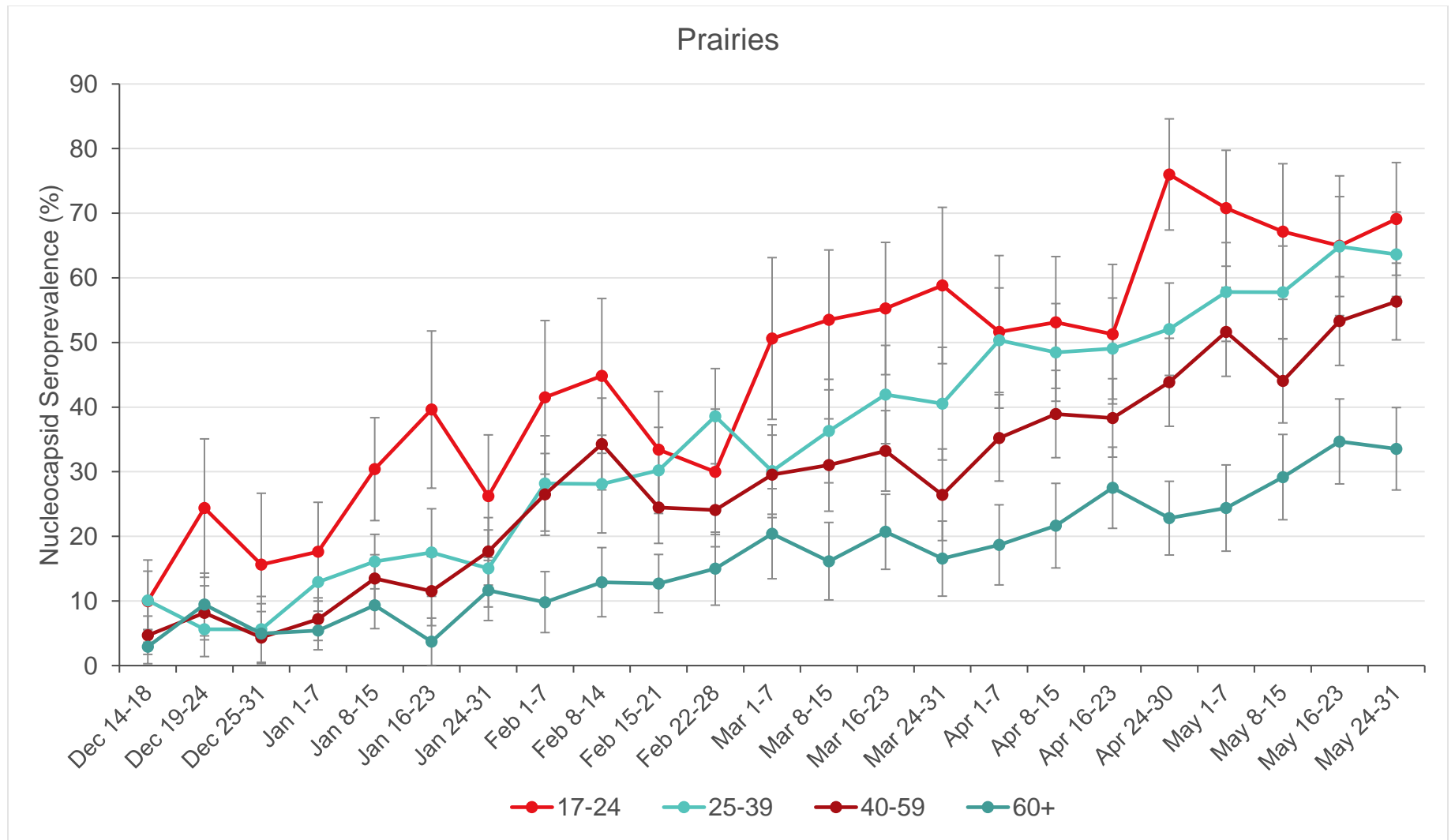
Note: SARS-CoV-2 seroprevalence rates (95% CI), that have been weighted and adjusted for test characteristics. Data from the CIHR funded study (Correlates of Immunity) from April 9, 2020-January 31, 2021, have been included.

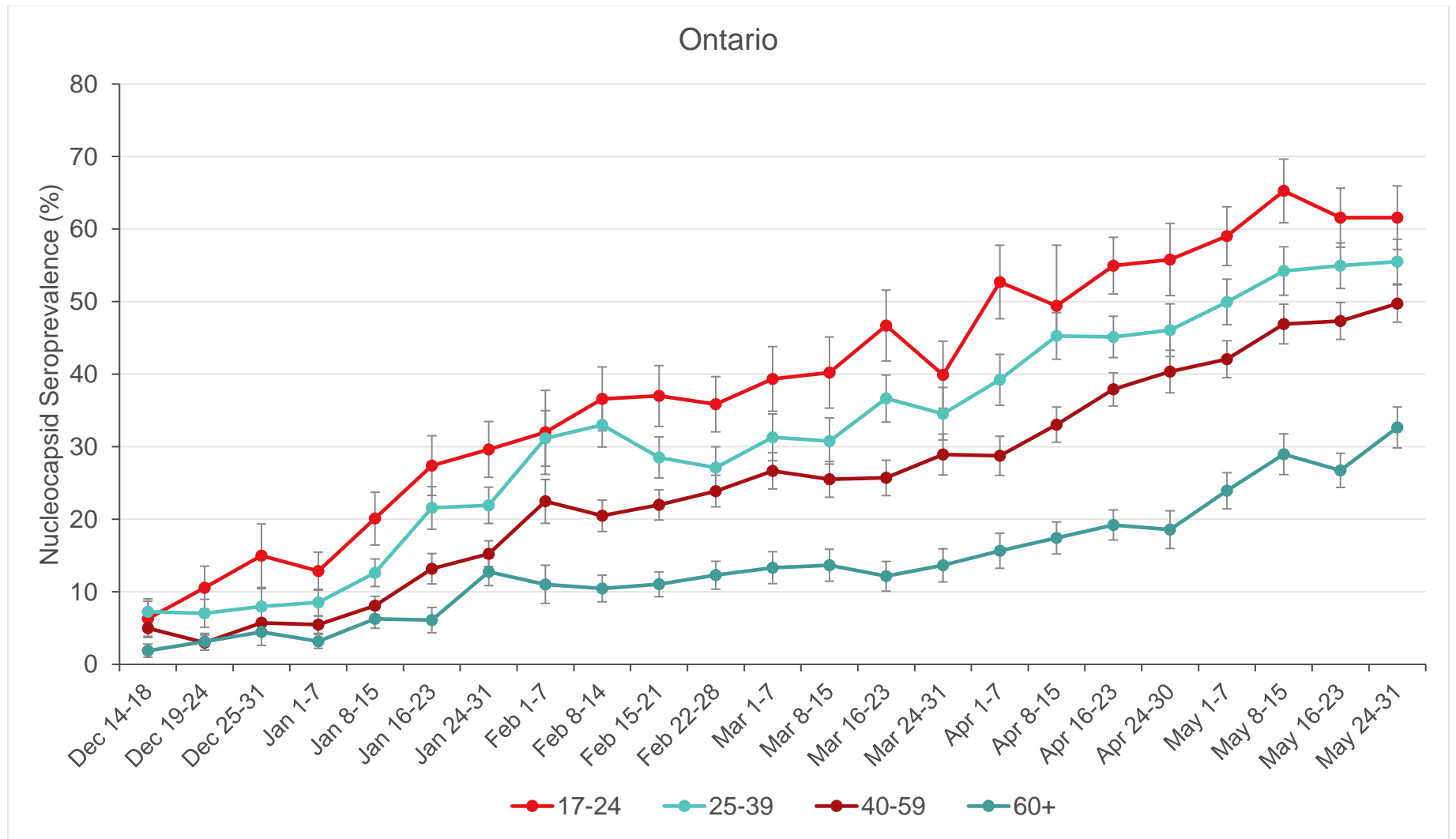
**Figure 3.** Distributions of log transformed Spike antibody concentration results (U/mL) (grey circle represents the median and the bar represents the IQR) in spike antibody seropositive donations from September 2021 to May 2022 stratified by age group.

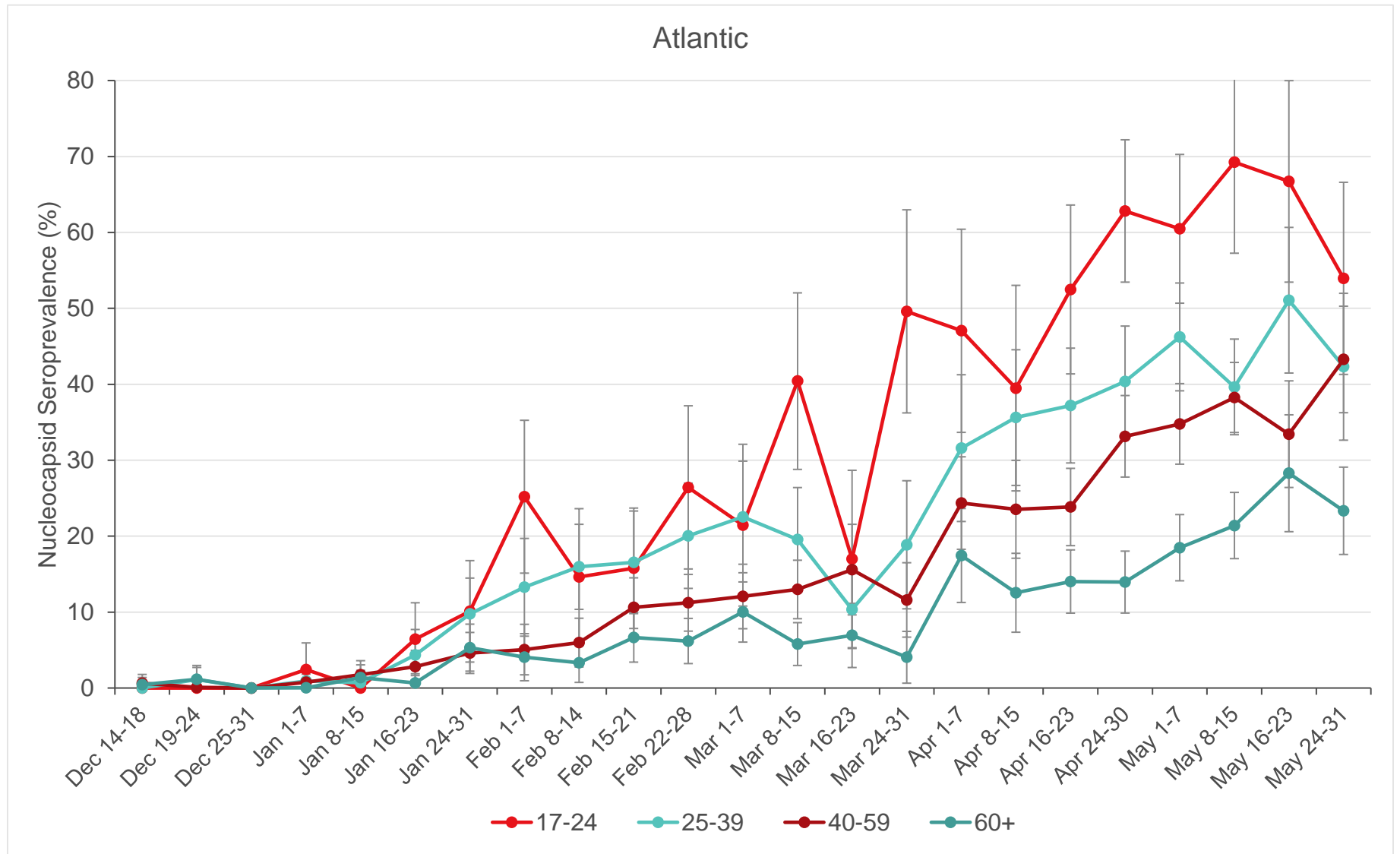


**Figure 4.** Regional temporal trends of SARS-CoV-2 Nucleocapsid (infection) seroprevalence by age group weekly from December 2021 - May 2022



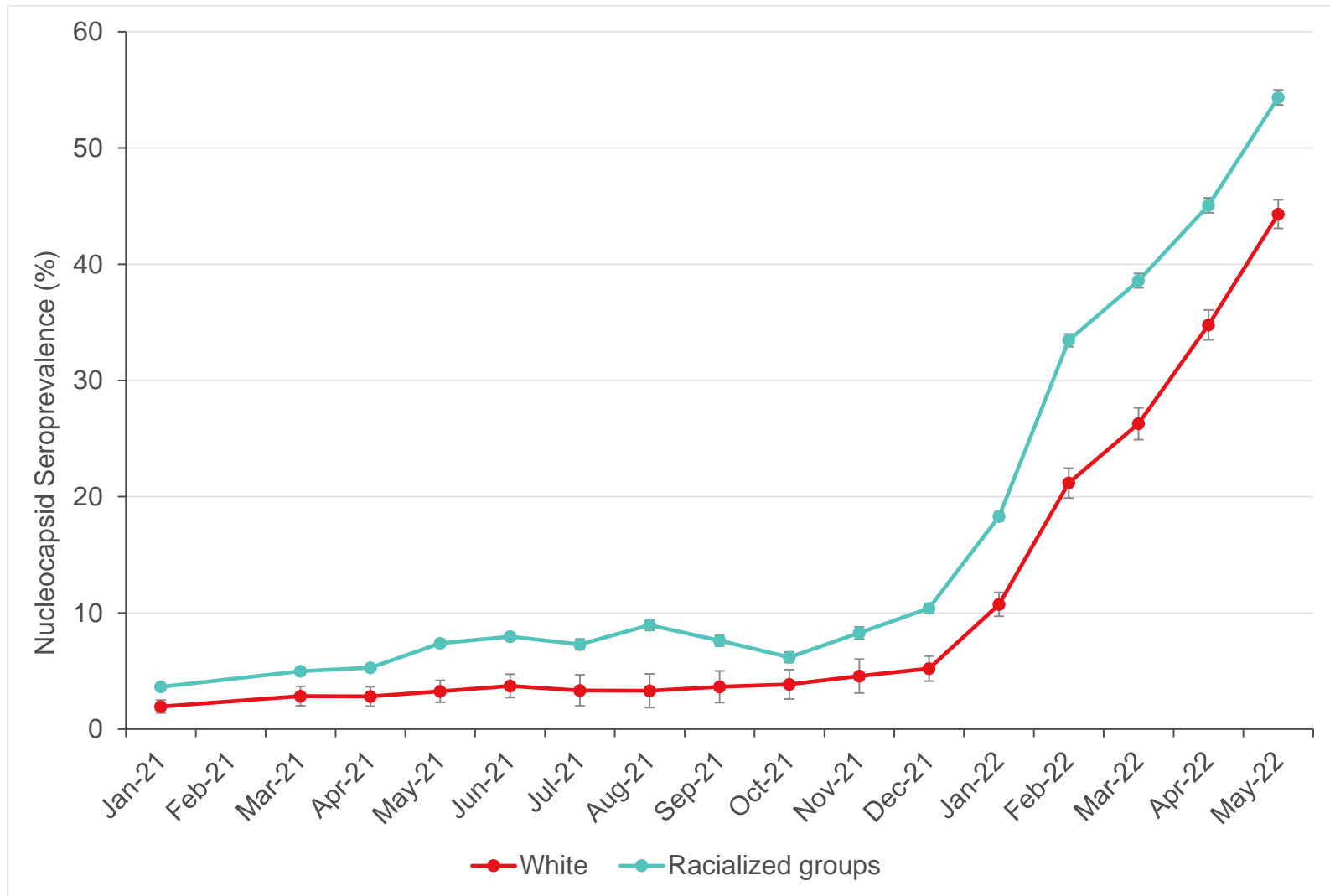




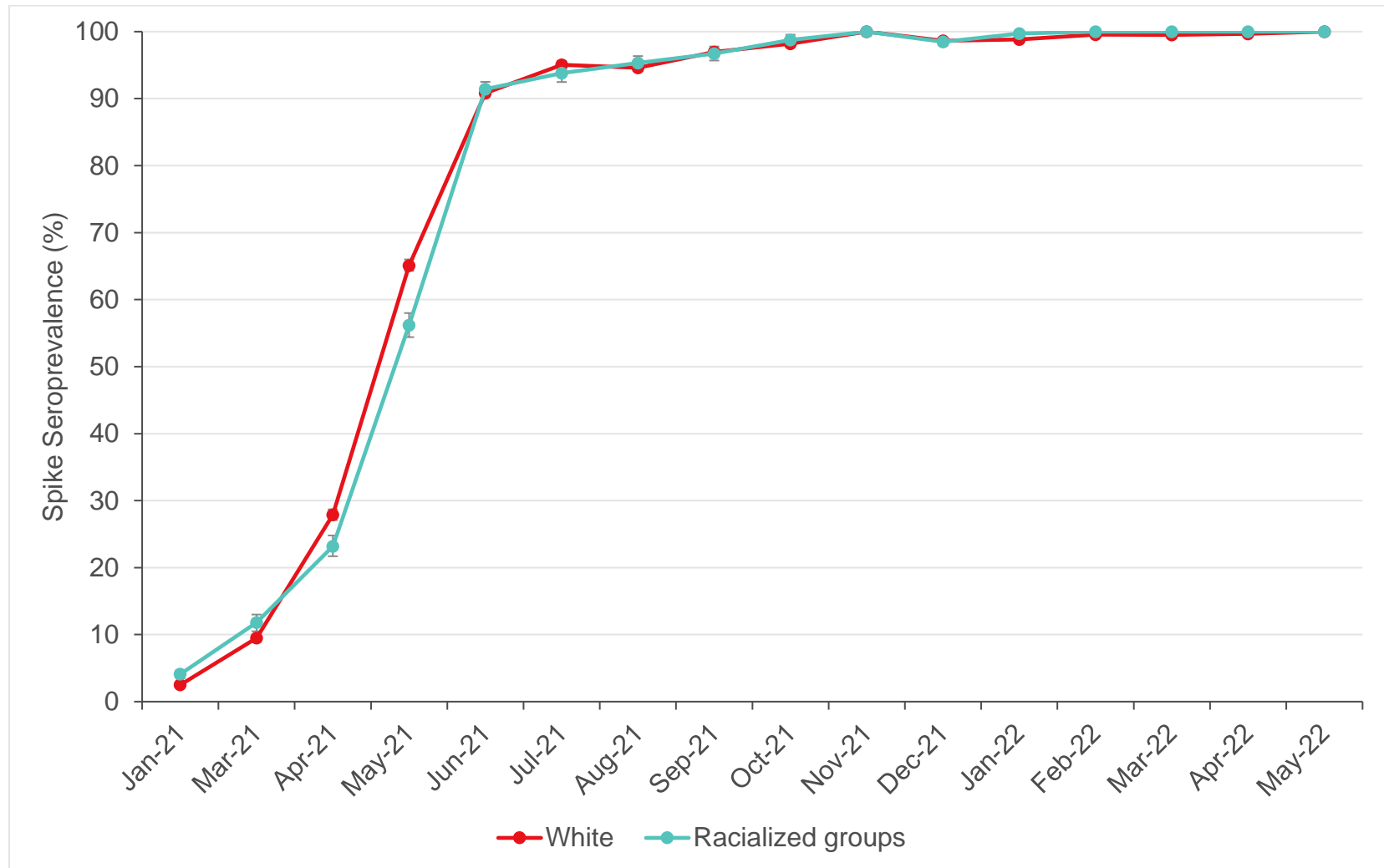




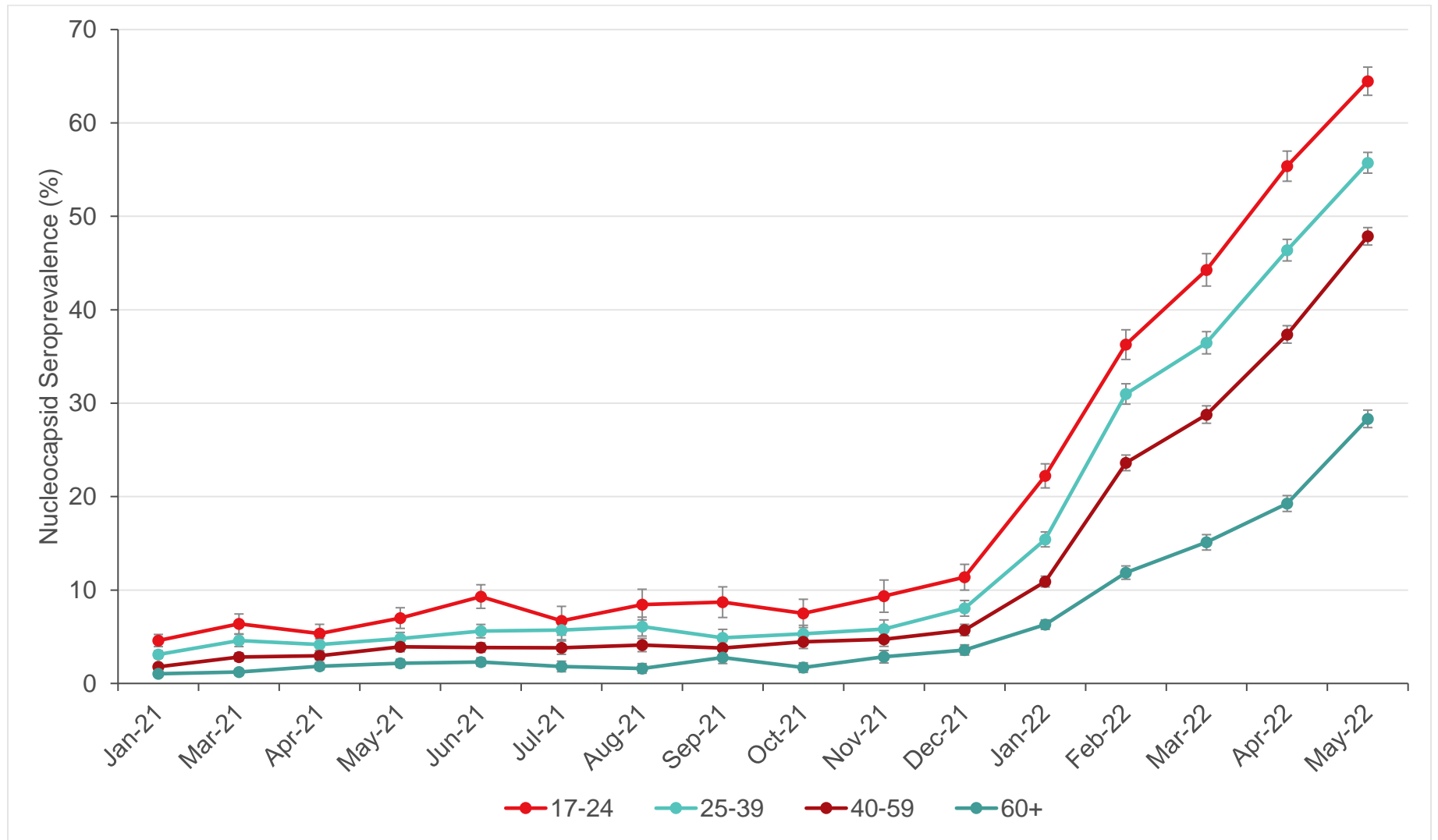
**Figure 5A.** Temporal trends of SARS-CoV-2 seroprevalence by monthly intervals from January 2021 - May 2022 estimated by Nucleocapsid antibody results by ethnicity.



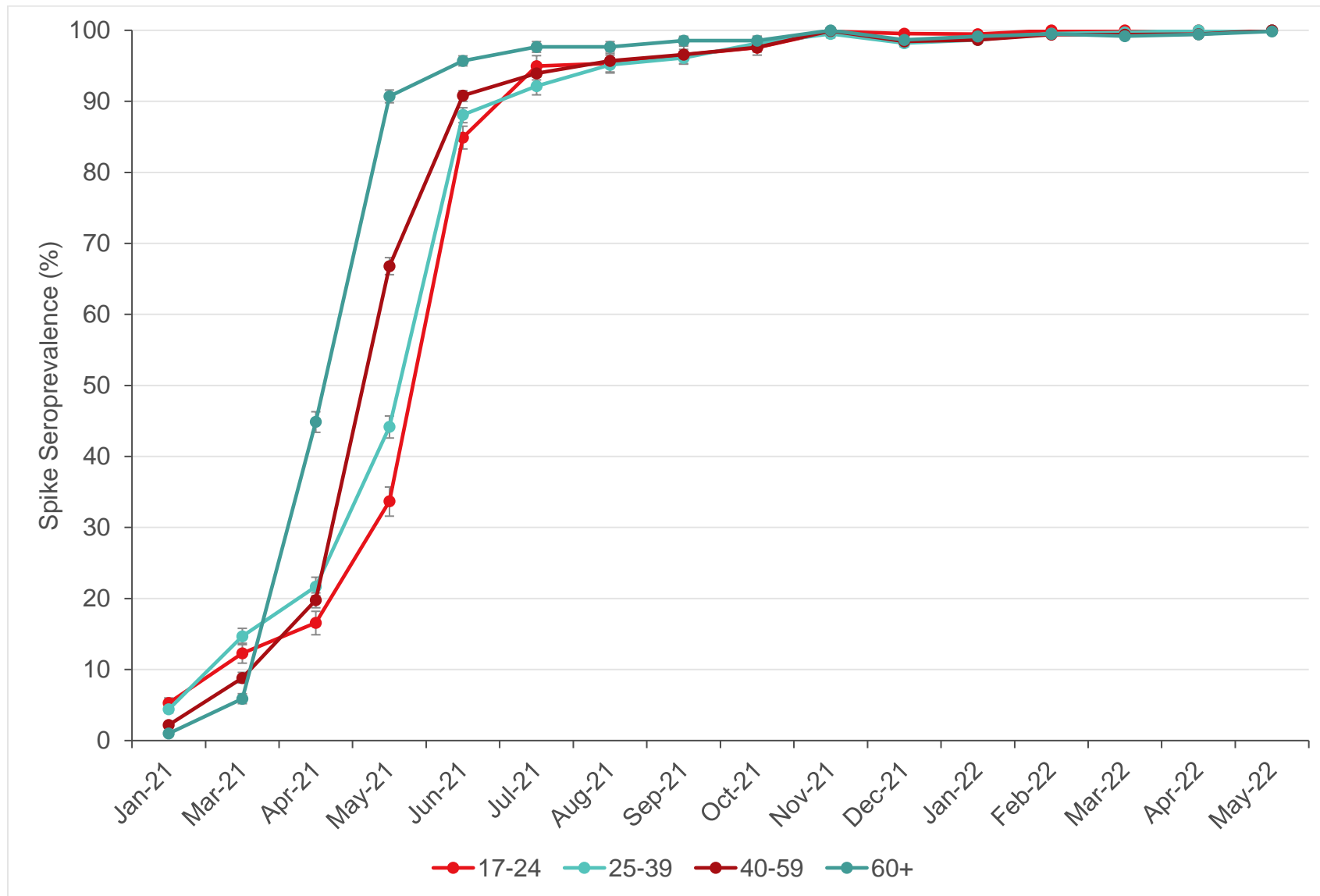
**Figure 5B.** Temporal trends of SARS-CoV-2 seroprevalence by monthly intervals from January 2021 - May 2022 estimated by Spike antibody results by ethnicity.



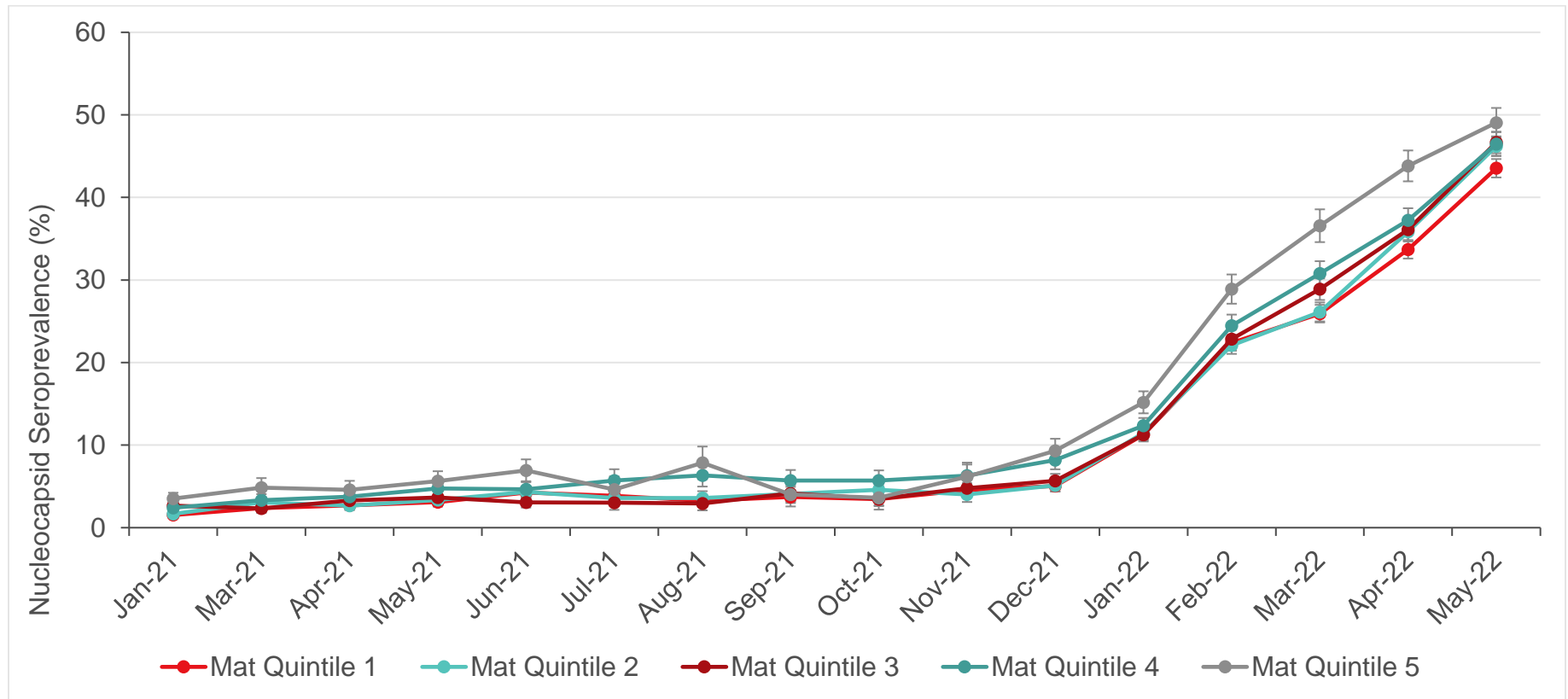
**Figure 5C.** Temporal trends of SARS-CoV-2 seroprevalence by monthly intervals from January 2021 - May 2022 estimated by Nucleocapsid antibody results by age group.



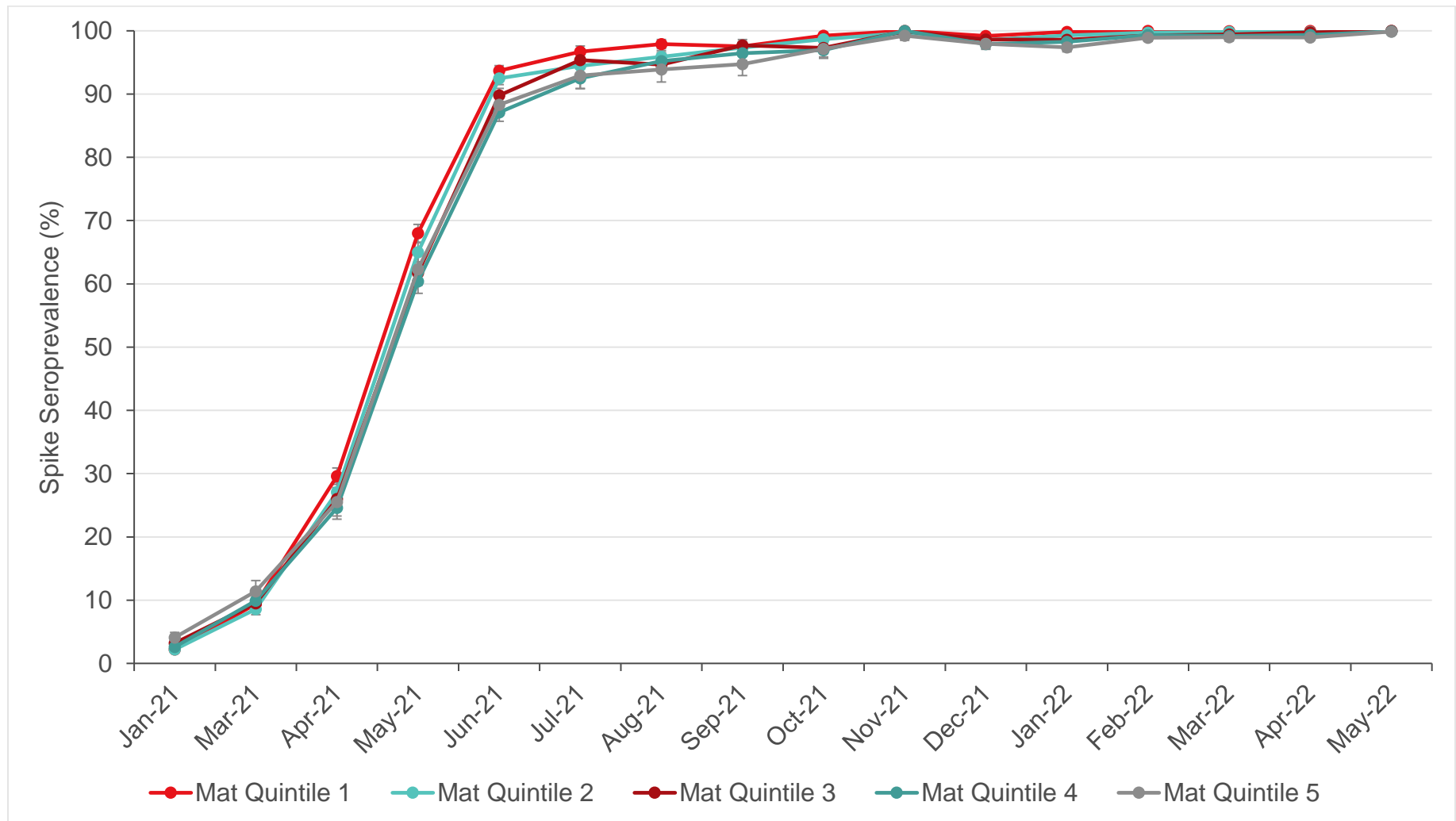
**Figure 5D.** Temporal trends of SARS-CoV-2 seroprevalence by monthly intervals from January 2021 - May 2022 estimated by Spike antibody results by age group.



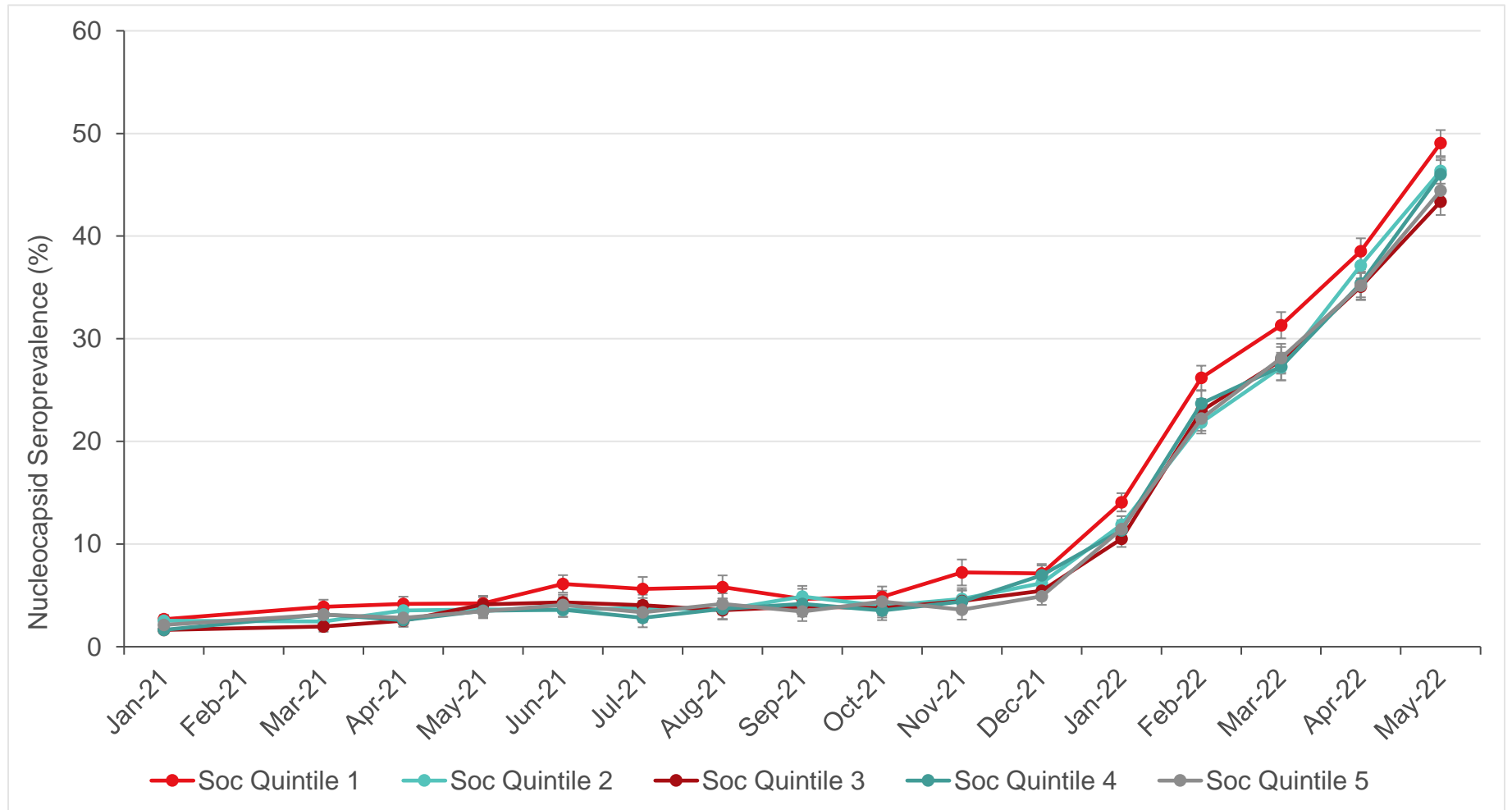
**Figure 5E.** Temporal trends of SARS-CoV-2 seroprevalence by monthly intervals from January 2021 - May 2022 estimated by Nucleocapsid antibody results by material deprivation level (1 = least deprived and 5 = most deprived).



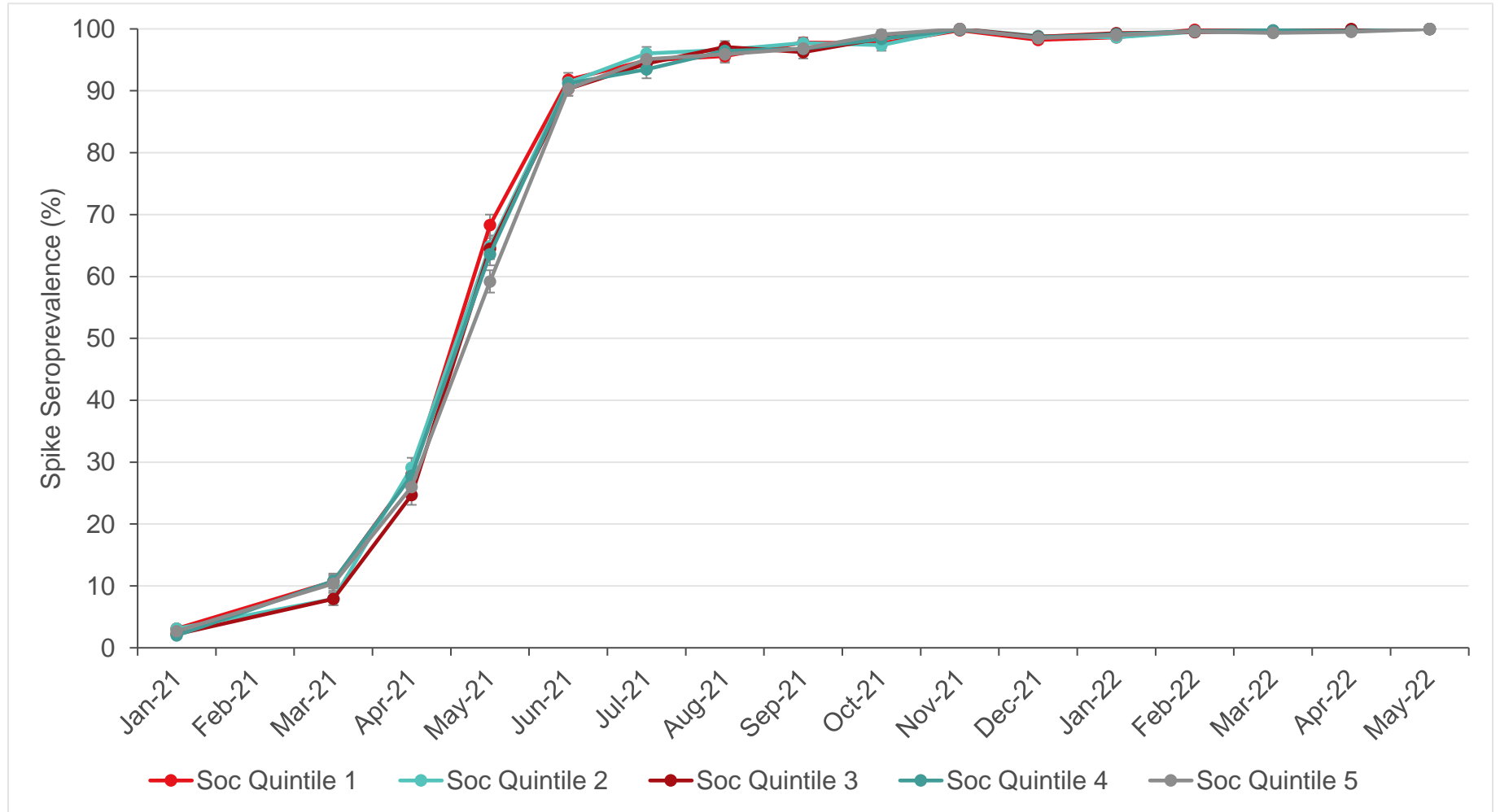
**Figure 5F.** Temporal trends of SARS-CoV-2 seroprevalence by monthly intervals from January 2021 - May 2022 estimated by Spike antibody results by material deprivation level (1 = least deprived and 5 = most deprived).



**Figure 5G.** Temporal trends of SARS-CoV-2 seroprevalence by monthly intervals from January 2021 - May 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 - May 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 May 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	2,318	1,037	44.38	42.56, 46.19	2,318	2,297	100.00	99.86, 100.00
Male	2,978	1,322	46.55	44.67, 48.42	2,978	2,944	100.00	99.61, 100.00
<b>Age</b>								
17-24	352	222	64.43	60.73, 68.12	352	352	100.00	100.00, 100.00
25-39	1,471	835	57.19	54.52, 59.86	1,471	1,460	100.00	99.87, 100.00
40-59	1,881	871	47.66	45.42, 49.89	1,881	1,860	99.96	99.46, 100.00
60+	1,592	431	26.50	24.40, 28.60	1,592	1,569	99.71	99.14, 100.00
<b>Material Deprivation<sup>1</sup></b>								
1 (least)	1,252	556	44.83	42.18, 47.49	1,252	1,244	100.00	99.83, 100.00
2	1,203	537	45.25	42.50, 47.99	1,203	1,188	99.95	99.34, 100.00
3	1,058	450	43.46	40.54, 46.39	1,058	1,047	100.00	99.53, 100.00
4	754	340	46.22	42.74, 49.71	754	743	99.86	99.05, 100.00
5 (most)	432	219	51.72	47.21, 56.23	432	425	99.27	98.02, 100.00
<b>Total</b>	<b>5,296</b>	<b>2,359</b>	<b>45.43</b>	<b>44.12, 46.74</b>	<b>5,296</b>	<b>5,241</b>	<b>100.00</b>	<b>99.89, 100.00</b>

<sup>1</sup>Postal codes were missing for 597 (11.3%) of donors which could not be included in the quintiles of Material Deprivation; 257/597 were positive by the Nucleocapsid antibody, adjusted SARS-CoV-2 seroprevalence among missing postal codes was 44.79% (95% CI 40.86, 48.73); and 594/597 were positive by the Spike antibody, adjusted SARS-CoV-2 seroprevalence was 100.00% (95% CI 99.65, 100.00).

**Table A1.2** Alberta SARS-CoV-2 seroprevalence, Nucleocapsid vs. Spike antibody results in May 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	2,615	1,454	55.68	53.66, 57.70	2,615	2,596	100.00	100.00, 100.00
Male	3,405	1,787	55.90	53.88, 57.93	3,405	3,361	99.96	99.50, 100.00
<b>Age</b>								
17-24	486	361	73.08	69.48, 76.68	486	483	100.00	99.31, 100.00
25-39	1,710	1,022	61.53	58.96, 64.11	1,710	1,699	100.00	99.95, 100.00
40-59	2,218	1,254	56.52	54.09, 58.94	2,218	2,191	100.00	99.47, 100.00
60+	1,606	604	37.47	34.54, 40.39	1,606	1,584	99.90	99.22, 100.00
<b>Material Deprivation<sup>1</sup></b>								
1 (least)	2,177	1,109	52.78	50.30, 55.26	2,177	2,167	100.00	100.00, 100.00
2	1,246	677	55.95	52.81, 59.09	1,246	1,233	100.00	99.34, 100.00
3	851	460	57.49	53.79, 61.19	851	840	99.85	98.98, 100.00
4	532	309	59.58	55.13, 64.02	532	524	99.84	98.79, 100.00
5 (most)	256	145	57.22	50.56, 63.88	256	252	99.19	97.31, 100.00
<b>Total</b>	<b>6,020</b>	<b>3,241</b>	<b>55.79</b>	<b>54.36, 57.22</b>	<b>6,020</b>	<b>5,957</b>	<b>100.00</b>	<b>99.92, 100.00</b>

<sup>1</sup>Postal codes were missing for 958 (15.9%) of donors which could not be included in the quintiles of Material Deprivation; 541/958 were positive by the Nucleocapsid antibody, adjusted SARS-CoV-2 seroprevalence among missing postal codes was 57.55% (95% CI 53.97, 61.12); 941/958 were positive by the Spike antibody, adjusted SARS-CoV-2 seroprevalence was 99.60% (95% CI 98.68, 100.00).

**Table A1.3** Saskatchewan SARS-CoV-2 seroprevalence, Nucleocapsid vs. Spike antibody results in May 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	588	299	51.53	47.61, 55.45	588	585	100.00	99.72, 100.00
Male	761	353	48.48	44.51, 52.46	761	748	99.56	98.54, 100.00
<b>Age</b>								
17-24	120	77	63.76	56.28, 71.25	120	119	99.05	96.81, 100.00
25-39	333	200	61.22	55.93, 66.51	333	331	100.00	98.96, 100.00
40-59	467	240	51.44	46.57, 56.32	467	462	99.61	98.39, 100.00
60+	429	135	31.36	26.45, 36.27	429	421	99.72	98.43, 100.00
<b>Material Deprivation<sup>1</sup></b>								
1 (least)	434	198	46.91	41.96, 51.86	434	430	100.00	98.93, 100.00
2	313	158	52.05	46.26, 57.83	313	308	99.75	98.35, 100.00
3	215	107	51.73	44.82, 58.63	215	213	99.46	97.67, 100.00
4	108	51	50.36	40.49, 60.24	108	107	98.57	95.46, 100.00
5 (most)	40	20	54.35	38.39, 70.30	40	39	99.15	94.59, 100.00
<b>Total</b>	<b>1,349</b>	<b>652</b>	<b>50.03</b>	<b>47.23, 52.82</b>	<b>1,349</b>	<b>1,333</b>	<b>100.00</b>	<b>99.38, 100.00</b>

<sup>1</sup>Postal codes were missing for 239 (17.7%) of donors which could not be included in the quintiles of Material Deprivation 118/239 were positive by the Nucleocapsid antibody, adjusted SARS-CoV-2 seroprevalence among missing postal codes was 50.48% (95% CI 43.85, 57.11); 236/239 were positive by the Spike antibody, adjusted SARS-CoV-2 seroprevalence was 99.89% (95% CI 98.38, 100.00).

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

Nucleocapsid Antibody Results					Spike Antibody Results			
(proxy for natural infection)					(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
Sex								
Female	796	409	51.3	47.67, 54.93	796	787	99.77	98.91, 100.00
Male	855	405	50.61	46.89, 54.33	855	842	99.76	98.88, 100.00
Age								
17-24	146	107	72.02	65.67, 78.36	146	146	100.00	98.86, 100.00
25-39	426	256	60.96	55.91, 66.02	426	422	99.58	98.27, 100.00
40-59	579	297	51.77	47.28, 56.25	579	573	99.75	98.67, 100.00
60+	500	154	30.56	26.01, 35.11	500	488	98.79	97.27, 100.00
Material Deprivation <sup>1</sup>								
1 (least)	336	134	40.75	35.08, 46.42	336	334	99.98	98.72, 100.00
2	321	165	52.88	47.01, 58.74	321	320	100.00	98.97, 100.00
3	335	170	52.83	47.06, 58.60	335	327	98.91	97.17, 100.00
4	258	128	50.86	44.33, 57.39	258	255	99.31	97.55, 100.00
5 (most)	162	90	57.74	49.53, 65.96	162	155	96.88	93.49, 100.00
Total	1,651	814	50.96	48.36, 53.56	1,651	1,629	99.90	99.31, 100.00

<sup>1</sup>Postal codes were missing for 239 (14.5%) of donors which could not be included in the quintiles of Material Deprivation; 127/239 were positive by the Nucleocapsid antibody, adjusted SARS-CoV-2 seroprevalence among missing postal codes was 55.65% (95% CI 48.83, 62.47); 238/239 were positive by the Spike antibody, adjusted SARS-CoV-2 seroprevalence was 99.87% (95% CI 98.30, 100.00).

**Table A1.5** Ontario SARS-CoV-2 seroprevalence, Nucleocapsid vs. Spike antibody results in May 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	5,935	2,605	42.93	41.86, 44.01	5,935	5,884	100.00	100.00, 100.00
Male	8,202	3,739	46.92	45.79, 48.04	8,202	8,091	99.94	99.69, 100.00
<b>Age</b>								
17-24	1,165	710	61.49	59.36, 63.63	1,165	1,163	100.00	100.00, 100.00
25-39	3,862	2,052	53.71	52.11, 55.31	3,862	3,823	100.00	99.84, 100.00
40-59	5,253	2,458	46.62	45.31, 47.93	5,253	5,187	99.96	99.66, 100.00
60+	3,857	1,124	27.80	26.48, 29.11	3,857	3,802	99.93	99.60, 100.00
<b>Material Deprivation<sup>1</sup></b>								
1 (least)	3,086	1,212	39.49	37.89, 41.08	3,086	3,061	100.00	100.00, 100.00
2	3,118	1,376	44.50	42.80, 46.20	3,118	3,087	100.00	99.65, 100.00
3	2,707	1,257	46.00	44.18, 47.82	2,707	2,675	100.00	99.78, 100.00
4	2,350	1,089	45.91	44.00, 47.83	2,350	2,312	99.77	99.31, 100.00
5 (most)	1,399	690	49.74	47.36, 52.12	1,399	1,381	99.94	99.40, 100.00
<b>Total</b>	<b>14,137</b>	<b>6,344</b>	<b>44.85</b>	<b>44.08, 45.63</b>	<b>14,137</b>	<b>13,975</b>	<b>100.00</b>	<b>99.98, 100.00</b>

<sup>1</sup>Postal codes were missing for 1,477(10.4%) of donors which could not be included in the quintiles of Material Deprivation; 720/1477 were positive by the Nucleocapsid antibody, adjusted SARS-CoV-2 seroprevalence among missing postal codes was 48.56% (95% CI 46.16, 50.96); 1459/1477 were positive by the Spike antibody, adjusted SARS-CoV-2 seroprevalence was 100.00% (95% CI 99.52, 100.00).

**Table A1.6** Atlantic Provinces SARS-CoV-2 seroprevalence, Nucleocapsid vs. Spike antibody results in May 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	1,511	549	35.52	33.03, 38.00	1,511	1,503	100.00	100.00, 100.00
Male	1,800	664	37.59	34.97, 40.20	1,800	1,788	100.00	99.99, 100.00
<b>Age</b>								
17-24	195	124	62.93	57.27, 68.58	195	195	100.00	99.58, 100.00
25-39	713	327	45.07	40.96, 49.18	713	709	100.00	99.63, 100.00
40-59	1,327	507	37.82	34.80, 40.85	1,327	1,320	100.00	100.00, 100.00
60+	1,076	255	21.66	18.98, 24.34	1,076	1,067	100.00	99.46, 100.00
<b>Material Deprivation<sup>1</sup></b>								
1 (least)	484	180	38.50	33.78, 43.22	484	484	100.00	100.00, 100.00
2	697	249	35.92	32.04, 39.81	697	692	100.00	99.61, 100.00
3	622	239	36.90	32.64, 41.17	622	618	100.00	99.31, 100.00
4	649	230	35.67	31.64, 39.70	649	642	99.83	98.84, 100.00
5 (most)	572	215	37.62	33.30, 41.93	572	569	100.00	99.49, 100.00
<b>Total</b>	<b>3,311</b>	<b>1,213</b>	<b>36.51</b>	<b>34.71, 38.31</b>	<b>3,311</b>	<b>3,291</b>	<b>100.00</b>	<b>100.00, 100.00</b>

<sup>1</sup>Postal codes were missing for 287 (8.7%) of donors which could not be included in the quintiles of Material Deprivation; 286/287 were positive by the Nucleocapsid antibody, adjusted SARS-CoV-2 seroprevalence among missing postal codes was 33.29% (95% CI 27.19, 39.40); 286/287 were positive by the Spike antibody, adjusted SARS-CoV-2 seroprevalence was 100.00% (95% CI 98.70, 100.00).

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

	May 1-7			May 8-15			May 16-23			May 24-31		
	Crude	Adjusted		Crude	Adjusted		Crude	Adjusted		Crude	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	3,360 (1,426)	41.34	39.81, 42.86	3,356 (1,519)	44.69	43.14, 46.24	3,602 (1,720)	46.19	44.71, 47.67	3,562 (1,729)	47.94	46.43, 49.45
Male	4,599 (1,937)	44.20	42.63, 45.76	4,670 (2,117)	47.55	45.97, 49.13	4,704 (2,185)	47.94	46.39, 49.49	4,603 (2,232)	50.09	48.50, 51.67
<b>Age</b>												
17-24	628 (396)	62.88	59.94, 65.82	577 (379)	65.63	62.51, 68.75	641 (426)	65.67	62.73, 68.61	645 (419)	64.07	61.11, 67.02
25-39	2,165 (1,107)	51.27	49.05, 53.49	2,140 (1,164)	55.71	53.48, 57.94	2,167 (1,246)	57.89	55.73, 60.06	2,155 (1,231)	57.62	55.44, 59.81
40-59	2,934 (1,288)	43.61	41.75, 45.46	2,993 (1,412)	47.31	45.45, 49.17	3,015 (1,452)	48.43	46.60, 50.27	2,987 (1,549)	51.40	49.56, 53.24
60+	2,232 (572)	24.14	22.33, 25.95	2,316 (681)	28.34	26.46, 30.22	2,483 (781)	29.14	27.36, 30.93	2,378 (762)	31.21	29.28, 33.14
<b>Province</b>												
British Columbia	1,210 (501)	42.81	40.06, 45.56	1,358 (602)	45.34	42.79, 47.90	1,430 (645)	45.9	43.39, 48.41	1,396 (652)	47.31	44.77, 49.84
Alberta	1,306 (658)	52.26	49.13, 55.39	1,555 (824)	55.02	52.18, 57.87	1,837 (1,003)	57.08	54.47, 59.68	1,604 (866)	56.54	53.71, 59.38
Saskatchewan	312 (132)	44.32	38.56, 50.09	344 (157)	46.51	41.03, 52.00	278 (132)	48.88	42.83, 54.94	418 (231)	57.45	52.57, 62.33
Manitoba	381 (191)	53.50	48.18, 58.83	402 (180)	46.34	41.12, 51.57	418 (218)	53.26	48.14, 58.39	453 (225)	50.55	45.65, 55.44
Ontario	3,671 (1,509)	41.30	39.79, 42.80	3,297 (1,501)	45.98	44.35, 47.61	3,753 (1,680)	44.38	42.91, 45.86	3,605 (1,721)	48.05	46.50, 49.60
New Brunswick	422 (164)	40.79	35.01, 46.57	418 (150)	37.57	31.84, 43.29	311 (134)	44.15	37.23, 51.07	210 (101)	48.75	40.49, 57.01
Nova Scotia	441 (140)	32.33	27.40, 37.26	437 (149)	34.10	29.08, 39.11	212 (74)	34.76	27.60, 41.92	344 (125)	36.21	30.46, 41.96
Prince Edward Island	59 (17)	22.29	9.81, 34.78	63 (19)	36.33	21.86, 50.81	14 (2)	44.33	23.51, 65.14	66 (23)	29.28	15.92, 42.64
Newfoundland	157 (51)	32.07	26.09, 38.05	152 (54)	35.87	29.56, 42.17	53 (17)	36.33	24.95, 47.72	69 (17)	25.76	17.44, 34.07
<b>Metro area</b>												

# COVID-19 Seroprevalence Report

Vancouver	566 (245)	43.04	39.26, 46.81	788 (393)	48.98	45.74, 52.21	686 (352)	51.35	47.85, 54.84	706 (381)	53.18	49.82, 56.53
Calgary	495 (249)	52.19	46.72, 57.66	558 (285)	52.54	47.35, 57.72	655 (335)	53.23	48.53, 57.94	640 (354)	58.12	53.43, 62.81
Edmonton	457 (214)	49.08	43.94, 54.22	465 (227)	49.65	44.57, 54.72	543 (275)	52.73	48.00, 57.46	564 (283)	52.64	47.90, 57.39
Ottawa	350 (101)	26.94	21.84, 32.03	369 (144)	40.78	35.21, 46.34	231 (93)	39.07	32.28, 45.86	321 (127)	38.91	33.12, 44.70
Toronto	1,115 (496)	43.76	41.37, 46.16	1,066 (516)	47.83	45.32, 50.35	1,445 (684)	45.65	43.54, 47.75	1,269 (646)	49.62	47.36, 51.88
Winnipeg	258 (104)	42.57	36.06, 49.07	251 (103)	41.22	34.58, 47.86	262 (133)	51.73	45.22, 58.24	267 (123)	45.87	39.46, 52.27
<b>Ethnicity<sup>1</sup></b>												
White	6,034 (2450)	40.95	39.69, 42.21	6,014 (2,601)	43.93	42.64, 45.22	6,169 (2,791)	44.9	43.65, 46.15	6,087 (2,844)	47.04	45.76, 48.33
Indigenous	109 (49)	43.55	34.34, 52.76	107 (60)	58.14	48.83, 67.45	109 (62)	55.91	46.32, 65.51	107 (57)	54.02	44.38, 63.67
Asian	414 (180)	42.71	38.21, 47.21	460 (219)	45.55	41.28, 49.82	457 (222)	49.43	45.17, 53.69	479 (225)	45.78	41.71, 49.86
Other racialized groups	854 (475)	56.69	53.49, 59.89	874 (508)	59.87	56.70, 63.04	928 (536)	58.52	55.45, 61.58	955 (573)	61.13	58.13, 64.13
<b>Social Deprivation<sup>2</sup></b>												
1 (least deprived)	1,385 (607)	44.40	41.79, 47.02	1,521 (735)	49.70	47.16, 52.23	1,579 (770)	48.2	45.78, 50.63	1,557 (815)	53.47	50.99, 55.95
2	1,584 (713)	45.28	42.83, 47.73	1,506 (678)	45.94	43.39, 48.50	1,611 (747)	47.01	44.57, 49.44	1,515 (713)	47.19	44.68, 49.69
3	1,469 (563)	38.66	36.16, 41.16	1,457 (633)	44.48	41.86, 47.11	1,464 (653)	44.88	42.31, 47.44	1,452 (652)	45.17	42.57, 47.76
4	1,289 (543)	43.46	40.74, 46.19	1,306 (543)	42.04	39.33, 44.76	1,353 (681)	49.4	46.76, 52.05	1,303 (628)	48.41	45.67, 51.15
5 (most deprived)	1,326 (502)	37.52	34.87, 40.17	1,330 (612)	46.67	43.96, 49.37	1,317 (587)	44.86	42.16, 47.56	1,270 (606)	48.16	45.41, 50.91
<b>Material Deprivation<sup>2</sup></b>												
1 (least deprived)	1,927 (749)	38.84	36.63, 41.05	1,906 (791)	41.98	39.67, 44.28	2,080 (952)	45.15	43.01, 47.29	2,052 (956)	46.87	44.71, 49.03
2	1,638 (668)	41.74	39.30, 44.17	1,815 (839)	47.24	44.89, 49.58	1,821 (846)	47.28	44.98, 49.58	1,784 (882)	48.24	45.85, 50.63
3	1,407 (595)	42.26	39.66, 44.87	1,505 (729)	49.15	46.60, 51.71	1,523 (710)	46.48	43.96, 49.00	1,465 (676)	47.76	45.16, 50.35
4	1,257 (541)	43.12	40.40, 45.84	1,214 (540)	45.44	42.64, 48.24	1,189 (572)	47.9	45.11, 50.69	1,110 (541)	49.89	46.98, 52.79
5 (most deprived)	824 (375)	46.88	43.60, 50.16	680 (302)	46.19	42.55, 49.84	711 (358)	50.28	46.68, 53.88	686 (359)	53.54	49.94, 57.14
<b>Total</b>	<b>7,959 (3,363)</b>	<b>42.74</b>	<b>41.65, 43.84</b>	<b>8,026 (3,636)</b>	<b>46.11</b>	<b>45.00, 47.21</b>	<b>8,306 (3905)</b>	<b>47.03</b>	<b>45.96, 48.10</b>	<b>8,165 (3961)</b>	<b>48.96</b>	<b>47.87, 50.06</b>



<sup>1</sup> In Week 1, self reported ethnicity was missing for 548 (6.9%) donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 37.99% (95% CI 33.77, 42.20). In Week 2, self reported ethnicity was missing for 571 (7.1%) donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 43.74% (95% CI 39.64, 47.84). In Week 3, self reported ethnicity was missing for 643 (7.7%) donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 45.96% (95% CI 42.01, 49.91). In Week 4, self reported ethnicity was missing for 537 (6.6%) donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 49.24% (95% CI 44.84, 53.65).

<sup>2</sup> In Week 1, postal codes were missing for 906 (11.4%) of donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 48.88% (95% CI 45.58, 52.19). In Week 2, postal codes were missing for 906 (11.3%) of donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 47.85% (95% CI 44.55, 51.15). In Week 3, postal codes were missing for 982 (11.9%) of donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 47.84% (95% CI 44.71, 50.97). In Week 4, postal codes were missing for 1,068 (13.1%) of donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 51.80% (95% CI 48.68, 54.91).

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

	May 1-7			May 8-15			May 16-23			May 24-31		
	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	80 (49)	64.12	56.61, 71.64	76 (48)	64.76	56.86, 72.67	77 (50)	66.10	58.02, 74.18	126 (81)	64.64	58.47, 70.82
25-39	370 (191)	50.84	45.43, 56.24	366 (205)	57.21	51.90, 62.52	399 (240)	60.54	55.55, 65.54	356 (212)	59.96	54.57, 65.35
40-59	424 (177)	43.07	38.33, 47.81	507 (247)	50.21	45.99, 54.43	497 (225)	47.70	43.39, 52.02	482 (234)	48.51	44.08, 52.93
60+	336 (84)	24.75	20.15, 29.36	409 (102)	24.49	20.50, 28.48	457 (130)	27.89	23.96, 31.82	432 (125)	28.11	23.95, 32.27
Total	1,210 (501)	42.81	40.06, 45.56	1,358 (602)	45.34	42.79, 47.90	1,430 (645)	45.90	43.39, 48.41	1,396 (652)	47.31	44.77, 49.84
<b>Alberta</b>												
17-24	97 (74)	75.04	67.21, 82.86	115 (77)	65.94	58.02, 73.85	168 (131)	76.52	70.65, 82.39	115 (85)	71.86	64.44, 79.28
25-39	373 (205)	55.70	50.05, 61.36	436 (272)	64.23	59.26, 69.21	522 (313)	61.62	56.93, 66.31	435 (261)	62.47	57.30, 67.65
40-59	494 (266)	53.60	48.41, 58.78	551 (295)	53.84	48.92, 58.77	662 (370)	56.02	51.56, 60.49	586 (356)	61.18	56.50, 65.86
60+	342 (113)	32.29	25.97, 38.62	453 (180)	39.97	34.31, 45.62	485 (189)	38.97	33.40, 44.55	468 (164)	34.75	29.18, 40.32
Total	1,306 (658)	52.26	49.13, 55.39	1,555 (824)	55.02	52.18, 57.87	1,837 (1,003)	57.08	54.47, 59.68	1604 (866)	56.54	53.71, 59.38
<b>Saskatchewan</b>												
17-24	26 (16)	60.02	43.90, 76.14	29 (17)	58.99	43.37, 74.62	24 (15)	62.74	46.70, 78.78	41 (29)	70.28	58.03, 82.52
25-39	73 (41)	57.21	45.81, 68.60	89 (52)	59.06	48.73, 69.40	61 (35)	58.94	46.63, 71.25	111 (72)	66.30	57.54, 75.05
40-59	114 (55)	48.70	38.85, 58.56	119 (50)	41.81	32.39, 51.23	97 (49)	50.16	39.55, 60.78	138 (86)	62.45	53.88, 71.03
60+	99 (20)	19.66	10.84, 28.49	107 (38)	34.11	24.13, 44.09	96 (33)	33.81	23.48, 44.15	128 (44)	35.68	26.55, 44.81
Total	312 (132)	44.32	38.56, 50.09	344 (157)	46.51	41.03, 52.00	278 (132)	48.88	42.83, 54.94	418 (231)	57.45	52.57, 62.33
<b>Manitoba</b>												

# COVID-19 Seroprevalence Report

17-24	48 (37)	76.76	66.34, 87.18	29 (22)	75.13	61.53, 88.73	28 (19)	66.92	52.32, 81.51	41 (29)	67.98	55.56, 80.39
25-39	104 (58)	58.32	48.02, 68.61	111 (63)	56.58	46.66, 66.49	100 (68)	69.07	59.25, 78.88	111 (67)	60.56	50.78, 70.34
40-59	125 (66)	54.43	44.85, 64.00	142 (65)	46.01	37.07, 54.96	139 (77)	55.59	46.61, 64.56	174 (89)	51.17	43.05, 59.29
60+	104 (30)	28.90	19.06, 38.75	120 (30)	24.69	16.04, 33.33	151 (54)	35.26	26.74, 43.78	127 (40)	31.40	22.51, 40.29
Total	381 (191)	53.50	48.18, 58.83	402 (180)	46.34	41.12, 51.57	418 (218)	53.26	48.14, 58.39	453 (225)	50.55	45.65, 55.44
<b>Ontario</b>												
17-24	315 (182)	59.03	54.98, 63.08	270 (175)	65.26	60.88, 69.65	309 (188)	61.57	57.49, 65.64	280 (172)	61.58	57.20, 65.96
25-39	1,007 (496)	49.96	46.83, 53.10	903 (479)	54.22	50.88, 57.56	966 (529)	54.95	51.81, 58.10	1,013 (560)	55.52	52.44, 58.60
40-59	1,362 (579)	42.07	39.52, 44.61	1,242 (590)	46.91	44.18, 49.65	1,367 (645)	47.34	44.79, 49.88	1345 (666)	49.73	47.16, 52.30
60+	987 (252)	23.93	21.44, 26.42	882 (257)	28.97	26.16, 31.78	1,111 (318)	26.75	24.39, 29.10	967 (323)	32.66	29.84, 35.48
Total	3,671 (1,509)	41.30	39.79, 42.80	3,297 (1,501)	45.98	44.35, 47.61	3,753 (1680)	44.38	42.91, 45.86	3,605 (1721)	48.05	46.50, 49.60
<b>Atlantic Canada</b>												
17-24	62 (38)	60.47	50.68, 70.27	58 (40)	69.25	57.26, 81.24	35 (23)	66.72	53.45, 79.99	42 (23)	53.95	41.30, 66.60
25-39	238 (116)	46.24	39.14, 53.34	235 (93)	39.65	33.36, 45.95	119 (61)	51.07	41.48, 60.66	129 (59)	42.31	32.64, 51.98
40-59	415 (145)	34.78	29.48, 40.09	432 (165)	38.26	33.65, 42.88	253 (86)	33.43	26.41, 40.45	262 (118)	43.27	36.26, 50.28
60+	364 (73)	18.48	14.12, 22.84	345 (74)	21.40	17.04, 25.76	183 (57)	28.29	20.59, 35.98	256 (66)	23.34	17.59, 29.09
Total	1,079 (372)	34.40	31.29, 37.50	1,070 (372)	35.73	32.57, 38.89	590 (227)	39.51	35.03, 43.98	689 (266)	36.82	32.83, 40.82
<b>Overall Total</b>	7,959 (3,363)	42.74	41.65, 43.84	8,026 (3,636)	46.11	45.00, 47.21	8,306 (3,905)	47.03	45.96, 48.10	8,165 (3,961)	48.96	47.87, 50.06