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COVID-19 Seroprevalence Report

# **COVID-19 Seroprevalence Report**

**June 3rd, 2022**

**Report #21: April 2022 Survey**

**The advance of Omicron**

# Summary

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 April 30, 2022, 3,755,705 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 April 30th, 2022. Starting in November 2021, some Canadians became eligible for a third dose. By April 30th, 2022, almost 58% 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.

		2020																								
		March			April			May		June		July		August		September		October		November		December				
Seroprevalence <sup>1</sup>								14,541		51,963			21,594							16,811			17,049			16,963
Correlates of Immunity Study <sup>2</sup>																										
		2021																								
		January		February		March		April		May		June		July		August		September		October		November		December		
Seroprevalence <sup>1</sup>		34,921						16,873		16,931		17,001		16,884		8,457		9,109		9,363		9,627		9,018		16,810
Correlates of Immunity Study <sup>2</sup>																										
		2022																								
		January		February		March		April																		
Seroprevalence <sup>1</sup>			32,505			28,616		26,027		29,787																
Orthogonal Testing <sup>2</sup>																										

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

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

## SARS-CoV-2 antibody testing

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

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

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

## Ethical issues

All data were de-identified by the information technology team at Canadian Blood Services by providing a random identification number. Demographic variables and vaccination history were extracted from the Canadian Blood Services donor database (e.g., donation date, birth year,

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

### **Data management and analysis**

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

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

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

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 April 1 and April 30, 2022, a total of 29,787 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 99.74% (95% CI 99.60, 99.88%). The adjusted seroprevalence by Nucleocapsid antibody (proxy for natural infection) was 36.71% (95% CI 36.16, 37.26) (please refer to points of interpretation). There was a gradual increase over the 30-day reporting period from 32.83% (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) consistent with the persistence of the Omicron variant.

Figure 1 illustrates temporal trends of SARS-CoV-2 seroprevalence from April 4, 2020, until April 30, 2022, by monthly intervals. The discontinuation of the line in January 2021 represents the transition from the Abbott assay to the Roche assay. The largest increase in seroprevalence was seen in the Roche S assay, from early-March 2021 onwards, mirroring wider vaccine roll out. Figure 2 (A-E) stratifies seroprevalence by regions. Most of the humoral immunity was induced by vaccines (compared to natural infections) across the country. The largest increase in seroprevalence using Roche N was seen in February 2022, but also increased in March, and continued to increase in April, 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 March 2022 and April 2022). Overall, the seroprevalence rate for natural infections was higher in April (36.71% (95% CI 36.16, 37.26)) compared to March (28.71% (95% CI 28.16, 29.26) ( $P < 0.0001$ )), and natural infections increased compared to the previous month across all demographics. Donors aged 17-24 years old continued to have the highest seroprevalence rate at 55.37% (95% CI 53.76, 56.99) 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 April 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 April.

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-March and in April was 21.99% (95% CI 21.19, 22.80). 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 further to 37.19% (95% CI 35.14, 39.28) by April 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 April 2022. Differences in natural infections between white and racialized groups were seen from January 2021 to April 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 April 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 April 2022, adjusted seroprevalence by the Spike antibody assay (proxy for humoral immunity) was 99.74% (95% CI 99.60, 99.88%). 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 April 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 36.43% (95% CI 35.88, 36.98), and after weighting factors applied it was 36.65% (95% CI 36.10, 37.20), then after the weighted seroprevalence was adjusted for sensitivity and specificity, 36.71% (95% 36.316, 37.26). Using the Spike antibody assay, the unweighted SARS-CoV-2 seroprevalence for the full sample was 98.49% (95% CI 98.35, 98.63), and after weighting factors applied it was 98.56% (95% CI 98.41, 98.69), then after the weighted seroprevalence was adjusted for sensitivity and specificity, 99.74% (95% CI 99.60, 99.88).

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

### Diagnostic phenotypes in April 2022 (unadjusted)

	Nucleocapsid Antibody	Spike Antibody	Total N (%)
	Negative	Negative	354 (1.2%)
	Negative	Positive	18,581 (62.4%)
	Positive	Negative	95 (0.3%)
	Positive	Positive	10,756 (36.1%)
Total			29,786

<sup>1</sup>One donor missing Spike

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**Table 1.** Comparing SARS-CoV-2 seroprevalence by sociodemographic variables by Nucleocapsid and Spike antibody results in April 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	12,628	4,538	34.94	34.18, 35.70	12,627	12,468	99.89	99.71, 100.00
Male	17,159	6,313	38.59	37.79, 39.38	17,159	16,869	99.58	99.37, 99.79
<b>Age</b>								
17-24	2,248	1,246	55.37	53.76, 56.99	2,248	2,235	100.00	100.00, 100.00
25-39	7,996	3,670	46.39	45.23, 47.54	7,996	7,901	99.99	99.73, 100.00
40-59	11,150	4,214	37.36	36.43, 38.30	11,150	10,961	99.48	99.22, 99.73
60+	8,393	1,721	19.26	18.41, 20.11	8,392	8,240	99.42	99.13, 99.70
<b>Province</b>								
British Columbia	4,662	1,676	36.32	35.01, 37.62	4,662	4,586	99.60	99.26, 99.94
Alberta	5,592	2,509	46.44	44.96, 47.91	5,592	5,506	99.72	99.36, 100.00
Saskatchewan	1,317	528	39.97	37.14, 42.80	1,316	1,298	99.88	99.22, 100.00
Manitoba	1,403	540	40.30	37.67, 42.92	1,403	1,385	99.96	99.37, 100.00
Ontario	14,103	4,913	34.89	34.12, 35.66	14,103	13,874	99.63	99.42, 99.83
New Brunswick	710	243	35.36	31.99, 38.73	710	703	100.00	99.45, 100.00
Nova Scotia	1,287	262	20.78	18.29, 23.27	1,287	1,276	100.00	99.52, 100.00
Prince Edward Island	203	41	37.10	29.56, 44.64	203	202	99.78	97.94, 100.00
Newfoundland	510	139	27.90	24.25, 31.56	510	507	100.00	99.69, 100.00
<b>Metro area</b>								
Vancouver	2,614	1,036	39.53	37.80, 41.26	2,614	2,571	99.49	99.02, 99.95
Calgary	1,996	877	45.54	42.92, 48.16	1,996	1,972	100.00	99.45, 100.00
Edmonton	1,899	769	41.33	38.94, 43.71	1,899	1,873	99.95	99.41, 100.00

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Ottawa	1,501	380	26.56	23.85, 29.27	1,501	1,492	100.00	99.76, 100.00
Toronto	5,074	1,871	36.53	35.38, 37.68	5,074	5,005	99.77	99.49, 100.00
Winnipeg	931	333	37.07	33.90, 40.25	931	922	100.00	99.51, 100.00
<b>Ethnicity<sup>1,2</sup></b>								
White	22,335	7,779	34.78	34.15, 35.42	22,334	21,987	99.68	99.52, 99.85
Indigenous	379	160	42.75	37.80, 47.70	379	374	99.67	98.43, 100.00
Asian	1,641	599	37.78	35.57, 39.99	1,641	1,634	100.00	100.00, 100.00
Other racialized groups	3,374	1,631	49.06	47.42, 50.70	3,374	3,337	100.00	99.77, 100.00
<b>Social Deprivation<sup>3</sup></b>								
1 (least deprived)	5,763	2,194	38.54	37.29, 39.79	5,763	5,681	99.82	99.51, 100.00
2	5,637	2,076	37.15	35.87, 38.42	5,637	5,557	99.89	99.59, 100.00
3	5,177	1,829	35.08	33.77, 36.39	5,177	5,109	99.99	99.69, 100.00
4	4,835	1,682	35.39	34.03, 36.74	4,835	4,760	99.67	99.32, 100.00
5 (most deprived)	4,857	1,706	35.18	33.82, 36.54	4,856	4,779	99.53	99.16, 99.89
<b>Material Deprivation<sup>3</sup></b>								
1 (least deprived)	7,499	2,528	33.69	32.60, 34.78	7,499	7,433	100.00	100.00, 100.00
2	6,521	2,329	35.86	34.67, 37.05	6,520	6,418	99.72	99.42, 100.00
3	5,534	2,002	36.11	34.84, 37.39	5,534	5,452	99.76	99.45, 100.00
4	4,205	1,550	37.25	35.81, 38.69	4,205	4,127	99.34	98.94, 99.74
5 (most deprived)	2,510	1,078	43.82	41.95, 45.69	2,510	2,456	98.96	98.40, 99.52
<b>Total</b>	<b>29,787</b>	<b>10,851</b>	<b>36.71</b>	<b>36.16, 37.26</b>	<b>29,786</b>	<b>29,337</b>	<b>99.74</b>	<b>99.60, 99.88</b>

<sup>1</sup> 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); and Spike antibody was 98.49% (95% CI 97.77, 99.20).

<sup>2</sup> 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, and 100.00% (95% CI 100.00, 100.00) by Spike antibody.

<sup>3</sup> 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) and Spike antibody was 99.34% (95% CI 98.89, 99.80).

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

March 2022 (crude)		March 2022 (adjusted)		April 2022 (crude)		April 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	11,321	3,266	27.23 26.27, 27.99	12,628	4,538	34.94 34.18, 35.70		<0.0001
Male	14,736	4,301	30.28 29.48, 31.09	17,159	6,313	38.59 37.79, 39.38		<0.0001
<b>Age</b>								
17-24	1,915	880	44.28 42.55, 46.01	2,248	1,246	55.37 53.76, 56.99		<0.0001
25-39	7,142	2,651	36.47 35.28, 37.66	7,996	3,670	46.39 45.23, 47.54		<0.0001
40-59	9,717	2,862	28.81 27.88, 29.75	11,150	4,214	37.36 36.43, 38.30		<0.0001
60+	7,283	1,174	15.10 14.28, 15.93	8,393	1,721	19.26 18.41, 20.11		<0.0001
<b>Province</b>								
British Columbia	4,646	1,497	32.09 30.74, 33.44	4,662	1,676	36.32 35.01, 37.62		<0.0001
Alberta	5,373	2,031	39.82 38.26, 41.38	5,592	2,509	46.44 44.96, 47.91		<0.0001
Saskatchewan	1,341	384	30.77 27.92, 33.62	1,317	528	39.97 37.14, 42.80		<0.0001
Manitoba	1,575	491	33.16 30.48, 35.85	1,403	540	40.30 37.67, 42.92		0.0002
Ontario	10,859	2,843	26.27 25.51, 27.03	14,103	4,913	34.89 34.12, 35.66		<0.0001
New Brunswick	851	116	15.03 12.44, 17.63	710	243	35.36 31.99, 38.73		<0.0001
Nova Scotia	1,067	184	18.01 15.51, 20.51	1,287	262	20.78 18.29, 23.27		0.1254
Prince Edward Island	109	7	7.63 3.02, 12.24	203	41	37.10 29.56, 44.64		<0.0001
Newfoundland	236	14	5.96 3.80, 8.12	510	139	27.90 24.25, 31.56		<0.0001

<b>Metro area</b>									
Vancouver	2,524	921	35.72	33.85, 37.59	2,614	1,036	39.53	37.80, 41.26	0.0034
Calgary	1,977	720	37.41	34.71, 40.11	1,996	877	45.54	42.92, 48.16	<0.0001
Edmonton	1,823	636	35.89	33.31, 38.47	1,899	769	41.33	38.94, 43.71	0.0025
Ottawa	1,459	285	19.56	16.95, 22.17	1,501	380	26.56	23.85, 29.27	0.0003
Toronto	3,227	924	27.80	26.61, 28.99	5,074	1,871	36.53	35.38, 37.68	<0.0001
Winnipeg	964	260	28.44	25.07, 31.81	931	333	37.07	33.90, 40.25	0.0003
<b>Ethnicity<sup>1,2</sup></b>									
White	19,574	5,246	26.28	25.66, 26.91	22,335	7,779	34.78	34.15, 35.42	<0.0001
Indigenous	361	118	31.13	26.20, 36.05	379	160	42.75	37.80, 47.70	0.0014
Asian	1,434	469	30.53	28.22, 32.84	1,641	599	37.78	35.57, 39.99	<0.0001
Other racialized groups	2,842	1,208	43.54	41.76, 45.32	3,374	1,631	49.06	47.42, 50.70	<0.0001
<b>Social Deprivation<sup>3</sup></b>									
1 (least deprived)	4,993	1,593	31.34	30.06, 32.62	5,763	2,194	38.54	37.29, 39.79	<0.0001
2	4,768	1,339	27.18	25.93, 28.44	5,637	2,076	37.15	35.87, 38.42	<0.0001
3	4,647	1,301	27.96	26.66, 29.26	5,177	1,829	35.08	33.77, 36.39	<0.0001
4	4,272	1,150	27.34	26.00, 28.68	4,835	1,682	35.39	34.03, 36.74	<0.0001
5 (most deprived)	4,228	1,198	28.12	26.72, 29.51	4,857	1,706	35.18	33.82, 36.54	<0.0001
<b>Material Deprivation<sup>3</sup></b>									
1 (least deprived)	6,872	1,842	25.93	24.87, 27.00	7,499	2,528	33.69	32.60, 34.78	<0.0001
2	5,665	1,527	26.16	25.01, 27.31	6,521	2,329	35.86	34.67, 37.05	<0.0001
3	4,651	1,357	28.91	27.61, 30.22	5,534	2,002	36.11	34.84, 37.39	<0.0001
4	3,574	1,100	30.78	29.29, 32.28	4,205	1,550	37.25	35.81, 38.69	<0.0001

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5 (most deprived)	2,146	755	36.61	34.63, 38.58	2,510	1,078	43.82	41.95, 45.69	<0.0001
<b>Total</b>	26,057	7,567	28.71	28.16, 29.26	29,787	10,851	36.71	36.16, 37.26	<0.0001

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

<sup>1</sup> In March, self reported ethnicity was missing for 1,846 (7.1%) donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 27.98% (95% CI 25.86, 30.11). 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).

<sup>2</sup> In March, combining all racialized groups together resulted in adjusted SARS-CoV-2 seroprevalence of 38.58% (95% CI 37.20, 39.95) by the Nucleocapsid antibody assay. 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.

<sup>3</sup> In March, postal codes were missing for 3,149 (12.1%) of donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 30.64% (95% CI 28.99, 32.29). 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).

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

March 2022 (crude)		March 2022 (adjusted)		April 2022 (crude)		April 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	11,320	11,154	99.78 99.58, 99.99	12,627	12,468	99.89 99.71, 100.00		0.4325
Male	14,736	14,468	99.35 99.11, 99.59	17,159	16,869	99.58 99.37, 99.79		0.1532
<b>Age</b>								
17-24	1,915	1,904	100.00 100.00, 100.00	2,248	2,235	100.00 100.00, 100.00		0.8867
25-39	7,142	7,043	99.72 99.42, 100.00	7,996	7,901	99.99 99.73, 100.00		0.1412
40-59	9,716	9,534	99.39 99.11, 99.67	11,150	10,961	99.48 99.22, 99.73		0.6578
60+	7,283	7,141	99.20 98.88, 99.52	8,392	8,240	99.42 99.13, 99.70		0.3253
<b>Province</b>								
British Columbia	4,646	4,576	99.78 99.43, 100.00	4,662	4,586	99.60 99.26, 99.94		0.4826
Alberta	5,373	5,282	99.43 99.01, 99.86	5,592	5,506	99.72 99.36, 100.00		0.3118
Saskatchewan	1,341	1,319	99.52 98.73, 100.00	1,316	1,298	99.88 99.22, 100.00		0.4932
Manitoba	1,575	1,548	99.45 98.69, 100.00	1,403	1,385	99.96 99.37, 100.00		0.1661
Ontario	10,859	10,662	99.44 99.22, 99.67	14,103	13,874	99.63 99.42, 99.83		0.2423
New Brunswick	851	840	99.78 98.92, 100.00	710	703	100.00 99.45, 100.00		0.4598
Nova Scotia	1,067	1,055	99.95 99.23, 100.00	1,287	1,276	100.00 99.52, 100.00		0.7005
Prince Edward Island	109	107	99.17 96.77, 100.00	203	202	99.78 97.94, 100.00		0.6304
Newfoundland	235	233	100.00 99.28, 100.00	510	507	100.00 99.69, 100.00		0.7345

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<b>Metro area</b>									
Vancouver	2,524	2,501	100.00	99.91, 100.00	2,614	2,571	99.49	99.02, 99.95	0.0048
Calgary	1,977	1,954	99.90	99.26, 100.00	1,996	1,972	100.00	99.45, 100.00	0.8021
Edmonton	1,823	1,801	99.98	99.39, 100.00	1,899	1,873	99.95	99.41, 100.00	0.6714
Ottawa	1,459	1,451	100.00	99.99, 100.00	1,501	1,492	100.00	99.76, 100.00	0.5166
Toronto	3,227	3,177	99.79	99.47, 100.00	5,074	5,005	99.77	99.49, 100.00	0.9595
Winnipeg	964	954	99.85	98.99, 100.00	931	922	100.00	99.51, 100.00	0.5832
<b>Ethnicity<sup>1,2</sup></b>									
White	19,573	19,238	99.52	99.33, 99.70	22,334	21,987	99.68	99.52, 99.85	0.1797
Indigenous	361	356	99.32	97.87, 100.00	379	374	99.67	98.43, 100.00	0.3596
Asian	1,434	1,422	100.00	99.95, 100.00	1,641	1,634	100.00	100.00, 100.00	0.1591
Other racialized groups	2,842	2,806	99.97	99.58, 100.00	3,374	3,337	100.00	99.77, 100.00	0.4697
<b>Social Deprivation<sup>3</sup></b>									
1 (least deprived)	4,993	4,920	99.70	99.36, 100.00	5,763	5,681	99.82	99.51, 100.00	0.6224
2	4,767	4,683	99.46	99.09, 99.83	5,637	5,557	99.89	99.59, 100.00	0.0763
3	4,647	4,573	99.71	99.36, 100.00	5,177	5,109	99.99	99.69, 100.00	0.1812
4	4,272	4,207	99.79	99.43, 100.00	4,835	4,760	99.67	99.32, 100.00	0.6408
5 (most deprived)	4,228	4,149	99.35	98.93, 99.77	4,856	4,779	99.53	99.16, 99.89	0.5293
<b>Material Deprivation<sup>3</sup></b>									
1 (least deprived)	6,872	6,790	99.95	99.68, 100.00	7,499	7,433	100.00	100.00, 100.00	0.0027
2	5,665	5,579	99.84	99.53, 100.00	6,520	6,418	99.72	99.42, 100.00	0.5971
3	4,651	4,566	99.45	99.07, 99.83	5,534	5,452	99.76	99.45, 100.00	0.2146
4	3,573	3,498	99.21	98.76, 99.67	4,205	4,127	99.34	98.94, 99.74	0.6905



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5 (most deprived)	2,146	2,099	99.01	98.41, 99.61	2,510	2,456	98.96	98.40, 99.52	0.9069
<b>Total</b>	26,056	25,622	99.57	99.42, 99.73	29,786	29,337	99.74	99.60, 99.88	0.1139

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

<sup>1</sup> In March, self reported ethnicity was missing for 1,846 (7.1%) donors; Adjusted seroprevalence by the Spike antibody was 98.74% (95% CI 98.00, 99.48). 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).

<sup>2</sup> In March, combining all racialized groups together resulted in adjusted SARS-CoV-2 seroprevalence of 100% (95% CI 99.76, 100.00) by Spike antibody. 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.

<sup>3</sup> In March, postal codes were missing for 3,149 (12.1%) of donors; Adjusted seroprevalence by the Spike antibody was 99.32% (95% CI 98.84, 99.81). 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).

**Table 3.** SARS-CoV-2 incidence among anti-S positive donors by month from June 2021 – April 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	16,816	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

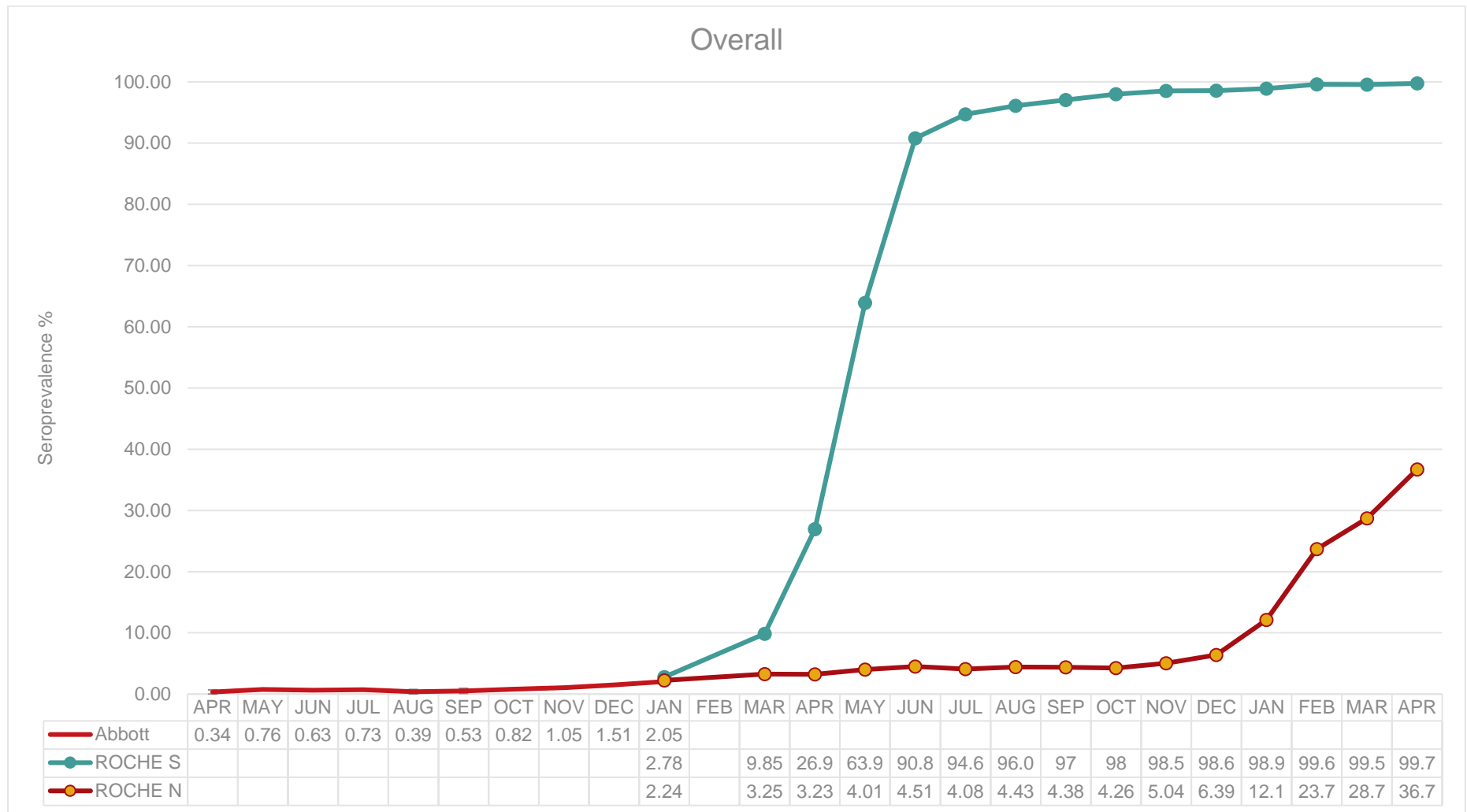
Note: A donation was considered a potential breakthrough incident infection if donors tested S positive and N negative on their previous donation and then tested S positive and N positive on their following donation.

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

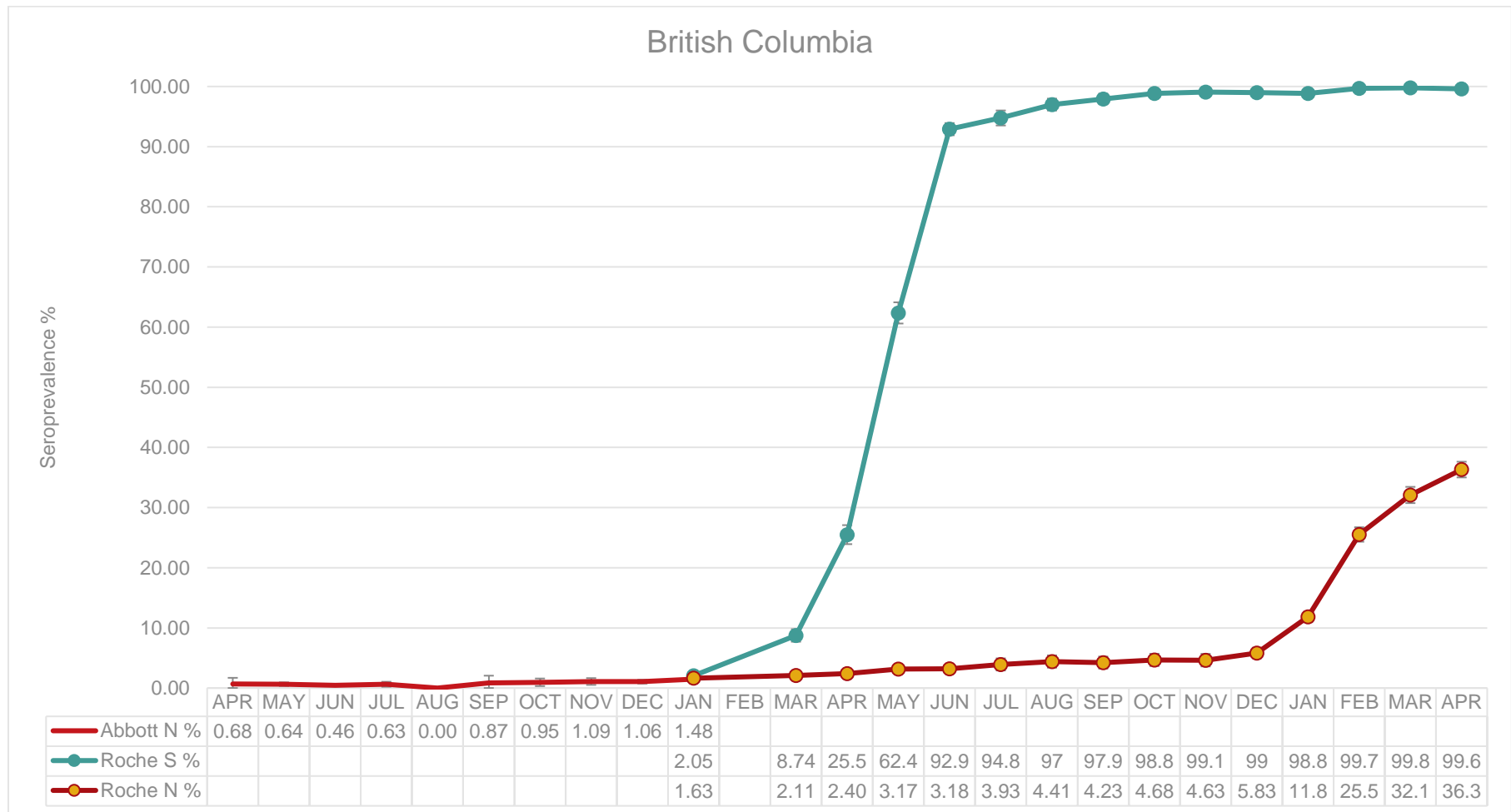
Note: A donation was considered a potential incident infection if donors tested S negative and N negative on their previous donation and then tested S positive and N positive on their following donation.

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

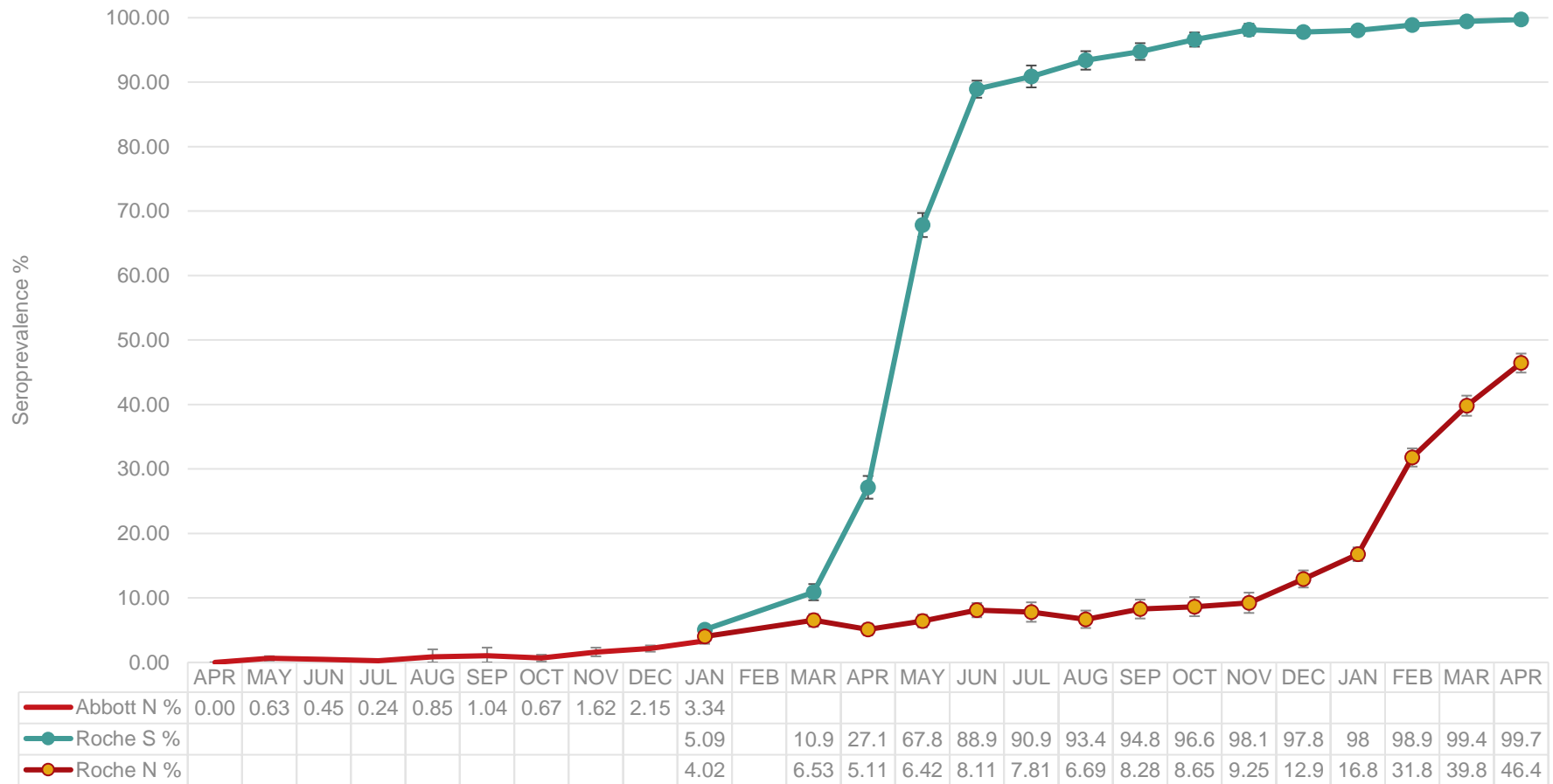


Notes: SARS-CoV-2 seroprevalence rates (95% CI), that have been weighted and adjusted for test characteristics. Data from the CIHR funded study (Correlates of Immunity) from April 9, 2020-January 31, 2021, have been included.

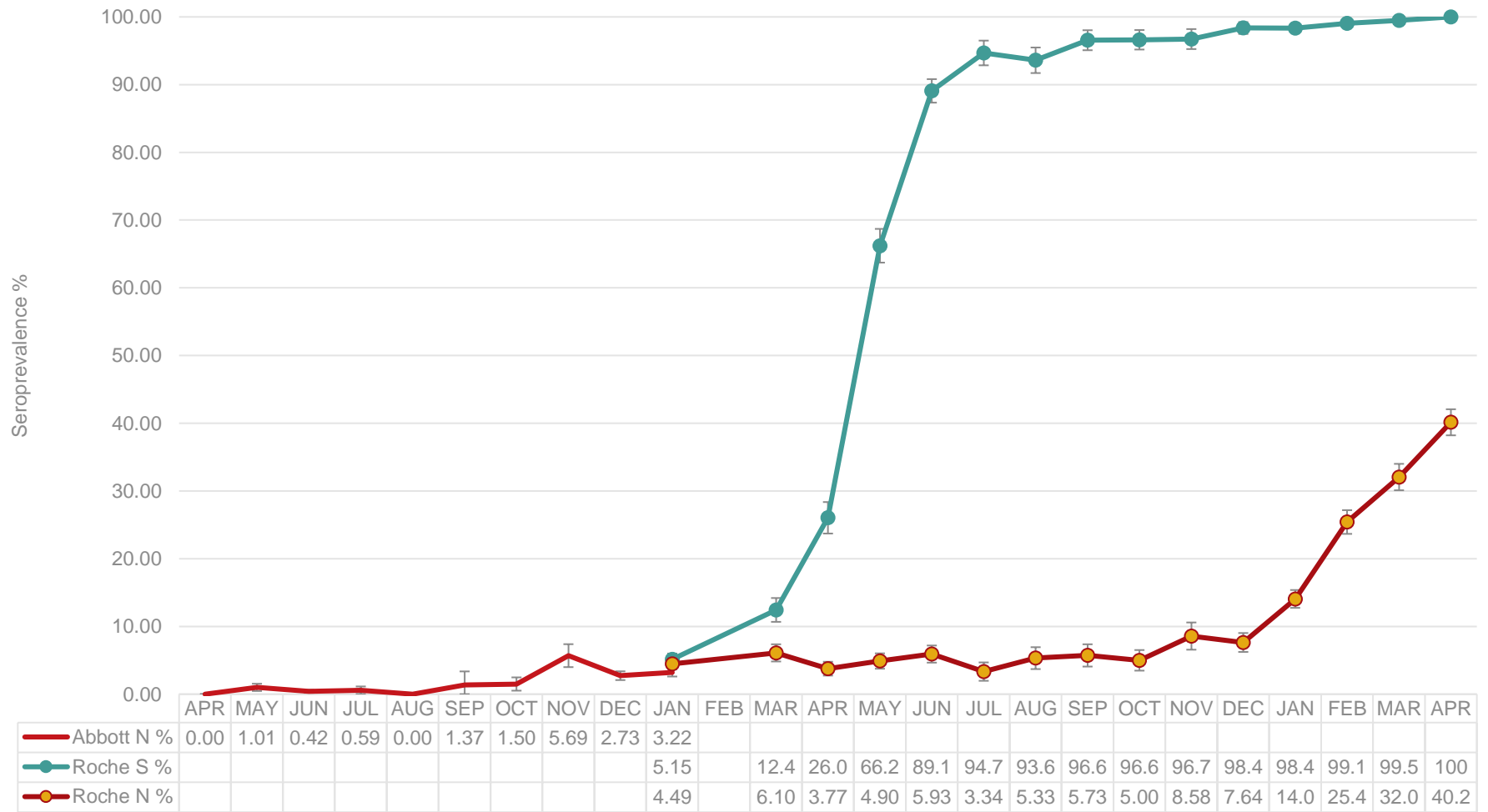
**Figure 2.** Regional temporal trends of SARS-CoV-2 seroprevalence monthly from April 2020-April 2022 (by Abbott N, Roche N and Roche S assays)



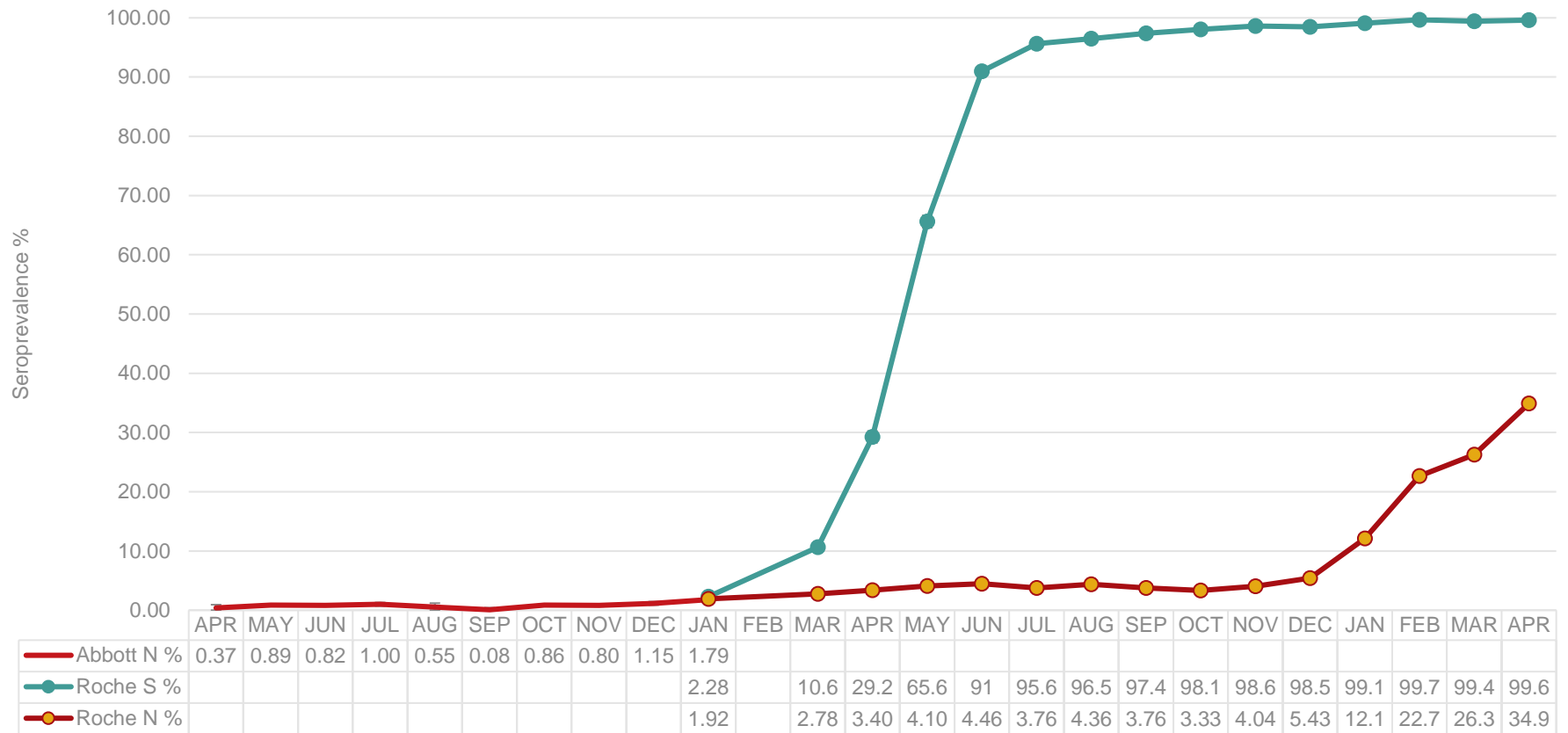
# Alberta



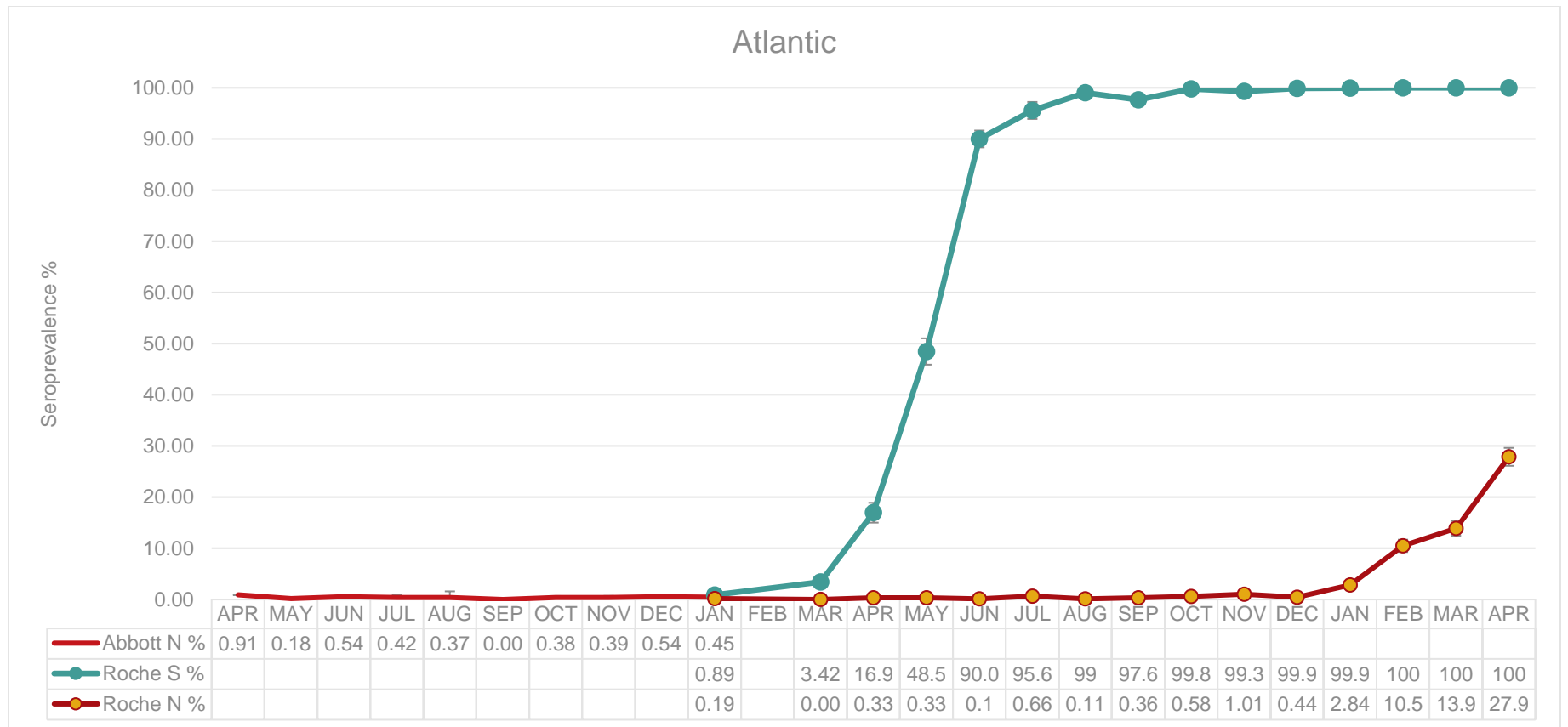
## Prairies



## Ontario

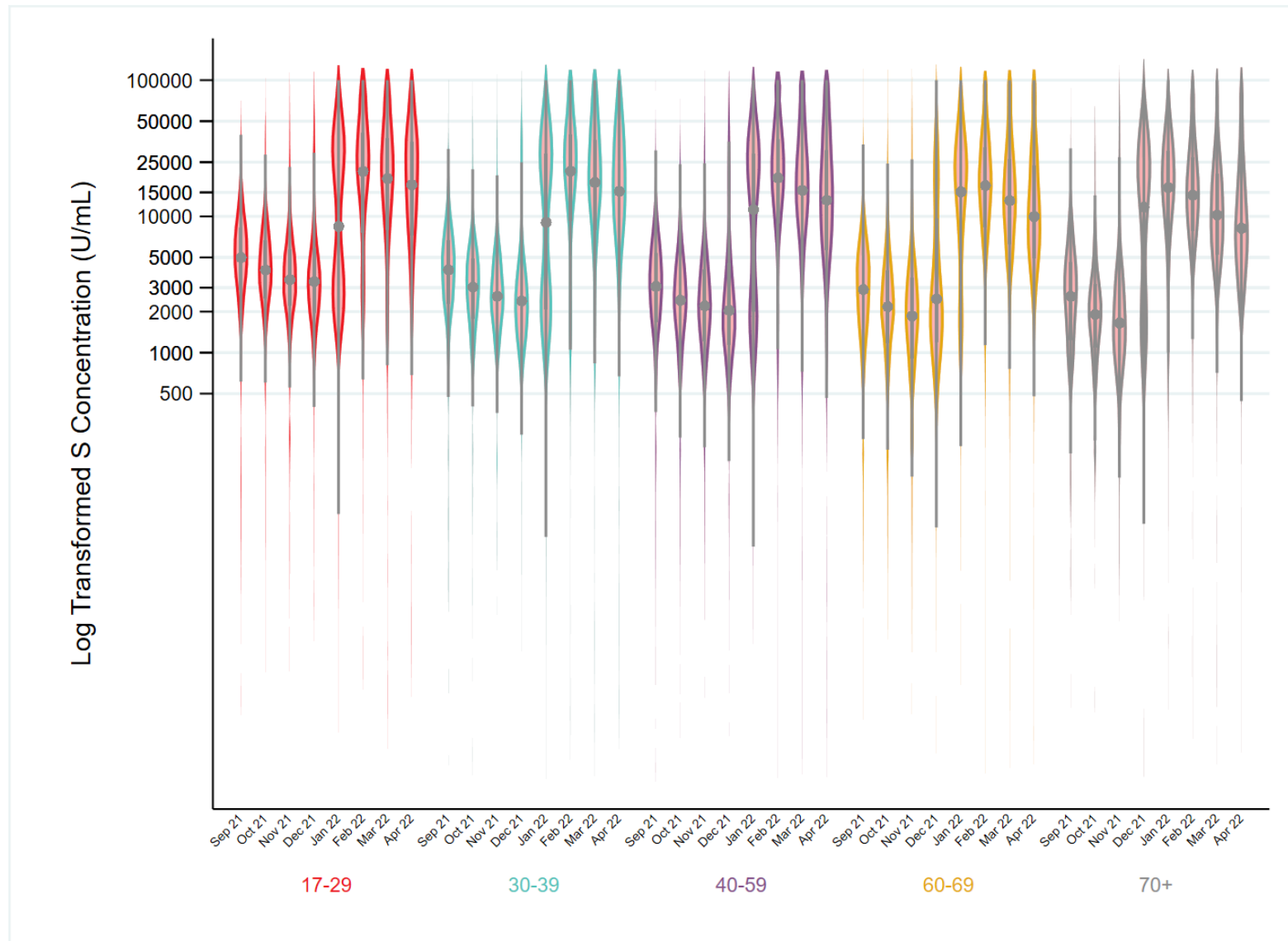


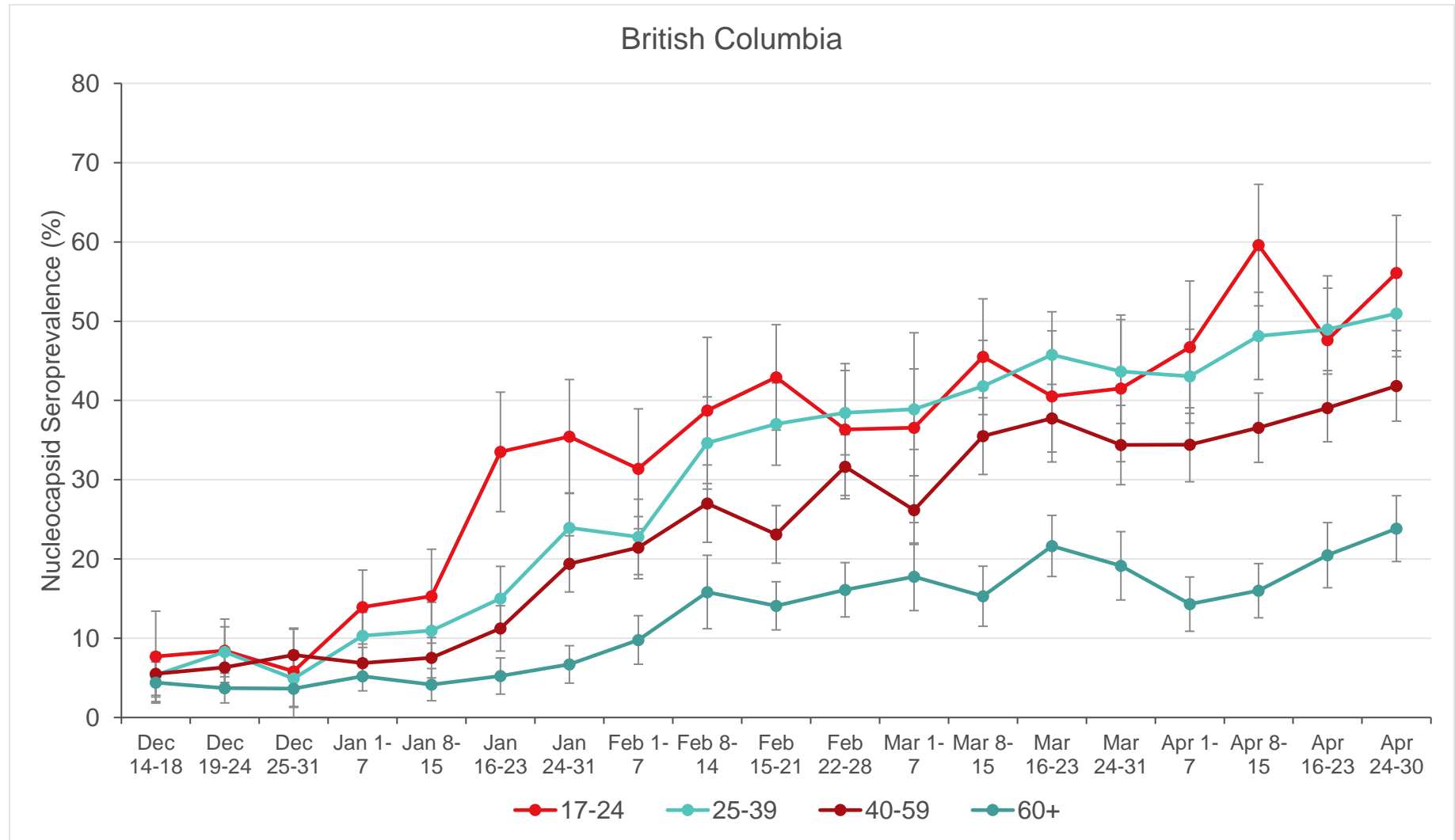


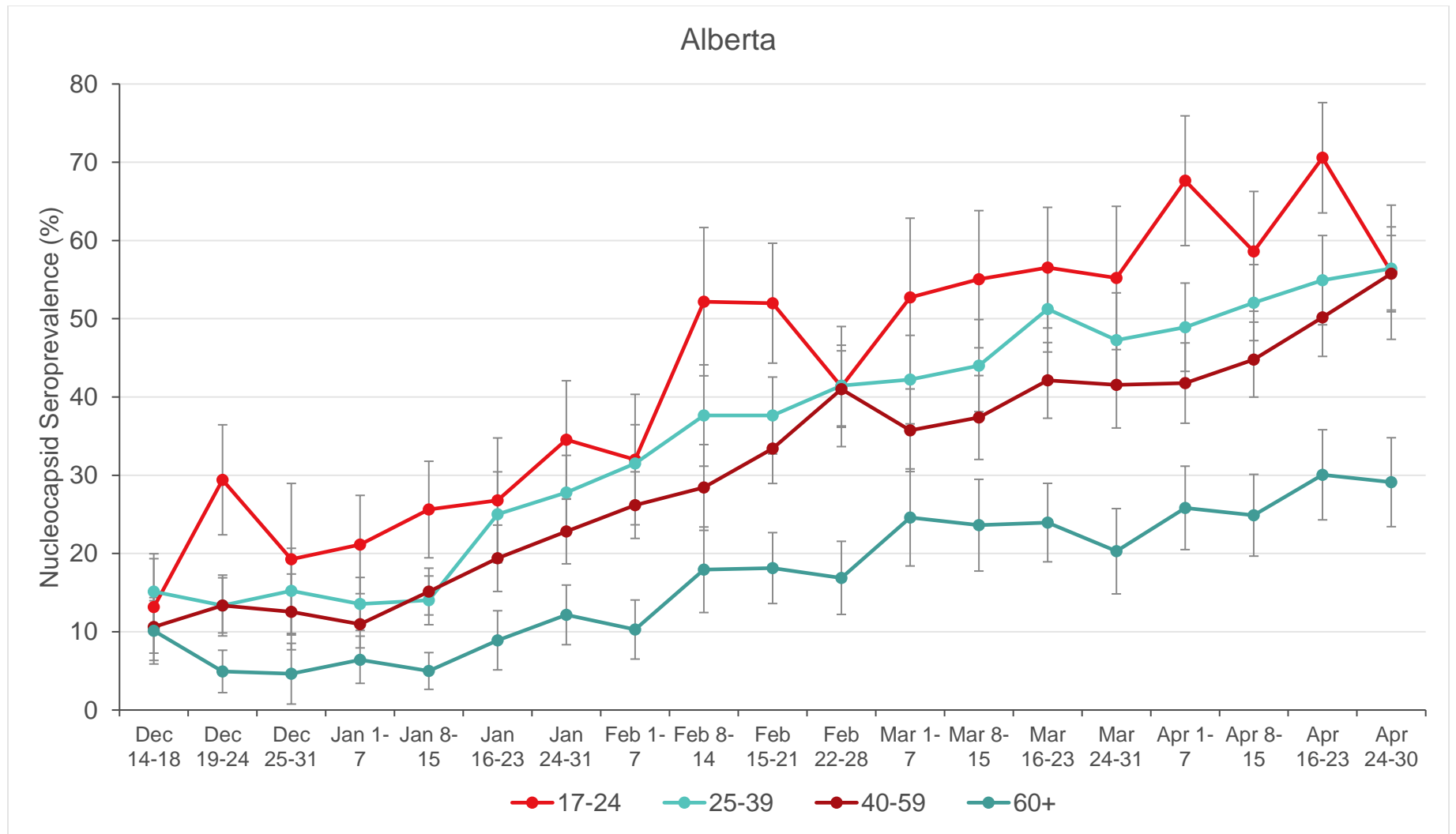


Note: SARS-CoV-2 seroprevalence rates (95% CI), that have been weighted and adjusted for test characteristics. Data from the CIHR funded study (Correlates of Immunity) from April 9, 2020-January 31, 2021, have been included.

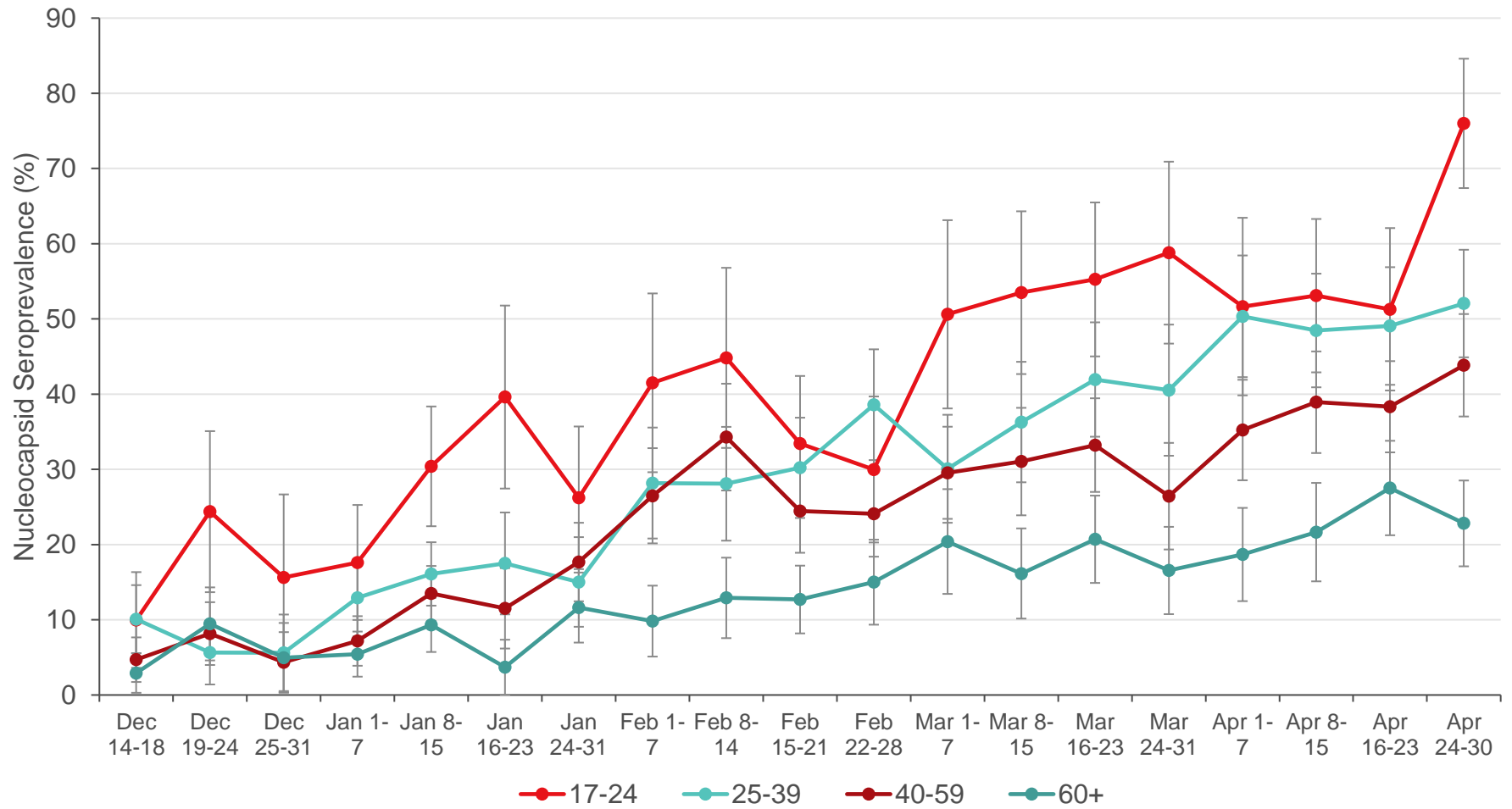
**Figure 3.** Distributions of log transformed Spike antibody concentration results (U/mL) (grey circle represents the median and the bar represents the IQR) in spike antibody seropositive donations from September 2021 to April 2022 stratified by age group.

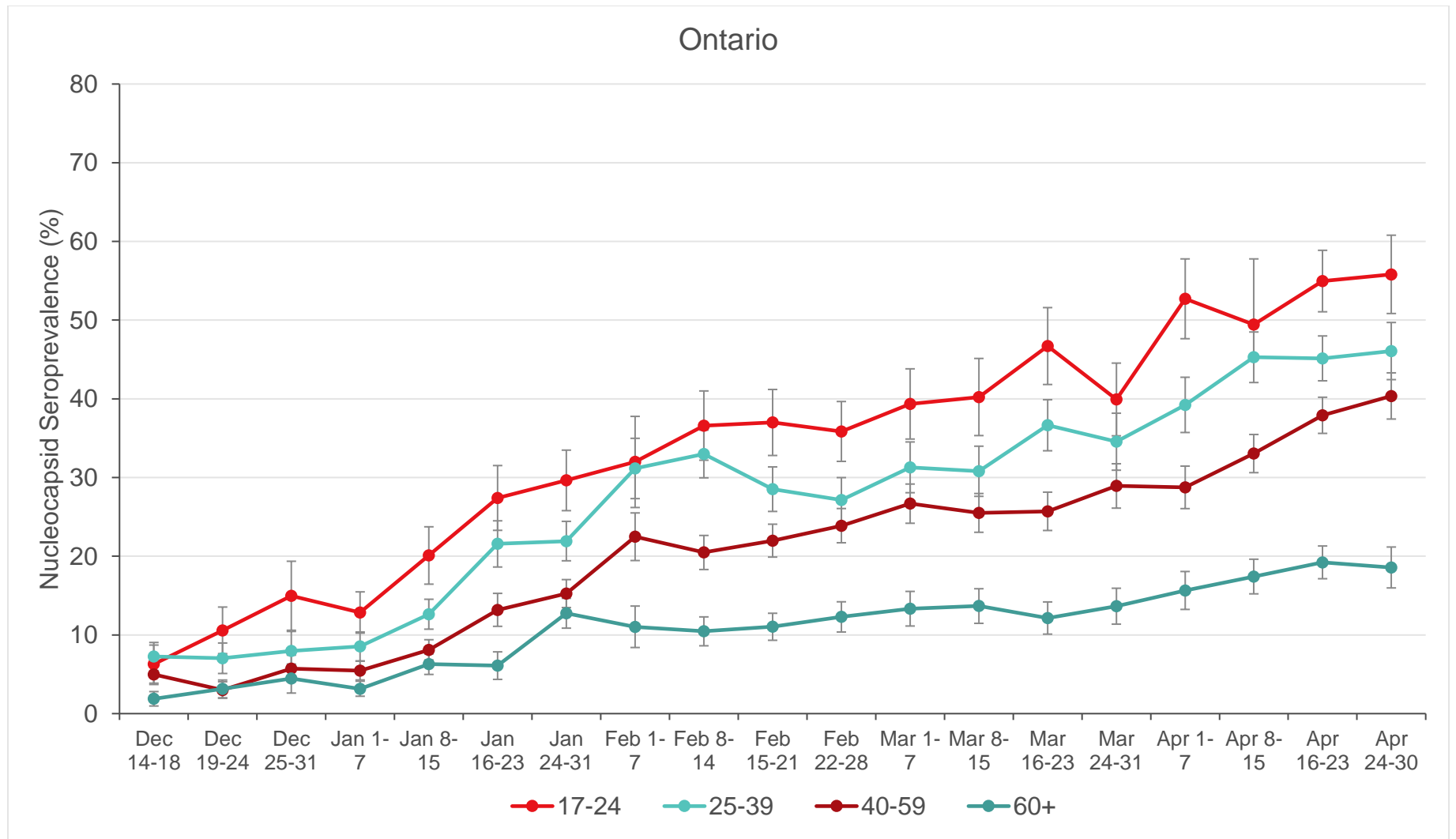


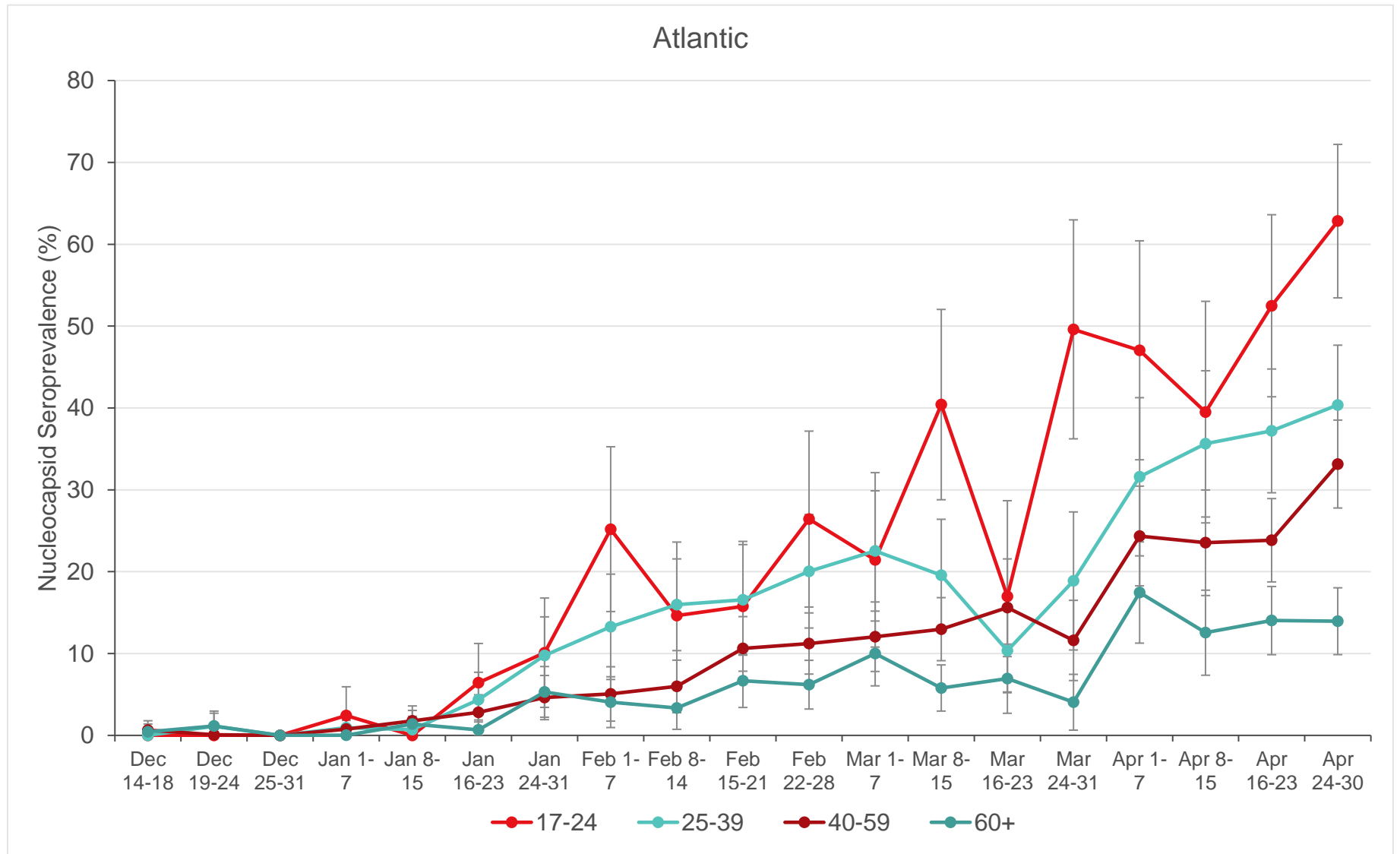
**Figure 4.** Regional temporal trends of SARS-CoV-2 Nucleocapsid (infection) seroprevalence by age group weekly from December 2021- April 2022



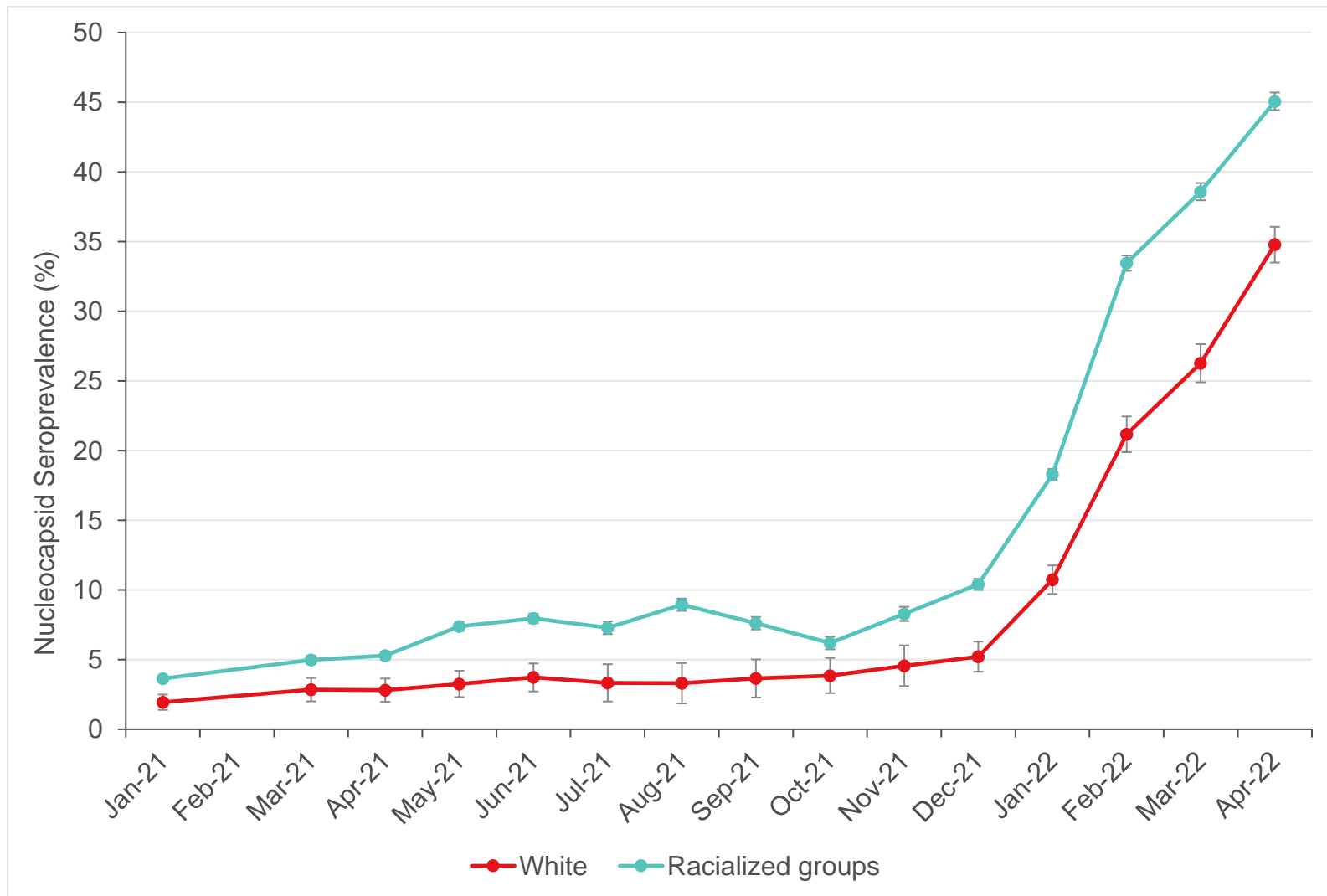
## Prairies





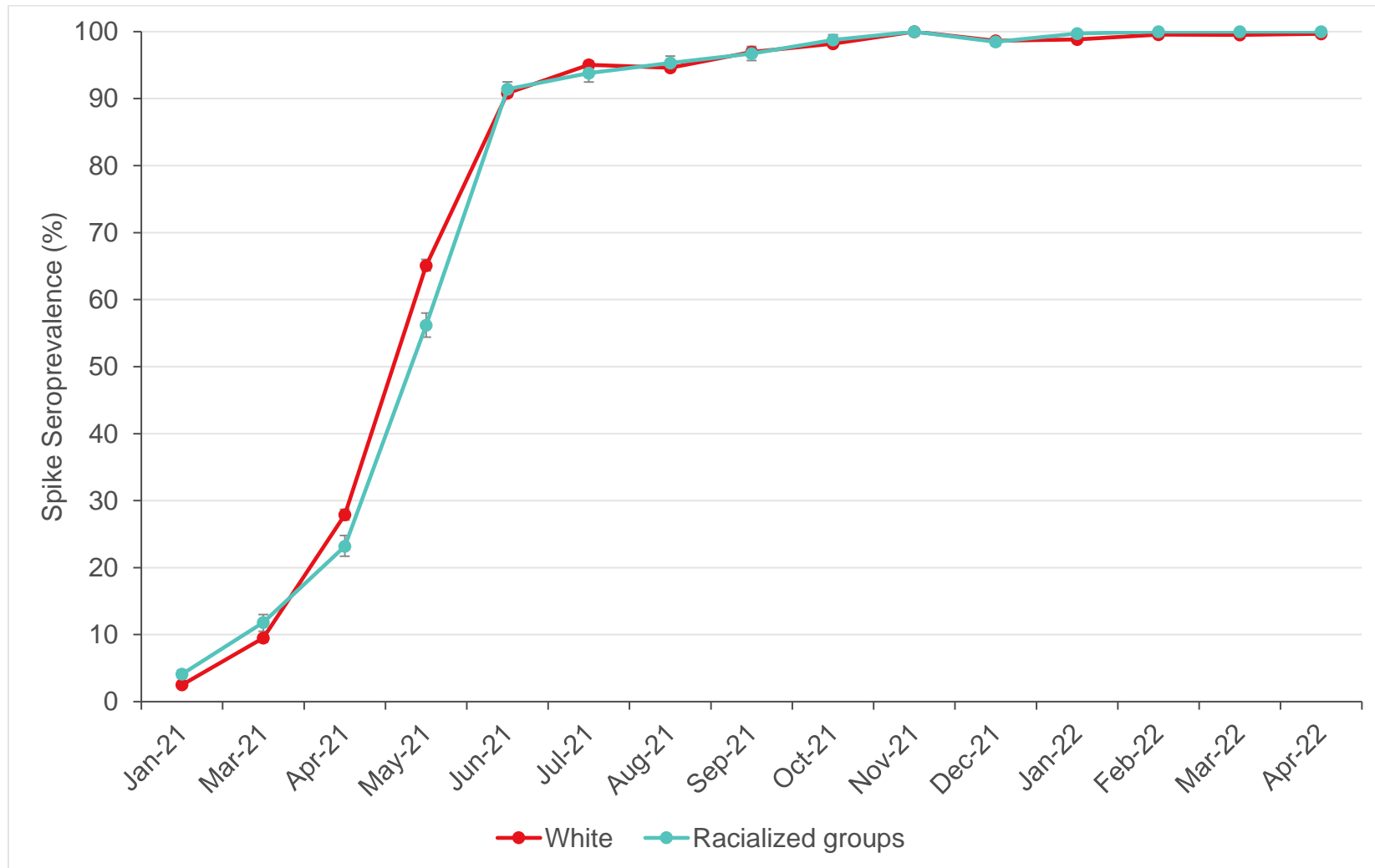


**Figure 5A.** Temporal trends of SARS-CoV-2 seroprevalence by monthly intervals from January 2021-April 2022 estimated by Nucleocapsid antibody results by ethnicity.

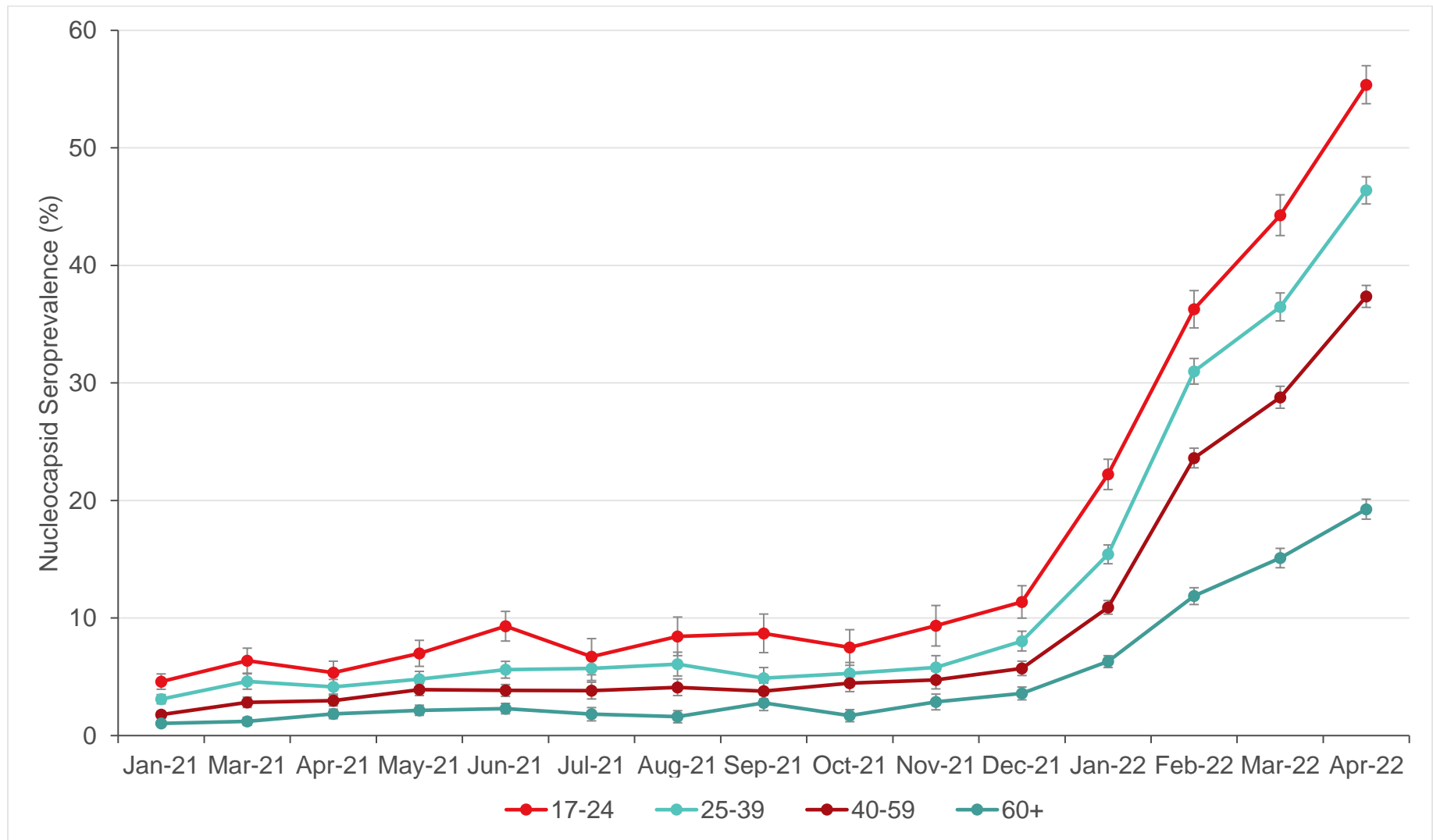




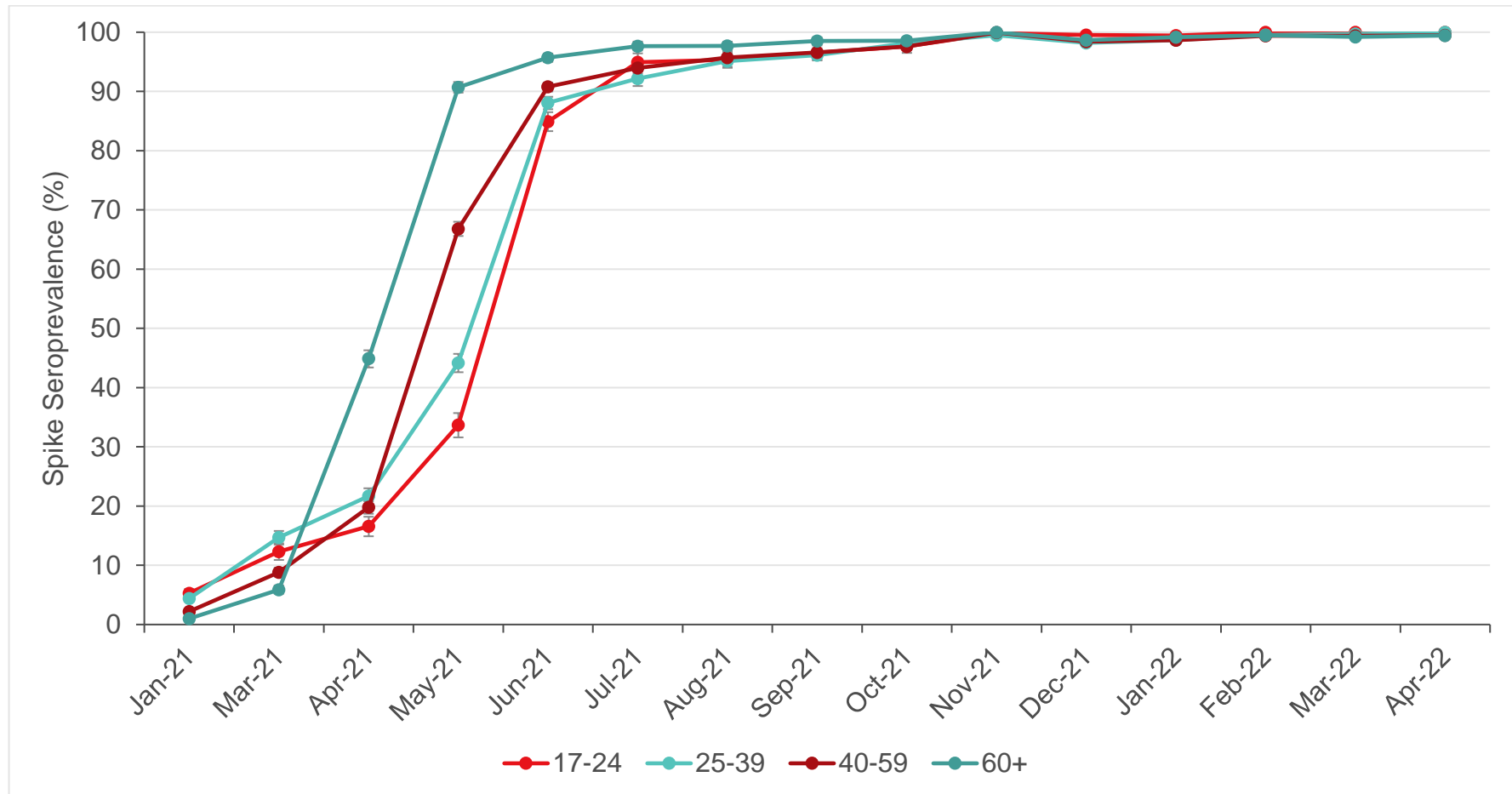
**Figure 5B.** Temporal trends of SARS-CoV-2 seroprevalence by monthly intervals from January 2021-April 2022 estimated by Spike antibody results by ethnicity.



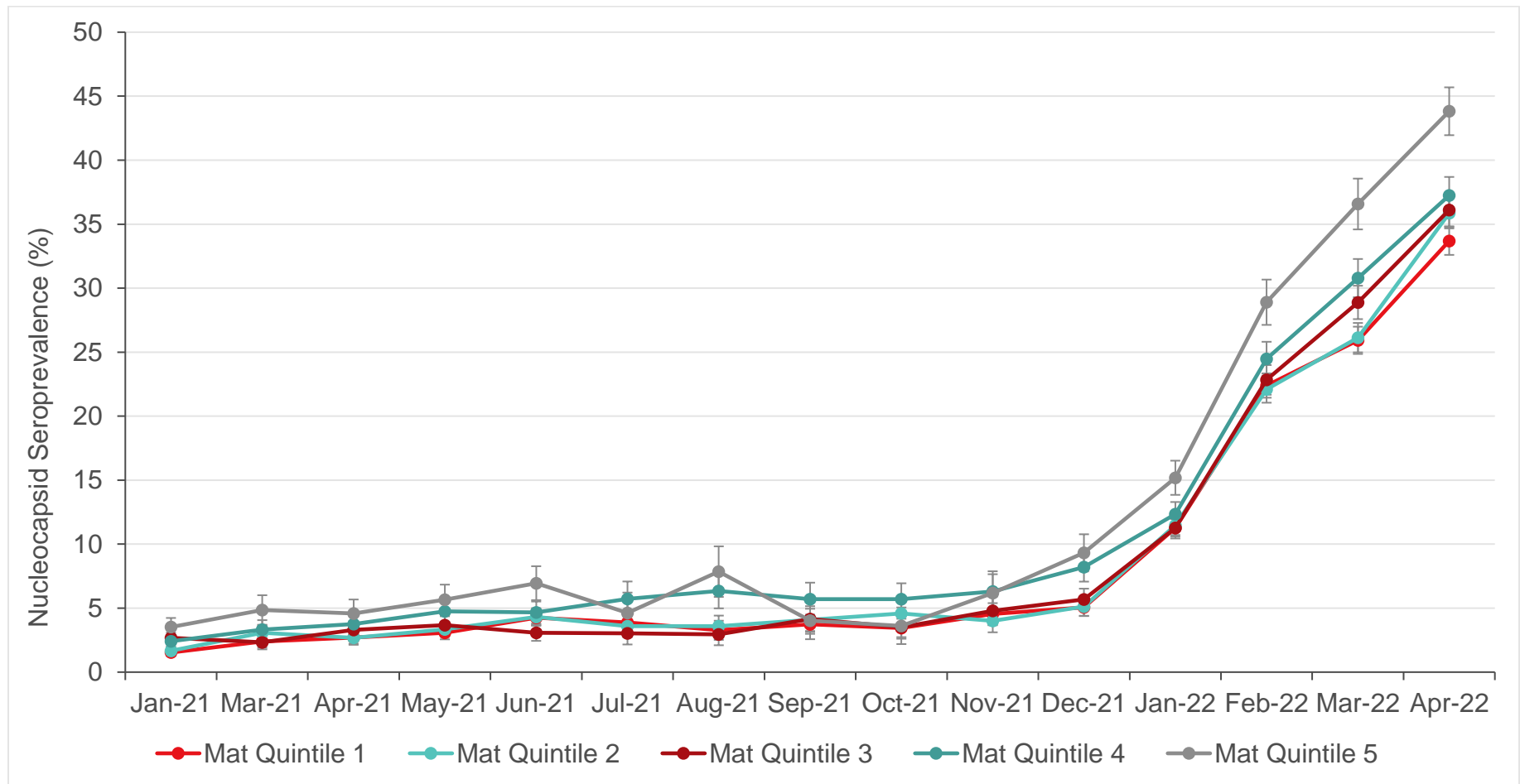
**Figure 5C.** Temporal trends of SARS-CoV-2 seroprevalence by monthly intervals from January 2021-April 2022 estimated by Nucleocapsid antibody results by age group.



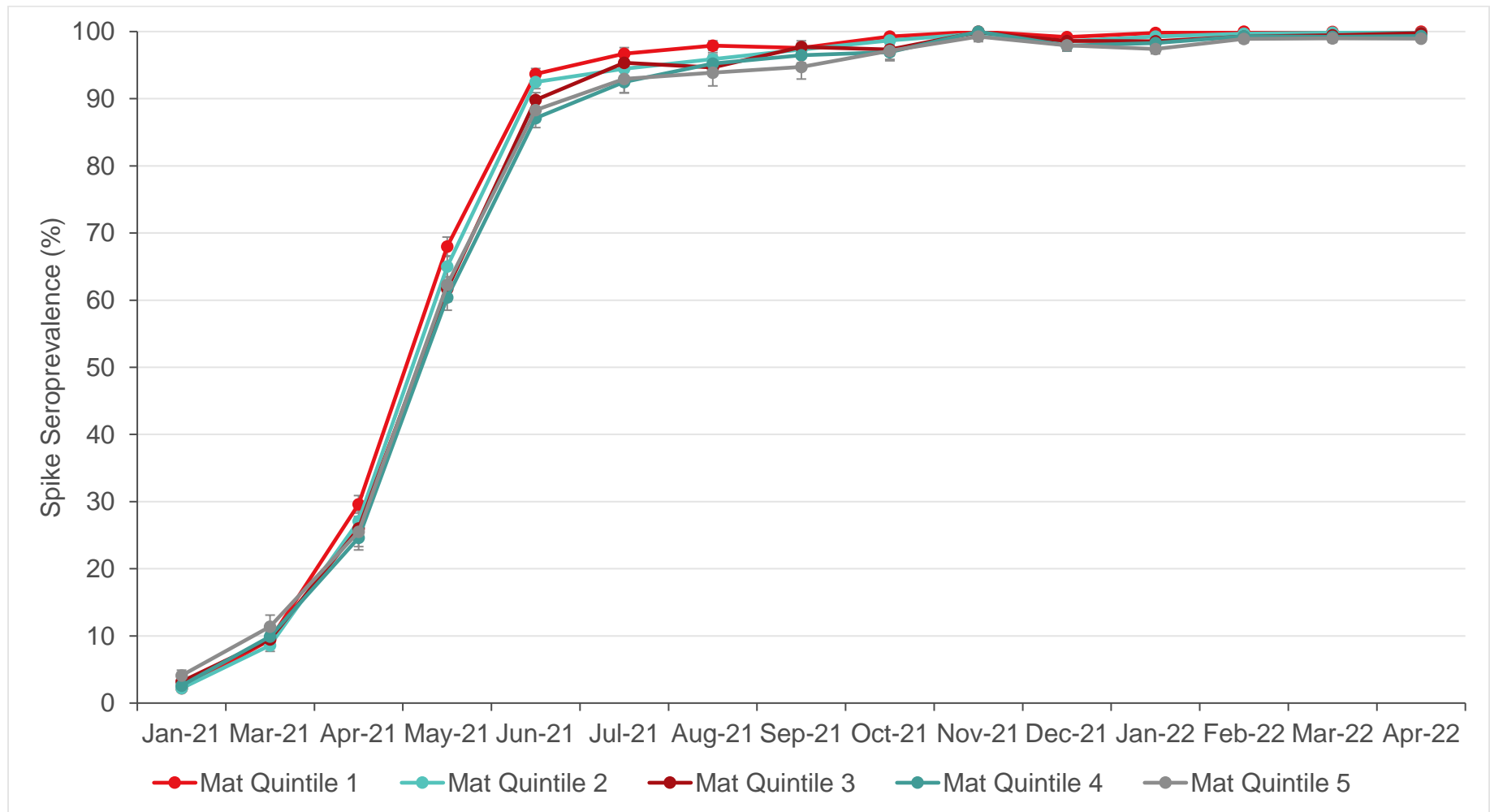
**Figure 5D.** Temporal trends of SARS-CoV-2 seroprevalence by monthly intervals from January 2021-April 2022 estimated by Spike antibody results by age group.



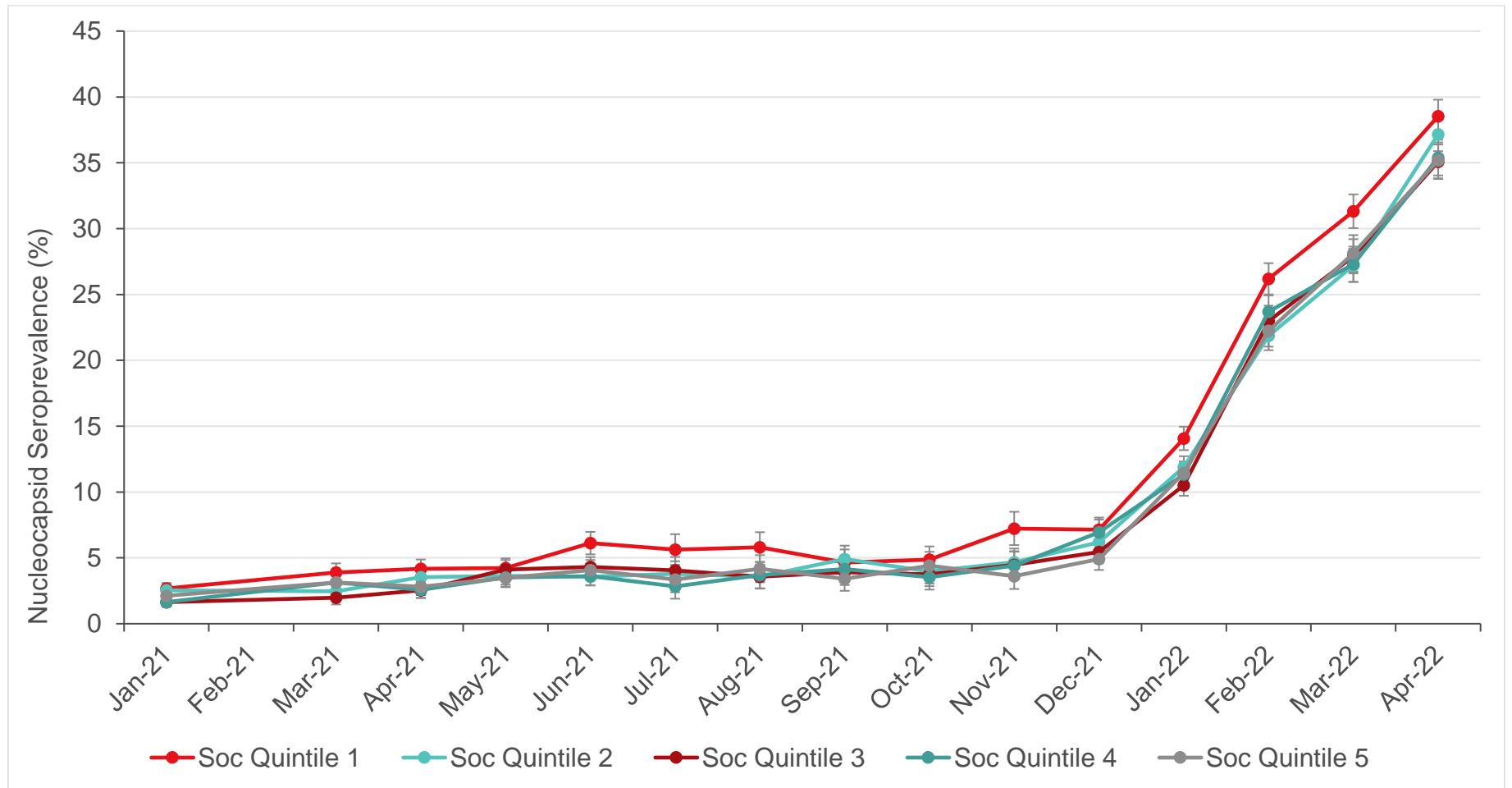
**Figure 5E.** Temporal trends of SARS-CoV-2 seroprevalence by monthly intervals from January 2021-April 2022 estimated by Nucleocapsid antibody results by material deprivation level (1 = least deprived and 5 = most deprived).



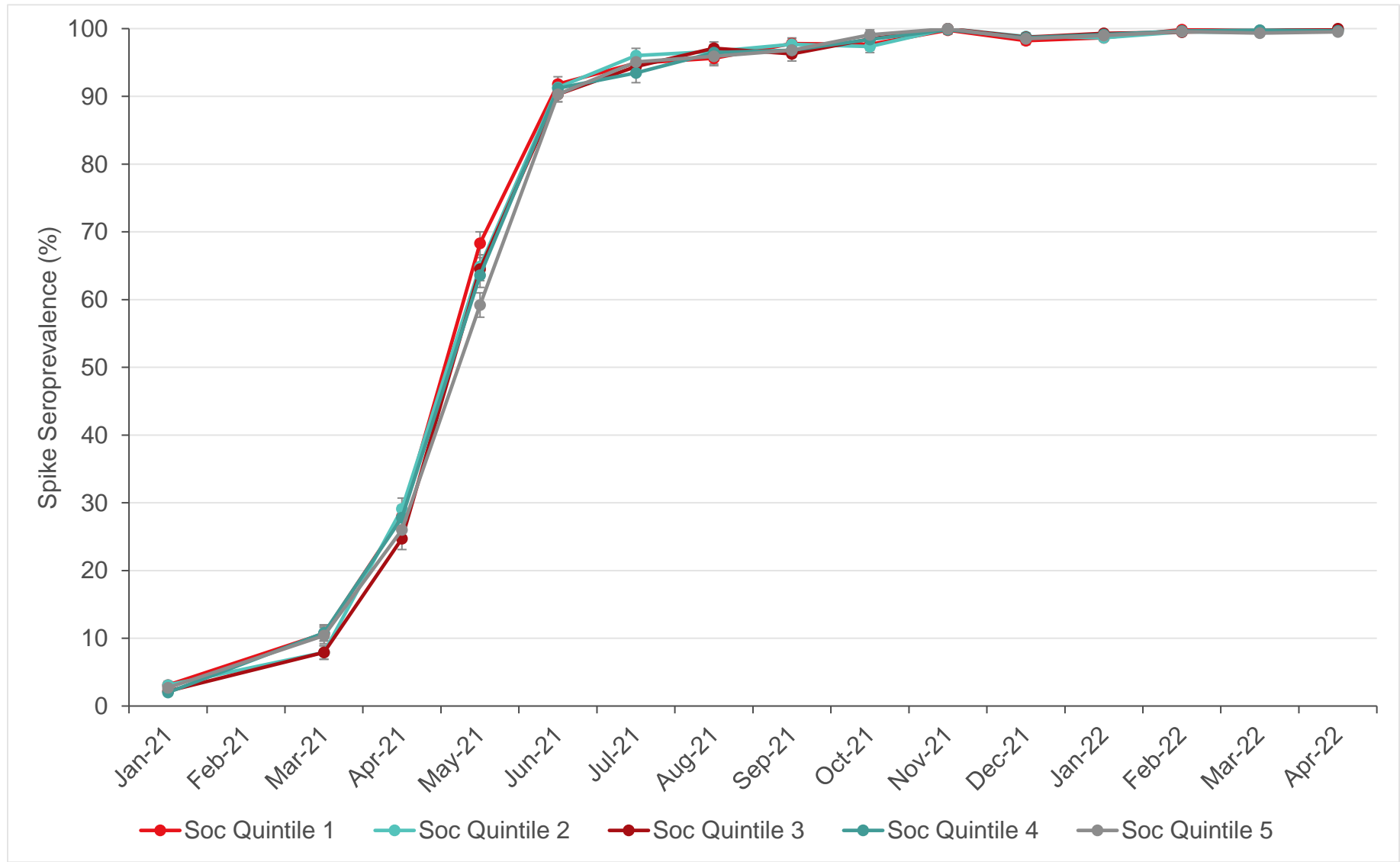
**Figure 5F.** Temporal trends of SARS-CoV-2 seroprevalence by monthly intervals from January 2021-April 2022 estimated by Spike antibody results by material deprivation level (1 = least deprived and 5 = most deprived).



**Figure 5G.** Temporal trends of SARS-CoV-2 seroprevalence by monthly intervals from January 2021-April 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-April 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 April 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	2,061	713	34.32	32.52, 36.11	2,061	2,030	99.64	99.16, 100.00
Male	2,601	963	38.44	36.55, 40.33	2,601	2,556	99.57	99.07, 100.00
<b>Age</b>								
17-24	305	159	53.19	49.22, 57.17	305	304	100.00	100.00, 100.00
25-39	1,259	601	48.04	45.26, 50.83	1,259	1,243	99.92	99.29, 100.00
40-59	1,671	642	38.22	35.98, 40.47	1,671	1,641	99.36	98.73, 99.98
60+	1,427	274	18.60	16.68, 20.51	1,427	1,398	99.12	98.41, 99.82
<b>Material Deprivation<sup>1</sup></b>								
1 (least)	1,085	355	32.24	29.65, 34.84	1,085	1,075	100.00	99.56, 100.00
2	1,187	402	35.08	32.48, 37.67	1,187	1,166	99.42	98.70, 100.00
3	834	304	35.96	32.86, 39.05	834	822	99.87	99.13, 100.00
4	655	240	37.36	33.90, 40.81	655	638	98.67	97.55, 99.80
5 (most)	372	182	49.50	44.78, 54.22	372	368	99.78	98.66, 100.00
<b>Total</b>	<b>4,662</b>	<b>1,676</b>	<b>36.32</b>	<b>35.01, 37.62</b>	<b>4,662</b>	<b>4,586</b>	<b>99.60</b>	<b>99.26, 99.94</b>

<sup>1</sup>Postal codes were missing for 529 (11.3%) of donors which could not be included in the quintiles of Material Deprivation; 193/529 were positive by the Nucleocapsid antibody, adjusted SARS-CoV-2 seroprevalence among missing postal codes was 37.30% (95% CI 33.35, 41.25); and 517/529 were positive by the Spike antibody, adjusted SARS-CoV-2 seroprevalence was 98.62% (95% CI 97.62, 100.00).



**Table A1.2** Alberta SARS-CoV-2 seroprevalence, Nucleocapsid vs. Spike antibody results in April 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	2,359	1,079	45.52	43.44, 47.60	2,359	2,330	99.94	99.47, 100.00
Male	3,233	1,430	47.36	45.26, 49.45	3,233	3,176	99.49	98.95, 100.00
<b>Age</b>								
17-24	425	274	63.79	59.81, 67.78	425	421	99.98	99.07, 100.00
25-39	1,642	843	52.2	49.49, 54.91	1,642	1,622	99.86	99.24, 100.00
40-59	2,078	982	47.69	45.18, 50.19	2,078	2,042	99.51	98.86, 100.00
60+	1,447	410	27.09	24.32, 29.86	1,447	1,421	99.51	98.70, 100.00
<b>Material Deprivation<sup>1</sup></b>								
1 (least)	1,985	818	42.77	40.27, 45.27	1,985	1,959	99.93	99.36, 100.00
2	1,129	527	48.64	45.36, 51.92	1,129	1,109	99.39	98.51, 100.00
3	857	396	46.74	42.99, 50.49	857	849	100.00	99.19, 100.00
4	471	219	47.52	42.59, 52.45	471	469	100.00	99.40, 100.00
5 (most)	255	147	60.22	53.63, 66.80	255	247	98.60	96.46, 100.00
<b>Total</b>	<b>5,592</b>	<b>2,509</b>	<b>46.44</b>	<b>44.96, 47.91</b>	<b>5,592</b>	<b>5,506</b>	<b>99.72</b>	<b>99.36, 100.00</b>

<sup>1</sup>Postal codes were missing for 895 (16.0%) of donors which could not be included in the quintiles of Material Deprivation; 402/895 were positive by the Nucleocapsid antibody, adjusted SARS-CoV-2 seroprevalence among missing postal codes was 46.39% (95% CI 42.69, 50.09); 873/895 were positive by the Spike antibody, adjusted SARS-CoV-2 seroprevalence was 98.59% (95% CI 97.41, 99.78).

**Table A1.3** Saskatchewan SARS-CoV-2 seroprevalence, Nucleocapsid vs. Spike antibody results in April 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	518	192	36.05	32.16, 39.94	517	509	99.74	98.76, 100.00
Male	799	336	44.01	39.93, 48.09	799	789	99.70	98.70, 100.00
<b>Age</b>								
17-24	115	62	54.30	46.30, 62.31	115	115	99.95	98.17, 100.00
25-39	371	188	50.48	44.87, 56.09	371	365	99.53	98.09, 100.00
40-59	451	187	40.70	35.75, 45.66	451	443	99.16	97.73, 100.00
60+	380	91	22.48	17.91, 27.04	379	375	99.86	98.59, 100.00
<b>Material Deprivation<sup>1</sup></b>								
1 (least)	434	174	40.53	35.55, 45.51	434	431	99.91	98.77, 100.00
2	303	114	35.58	29.78, 41.39	302	298	99.96	98.61, 100.00
3	220	90	41.14	34.35, 47.92	220	217	99.12	97.17, 100.00
4	124	55	44.82	35.64, 54.00	124	121	99.41	96.95, 100.00
5 (most)	54	19	32.55	19.02, 46.08	54	54	97.35	91.99, 100.00
<b>Total</b>	<b>1,317</b>	<b>528</b>	<b>39.97</b>	<b>37.14, 42.80</b>	<b>1,316</b>	<b>1,298</b>	<b>99.88</b>	<b>99.22, 100.00</b>

<sup>1</sup>Postal codes were missing for 182 (13.8%) of donors which could not be included in the quintiles of Material Deprivation 76/182 were positive by the Nucleocapsid antibody, adjusted SARS-CoV-2 seroprevalence among missing postal codes was 43.12% (95% CI 35.40, 50.84); 177/182 were positive by the Spike antibody, adjusted SARS-CoV-2 seroprevalence was 98.22% (95% CI 95.56, 100.00).

**Table A1.4** Manitoba SARS-CoV-2 seroprevalence, Nucleocapsid vs. Spike antibody results in April 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	618	240	39.74	36.09, 43.40	618	613	100.00	99.34, 100.00
Male	785	300	40.87	37.11, 44.63	785	772	99.79	98.89, 100.00
Age								
17-24	119	77	63.1	56.10, 70.11	119	119	100.00	98.73, 100.00
25-39	319	157	49.67	44.35, 54.98	319	318	100.00	99.28, 100.00
40-59	516	198	37.96	33.48, 42.44	516	508	99.78	98.68, 100.00
60+	449	108	23.29	18.99, 27.60	449	440	99.25	97.84, 100.00
Material Deprivation <sup>1</sup>								
1 (least)	313	109	38.11	32.64, 43.58	313	312	100.00	99.28, 100.00
2	288	112	40.88	35.02, 46.73	288	284	99.86	98.48, 100.00
3	302	110	37.21	31.64, 42.78	302	298	99.62	98.19, 100.00
4	215	91	43.98	37.16, 50.80	215	211	99.53	97.76, 100.00
5 (most)	104	43	45.53	35.78, 55.28	104	101	98.67	95.59, 100.00
Total	1,403	540	40.30	37.67, 42.92	1,403	1,385	99.96	99.37, 100.00

<sup>1</sup>Postal codes were missing for 181 (12.9%) of donors which could not be included in the quintiles of Material Deprivation; 75/181 were positive by the Nucleocapsid antibody, adjusted SARS-CoV-2 seroprevalence among missing postal codes was 40.99% (95% CI 33.77, 48.21); 179/181 were positive by the Spike antibody, adjusted SARS-CoV-2 seroprevalence was 99.15% (95% CI 97.09, 100.00).

**Table A1.5** Ontario SARS-CoV-2 seroprevalence, Nucleocapsid vs. Spike antibody results in April 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	5,856	1,977	32.68	31.63, 33.73	5,856	5,778	99.81	99.55, 100.00
Male	8,247	2,936	37.27	36.14, 38.39	8,247	8,096	99.42	99.12, 99.73
<b>Age</b>								
17-24	1,102	584	53.26	51.00, 55.52	1,102	1,094	100.00	100.00, 100.00
25-39	3,853	1,689	44.25	42.60, 45.89	3,853	3,803	99.94	99.57, 100.00
40-59	5,385	1,934	35.56	34.26, 36.86	5,385	5,287	99.36	98.99, 99.72
60+	3,763	706	18.00	16.83, 19.17	3,763	3,690	99.29	98.87, 99.71
<b>Material Deprivation<sup>1</sup></b>								
1 (least)	3,261	970	30.11	28.57, 31.64	3,261	3,236	100.00	100.00, 100.00
2	3,094	1,047	33.61	31.94, 35.28	3,094	3,046	99.80	99.39, 100.00
3	2,807	973	34.26	32.52, 36.00	2,807	2,754	99.34	98.85, 99.84
4	2,170	788	36.19	34.24, 38.13	2,170	2,126	99.17	98.60, 99.74
5 (most)	1,290	567	43.67	41.16, 46.18	1,290	1,256	98.25	97.39, 99.11
<b>Total</b>	<b>14,103</b>	<b>4,913</b>	<b>34.89</b>	<b>34.12, 35.66</b>	<b>14,103</b>	<b>13,874</b>	<b>99.63</b>	<b>99.42, 99.83</b>

<sup>1</sup>Postal codes were missing for 1,481(10.5%) of donors which could not be included in the quintiles of Material Deprivation; 568/1481 were positive by the Nucleocapsid antibody, adjusted SARS-CoV-2 seroprevalence among missing postal codes was 38.64% (95% CI 36.22, 41.06); 1456/1481 were positive by the Spike antibody, adjusted SARS-CoV-2 seroprevalence was 99.64% (95% CI 99.03, 100.00).

**Table A1.6** Atlantic Provinces SARS-CoV-2 seroprevalence, Nucleocapsid vs. Spike antibody results in April 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	1,216	337	28.61	26.17, 31.06	1,216	1,208	100.00	100.00, 100.00
Male	1,494	348	27.09	24.59, 29.59	1,494	1,480	100.00	99.63, 100.00
<b>Age</b>								
17-24	182	90	52.90	47.02, 58.78	182	182	100.00	99.56, 100.00
25-39	552	192	37.63	33.46, 41.81	552	550	100.00	99.73, 100.00
40-59	1,049	271	26.92	24.02, 29.81	1,049	1,040	100.00	99.46, 100.00
60+	927	132	14.51	12.11, 16.91	927	916	99.96	99.21, 100.00
<b>Material Deprivation<sup>1</sup></b>								
1 (least)	421	102	25.17	20.94, 29.39	421	420	100.00	99.57, 100.00
2	520	127	26.05	22.15, 29.95	520	515	100.00	99.05, 100.00
3	514	129	29.53	25.43, 33.62	514	512	100.00	99.78, 100.00
4	570	157	29.71	25.74, 33.67	570	562	99.89	98.89, 100.00
5 (most)	435	120	30.94	26.50, 35.38	435	430	99.79	98.65, 100.00
<b>Total</b>	<b>2,710</b>	<b>685</b>	<b>27.88</b>	<b>26.13, 29.63</b>	<b>2,710</b>	<b>2,688</b>	<b>100.00</b>	<b>100.00, 100.00</b>

<sup>1</sup>Postal codes were missing for 250 (9.2%) of donors which could not be included in the quintiles of Material Deprivation; 50/250 were positive by the Nucleocapsid antibody, adjusted SARS-CoV-2 seroprevalence among missing postal codes was 23.55% (95% CI 18.08, 29.03); 249/250 were positive by the Spike antibody, adjusted SARS-CoV-2 seroprevalence was 100.00% (95% CI 98.68, 100.00).

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

	April 1-7			April 8-15			April 16-23			April 24-30		
	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	2,669 (865)	32.21	30.62, 33.81	3,294 (1,123)	33.27	31.80, 34.74	3,728 (1,396)	36.00	34.60, 37.39	3,049 (1,186)	37.88	36.30, 39.46
Male	3,764 (1,205)	33.48	31.81, 35.14	4,614 (1,667)	37.89	36.36, 39.43	5,184 (1,951)	39.39	37.92, 40.86	4,149 (1,659)	42.32	40.67, 43.97
<b>Age</b>												
17-24	468 (258)	53.55	50.00, 57.11	611 (319)	52.34	49.24, 55.44	663 (372)	55.84	52.89, 58.78	533 (311)	58.86	55.63, 62.10
25-39	1,697 (705)	42.40	39.94, 44.86	2,135 (969)	46.91	44.68, 49.14	2,357 (1,110)	46.82	44.71, 48.94	1,920 (936)	49.05	46.70, 51.39
40-59	2,378 (779)	32.04	30.10, 33.98	2,946 (1,074)	35.30	33.50, 37.11	3,400 (1,316)	38.44	36.73, 40.15	2,621 (1,109)	42.58	40.62, 44.54
60+	1,890 (328)	17.18	15.45, 18.91	2,216 (428)	17.98	16.36, 19.60	2,492 (549)	20.57	18.97, 22.17	2,124 (489)	20.73	18.95, 22.51
<b>Province</b>												
British Columbia	1,075 (328)	31.00	28.39, 33.61	1,233 (426)	35.26	32.74, 37.77	1,208 (452)	37.50	34.94, 40.06	1,246 (500)	40.54	37.95, 43.12
Alberta	1,409 (553)	42.94	39.93, 45.95	1,610 (687)	44.72	41.96, 47.49	1,456 (700)	49.97	47.00, 52.94	1,447 (685)	50.08	47.13, 53.02
Saskatchewan	290 (104)	36.30	30.39, 42.20	363 (143)	39.86	34.56, 45.16	324 (132)	40.16	34.51, 45.81	353 (153)	42.72	37.19, 48.25
Manitoba	325 (115)	37.04	31.66, 42.42	283 (107)	38.81	33.16, 44.47	418 (157)	38.64	33.82, 43.47	384 (163)	45.34	40.39, 50.29
Ontario	2,805 (844)	30.46	28.83, 32.08	3,894 (1,306)	33.57	32.12, 35.02	4,674 (1,722)	36.54	35.19, 37.89	2,868 (1,078)	37.48	35.76, 39.20
New Brunswick	125 (46)	37.85	29.67, 46.04	99 (27)	27.59	19.18, 35.99	151 (49)	34.44	27.19, 41.69	350 (125)	36.94	32.09, 41.78
Nova Scotia	262 (53)	21.30	15.75, 26.84	258 (52)	21.06	15.46, 26.65	416 (64)	15.88	11.92, 19.85	382 (96)	25.17	20.27, 30.07
Prince Edward Island	47 (6)	21.26	6.23, 36.30	48 (11)	34.48	18.90, 50.07	68 (14)	41.97	28.93, 55.01	57 (12)	34.53	20.14, 48.93
Newfoundland	95 (21)	22.14	14.21, 30.07	120 (31)	24.09	16.88, 31.30	197 (57)	30.70	24.67, 36.72	111 (33)	31.82	23.65, 39.99
<b>Metro area</b>												

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Vancouver	572 (196)	33.75	30.19, 37.30	675 (259)	39.00	35.57, 42.42	682 (276)	40.25	36.86, 43.64	706 (310)	43.80	40.46, 47.14
Calgary	534 (205)	40.90	35.76, 46.04	524 (216)	43.37	38.18, 48.55	530 (245)	47.64	42.49, 52.79	529 (247)	47.66	42.41, 52.92
Edmonton	449 (147)	35.05	29.90, 40.19	570 (212)	36.76	32.30, 41.23	483 (220)	46.41	41.24, 51.58	494 (218)	46.62	41.62, 51.63
Ottawa	274 (51)	21.10	15.28, 26.92	478 (112)	23.69	19.03, 28.35	443 (118)	28.28	23.25, 33.32	314 (99)	32.17	25.92, 38.41
Toronto	1,191 (378)	32.34	30.04, 34.64	1,137 (435)	37.79	35.32, 40.25	1,689 (633)	36.76	34.74, 38.79	1,076 (434)	40.07	37.46, 42.67
Winnipeg	233 (83)	36.78	30.43, 43.13	210 (70)	33.49	27.12, 39.86	266 (94)	36.21	30.27, 42.14	228 (88)	41.34	34.90, 47.77
<b>Ethnicity<sup>1</sup></b>												
White	4,821 (1,475)	31.03	29.71, 32.36	5,955 (1,994)	33.32	32.11, 34.53	6,635 (2,367)	35.63	34.46, 36.80	5,474 (2,100)	38.61	37.30, 39.92
Indigenous	85 (27)	32.85	23.00, 42.70	91 (43)	44.02	33.91, 54.12	119 (51)	44.19	35.31, 53.07	98 (45)	45.91	36.18, 55.64
Asian	357 (116)	33.51	28.78, 38.23	421 (139)	36.02	31.68, 40.36	503 (190)	36.93	33.02, 40.84	378 (161)	44.76	39.93, 49.58
Other racialized groups	720 (324)	45.65	42.13, 49.18	895 (428)	49.08	45.86, 52.30	1,072 (539)	51.05	48.08, 54.02	743 (366)	50.07	46.58, 53.57
<b>Social Deprivation<sup>2</sup></b>												
1 (least deprived)	1,279 (427)	34.15	31.51, 36.80	1,513 (557)	37.66	35.24, 40.08	1,744 (692)	40.08	37.80, 42.36	1,361 (567)	41.99	39.37, 44.61
2	1,222 (419)	35.30	32.62, 37.98	1,465 (508)	34.81	32.33, 37.29	1,764 (640)	36.63	34.36, 38.89	1,306 (545)	41.46	38.77, 44.14
3	1,075 (345)	32.26	29.48, 35.05	1,376 (446)	32.16	29.71, 34.62	1,531 (562)	35.53	33.10, 37.95	1,331 (506)	38.15	35.55, 40.76
4	1,060 (306)	30.03	27.27, 32.78	1,279 (430)	33.65	31.04, 36.26	1,430 (532)	37.72	35.20, 40.24	1,181 (452)	39.44	36.60, 42.28
5 (most deprived)	1,043 (304)	29.26	26.47, 32.05	1,336 (489)	36.34	33.72, 38.96	1,383 (504)	36.63	34.06, 39.20	1,195 (439)	37.17	34.39, 39.95
<b>Material Deprivation<sup>2</sup></b>												
1 (least deprived)	1,612 (458)	28.85	26.60, 31.10	2,010 (655)	32.90	30.80, 34.99	2,143 (742)	34.57	32.51, 36.62	1,951 (731)	37.16	34.94, 39.38
2	1,365 (406)	30.89	28.41, 33.38	1,758 (615)	35.60	33.32, 37.88	2,009 (745)	36.01	33.87, 38.15	1,561 (616)	40.04	37.58, 42.50
3	1,208 (392)	32.45	29.78, 35.12	1,495 (523)	33.99	31.57, 36.41	1,642 (611)	37.23	34.90, 39.56	1,292 (506)	39.53	36.86, 42.19
4	883 (290)	33.58	30.52, 36.65	1,112 (394)	35.86	33.10, 38.63	1,272 (487)	38.48	35.86, 41.10	1,014 (401)	40.19	37.19, 43.19
5 (most deprived)	611 (255)	42.09	38.27, 45.91	594 (243)	40.33	36.55, 44.10	786 (345)	46.36	42.96, 49.77	556 (255)	45.94	42.04, 49.84
<b>Total</b>	<b>6,433 (2,070)</b>	<b>32.83</b>	<b>31.67, 33.98</b>	<b>7,908 (2790)</b>	<b>35.54</b>	<b>34.47, 36.60</b>	<b>8,912 (3,347)</b>	<b>37.64</b>	<b>36.62, 38.65</b>	<b>7,198 (2,845)</b>	<b>40.04</b>	<b>38.90, 41.18</b>

<sup>1</sup> In Week 1, self reported ethnicity was missing for 450 (7.0%) donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 28.90% (95% CI 24.58, 33.22). In Week 2, self reported ethnicity was missing for 546 (6.9%) donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 34.06% (95% CI 29.93, 38.20). In Week 3, self reported ethnicity was missing for 583 (6.5%) donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 34.04% (95% CI 30.20, 37.87). In Week 4, self reported ethnicity was missing for 505 (7.0%) donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 34.26% (95% CI 30.07, 38.45).

<sup>2</sup> In Week 1, postal codes were missing for 754 (11.7%) of donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 36.29% (95% CI 32.83, 39.76). In Week 2, postal codes were missing for 939 (11.9%) of donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 39.80% (95% CI 36.59, 43.02). In Week 3, postal codes were missing for 1,060 (11.9%) of donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 39.39% (95% CI 36.40, 42.37). In Week 4, postal codes were missing for 824 (11.4%) of donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 42.61% (95% CI 39.15, 46.06).



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

	April 1-7			April 8-15			April 16-23			April 24-30		
	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	69 (33)	46.72	38.37, 55.07	83 (48)	59.60	51.93, 67.27	69 (32)	47.61	39.49, 55.72	89 (48)	56.08	48.81, 63.35
25-39	274 (117)	43.06	37.14, 48.99	315 (149)	48.14	42.64, 53.64	350 (173)	48.97	43.77, 54.17	335 (170)	50.97	45.52, 56.42
40-59	364 (127)	34.41	29.74, 39.07	438 (160)	36.56	32.19, 40.93	457 (179)	39.06	34.79, 43.33	439 (185)	41.83	37.39, 46.27
60+	368 (51)	14.31	10.88, 17.73	397 (69)	16.00	12.58, 19.42	332 (68)	20.48	16.37, 24.59	383 (97)	23.83	19.68, 27.98
Total	1,075 (328)	31.00	28.39, 33.61	1,233 (426)	35.26	32.74, 37.77	1,208 (452)	37.50	34.94, 40.06	1,246 (500)	40.54	37.95, 43.12
<b>Alberta</b>												
17-24	99 (64)	67.64	59.35, 75.93	115 (70)	58.60	50.96, 66.24	129 (93)	70.57	63.52, 77.62	102 (59)	55.94	47.37, 64.52
25-39	386 (177)	48.92	43.28, 54.56	509 (252)	52.06	47.21, 56.92	393 (213)	54.93	49.23, 60.64	419 (230)	56.42	51.11, 61.74
40-59	509 (210)	41.78	36.65, 46.91	581 (260)	44.78	39.99, 49.57	550 (271)	50.16	45.19, 55.12	528 (276)	55.77	50.89, 60.64
60+	415 (102)	25.83	20.50, 31.16	405 (105)	24.89	19.67, 30.12	384 (123)	30.06	24.30, 35.82	398 (120)	29.11	23.43, 34.80
Total	1,409 (553)	42.94	39.93, 45.95	1,610 (687)	44.72	41.96, 47.49	1,456 (700)	49.97	47.00, 52.94	1,447 (685)	50.08	47.13, 53.02
<b>Saskatchewan</b>												
17-24	27 (12)	45.17	28.85, 61.50	40 (19)	48.48	35.01, 61.94	27 (15)	54.85	38.51, 71.18	21 (16)	76.39	60.54, 92.24
25-39	71 (39)	53.90	41.19, 66.60	100 (44)	43.98	33.48, 54.49	102 (51)	50.44	39.81, 61.07	100 (55)	54.78	44.03, 65.54
40-59	100 (38)	37.75	27.53, 47.98	133 (55)	42.06	32.99, 51.13	115 (45)	37.61	27.89, 47.32	108 (50)	44.04	33.80, 54.28
60+	92 (15)	16.14	7.72, 24.57	90 (25)	25.78	15.89, 35.67	80 (21)	24.31	14.45, 34.16	124 (32)	23.49	15.44, 31.54
Total	290 (104)	36.30	30.39, 42.20	363 (143)	39.86	34.56, 45.16	324 (132)	40.16	34.51, 45.81	353 (153)	42.72	37.19, 48.25
<b>Manitoba</b>												

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17-24	21 (13)	58.62	41.84, 75.39	24 (16)	59.34	43.94, 74.74	30 (15)	48.56	34.23, 62.89	45 (33)	75.84	65.61, 86.07
25-39	82 (38)	47.96	37.49, 58.42	75 (40)	53.13	42.35, 63.92	66 (31)	47.42	35.89, 58.96	96 (48)	49.91	40.36, 59.46
40-59	124 (42)	33.25	24.44, 42.06	97 (35)	34.80	24.75, 44.85	171 (66)	38.78	31.01, 46.54	127 (56)	43.68	34.56, 52.80
60+	98 (22)	21.06	12.03, 30.08	87 (16)	17.63	9.12, 26.15	151 (45)	29.45	21.34, 37.56	116 (26)	22.11	14.03, 30.18
Total	325 (115)	37.04	31.66, 42.42	283 (107)	38.81	33.16, 44.47	418 (157)	38.64	33.82, 43.47	384 (163)	45.34	40.39, 50.29
<b>Ontario</b>												
17-24	217 (119)	52.71	47.64, 57.78	312 (151)	49.42	45.20, 53.65	360 (196)	54.96	51.06, 58.87	214 (118)	55.81	50.84, 60.79
25-39	783 (305)	39.23	35.72, 42.74	1,023 (446)	45.28	42.07, 48.49	1,279 (584)	45.14	42.29, 47.99	792 (364)	46.07	42.44, 49.70
40-59	1,055 (309)	28.75	26.05, 31.45	1,498 (519)	33.05	30.62, 35.47	1,792 (686)	37.91	35.61, 40.20	1,087 (433)	40.36	37.43, 43.30
60+	750 (111)	15.65	13.24, 18.06	1,061 (190)	17.42	15.22, 19.62	1,243 (256)	19.22	17.14, 21.30	775 (163)	18.57	15.97, 21.17
Total	2,805 (844)	30.46	28.83, 32.08	3,894 (1,306)	33.57	32.12, 35.02	4,674 (1,722)	36.54	35.19, 37.89	2,868 (1,078)	37.48	35.76, 39.20
<b>Atlantic Canada</b>												
17-24	35 (17)	47.05	33.67, 60.42	37 (15)	39.49	25.96, 53.03	48 (21)	52.49	41.37, 63.61	62 (37)	62.83	53.45, 72.20
25-39	101 (29)	31.60	21.93, 41.26	113 (38)	35.62	26.68, 44.55	167 (58)	37.20	29.64, 44.76	178 (69)	40.37	33.06, 47.67
40-59	226 (53)	24.36	18.27, 30.45	199 (45)	23.54	17.09, 29.98	315 (69)	23.84	18.75, 28.93	332 (109)	33.15	27.78, 38.52
60+	167 (27)	17.45	11.27, 23.64	176 (23)	12.55	7.35, 17.74	302 (36)	14.03	9.86, 18.19	328 (51)	13.95	9.87, 18.03
Total	529 (126)	26.14	22.20, 30.08	525 (121)	24.36	20.54, 28.19	832 (184)	26.02	22.92, 29.11	900 (266)	31.89	28.76, 35.03
<b>Overall Total</b>	6,433 (2,070)	32.82	31.67, 33.98	7,908 (2,790)	35.54	34.47, 36.60	8,912 (3,347)	37.64	36.62, 38.65	7,198 (2,845)	40.04	38.90, 41.18