

# COVID-19 Seroprevalence Brief Report

Report #26A: September 1-14, 2022, Survey

(Reported September 24, 2022)

## Introduction

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 report weekly seroprevalence and evaluate differences by geographical regions, age groups, racialized groups, and socioeconomic status.

This is a brief bi-weekly report intended to provide updates to inform public health policy and mathematical modelling as the Omicron variant wave progresses. Full reports with more detailed results are released monthly.

## 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.

### 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%. All testing was conducted at Canadian Blood Services laboratories in Ottawa.

Full details on methods, data management and analysis, and ethical issues can be found in the previous Report, #25: August 2022.

## Results

Between September 1 and September 14, 2022, a total of 15,180 unique donors were tested for SARS-CoV-2 antibodies.

Spike antibody results indicate a SARS-CoV-2 humoral response to vaccination or natural infection. The (adjusted) proportion of blood donors with humoral immunity was 100% (95% CI, 100.00, 100.00) (based on results from the Spike antibody assay). A peak in blood concentration followed by decline is expected after vaccination. Spike antibody concentrations are shown since September 2021 (Figure 1) and declines and peaks in antibody concentration are consistent with the roll-out of third and fourth vaccination doses in late 2021/early 2022 and in the spring of 2022. Peaks occurred earlier in older age groups, consistent with the policies to vaccinate older age groups earlier and progressively in younger donors consistent with infection rates.

The nucleocapsid seroprevalence is indicative of natural infection (Table 1). There was an increase over the 14-day reporting period from 59.87% (95% CI, 58.89, 60.86) in the last week of August, to 61.17% (95% CI, 60.07, 62.28) in the first week of September, to 63.62% (95% CI, 62.53, 64.71) by mid-September. Consistent with previous surveys, donors aged 17-24 years old had the highest seroprevalence rate compared to other age groups (76.70% (95% CI 73.89, 79.51) in the week of September 8-14, 77.43% (95% CI, 74.80, 80.07) from September 1-7). Compared to the last week of August, the seroprevalence rate increased in all provinces except New Brunswick and Newfoundland where few samples were tested. Racialized groups continue to have higher seroprevalence compared with white donors (70.39% (95% CI, 67.88, 72.90) vs 62.28% (95% CI, 61.03, 63.53) in the week of September 8-14, 67.16% (95% CI, 64.76, 69.57) vs 60.05% (95% CI, 58.75, 61.34) from September 1-7).

## Conclusion

Spike antibody concentrations are high. While antibody concentrations have waned from their peak seen around the roll-out of the third dose in January, levels have remained consistently high, particularly among younger donors. This is possibly related to breakthrough natural infections in these age groups. Despite all donors having vaccine related antibodies as of September 2022, the infection related antibody rate is 62.40% (95% CI, 61.62, 63.18) in the period September 1-14, consistent with the continued prevalence of the Omicron variant and subvariants.

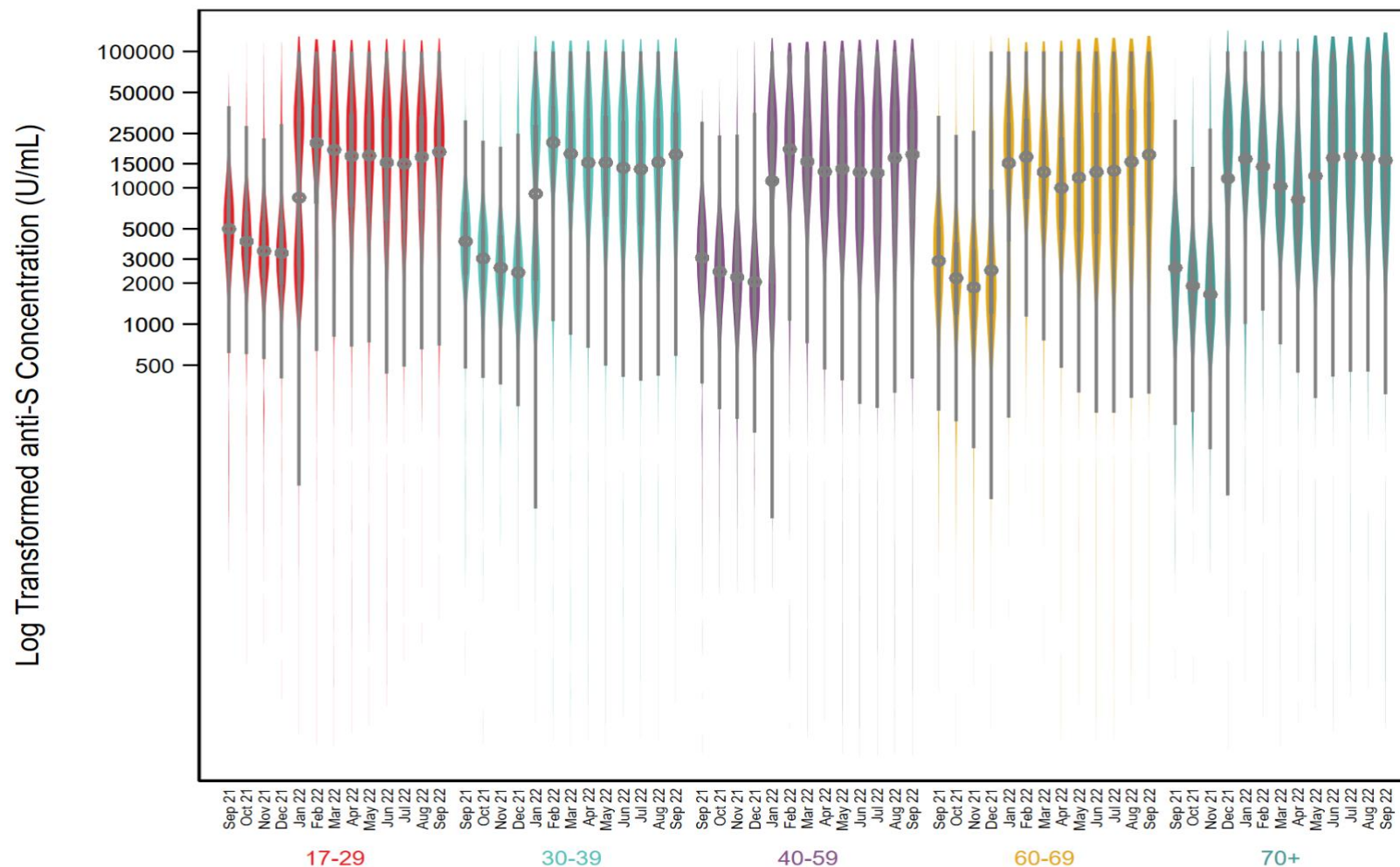
**Table 1.** Weekly SARS-CoV-2 seroprevalence by sociodemographic variables by natural infection (nucleocapsid) results in August and September 2022 (weighted for population demographics and adjusted for test characteristics (sensitivity and specificity)).

| August 24-31         |               |                 |                  |              | September 1 – 7 |                 |                  |              | September 8 – 14 |                 |                  |              |
|----------------------|---------------|-----------------|------------------|--------------|-----------------|-----------------|------------------|--------------|------------------|-----------------|------------------|--------------|
|                      | Crude         |                 | Adjusted         |              | Crude           |                 | Adjusted         |              | Crude            |                 | Adjusted         |              |
|                      | Number Tested | Number Positive | Percent Positive | 95% CI       | Number Tested   | Number Positive | Percent Positive | 95% CI       | Number Tested    | Number Positive | Percent Positive | 95% CI       |
| <b>Sex</b>           |               |                 |                  |              |                 |                 |                  |              |                  |                 |                  |              |
| Female               | 4,422         | 2,635           | 58.77            | 57.39, 60.15 | 3,287           | 2,004           | 60.49            | 58.92, 62.06 | 3,458            | 2,224           | 64.20            | 62.71, 65.70 |
| Male                 | 5,308         | 3,134           | 61.04            | 59.63, 62.44 | 4,301           | 2,617           | 61.86            | 60.30, 63.43 | 4,134            | 2,570           | 62.98            | 61.39, 64.56 |
| <b>Age</b>           |               |                 |                  |              |                 |                 |                  |              |                  |                 |                  |              |
| 17-24                | 745           | 570             | 76.87            | 74.49, 79.24 | 563             | 445             | 77.43            | 74.80, 80.07 | 510              | 397             | 76.70            | 73.89, 79.51 |
| 25-39                | 2,660         | 1,809           | 68.74            | 66.86, 70.62 | 2,033           | 1,432           | 70.30            | 68.21, 72.39 | 1,939            | 1,398           | 73.07            | 71.02, 75.12 |
| 40-59                | 3,569         | 2,206           | 61.81            | 60.16, 63.47 | 2,773           | 1,702           | 60.47            | 58.55, 62.38 | 2,969            | 1,950           | 66.05            | 64.26, 67.83 |
| 60+                  | 2,756         | 1,184           | 41.68            | 39.80, 43.56 | 2,219           | 1,042           | 46.45            | 44.32, 48.58 | 2,174            | 1,049           | 46.99            | 44.86, 49.11 |
| <b>Province</b>      |               |                 |                  |              |                 |                 |                  |              |                  |                 |                  |              |
| British Columbia     | 1,605         | 935             | 59.32            | 56.94, 61.69 | 1,295           | 827             | 64.38            | 61.73, 67.02 | 1,406            | 878             | 63.39            | 60.83, 65.96 |
| Alberta              | 1,839         | 1,248           | 69.24            | 66.84, 71.64 | 1,522           | 1,044           | 70.62            | 67.90, 73.34 | 1,548            | 1,079           | 71.02            | 68.35, 73.69 |
| Saskatchewan         | 408           | 234             | 59.06            | 53.94, 64.18 | 381             | 222             | 59.34            | 53.92, 64.76 | 324              | 203             | 62.37            | 56.50, 68.23 |
| Manitoba             | 474           | 286             | 62.13            | 57.59, 66.66 | 380             | 236             | 63.95            | 58.71, 69.18 | 419              | 267             | 64.87            | 59.86, 69.87 |
| Ontario              | 4,270         | 2,443           | 57.78            | 56.36, 59.20 | 3,304           | 1,878           | 57.56            | 56.01, 59.11 | 3,073            | 1,901           | 62.37            | 60.81, 63.92 |
| New Brunswick        | 297           | 169             | 58.64            | 52.78, 64.50 | 292             | 191             | 67.94            | 61.89, 73.99 | 255              | 146             | 56.91            | 49.88, 63.95 |
| Nova Scotia          | 561           | 289             | 52.88            | 48.29, 57.47 | 338             | 174             | 50.79            | 44.42, 57.16 | 415              | 230             | 56.85            | 51.09, 62.61 |
| Prince Edward Island | 132           | 79              | 60.40            | 50.34, 70.45 | 3               | 2               | 53.58            | 23.11, 84.06 | 20               | 15              | 75.04            | 64.39, 85.68 |
| Newfoundland         | 144           | 86              | 59.68            | 52.96, 66.39 | 73              | 47              | 65.90            | 56.08, 75.72 | 132              | 75              | 58.37            | 50.92, 65.83 |
| <b>Metro area</b>    |               |                 |                  |              |                 |                 |                  |              |                  |                 |                  |              |
| Vancouver            | 880           | 555             | 63.16            | 60.18, 66.15 | 645             | 432             | 68.09            | 64.40, 71.78 | 737              | 504             | 69.16            | 65.75, 72.56 |
| Calgary              | 675           | 471             | 71.69            | 67.44, 75.94 | 601             | 410             | 70.99            | 66.45, 75.54 | 552              | 399             | 74.29            | 69.69, 78.89 |

|                                         |              |              |              |                     |              |              |              |                     |              |              |              |                     |
|-----------------------------------------|--------------|--------------|--------------|---------------------|--------------|--------------|--------------|---------------------|--------------|--------------|--------------|---------------------|
| Edmonton                                | 593          | 364          | 61.65        | 57.36, 65.94        | 459          | 312          | 69.53        | 64.69, 74.37        | 492          | 318          | 66.16        | 61.38, 70.93        |
| Ottawa                                  | 507          | 269          | 52.55        | 47.17, 57.93        | 327          | 181          | 56.70        | 50.97, 62.43        | 360          | 205          | 57.60        | 52.17, 63.03        |
| Toronto                                 | 1,177        | 693          | 59.21        | 56.89, 61.53        | 916          | 530          | 57.81        | 55.33, 60.29        | 843          | 548          | 63.56        | 61.14, 65.98        |
| Winnipeg                                | 338          | 203          | 62.20        | 56.49, 67.92        | 224          | 131          | 59.89        | 52.95, 66.83        | 206          | 127          | 62.89        | 55.61, 70.17        |
| <b>Ethnicity<sup>1</sup></b>            |              |              |              |                     |              |              |              |                     |              |              |              |                     |
| White                                   | 7,475        | 4,317        | 58.13        | 56.99, 59.27        | 5,737        | 3,435        | 60.05        | 58.75, 61.34        | 5,932        | 3,677        | 62.28        | 61.03, 63.53        |
| Indigenous                              | 126          | 80           | 66.93        | 59.23, 74.63        | 99           | 73           | 73.93        | 65.10, 82.75        | 83           | 53           | 57.68        | 46.82, 68.54        |
| Asian                                   | 489          | 313          | 63.94        | 59.92, 67.97        | 407          | 253          | 58.36        | 53.90, 62.81        | 337          | 230          | 67.77        | 63.05, 72.50        |
| Other racialized groups                 | 1,035        | 722          | 71.58        | 68.84, 74.31        | 846          | 590          | 71.04        | 68.08, 74.01        | 759          | 540          | 72.83        | 69.78, 75.89        |
| <b>Social Deprivation<sup>2</sup></b>   |              |              |              |                     |              |              |              |                     |              |              |              |                     |
| 1 (least deprived)                      | 1,847        | 1,124        | 60.74        | 58.53, 62.96        | 1,443        | 926          | 64.15        | 61.68, 66.62        | 1,435        | 950          | 67.17        | 64.69, 69.65        |
| 2                                       | 1,799        | 1,045        | 58.42        | 56.15, 60.70        | 1,434        | 828          | 57.85        | 55.30, 60.40        | 1,435        | 894          | 62.12        | 59.62, 64.62        |
| 3                                       | 1,686        | 1,011        | 61.75        | 59.40, 64.09        | 1,261        | 759          | 59.16        | 56.43, 61.89        | 1,344        | 851          | 64.42        | 61.84, 67.00        |
| 4                                       | 1,657        | 965          | 59.82        | 57.42, 62.22        | 1,263        | 776          | 63.90        | 61.21, 66.59        | 1,153        | 717          | 62.18        | 59.37, 64.98        |
| 5 (most deprived)                       | 1,606        | 913          | 56.61        | 54.08, 59.13        | 1,300        | 773          | 59.59        | 56.87, 62.31        | 1,219        | 727          | 60.33        | 57.59, 63.07        |
| <b>Material Deprivation<sup>2</sup></b> |              |              |              |                     |              |              |              |                     |              |              |              |                     |
| 1 (least deprived)                      | 2,591        | 1,458        | 56.43        | 54.43, 58.44        | 1,920        | 1,172        | 60.50        | 58.28, 62.71        | 1,954        | 1,235        | 62.27        | 60.11, 64.44        |
| 2                                       | 2,103        | 1,266        | 61.15        | 59.01, 63.29        | 1,584        | 956          | 60.64        | 58.19, 63.09        | 1,665        | 1,050        | 63.99        | 61.61, 66.37        |
| 3                                       | 1,752        | 1,035        | 59.12        | 56.83, 61.42        | 1,386        | 853          | 62.75        | 60.17, 65.32        | 1,374        | 854          | 63.18        | 60.61, 65.76        |
| 4                                       | 1,390        | 837          | 61.28        | 58.78, 63.77        | 1,154        | 686          | 59.43        | 56.62, 62.23        | 1,007        | 636          | 63.80        | 60.85, 66.75        |
| 5 (most deprived)                       | 759          | 462          | 62.24        | 58.95, 65.53        | 657          | 395          | 61.72        | 58.07, 65.37        | 586          | 364          | 64.46        | 60.80, 68.12        |
| <b>Total</b>                            | <b>9,730</b> | <b>5,769</b> | <b>59.87</b> | <b>58.89, 60.86</b> | <b>7,588</b> | <b>4,621</b> | <b>61.17</b> | <b>60.07, 62.28</b> | <b>7,592</b> | <b>4,794</b> | <b>63.62</b> | <b>62.53, 64.71</b> |

<sup>1</sup> In Week 1, self reported ethnicity was missing for 605 (6.2%) donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 54.70% (95% CI 50.66, 58.74). In Week 2, self reported ethnicity was missing for 499 (6.6%) donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 55.69% (95% CI 51.23, 60.14). In Week 3, self reported ethnicity was missing for 481 (6.3%) donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 61.72% (95% CI 57.25, 66.20).

<sup>2</sup> In Week 1, postal codes were missing for 1,135 (11.7%) of donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 62.44% (95% CI 59.56, 65.31). In Week 2, postal codes were missing for 887 (11.7%) of donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 63.14% (95% CI 59.85, 66.43). In Week 3, postal codes were missing for 1,006 (13.3%) of donors; Adjusted seroprevalence by the Nucleocapsid antibody assay was 65.55% (95% CI 62.57, 68.52).



**Figure 1.** Spike antibody concentration (U/mL) by month and age group from September 1, 2021, to September 14, 2022.