Coronavirus (COVID-19) Infection Survey quality report: September 2022

This quality report presents information on the Coronavirus (COVID-19) Infection Survey data collection method change from study worker home visit to remote data collection.

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1 . Main points

Following on from our first quality report, to further assess the impact of the change in how data are collected on our estimates, we compared estimates of the percentage of the population testing positive for antibodies against SARS-CoV-2 at different levels by data collection method.

- Between 10 and 29 July 2022, there was no statistical evidence of a difference between estimates of the percentage of the population of Great Britain testing positive for antibodies against SARS-CoV-2 at the 179 nanograms per millilitre (ng/ml) level produced by remote data collection or study worker home visit data collection.
- Between 10 and 29 July 2022, there was statistical evidence of a small difference at the 800 ng/ml level, indicating that blood samples collected remotely were slightly more likely to have antibodies against SARS-CoV-2 at or above this level compared with those collected at study worker home visits, in Great Britain.

2 . Change in Coronavirus (COVID-19) Infection Survey data collection method

In response to the coronavirus (COVID-19) pandemic, the Coronavirus (COVID-19) Infection Survey (CIS) measures:

- how many people across England, Wales, Northern Ireland and Scotland would have tested positive for a COVID-19 infection on a nose and throat swab, regardless of whether they report experiencing symptoms
- the number of people who would have tested positive for antibodies against SARS-CoV-2 at different levels on a blood sample

Since the start of the survey in April 2020, the COVID-19 Infection Survey questionnaire data, and swab and blood samples have been collected by study worker home visits to participants. From July 2022 we changed the way that we collect our data, moving from study worker home visits to a more flexible remote data collection approach.

We have introduced a digitalised questionnaire, which participants can complete online or by telephone, as well as returning swab and blood sample kits through the post (or by courier for some participants). Our August 2022 Coronavirus (COVID-19) Infection Survey quality report provides more information on this data collection method change, as well as initial analysis of the effects of the two data collection methods. Findings from this first analysis include:

- overall, around 9 out of 10 participants (89.3%) who completed our feedback survey were "satisfied" or "very satisfied" with the new remote data collection service

- in the week ending 21 July 2022, point estimates of the percentage of people testing positive for COVID-19 on a nose and throat swab produced by remote data collection were within the credible intervals of the point estimates produced by study worker home visit data collection for England, Wales, Northern Ireland, Scotland and all English regions except for the East of England

- in the week ending 21 July 2022, point estimates of the percentage of people in England testing positive for COVID-19 on a nose and throat swab produced by remote data collection were within the credible intervals of the point estimates produced by study worker home visit data collection for most age groups

This is the second report presenting analysis of the effects of data collection method. These analyses compare data collected between study worker home visits in the majority of participants and our new remote data collection approach.

This quality report includes comparisons between the different data collection methods on our estimates of the percentage of the population that have antibodies against SARS-CoV-2, the specific virus that causes COVID-19, at different levels.

This analysis includes Coronavirus (COVID-19) Infection Survey participants aged 8 years and over in Great Britain. All data are based on blood test results from those living in private households, excluding those living in care homes or other communal establishments.

3 . Antibody estimates at different levels by data collection method

We use blood samples from the Coronavirus (COVID-19) Infection Survey to estimate the percentage of the population that would have antibodies against SARS-CoV-2, the specific virus that causes COVID-19, at or above two levels: a 179 nanograms per millilitre (ng/ml) level and an 800 ng/ml level. More information on how we interpret antibodies and these levels is available in Section 5: How the data are measured.

We regularly publish estimates of the percentages of the population that have antibodies against SARS-CoV-2 for England, Wales, Scotland and Northern Ireland at or above these levels in our Coronavirus (COVID-19) Infection Survey, antibody data bulletin. To produce these estimates, we run two separate models: one for Great Britain and the other for Northern Ireland. More information on the models used to produce these estimates can be found in our methods article.

We investigated the impact of the change in data collection method by comparing estimates produced by study worker home visit data collection only, with those produced by remote data collection only, for each of these levels. To do this, we added data collection method as a fixed effect to our model for Great Britain (England, Wales and Scotland). The analysis includes blood samples provided to study workers at home visits from 7 December 2020 to 29 July 2022 and blood samples provided via post or courier from 10 to 29 July 2022.

There was statistical evidence of a small difference at the 800 ng/ml level, indicating that blood samples collected remotely were slightly more likely to have antibodies against SARS-CoV-2 at or above this level compared with those collected at study worker home visits. Based on the most recently published figure for the percentage of the adult population estimated to have antibodies against SARS-CoV-2 at or above the level of 800 ng/ml in England (73.6% for the week commencing 18 July 2022), the estimate would be 2.06% points higher (95% credible interval: 1.43% to 2.68%) in blood samples returned via post or courier than in blood samples collected at study worker home visits.

At or above the level of 179 ng/ml, there was no statistical evidence of a difference between estimates of the percentage of the population of Great Britain testing positive for antibodies against SARS-CoV-2 produced by remote data collection or study worker home visit data collection. Results from the same analysis for Northern Ireland, at or above the level of 179 ng/ml and 800 ng/ml, showed high variability and large uncertainty, likely because of low sample counts. However, overall results for Northern Ireland are likely to be consistent with results for Great Britain, given estimates for Northern Ireland have followed similar trends to those in England, Wales and Scotland in our previously published bulletins.

Although there was evidence of a difference in estimates of antibodies against SARS-CoV-2 at or above the 800 ng/ml level, the size of the difference was small. Therefore, we plan to combine data collected remotely with data from our previous collection method using study worker home visits to produce our estimates of the percentage of the population estimated to have antibodies against SARS-CoV-2 at different levels in our Coronavirus (COVID-19) Infection Survey, antibody data bulletin.

Estimates of the percentage of the population who would have antibodies against SARS-CoV-2 at or above the level of 179 ng/ml and 800 ng/ml produced by study worker home visit data collection only, and estimates produced through a combination of remote and study worker home visit data collection methods, for England, Wales and Scotland are available in our Coronavirus (COVID-19) Infection Survey quality report: September 2022 dataset.

Estimates of the percentage of the population that have antibodies against SARS-CoV-2 using both methods of data collection only include three weeks of remote data collection from 10 to 29 July 2022, because of the recency of the method change. Because of the variability in results for Northern Ireland caused by low sample counts, we have not included this analysis for Northern Ireland. However, results for Northern Ireland using the study worker home visit only and combined data collection methods are generally similar to the equivalent results for England, Wales and Scotland. Therefore, we plan to combine both methods of data collection for Northern Ireland as well as England, Wales and Scotland in our Coronavirus (COVID-19) Infection Survey, antibody data bulletin.

Credible intervals around estimates of antibodies against SARS-CoV-2 for England, Wales and Scotland produced by combining both methods of data collection consistently overlap with credible intervals around estimates produced by study worker home visit data collection only, at the 179 ng/ml level and the 800 ng/ml level. In the final week included in this analysis, remote data collection accounted for approximately two-thirds of the total sample.

4 . Future developments

The findings presented in this article, as well as findings from our August 2022 Coronavirus (COVID-19) Infection Survey quality report, indicate that the change to a remote data collection method has had minimal impact on survey results.

We are continuing to conduct comparative analyses and will publish further findings over the coming months. This analysis will include representativeness of participants providing data by remote collection over time.

5 . How the data are measured

Antibodies and immunity

Antibody positivity is defined by having a concentration of antibodies in the blood that is at or above a certain level. A negative test result occurs if there are no antibodies, or if antibody levels are below this level at the time of testing. It does not mean that the antibody level is at zero or that a person has no protection against coronavirus (COVID-19). Additionally, there are other parts of the immune system that will offer protection, for example, a person's T-cell response. This will not be detected by blood tests for antibodies. A person's immune response is affected by a number of factors, including health conditions and age.

Our blog on antibodies and immunity gives further information on the link between antibodies, immunity and the vaccine programme. Our blog on vaccine effectiveness provides information on the effectiveness of vaccinations against Alpha and Delta variants, which is based on research conducted by partners from the University of Oxford.

Measuring antibody positivity

Our 179 nanograms per millilitre (ng/ml) level is based on research by our academic partners, and reflects the percentage of adults who would have been likely to have a strong enough antibody response to provide some protection from getting a new COVID-19 infection with the Delta variant. This level is higher than our previously reported standard level of 42 ng/ml, which was associated with SARS-CoV-2 infection before vaccines became available.

This antibody level was identified as providing a 67% lower risk of getting a new COVID-19 infection with the Delta variant after two vaccinations with either Pfizer or AstraZeneca vaccines, compared with someone who was unvaccinated and had not had COVID-19 before. It is unlikely that this level will provide equivalent protection against the Omicron variant. The 800 ng/ml level is the highest level at which we can produce a historical back-series and is provided to enable enhanced monitoring of antibody levels and waning. It is not based on academic research on protection against the Omicron variant, as sufficient evidence on this is not yet available.

The test used for spike antibodies measures their concentration in ng/ml. The antibody level of 179 ng/ml corresponds to 100 binding antibody units (BAU)/ml, using the World Health Organization's (WHO) standardised units (enabling comparison across different antibody assays).

Further information on antibody test levels, and the link between antibodies and infections can be found in our recent blog post: Relationship between COVID-19 infections and antibodies: What do the data show?

6 . Collaboration

The Coronavirus (COVID-19) Infection Survey analysis was produced by the Office for National Statistics (ONS) in collaboration with our research partners at the University of Oxford, the University of Manchester, UK Health Security Agency (UK HSA) and Wellcome Trust. Of particular note are:

- Sarah Walker - University of Oxford, Nuffield Department for Medicine: Professor of Medical Statistics and Epidemiology and Study Chief Investigator
- Koen Pouwels - University of Oxford, Health Economics Research Centre, Nuffield Department of Population Health: Senior Researcher in Biostatistics and Health Economics
- Thomas House - University of Manchester, Department of Mathematics: Reader in Mathematical Statistics
- Anna Seale - University of Warwick, Warwick Medical School: Professor of Public Health; UK Health Security Agency, Data, Analytics and Surveillance: Scientific Advisor

7 . Glossary

Age groups for children and young people

- "aged 2 years to school Year 6" includes children in primary school and below
- "school Year 7 to school Year 11" includes children in secondary school
- "school Year 12 to those aged 24 years" includes young adults who may be in further or higher education

Those aged 11 to 12 years and those aged 16 to 17 years have been split between different age categories depending on whether their birthday is before or after 1 September.

Credible interval

A credible interval gives an indication of the uncertainty of an estimate from data analysis. The 95% credible intervals are calculated so that there is a 95% probability of the true value lying in the interval. A wider interval indicates more uncertainty in the estimate. Overlapping credible intervals indicate that there may not be a true difference between two estimates. For more information, see our methodology page on statistical uncertainty.

Antibodies

We measure the levels of antibodies in people who live in private households to understand who has had coronavirus (COVID-19) in the past and the impact of vaccinations. It takes between two and three weeks after infection or vaccination for the body to make enough antibodies to fight the infection. Antibodies can help prevent individuals from getting the same infection again. Once infected or vaccinated, antibodies remain in the blood at low levels and can decline over time.

SARS-CoV-2

This is the scientific name given to the specific virus that causes COVID-19.

8 . Related links

Coronavirus (COVID-19) Infection Survey: methods and further information
Methodology | Revised 5 August 2022
This methodology guide is intended to provide information on the methods used to collect the data, process it, and calculate the statistics produced from the Coronavirus (COVID-19) Infection Survey.

Coronavirus (COVID-19) Infection Survey QMI
Methodology | Revised 8 August 2022
Quality and Methodology Information (QMI) for the Coronavirus (COVID-19) Infection Survey (CIS), detailing the strengths and limitations of the data, methods used, and data uses and users.

Coronavirus (COVID-19) Infection Survey, UK
Bulletin | Updated weekly
Estimates for England, Wales, Northern Ireland and Scotland, including regional and age breakdowns. This survey is being delivered in partnership with the University of Oxford, University of Manchester, UK Health Security Agency and Wellcome Trust.

Coronavirus (COVID-19) Infection Survey: characteristics of people testing positive for COVID-19 in countries of the UK
Bulletin | Updated fortnightly
The characteristics of people testing positive for coronavirus (COVID-19) from the COVID-19 Infection Survey. This survey is being delivered in partnership with the University of Oxford, the University of Manchester, UK Health Security Agency and Wellcome Trust.

Coronavirus (COVID-19) Infection Survey: antibody and vaccination data for the UK
Bulletin | Updated fortnightly
Antibody and vaccination data by UK country and English regions from the Coronavirus (COVID-19) Infection Survey. This survey is being delivered in partnership with the University of Oxford, University of Manchester, UK Health Security Agency and Wellcome Trust.

The Nuffield Department of Medicine study protocol specifies the research for the study.

9 . Cite this report

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