

Statistical bulletin

# Coronavirus (COVID-19) Infection Survey, antibody data, UK: 1 December 2022

Antibody data, by UK country and age, from the Coronavirus (COVID-19) Infection Survey. This survey is delivered in partnership with University of Oxford, University of Manchester, UK Health Security Agency (UKHSA) and Wellcome Trust, working with the University of Oxford and partner laboratories to collect and test samples.

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# 1 . Main points

In this bulletin, we report percentages of the population that are estimated to have antibodies against SARS-CoV-2, the specific virus that causes coronavirus (COVID-19), above varying levels.

In the week beginning 17 October 2022, the percentage of people estimated to have antibodies against SARS-CoV-2:

- in England, was 97.3% of adults at or above 179 nanograms per millilitre (ng/ml) (95% credible interval: 97.0% to 97.6%), and 77.9% of adults at or above 800 ng/ml (95% credible interval: 76.5% to 79.1%)
- in Wales, was 96.9% of adults at or above 179 ng/ml (95% credible interval: 96.3% to 97.5%), and 73.4% of adults at or above 800 ng/ml (95% credible interval: 71.1% to 75.4%)
- in Northern Ireland, was 96.4% of adults at or above 179 ng/ml (95% credible interval: 94.9% to 97.4%), and 75.3% of adults at or above 800 ng/ml (95% credible interval: 71.6% to 78.6%)
- in Scotland, was 96.6% of adults at or above 179 ng/ml (95% credible interval: 96.0% to 97.1%), and 75.4% of adults at or above 800 ng/ml (95% credible interval: 73.5% to 77.0%)
- in Great Britain, was 79.9% (95% credible interval: 72.1% to 86.0%) for children aged 8 to 11 years and 95.1% (95% credible interval: 92.2% to 97.0%) for children aged 12 to 15 years at or above 179 ng/ml, and 41.6% (95% credible interval: 33.2% to 50.9%) for children aged 8 to 11 years and 77.4% (95% credible interval: 71.8% to 82.2%) for children aged 12 to 15 years at or above 800 ng/ml

The percentage estimated to have antibodies at or above the 800 ng/ml level increased among those aged 65 years and over in recent weeks, likely as a result of the vaccination booster campaign.

## About this bulletin

This publication includes estimates of antibody positivity at the following thresholds: 179 nanograms per millilitre (ng/ml), 800 ng/ml, 2,000 ng/ml, 4,000 ng/ml and 6,000 ng/ml.

As part of our continuous improvement, a small percentage of samples are being retested where a conclusive result was not previously obtained. Some of these samples have now been retested, and estimates of antibody positivity have been updated accordingly, with minimal impact to the results.

## 2 . Antibodies by age group

In the week beginning 17 October 2022, the percentage of the adult population estimated to have antibodies against SARS-CoV-2 at or above the level of 179 nanograms per millilitre (ng/ml) remained high across the UK. The percentage estimated to have antibodies at or above the 800 ng/ml level increased among those aged 65 years and over in recent weeks, likely as a result of the vaccination booster campaign.

### Figure 1: The percentage of the population estimated to have antibodies against SARS-CoV-2 remained high for UK adults in the week beginning 17 October 2022

Modelled percentage of the adult population with levels of antibodies against SARS-CoV-2 at or above 179 nanograms per millilitre (ng/ml) or 800 ng/ml, by age group, UK countries, 7 December 2020 to 23 October 2022

Notes:

1. All results are provisional and subject to revision.
2. These statistics refer to antibody tests for individuals living in private households. They exclude those in hospitals, care homes or other communal establishments.
3. All estimates are subject to uncertainty, given that a sample is only part of the wider population. [A credible interval](#) gives an indication of the uncertainty of an estimate from data analysis.
4. The denominators used for antibodies are the total for each age group in the sample at that particular time point, then post-stratified by the mid-year population estimate.
5. There was an issue with antibody laboratory results over the period 10 January to 27 February 2022, which primarily affected 800 ng/ml estimates. As a result, 800 ng/ml level estimates are not available for this period, and all other estimates for February 2022 are subject to change because of the reprocessing of some results.
6. In Northern Ireland, the number of people sampled is low compared with England, Wales and Scotland, therefore some age groups have been combined. In this publication, age groups for Northern Ireland have been adjusted to distinguish between those aged below and above 75 years, reflecting the different timing of vaccination rollout between these groups. The new age groups are: 16 to 24, 25 to 34, 35 to 49, 50 to 64, 65 to 74, and 75 years and over. This does not affect results for England, Wales, Scotland or Great Britain.

#### Download the data

[.xlsx](#)

In the week beginning 17 October 2022, the percentage of children estimated to have antibodies against SARS-CoV-2 at or above 179 ng/ml continued to increase for those aged 8 to 11 years and remained high for those aged 12 to 15 years across Great Britain. Among those aged 12 to 15 years, the percentage estimated to have antibodies against SARS-CoV-2 at or above 800 ng/ml remained high over recent weeks.

### **Figure 2: The percentage of children aged 8 to 15 years estimated to have antibodies against SARS-CoV-2 at the 179 ng/ml level generally increased over recent months**

**Modelled percentage of children with levels of antibodies against SARS-CoV-2 at or above 179 nanograms per millilitre (ng/ml) or 800 ng/ml, by age group, Great Britain, 29 November 2021 to 23 October 2022**

#### Notes:

1. All results are provisional and subject to revision.
2. These statistics refer to antibody tests for individuals living in private households. They exclude those in hospitals, care homes or other communal establishments.
3. All estimates are subject to uncertainty, given that a sample is only part of the wider population. [A credible interval](#) gives an indication of the uncertainty of an estimate from data analysis.
4. The denominators used for antibody age groups are for the total number of children aged 8 to 11 years and 12 to 15 years, respectively, in the sample at that particular time point. These are then post-stratified by the mid-year population estimate.
5. Estimates show the percentages of children in age groups 8 to 11 years and 12 to 15 years in Great Britain as a whole (England, Wales and Scotland) who would have tested positive for antibodies against SARS-CoV-2 at or above the antibody levels of 179 ng/ml and 800 ng/ml.
6. There was an issue with antibody laboratory results over the period 10 January to 27 February 2022 which primarily impacted 800 ng/ml estimates. As a result, 800 ng/ml level estimates are not available for this period, and all other estimates for February 2022 are subject to change due to the re-processing of some results.
7. Estimates for children in age groups 8 to 11 years and 12 to 15 years are not available before 29 November 2021.

#### Download the data

[.xlsx](#)

Figure 3 shows the proportion of the adult population estimated to have antibodies to SARS-CoV-2 between the following ranges:

- less than 179 ng/ml (including those with low or no antibodies to SARS-CoV-2)
- from 179 ng/ml to less than 800 ng/ml
- from 800 ng/ml to less than 2,000 ng/ml
- from 2,000 ng/ml to less than 4,000 ng/ml
- from 4,000 ng/ml to less than 6,000 ng/ml
- 6,000 ng/ml and above

Each of these ranges is represented by a shaded area. The larger the area, the greater the proportion of people who have antibody levels within this range. This information is shown by age group and country.

Over recent weeks, there was an increase in the proportion of those estimated to have antibodies to SARS-CoV-2 in the 6,000 ng/ml and above range across most of the UK, for those aged 65 years and over, likely reflecting recent vaccinations.

Results at the 2,000ng/ml level and above, for children aged 8 to 15 years in Great Britain, can be found in our [Coronavirus \(COVID-19\) Infection Survey, antibody data, UK: dataset](#).

### **Figure 3: The highest antibody levels were seen among those aged 65 years and over across the UK, in the week beginning 17 October 2022**

**Modelled percentage of the population with levels of antibodies across varying levels from less than 179 nanograms per millilitre (ng/ml) to 6,000 ng/ml or above, 2 May to 23 October 2022**

#### Notes:

1. All results are provisional and subject to revision.
2. These statistics refer to antibody tests for individuals living in private households. They exclude those in hospitals, care homes or other communal establishments.
3. All estimates are subject to uncertainty, given that a sample is only part of the wider population. [A credible interval](#) gives an indication of the uncertainty of an estimate from data analysis.
4. The denominators used for antibodies are the total for each age group in the sample at that particular time point, then post-stratified by the mid-year population estimate.

#### Download the data

[.xlsx](#)

## 3 . Coronavirus (COVID-19) Infection Survey data

[Coronavirus \(COVID-19\) Infection Survey, antibody data for the UK](#)

Dataset | Released 1 December 2022

Antibody data by UK country and regions in England from the Coronavirus (COVID-19) Infection Survey.

## 4 . Glossary

### 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.

### Credible interval

A credible interval gives an indication of the uncertainty of an estimate from data analysis. A 95% credible interval is calculated so that there is a 95% probability of the true value lying in the interval.

## 5 . Measuring the data

## Reference dates

The antibody positivity estimates for the most recent week in this publication include data from 17 to 23 October 2022.

Our [Coronavirus \(COVID-19\) Infection Survey: methods and further information methodology](#) provides further information around the survey design, how we process data, and how data are analysed. Our [Coronavirus \(COVID-19\) Infection Survey QMI](#) explains the strengths and limitations of the data, the methods used, and data uses and users.

More information is available in the [measuring the data section of the Coronavirus \(COVID-19\) Infection Survey statistical bulletin](#).

## Change in data collection method

Following our change to a remote data collection method, we published results comparing estimates produced by study worker home visit data collection only, with those produced by remote data collection only. The 179 ng/ml and 800 ng/ml levels were used for this analysis. 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 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. Details of these results can be found in our [Coronavirus \(COVID-19\) Infection Survey quality report: September 2022](#). Results from 14 to 31 July 2022 include a combination of survey worker and remote data collection, while estimates from the 1 August 2022 are based on remote data collection alone.

## Survey data

The analysis on antibodies in this bulletin is based on blood test results taken from a randomly selected subsample of individuals aged 8 years and over who live in private households. The survey excludes those in hospitals, care homes and other communal establishments. The blood samples are used to test for antibodies against SARS-CoV-2.

## Antibodies and immunity

Antibody positivity is defined by having a fixed concentration of antibodies in the blood. A negative test result occurs if there are no antibodies, or if antibody levels are too low to reach a level at the time of testing. It does not mean that their antibody level is at zero or that a person has no protection against 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 and 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](#). It 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. Antibody levels below this 179 ng/ml level does not mean that a person has no antibodies or immune protection at all. 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, and we will keep the level used in our analysis of antibodies under regular review. The 800 ng/ml level is the highest level at which we can produce a historic back-series. We have also introduced estimates of antibody positivity at 2,000 ng/ml, 4,000 ng/ml and 6,000 ng/ml. These levels have been introduced to enable enhanced monitoring of antibody levels and waning. They are not based on academic research on protection against Omicron, as sufficient evidence on this is not yet available. Further details of recent method changes to incorporate these higher threshold levels can be found in our [Coronavirus \(COVID-19\) Infection Survey, antibody data, UK: 27 July 2022](#) bulletin.

Estimates of antibodies against SARS-CoV-2 at the 800 ng/ml level are not comparable with our estimates published before 27 July 2022 because of method changes.

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 describing the relationship between COVID-19 infections and antibodies](#).

## 6 . Related links

### [Coronavirus \(COVID-19\) Infection Survey quality report: September 2022](#)

Methodology | Released 23 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.

### [Coronavirus \(COVID-19\) Infection Survey, UK](#)

Bulletin | Updated weekly

Estimates for England, Wales, Northern Ireland and Scotland. 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, UK](#)

Bulletin | Updated monthly

Characteristics of people testing positive for COVID-19 from the Coronavirus (COVID-19) Infection Survey, including antibody data by UK country, and region and occupation for England. Antibodies data published before 3 February 2021 are available in this series.

### [Coronavirus \(COVID-19\) Infection Survey technical article: Characteristics associated with third vaccination uptake: 21 April 2022](#)

Article | Released 21 April 2022

Analysis of populations in the UK by likelihood of having received a third vaccination against COVID-19 using the Coronavirus (COVID-19) Infection Survey. This survey is being delivered in partnership with University of Oxford, University of Manchester, UK Health Security Agency and Wellcome Trust.

### [Coronavirus \(COVID-19\) Infection Survey technical article: Cumulative incidence of the number of people who have tested positive for COVID-19, UK: 22 April 2022](#)

Article | Released 22 April 2022

Analysis of the number of people in the UK who have tested positive for COVID-19 using the Coronavirus (COVID-19) Infection Survey. This survey is being delivered in partnership with University of Oxford, University of Manchester, UK Health Security Agency and Wellcome Trust.

### [Coronavirus \(COVID-19\) Infection Survey Technical Article: Impact of vaccination on testing positive in the UK: October 2021](#)

Article | Released 18 October 2021

The reduction in risk of testing positive for COVID-19 associated with vaccination overall and by different vaccine types using data from the Coronavirus (COVID-19) Infection Survey. Two time periods were analysed; when the Alpha variant was dominant in the UK (1 December 2020 to 16 May 2021), and when the Delta variant was dominant (17 May to 14 August 2021).

### [Coronavirus \(COVID-19\) Infection Survey QMI](#)

Methodology | Last revised 16 July 2021

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

## 7 . Cite this statistical bulletin

Office for National Statistics (ONS), released 1 December 2022, ONS website, statistical bulletin, [Coronavirus \(COVID-19\) Infection Survey, antibody data, UK: 1 December 2022](#)