

Article

# Coronavirus (COVID-19) Infection Survey, antibody and vaccination data for the UK: 28 April 2021

Antibody and vaccination data by UK country and regions in England from the Coronavirus (COVID-19) Infection Survey. This survey is being delivered in partnership with University of Oxford, University of Manchester, Public Health England and Wellcome Trust.

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# 1 . Main points

- In England, an estimated 7 in 10 adults or 68.3% of the adult population (95% credible interval: 63.9% to 73.0%) would have tested positive for antibodies against the coronavirus – SARS-CoV-2 – on a blood test in the week ending 11 April 2021, suggesting they had the infection in the past or have been vaccinated.
- In Wales, an estimated 6 in 10 adults, or 61.0% of the adult population (95% credible interval: 55.9% to 66.5%) would have tested positive for antibodies against SARS-CoV-2 on a blood test in the week ending 11 April 2021, suggesting they had the infection in the past or have been vaccinated.
- In Northern Ireland, an estimated 6 in 10 adults, or 62.5% of the adult population (95% credible interval: 56.4% to 70.9%) would have tested positive for antibodies against SARS-CoV-2 on a blood test in the week ending 11 April 2021, suggesting they had the infection in the past or have been vaccinated.
- In Scotland, an estimated 6 in 10 adults, or 57.8% of the adult population (95% credible interval: 52.9% to 63.1%) would have tested positive for antibodies against SARS-CoV-2 on a blood test in the week ending 11 April 2021, suggesting they had the infection in the past or have been vaccinated.
- Across all four countries of the UK, there is a clear pattern between vaccination and testing positive for COVID-19 antibodies but the detection of antibodies alone is not a precise measure of the immunity protection given by vaccination.

## 2 . Overview

In this article, we refer to the presence of antibodies to the coronavirus (COVID-19) within the community population; community in this instance refers to private residential households, and it excludes those in hospitals, care homes and/or other institutional settings.

It takes between two and three weeks after infection or vaccination for the body to make enough antibodies to fight the infection. Antibodies remain in the blood at low levels, although these levels can decline over time to the point that tests can no longer detect them. Having antibodies can help to prevent individuals from getting the same infection again.

We measure the presence of antibodies to understand who has had COVID-19 in the past, and the impact of vaccination. Once infected or vaccinated, the length of time antibodies remain at detectable levels in the blood is not fully known. It is also not yet known how having detectable antibodies, now or at some time in the past, affects the chance of getting COVID-19 again as other parts of the immune system (T cell response) will offer protection.

Antibody positivity is defined by a fixed amount of antibodies in the blood. A negative test result will occur if there are no antibodies or if antibody levels are too low to reach this threshold. It is important to draw the distinction between testing positive for antibodies and having immunity. Following infection or vaccination, antibody levels can vary and sometimes increase but are still below the level identified as "positive" in our test, and other tests. This does not mean that a person has no protection against COVID-19 as an immune response does not rely on the presence of antibodies alone. We also do not yet know exactly how much antibodies need to rise to give protection. [A person's T cell response will provide protection](#) but is not detected by blood tests for antibodies. [A person's immune response is affected by a number of factors](#), including health conditions and age. Additional information on the link between antibodies and immunity and the [vaccine programme](#) can be found in our [latest blog](#).

This article presents antibody analysis on past infection and/or vaccination – which we define as testing positive for antibodies to SARS-CoV-2 for England, Wales, Northern Ireland and Scotland – based on findings from the Coronavirus (COVID-19) Infection Survey in the UK. We have also included estimates from our survey on the proportion of people who have received at least one dose of a vaccine against SARS-CoV-2, as well as those who have been fully vaccinated against SARS-CoV-2. While these are not the [official government figures](#) of the numbers of vaccinations issued, collecting information from participants on their vaccination status is helpful so that we can analyse vaccines with other information collected in the survey.

SARS-CoV-2 is the scientific name given to the specific virus that causes COVID-19. More information on our headline estimates of the overall number of positive cases of COVID-19 infection in England, Wales, Northern Ireland and Scotland is available in our [latest bulletin](#).

Earlier antibodies data are available as part of a [series of articles](#) on the characteristics of people testing positive for COVID-19. To make the antibodies data and analysis easier to find, all releases from 3 February 2021 onwards are published in this [Coronavirus \(COVID-19\) Infection Survey: antibody data for the UK article series](#).

Our [methodology article](#) provides further information around the survey design, how we process data, and how data are analysed. The [study protocol](#) specifies the research for the study. Further information on what the analysis covers is provided at the start of each section.

## About this analysis

The analysis on antibodies in this article is based on blood test results taken from a randomly selected subsample of individuals aged 16 years and over, which are used to test for antibodies against SARS-CoV-2. This can be used to identify individuals who have had the infection in the past or have developed antibodies as a result of vaccination.

Antibody estimates are based on a model where England, Wales and Scotland are included together in a spatial-temporal model; Northern Ireland is modelled separately. This reflects the geography of the four countries as Northern Ireland does not share a land border with Great Britain; the geo-spatial model incorporates physical land distance between regions.

This modelling approach means we are able to provide weekly estimates while adjusting to make the estimates representative of the population. The data are modelled on standardised Monday to Sunday surveillance weeks and we present data beginning 7 December 2020. Further information on our method to model antibodies can be found in our [methods article](#).

We also present data on the percentage of people aged 16 years and over who have received one or more doses of a COVID-19 vaccine since 14 December 2020, and the percentage of people aged 16 years and over who are fully vaccinated since 15 February 2021. The first COVID-19 vaccination was administered on 8 December 2020, but vaccination rates were too low to model until 14 December 2020.

The estimates of the percentage of people vaccinated are based on modelling of the people visited in the Coronavirus (COVID-19) Infection Survey in the community in a particular time period. These estimates are then adjusted (post-stratified) using population estimates to be representative (in the same way as for the antibody analysis). These estimates may differ from other figures given through administrative data because of a difference in the population denominator (our survey does not include people who live in communal establishments, such as care homes, which are a priority group for the vaccine rollout) or any biases that are adjusted for in our sample.

National Immunisation Management System (NIMS) administrative data are used to validate Coronavirus (COVID-19) Infection Survey self-reported records of vaccination for England. The equivalent of this is currently not included for other countries meaning the estimates for Wales, Northern Ireland and Scotland are produced only from Coronavirus (COVID-19) Infection Survey self-reported records of vaccination.

The [UK coronavirus dashboard](#) includes daily data for the UK and each constituent country on the actual number of people who have received a COVID-19 vaccination. This is based on individual vaccination records (administrative data held by each nation) and should be used to understand progress of the vaccination programme across the UK. Our estimates are not the same as the figures in the UK coronavirus dashboard and there may be differences between our modelled estimates and these official figures, which are updated more regularly. As our analysis develops, our survey-based estimates will enable possible future analysis of people who have received a vaccine with other characteristics collected in the survey.

Antibody data are a week behind vaccination data as there is a time lag on when antibody data are received, whereas vaccine data are self-reported and more readily available.

We are presenting weekly modelled antibody estimates by country, grouped age, and single year of age for England, Wales, Northern Ireland and Scotland, as well as by region in England. Analysis on antibodies included in Sections 3, 4 and 5 uses data taken from 5 to 11 April 2021 to produce modelled antibody estimates. Modelled antibody estimates for previous weeks can be found in the accompanying [dataset](#).

We are presenting trends in weekly modelled vaccination estimates for adults who reported they have received one or more doses of a COVID-19 vaccine, and adults who are fully vaccinated by country and grouped age for England, Wales, Northern Ireland and Scotland, as well as by region in England. The analysis on vaccinations included in Sections 3, 4 and 5 uses data taken from 12 April to 16 April 2021 to produce modelled vaccination estimates. Modelled vaccination estimates can be found in the accompanying [dataset](#). These modelled estimates are produced for analysis purposes and do not replace the [official government figures on vaccines](#), which are a more precise count of total vaccines issued. While we would expect the overall trend of our estimated number of people who have received vaccines to increase, it is possible that in some weeks, the estimate may remain the same or decrease as a result of sampling variability (for example, we may have a lower number of participants recording a vaccination in the latest week compared with an earlier week).

#### More about coronavirus

- Find the latest on [coronavirus \(COVID-19\) in the UK](#).
- [Explore the latest coronavirus data](#) from the ONS and other sources.
- All ONS analysis, summarised in our [coronavirus roundup](#).
- View [all coronavirus data](#).
- Find out how we are [working safely in our studies and surveys](#).

## 3 . Likelihood of testing positive for COVID-19 antibodies and percentage of adults who have received one or more doses of a COVID-19 vaccine in England, Wales, Northern Ireland and Scotland

Our survey shows that in the week ending 11 April 2021:

- in England, an estimated 68.3% (95% credible interval: 63.9% to 73.0%) of the adult population would have tested positive for antibodies to SARS-CoV-2 from a blood sample
- in Wales, an estimated 61.0% (95% credible interval: 55.9% to 66.5%) of the adult population would have tested positive for antibodies to SARS-CoV-2 from a blood sample
- in Northern Ireland, an estimated 62.5% (95% credible interval: 56.4% to 70.9%) of the adult population would have tested positive for antibodies to SARS-CoV-2 from a blood sample
- in Scotland, an estimated 57.8% (95% credible interval: 52.9% to 63.1%) of the adult population would have tested positive for antibodies to SARS-CoV-2 from a blood sample

In the week ending 16 April 2021, our estimated percentage of adults who reported they have received at least one dose of a coronavirus (COVID-19) vaccine continued to increase, with 59.8% to 70.6% of people across the UK having received at least one dose of a COVID-19 vaccine. In the week ending 16 April 2021, the estimated percentage of adults who are fully vaccinated against COVID-19 varied between 19.5% to 23.3% of people across the UK.

In the data used to produce estimates for Wales, Northern Ireland and Scotland, the number of people sampled who tested positive for antibodies to SARS-CoV-2 or who have been vaccinated is low compared with England. This means there is a higher degree of uncertainty in estimates for these nations, as indicated by larger credible intervals.

### **Figure 1: The percentage of adults testing positive for COVID-19 antibodies and the percentage of adults who reported being vaccinated in England, Wales, Northern Ireland and Scotland**

Modelled percentage of: adults testing positive for antibodies to SARS-CoV-2, 7 December 2020 to 11 April 2021, UK, adults who received one or more doses of COVID-19 vaccination and fully vaccinated adults, 14 December 2020 to 16 April 2021, UK

#### **Notes:**

1. All results are provisional and subject to revision.
2. These statistics refer to antibody tests and vaccinations in individuals living in the community, by which we mean private households. These figures exclude individuals in hospitals, care homes and/or other institutional settings.
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. 95% credible intervals are calculated so that there is a 95% probability of the true value lying in the interval.
4. The denominators used for vaccinations are the total people in the sample at that particular time point, then it is post-stratified by the mid-year population estimate.
5. Vaccination data for Northern Ireland starts later than the other countries, from 21 December 2021.

[Download the data](#)

## 4 . Regional analysis of the likelihood of testing positive for COVID-19 antibodies and of the percentage of adults who have received one or more doses of a COVID-19 vaccine in England

Antibody positivity varied between regions, from the lowest in the North East at 64.4% (95% credible interval: 59.4% to 69.7%) to the highest in the North West at 69.6% (95% credible interval: 65.1% to 74.2%) in the week ending 11 April 2021.

The estimated percentage of adults who have received one or more doses of a vaccine also varied between regions, from the lowest in London at 56.8% to the highest in the East Midlands at 70.0% in the week ending 16 April 2021.

The percentage of adults who are fully vaccinated also varied between regions, with the lowest estimates in London at 19.4% and the highest in the East of England at 23.7%. In all regions, the estimated percentage of adults who reported receiving at least one dose of a coronavirus (COVID-19) vaccine continued to increase, and antibody positivity increased in the week ending 11 April 2021. Variation in regional COVID-19 infection rates and regional vaccination roll out and uptake could result in variation in antibody positivity across regions.

### **Figure 2: COVID-19 antibody positivity and the estimated percentage of adults who have been vaccinated varied across regions in England**

Modelled percentages: of adults testing positive for antibodies to SARS-CoV-2, 7 December 2020 to 11 April 2021, adults who received one or more doses of a COVID-19 vaccine and fully vaccinated, by England regions, 14 December 2020 to 16 April 2021

#### **Notes**

1. All results are provisional and subject to revision.
2. These statistics refer to antibody tests and vaccinations in individuals living in the community, by which we mean private households. These figures exclude individuals in hospitals, care homes and/or other institutional settings.
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. 95% credible intervals are calculated so that there is a 95% probability of the true value lying in the interval.
4. The denominators used for vaccinations are the total people in the sample at that particular time point, then it is post-stratified by the mid-year population estimate.

[Download the data](#)

## 5 . Age analysis on the likelihood of testing positive for COVID-19 antibodies and the percentage of adults who have received one or more doses of a COVID-19 vaccine in England, Wales, Northern Ireland and Scotland

Our survey shows that in the week ending 11 April 2021:

- in England, the percentage of adults testing positive for antibodies aged 16 to 49 years ranged from 46.5 to 54.3%; in those aged 50 to 64 years, from 82.0% to 85.7%; in those aged 65 years and over, from 85.5% to 87.6%; the highest percentage of people testing positive for antibodies was in those aged 70 to 74 years at 87.6% (95% credible interval: 82.9% to 91.1%)
- in Wales, the percentage of adults testing positive for antibodies aged 16 to 49 years ranged from 35.7% to 46.6%; in those aged 50 to 64 years, from 75.0% to 82.8%; in those aged 65 years and over, from 81.9% to 83.0%; the highest percentage of people testing positive for antibodies was in those aged 70 to 74 years at 83.0% (95% credible interval: 76.6% to 88.0%)
- in Northern Ireland, the percentage of adults testing positive for antibodies aged 70 years and over was 82.0% (95% credible interval: 69.2% to 91.3%) – because of small sample sizes, this analysis uses different age groups to antibody analysis to England, Wales and Scotland, with everyone over the age of 70 years included in the same age group; in those aged 16 to 69 years, antibody positivity ranged from 36.0% to 79.5%
- in Scotland, the percentage of adults testing positive for antibodies aged 16 to 49 years ranged from 30.7% to 42.9%; in those aged 50 to 64 years, from 73.2% to 80.1%; in those aged 65 years and over, from 76.4% to 85.1%; the highest percentage of people testing positive for antibodies was in those aged 65 to 69 years at 85.1% (95% credible interval: 80.0% to 89.3%)

Antibody positivity is increasing with age, with the highest percentage testing positive for antibodies in the older age groups and lowest among the youngest groups across the four UK countries; this reflects the age prioritisation in vaccination programmes in place across the UK. The percentage of adults who have received at least one dose of a coronavirus (COVID-19) vaccine is lowest in the younger age groups but is increasing.

Based on our estimates, more than 97% of people aged 70 years and over have received at least one dose of a COVID-19 vaccine across the UK. Of those who have been fully vaccinated, the highest percentages are found in the oldest age groups and lowest among the younger age groups. The trend in the percentage of adults who are fully vaccinated varies between the four countries of the UK.

The percentage of adults testing positive for antibodies varies by age group between the four nations of the UK. This could be explained by different historical trends in COVID-19 infection rates and the approaches to vaccine distribution in different nations. This survey does not include people who live in care homes, one of the priority groups identified by the [Joint Committee on Vaccination and Immunisation \(JCVI\)](#). Daily and weekly counts of vaccine doses administered by nation can be seen in the [Public Health England \(PHE\) dashboard](#).

Modelled antibody estimates and modelled vaccine estimates relate to the adult community population (aged 16 years and over) who live in private households, and does not include establishments such as care homes. The true figure among the older age groups in the population may be different. An estimated [90% of people aged 80 years and over live in private households](#) and 10% live in other establishments such as care homes.



In the data used to produce estimates for Wales, Northern Ireland and Scotland, the number of people sampled who tested positive for antibodies to SARS-CoV-2 or who have been vaccinated is low compared with England. This means there is a higher degree of uncertainty in estimates for these nations, as indicated by larger credible intervals.

### **Figure 3: Percentage of adults testing positive for COVID-19 antibodies and percentage of adults who have been vaccinated by grouped age in England, Wales, Northern Ireland and Scotland**

Modelled percentage of: adults testing positive for antibodies to SARS-CoV-2, 7 December 2020 to 11 April 2021, adults who received one or more doses of vaccine and fully vaccinated adults, 29 March to 16 April 2021: by grouped age, UK

#### **Notes:**

1. All results are provisional and subject to revision.
2. These statistics refer to antibody tests and vaccinations reported in the community, by which we mean private households. These figures exclude individuals in hospitals, care homes and/or other institutional settings.
3. In Northern Ireland, the number of people sampled who tested positive for antibodies to SARS-CoV-2 or reported receiving a COVID-19 vaccination is low compared with England, Wales and Scotland; therefore, people aged 50 to 69 years are included in the same age group, and those aged 70 years and over are included in the same age group.
4. 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. 95% credible intervals are calculated so that there is a 95% probability of the true value lying in the interval.
5. The denominators used for vaccinations are the total people in the sample at that particular time point, then it is post-stratified by the mid-year population estimate.

[Download the data](#)

## **6 . Age over time analysis of the likelihood of testing positive for COVID-19 antibodies in England, Wales, Northern Ireland and Scotland**

The analysis in this section presents modelled daily estimates of antibody positivity by single year of age for England, Wales and Scotland, and Northern Ireland separately. The modelled data in this section are produced using a different method to the weekly modelled estimates presented in [Section 5](#) and so cannot be compared. Figure 4 shows the percentages testing positive for coronavirus (COVID-19) antibodies by single year of age from 16 February to 11 April 2021 for each of the four UK countries. Each data point represents a modelled estimate of antibody positivity for a particular day.

Figure 4 shows a decrease in the estimated percentage of adults testing positive for antibodies in the older ages in early to mid-March 2021. Antibody positivity has since risen again in the older ages. This is likely to reflect the increase in individuals receiving the second dose of their COVID-19 vaccine.



## Figure 4: The percentages testing positive for COVID-19 antibodies by single year of age in England, Wales, Northern Ireland and Scotland

Modelled percentage of adults testing positive for antibodies to SARS-CoV-2, by single year of age, 16 February to 11 April 2021, UK

### Notes:

1. All results are provisional and subject to revision.
2. These statistics refer to antibody tests reported in the community, by which we mean private households. These figures exclude individuals in hospitals, care homes and/or other institutional settings.
3. The method used to generate the data differs from the modelled weekly estimates of antibody positivity by age and so is not comparable

[Download the data](#)

It is unclear if decreasing levels of antibodies means that protection is decreasing. Further work to understand this is being undertaken.

## 7 . Behavioural changes following vaccination in the UK

### About this analysis

The analysis presented in this section examines behaviour changes following vaccination, among people aged 50 years and over, from 5 January 2021 to 10 April 2021 across all four UK countries.

### Methodology

The analysis considers the number of reported social and physical contacts within seven days prior to each visit in those aged 50 years and over, before and after receiving the first dose of a COVID-19 vaccine.

We asked individuals how many people aged 17 years and under, 18 to 69 years, and 70 years and over, outside their household, they have had contact with up to seven days prior to each visit. "Contact" refers to either of the following:

- socially distanced contact – direct contact with social distancing only
- physical contact – physical contact, such as a handshake or personal care, including wearing Personal Protective Equipment (PPE)

We report the number of contacts in the following groups:

- 0 (no reported contact)
- 1 to 5 (reported contacts)
- 6 to 10 (reported contacts)
- 11 to 20 (reported contacts)
- 21 or more (reported contacts)

Vaccination status is divided into three categories:

- before vaccination
- within seven days after first vaccine dose
- more than seven days after first vaccine dose

The post-vaccination category was divided because we expect that many respondents will include the contacts they had as part of getting vaccinated, which could otherwise complicate the analysis. In Figure 5, we present the differences between before vaccination and each of two after-vaccination categories.

Figure 5 shows the percentage point change in the number of physical contacts with individuals aged 18 to 69 years old, and the percentage point change in the number of socially distanced contacts with individuals aged 18 to 69 years, zero to seven days after vaccination, and more than seven days after vaccination.

Physical contacts with those aged 18 to 69 increased after vaccination, both within the first seven days and after. Most of this increase is among those reporting 1 to 5 contacts. There is a much greater increase within the first seven days (10 percentage points), than after seven days (3 percentage points). This is consistent with the idea that people report contacts they make in the course of getting their vaccine.

There is no evidence of a pronounced difference in the number of socially distanced contacts before and after vaccination, or in physical contacts with those under 18 years or over 70 years.

It is important to note that during the entire study period, strict lockdown measures (including bans on indoor socialising and restrictions on socialising outside the home) were in effect throughout the UK.

### **Figure 5: After receiving one dose of a COVID-19 vaccine, adults reported an increase in physical contact with 1 to 5 people aged 18 to 69**

Reported difference in social and physical contacts with individuals aged 18 to 69, between pre-vaccination status and post-vaccination status, 5 January 2021 to 10 April 2021, UK

#### **Notes:**

1. These results are provisional and subject to change
2. These statistics refer to vaccinations reported in the community, by which we mean private households. These figures exclude individuals in hospitals, care homes and/or other institutional settings.
3. This analysis is based on a pre-post regression model, comparing the contact numbers for the three vaccination categories. This model only compares the categories and does not measure changes over time within these categories.
4. The data are not weighted to reflect UK demographics, but we do control for the effect of time. We also control for key characteristics that may confound behaviour.

[Download the data](#)

Two further analyses were carried out, considering the number of instances of shopping or socialising outdoors, and the number of times the respondent spent an hour or more in another person's home, or in their own home with someone not in their household in the previous seven days prior to the visit. These analyses also compared behaviour before vaccination with after vaccination and divided the after-vaccination category as previously described. The data are presented in our accompanying [dataset](#).

There is no evidence of pronounced changes in either the number of interactions in the home with someone who is not a member of the household, the number of interactions in another person's home, or in the number of trips outside the home for socialising or shopping.

This means that we do not find evidence that the increased numbers of contacts reported after vaccination are the result of more social visits or more shopping trips.

## 8 . Academic research on the impact of vaccination

Academic partners from the University of Oxford have written two articles examining the [impact of community vaccinations on positivity](#) and [antibody response in the community post-vaccination](#).

Data from the Coronavirus (COVID-19) Infection Survey were used to examine the effect that community vaccination has had on positivity by comparing the likelihood of testing positive between participants who have had at least one dose of a coronavirus (COVID-19) vaccine and those who have not been vaccinated and found that:

- the odds of a new SARS-CoV-2 infection (with or without symptoms) were reduced by 65% (95% CI 40% to 60%) for adults who received their first dose of a COVID-19 vaccine and have not had their second dose after 21 or more days, compared with those who have not yet received a COVID-19 vaccination; after receiving a second dose, the odds of a new infection fell further to 70% (95% CI 62 % to 77%)
- both the Pfizer-BioNTech and Oxford-AstraZeneca vaccines had a greater effect on preventing symptomatic cases or cases with a high viral load (Ct<30)
- there was no evidence of differences between Pfizer-BioNTech and Oxford-AstraZeneca in reductions in positivity after vaccination
- there is still the potential for ongoing limited transmission of the virus, particularly asymptomatic transmission, following vaccination

Academic partners from the University of Oxford examined the antibody responses after vaccination by time since vaccination and found that:

- antibody levels rose more slowly and to a lower level after a single dose of Oxford Astra-Zeneca than a single dose of Pfizer-BioNTech
- antibody levels fell over time following a single Pfizer-BioNTech dose, with waning happening earlier and to a greater degree with increasing age
- while antibody levels after single doses of both vaccines were lower in older individuals, (especially those over 60 years), responses were high after two Pfizer-BioNTech doses across all ages

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

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

Dataset | Released 28 April 2021

Antibody data for the UK taken from the Coronavirus (COVID-19) Infection Survey.

## 10 . Collaboration

The Coronavirus (COVID-19) Infection Survey analysis was produced by the Office for National Statistics (ONS) in partnership with the University of Oxford, the University of Manchester, Public Health England 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

## 11 . Glossary

### Confidence interval

A confidence interval gives an indication of the degree of uncertainty of an estimate, showing the precision of a sample estimate. The 95% confidence intervals are calculated so that if we repeated the study many times, 95% of the time, the true unknown value would lie between the lower and upper confidence limits. A wider interval indicates more uncertainty in the estimate. Overlapping confidence intervals indicate that there may not be a true difference between two estimates.

For more information, see our [methodology page on statistical uncertainty](#).

## 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.

## 12 . Data sources and quality

More information on [measuring the data](#) and [strengths and limitations](#) of the data is available in the Coronavirus (COVID-19) Infection Survey statistical bulletin.

Our [methodology article](#) provides further information around the survey design, how we process data, and how data are analysed.

## 13 . Related links

### [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 University of Oxford, University of Manchester, Public Health England and Wellcome Trust.

### [Coronavirus \(COVID-19\) Infection Survey: characteristics of people testing positive for COVID-19 in England](#)

Article | Updated fortnightly

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.

### [Coronavirus and vaccination rates in people aged 70 years and over by socio-demographic characteristic, England](#)

Article | Updated 29 March 2021

First dose COVID-19 vaccination rates among people aged 70 years and older who live in England, both in private households and communal establishments. Includes estimates for the population as a whole by age and sex, and for ethnic minorities, religious groups, those identified as disabled and by area deprivation.

### [COVID-19 Infection Survey: methods and further information](#)

Methods article | Updated 26 March 2021

Information on the methods used to collect and process the data, and calculate the statistics produced from the COVID-19 Infection Survey pilot.

### [COVID-19 Infection Survey \(CIS\)](#)

Article | Updated 14 May 2020

Whether you have been invited to take part, or are just curious, find out more about our COVID-19 Infection Survey and what is involved.

### [Coronavirus \(COVID-19\) roundup](#)

Web page | Updated as and when data become available

Catch up on the latest data and analysis related to the coronavirus pandemic and its impact on our economy and society.

### [Coronavirus \(COVID-19\) latest insights](#)

Interactive tool | Updated as and when data become available

Explore the latest data and trends about the coronavirus (COVID-19) pandemic from the ONS and other official sources.

