Statistical bulletin

# Coronavirus (COVID-19) Infection Survey, UK: 10 December 2021

Estimates forEngland, Wales, Northern Ireland and Scotland.This survey is being delivered in partnership with University of Oxford, University of Manchester, UK Health Security Agency andWellcomeTrust. This study is jointly led by the ONS and the Department for Health and Social Care (DHSC) working with the University of Oxford and Lighthouse laboratory to collect and test samples.

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# 1 . Main points

- In England, the percentage of people testing positive for coronavirus (COVID-19) increased over the last two weeks, but the trend was uncertain in the week ending 1 December 2021; we estimate that 891,500 people in England had COVID-19 (95% credible interval: 842,000 to 941,200), equating to around 1 in 60 people.

- In Wales, the percentage of people testing positive for COVID-19 appears stable over the most recent three weeks; we estimate that 60,300 people in Wales had COVID-19 (95% credible interval: 49,400 to 71,200), equating to around 1 in 50 people in the week ending 1 December 2021.

- In Northern Ireland, the percentage of people testing positive for COVID-19 increased over the last two weeks, but the trend was uncertain in the week ending 1 December 2021; we estimate that 39,300 people in Northern Ireland had COVID-19 (95% credible interval: 30,600 to 49,000) equating to around 1 in 45 people.

- In Scotland, the percentage of people testing positive for COVID-19 decreased in the week ending 2 December 2021; we estimate that 65,200 people in Scotland had COVID-19, (95% credible interval: 53,200 to 79,100) equating to around 1 in 80 people.

- To date, we have identified a very small number of infections consistent with the Omicron variant (B. 1.1.529) among our survey participants, which is not sufficient to produce estimates at this time; we will continue to monitor this variant and will report estimates if the Omicron variant becomes more prevalent among the population.

Within this bulletin, we summarise some of the latest results from the Coronavirus (COVID-19) Infection Survey. For more detailed information on our methods you can view our COVID-19 Infection Survey methodology article. You can also find out more about comparing methods used in the Coronavirus (COVID-19) Infection Survey and NHS Test and Trace in our article, to better understand comparisons in data sources.

## About this bulletin

In this bulletin, we refer to the number of current COVID-19 infections within the population living in private residential households. We exclude those in hospitals, care homes and/or other communal establishments. In communal establishments, rates of COVID-19 infection are likely to be different. More information about the COVID-19 pandemic from the Office for National Statistics (ONS) and other sources can be found in our Coronavirus (COVID-19) latest insights.

The positivity rate is the percentage of people who have tested positive for COVID-19 on a polymerase chain reaction (PCR) test at a point in time. We use current COVID-19 infections to mean testing positive for SARS-CoV-2, with or without having symptoms, on a swab taken from the nose and throat. This is different to the incidence rate, which is a measure of only the new PCR positive cases in a given time period. All analysis was produced with our research partners at the University of Oxford.

Our estimates are based on confirmed positive test results. The remaining swabs are either negative, which are included in our analysis, or are inconclusive, which are not included in our analysis. Some swabs are test failures, which are also not included in our analysis. We are working with the laboratories to understand consistency in the identification of inconclusive results, that could be weak positive results. The impact of this on our estimates of positive infections is likely to be very small and unlikely to affect the trend.

**More information on COVID-19 and taking part in our survey**

- If you have any further questions, please email the CIS operations team: COVID-19@ons.gov.uk.
- Find the latest on coronavirus (COVID-19) in the UK.
- Explore the latest coronavirus data from the ONS and other sources.
- View all coronavirus data.
- Find out how we are working safely in our studies and surveys.

Early management information from the Coronavirus (COVID-19) Infection Survey is made available to government decision-makers to inform their response to COVID-19. Occasionally we may publish figures early if it is considered in the public interest. We will ensure that we pre-announce any ad hoc or early publications as soon as we can. These will include supporting information where possible to aid user understanding. This is consistent with guidance from the Office for Statistics Regulation (OSR).

## How the data in this bulletin can be used

## The data can be used for:

- estimating the number of positive cases among the population living in private households, including cases where people do not report having any symptoms
- identifying differences in numbers of positive cases between UK countries and different regions in England
- estimating the number of new cases and change over time in positive cases

## The data cannot be used for:

- measuring the number of cases and infections in care homes, hospitals and/or other communal establishments
- providing information about recovery time of those infected

# 2 . Percentage of people who had COVID-19 in England, Wales, Northern Ireland and Scotland

Because of the availability of test results, this week the reference week for England, Wales and Northern Ireland is 25 November to 1 December 2021. For Scotland, the reference week is 26 November to 2 December 2021.

In England and in Northern Ireland, the percentage of people testing positive for coronavirus (COVID-19) increased in the two weeks up to 1 December 2021, but the trend was uncertain in the seven days up to 1 December 2021. In Wales, the trend appeared stable in the three weeks up to 1 December 2021. In the week ending 2 December 2021, the percentage of people testing positive for COVID-19 decreased in Scotland.

These estimates are based on statistical modelling of the trend in rates of positive nose and throat swab results. All our estimates are subject to uncertainty given that a sample is only part of the wider population. Therefore, caution should be taken in over-interpreting any small movements in the latest trends.

Table 1: Official reported estimates of the percentage of the population testing positive for COVID-19, UK countries

Estimated percentage of the population testing positive for coronavirus (COVID-19) on nose and throat swabs, UK, 25 November to 2 December 2021

| Country | Estimated average % of the population that had COVID-19 | 95% credible interval | | Estimated average number of people testing positive for COVID-19 | 95% credible interval | | Estimated average ratio of the population that had COVID-19 | 95% credible interval | |
|---|---|---|---|---|---|---|---|---|---|
| | | Lower | Upper | | Lower | Upper | | Lower | Upper |
| **England** | 1.64 | 1.54 | 1.73 | 891,500 | 842,000 | 941,200 | 1 in 60 | 1 in 65 | 1 in 60 |
| **Wales** | 1.98 | 1.62 | 2.34 | 60,300 | 49,400 | 71,200 | 1 in 50 | 1 in 60 | 1 in 45 |
| **Northern Ireland** | 2.14 | 1.67 | 2.67 | 39,300 | 30,600 | 49,000 | 1 in 45 | 1 in 60 | 1 in 35 |
| **Scotland** | 1.24 | 1.01 | 1.50 | 65,200 | 53,200 | 79,100 | 1 in 80 | 1 in 100 | 1 in 65 |

Source: Office for National Statistics – Coronavirus (COVID-19) Infection Survey

Notes

1. These statistics refer to infections occurring in private households. These figures exclude infections reported in hospitals care homes and/or other communal establishments.

2. All estimates are subject to uncertainty given that a sample is only part of the wider population. The model used to provide these estimates is a Bayesian model: these provide 95% credible intervals. A credible interval gives an indication of the uncertainty of an estimate from data analysis.

3. The ratios presented are rounded to the nearest 100 if over 1,000, to the nearest 10 if under 1,000, and to the nearest 5 if under 100.

4. These ratios do not represent a person's risk of becoming infected, since risk of infection depends on a number of factors such as contact with others or whether a person has been vaccinated.

5. The reference week for England, Wales and Northern Ireland is 25 November to 1 December 2021. The reference week for Scotland is 26 November to 2 December 2021.

Because of the relatively small number of tests in Wales, Northern Ireland and Scotland in our sample, credible intervals are wider and therefore results should be interpreted with caution. These wide credible intervals mean that differences between the central estimates within and between nations may appear smaller or more exaggerated than they really are.

### Figure 1: The trend in the percentage of people testing positive for COVID-19 in England and Northern Ireland was uncertain, decreased in Scotland, and appeared stable for Wales

### Estimated percentage of the population testing positive for coronavirus (COVID-19) on nose and throat swabs, UK, 6 December 2020 to 2 December 2021

### Notes:

1. Modelled results are provisional and subject to revision.
2. These statistics refer to infections occurring in private households. These figures exclude infections reported in hospitals, care homes and/or other communal establishments.
3. All estimates are subject to uncertainty, given that a sample is only part of the wider population. The model used to provide these estimates is a Bayesian model: these provide 95% credible intervals. A credible interval gives an indication of the uncertainty of an estimate from data analysis.
4. Official reported estimates are plotted at a reference point believed to be most representative of the given week.
5. The official estimate presents the best estimate at that point in time. Modelled estimates are used to calculate the official reported estimate. The model smooths the series to understand the trend and is revised each week to incorporate new test results, providing the best indication of trend over time.
6. Official estimates are displayed over a rolling year up to the most recent week. The full time series of our official estimates from 27 April 2020 onwards are available in the Coronavirus (COVID-19) Infection Survey datasets.
7. The reference week for England, Wales and Northern Ireland is 25 November to 1 December 2021. The reference week for Scotland is 26 November to 2 December 2021.

### Download the data

.xlsx

## About our estimates

Our headline estimates of the percentage of people testing positive in England, Wales, Northern Ireland and Scotland are the latest official estimates. We include different measures to support our estimation and this section outlines the appropriate uses of all the approaches.

Official estimates should be used to understand the positivity rate for a single point in time. This is based on the modelled estimate for the latest week and is our best and most stable estimate, used in all previous outputs. The modelled estimate is more suited to understanding the recent trend. This is because the model is regularly updated to include new test results and smooths the trend over time. These modelled estimates can be found in the Coronavirus (COVID-19) Infection Survey datasets.

The estimates for non-overlapping 14-day periods (which underpin our modelled official estimates) and the unweighted sample counts are included in the Coronavirus (COVID-19) Infection Survey datasets. These estimates are produced using a different method of weighting to the model and are available for people who wish to compare infection levels over time in this way. For more information on our methods and quality surrounding the estimates please see our COVID-19 Infection Survey methods article and Quality and Methodology Information report.

All estimates presented in this bulletin are provisional results. As swabs are not necessarily analysed in date order by the laboratory, we have not yet received test results for all swabs taken on the dates included in this analysis. Estimates may therefore be revised as more test results are included.

# 3 . Sub-national analysis of the number of people who had COVID-19

The percentage of people testing positive for coronavirus (COVID-19) continued to fluctuate across regions in England. In the week ending 1 December 2021, the percentage of people testing positive increased in the South East and London. The percentage testing positive also increased in the North East in the two weeks up to 1 December 2021, but the trend was uncertain in the most recent week. In the week ending 1 December 2021, the percentage of people testing positive decreased in the East Midlands, the West Midlands and the East of England. In the same week, the trend in the percentage of people testing positive was uncertain for the North West, the South West and Yorkshire and The Humber. Caution should be taken in over-interpreting any small movements in the latest trend.

In the data used to produce these estimates, the number of people sampled in each region who tested positive for COVID-19 was low relative to England overall. This means there is a higher degree of uncertainty in the regional estimates for this period, as indicated by larger credible intervals.

### Figure 2: The percentage of people testing positive for COVID-19 increased in the South East and London, and decreased in the East Midlands, the West Midlands and the East of England

### Estimated daily percentage of the population testing positive for coronavirus (COVID-19) on nose and throat swabs by region, England, 21 October to 1 December 2021

### Notes:

1. All results are provisional and subject to revision.

2. These statistics refer to infections occurring in private households. These figures exclude infections reported in hospitals, care homes and/or other communal establishments.

3. All estimates are subject to uncertainty, given that a sample is only part of the wider population. The model used to provide these estimates is a Bayesian model: these provide 95% credible intervals. Acredible interval gives an indication of the uncertainty of an estimate from data analysis.

4. The credible intervals widen slightly at the end as there is a delay between the swab being taken and reporting of results.

5. The percentage of people testing positive by region was calculated using a similar modelling approach to the national daily estimates inSection 2: Percentage of people who had COVID-19 in England, Wales, Northern Ireland and Scotland.

6. The analysis is conducted over a six-week period, which means specific positive cases move into and then out of the sample. This causes variability between estimates over time, which is expected given the lower number of positive tests within each region, compared with England as a whole.

### Download the data

.xlsx

## Sub-regional analysis of the UK

Sub-regional estimates are based on a different model to our headline national estimates and should not be compared with one another. The number of people sampled in each sub-regional area who tested positive is lower compared with the number testing positive in their respective national samples. This means there is a higher degree of uncertainty in the sub-regional estimates and caution should be taken when interpreting or ranking them.

The percentage of people testing positive for COVID-19 also varies across sub-regions of the UK. In Figure 3, we have presented modelled estimates for sub-regions of England, Wales and Northern Ireland in the week ending 1 December 2021 and sub-regions of Scotland in the week ending 2 December 2021.

### Figure 3: The percentage of people testing positive for COVID-19 by sub-regions of the UK

### Estimated percentage of the population testing positive for coronavirus (COVID-19) on nose and throat swabs by sub-regional geography, UK, 25 November to 2 December 2021

### Notes:

1. All results are provisional and subject to revision.

2. These statistics refer to infections occurring in private households. These figures exclude infections reported in hospitals, care homes and/or other communal establishments.

3. All estimates are subject to uncertainty, given that a sample is only part of the wider population. The model used to provide these estimates is a Bayesian model: these provide 95% credible intervals. Acredible intervalgives an indication of the uncertainty of an estimate from data analysis.

4. Sub-regional estimates are based on a different model to our headline estimates. Our sub-regional estimates are calculated as an average over a seven-day period and should not be compared with our headline positivity estimates, which are for a single reference date. Therefore the subregional figures may differ from the headline estimates because they are averaged over a longer time period. If a trend is changing, the figures shown in Figure 3 may not reflect the change we are seeing in our headline estimates.

5. We have modelled Wales and Scotland separately to England. Northern Ireland is always modelled separately as it does not share a land border with the other UK countries and so requires a different geospatial modelling approach.

6. The reference week for England, Wales and Northern Ireland is 25 November to 1 December 2021. The reference week for Scotland is 26 November to 2 December 2021.

### Download the data

.xlsx

# 4 . Age analysis of the number of people who had COVID-19

## Age analysis by category for England

Our age categories separate children and young people by school age:

- "aged two 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

This means that 11- to 12-year-olds and 16- to 17-year-olds have been split between different age categories depending on whether their birthday is before or after 1 September.

Estimates are based on smaller sample sizes within each age group relative to England overall. There is a higher degree of uncertainty as indicated by larger credible intervals. These can be found in the Coronavirus (COVID-19) Infection Survey: England dataset.

In the week ending 1 December 2021, the percentage of people testing positive for coronavirus (COVID-19) increased for those in school Year 7 to school Year 11, and for those aged 25 to 49 years. The percentage of people testing positive also increased for those aged two years to school Year 6 in the two weeks up to 1 December 2021, but the trend was uncertain in the most recent week. In the week ending 1 December 2021, the percentage testing positive decreased for those aged 50 years and over, while the trend was uncertain for those in school Year 12 to those aged 24 years.

The percentage of people testing positive for COVID-19 was highest in school aged children: 4.18% (95% credible interval: 3.63% to 4.77%) of those aged two years to school Year 6 tested positive and 3.87% (95% credible interval: 3.33% to 4.41%) of those in school Years 7 to 11 tested positive in the week ending 1 December 2021.

### Figure 4: The percentage of people testing positive for COVID-19 increased for those in school Year 7 to school Year 11 and for those aged 24 to 49 years and decreased for those aged 50 years and over

### Estimated daily percentage of the population testing positive for coronavirus (COVID-19) on nose and throat swabs by age group, England, 21 October 2021 to 1 December 2021

### Notes:

1. All results are provisional and subject to revision.

2. These statistics refer to infections occurring in private households. These figures exclude infections reported in hospitals, care homes and/or other communal establishments.

3. All estimates are subject to uncertainty, given that a sample is only part of the wider population. The model used to provide these estimates is a Bayesian model: these provide 95% credible intervals. A credible interval gives an indication of the uncertainty of an estimate from data analysis.

4. The credible intervals widen slightly at the end as there can be a delay between the swab being taken and reporting of results. Because of this greater uncertainty in the most recent days, we report latest figures based on a reference day during that week. This week the reference day is 28 November 2021.

### Download the data

.xlsx

Estimates for non-overlapping 14-day periods (which underpin our modelled estimates) by age group are available in our Coronavirus (COVID-19) Infection Survey datasets and are provided as an alternative measure over time for context.

We are unable to produce the same grouped analysis as presented in Figure 4 for the devolved administrations because of smaller sample sizes within each age group. We are able to produce analysis on positivity by single year of age for Wales, Northern Ireland and Scotland using a different model and these estimates can be found in the following subsection and in the Coronavirus (COVID-19) Infection Survey datasets.

## Age analysis by single year of age over time by country

In this section we present modelled daily estimates of the percentage testing positive for COVID-19 by single year of age over time for England, Wales and Northern Ireland from 21 October to 1 December 2021, and for Scotland from 22 October to 2 December 2021. These estimates are presented in Figure 5. These estimates are produced using a different method to the grouped age analysis for England presented previously and are therefore not comparable. Caution should be taken in over-interpreting small movements in positivity day to day.

Estimates are based on smaller sample sizes within each age group in comparison to the total sample size for each country. There is a higher degree of uncertainty as indicated by larger confidence intervals. These can be found in the Coronavirus (COVID-19) Infection Survey datasets.

The data presented in Figure 5 for England suggests that positivity was highest in school-aged children. The trends were uncertain for all other age groups. Uncertainty is high for all ages in Wales, Northern Ireland and Scotland in comparison to England because of comparatively smaller sample sizes, as indicated by wider confidence intervals. In Wales, the percentage testing positive continued to decrease for those of secondary school age and the trends were uncertain for all other ages. In Northern Ireland, the percentage testing positive continued to increase in recent weeks for those of secondary school age and appears to have continued to increase in those aged around 30 years and aged around 60 years. The trends were uncertain for all other ages. In Scotland, the trends were uncertain for all ages.

Further analysis on age for Wales, Northern Ireland and Scotland is published by their respective statistical agencies. Analysis for Wales is published in English and Welsh.

**Figure 5: The percentage testing positive for COVID-19 by single year of age over time for England, Wales, Northern Ireland and Scotland**

**Estimated daily percentage of the population testing positive for coronavirus (COVID-19) on nose and throat swabs by single year of age, UK, 21 October to 2 December 2021**

**Notes:**

1. All results are provisional and subject to revision.
2. These statistics refer to infections occurring in private households. These figures exclude infections reported in hospitals, care homes and/or other communal establishments.
3. These estimates use a different method to previous modelled daily estimates of the percentage testing positive by age group for England and are therefore not comparable.
4. Uncertainty is high for all ages in Wales, Northern Ireland and Scotland in comparison with England because of smaller sample sizes, as indicated by wider confidence intervals.
5. The modelled estimates for England, Wales and Northern Ireland are shown from 21 October to 1 December 2021. The modelled estimates for Scotland are shown for 22 October to 2 December 2021.

**Download the data**

.xlsx

# 5 . Number of new COVID-19 infections in England, Wales, Northern Ireland and Scotland

The incidence rate is a measure of new polymerase chain reaction (PCR)-positive cases in a given time period. We include estimates of the incidence rate in our Coronavirus (COVID-19) Infection Survey datasets.

In the week ending 17 November 2021, the number of new PCR-positive coronavirus (COVID-19) cases increased in England, Northern Ireland and Scotland, and the trend was uncertain in Wales. Credible intervals are very wide because of relatively small sample sizes, and care should be taken in interpreting results.

The reference date used for our official estimates of incidence of PCR-positive cases is 14 days before the positivity reference day, meaning that there is a two-week lag between the incidence estimate and the positivity estimate. This is necessary as estimates later than this date are more likely to change as we receive additional data. While we believe that the incidence estimates are useful, they can be volatile and subject to change as more data become available. For more information on how we calculate estimates of incidence please see COVID-19 Infection Survey: methods and further information.

# 6 . Analysis of viral load and variants of COVID-19

Each week, we publish Cycle-threshold (Ct) values, which indicate viral load and act as a proxy for the strength of the virus. We also break down infections by variant based on gene positivity patterns from our swab tests.

The World Health Organization (WHO) have defined names for Variants of Concern. These are variants that the UK government has under surveillance. You can find out more in the SARS-CoV-2 variants of concern and variants under investigation in England briefing document (PDF, 2.51MB).

UK Variants of Concern:

- Alpha: B.1.1.7
- Beta: B.1.351
- Gamma: P.1
- Delta: B.1.617.2
- Omicron: B.1.1.529

Infections compatible with the Delta variant have been the most common since the end of May 2021 in England, and since the end of July 2021 in all four UK countries. Our most recent results show over 99% of all coronavirus (COVID-19) infections, from which we obtained a genetic sequence, were genetically compatible with the Delta variant or its descendants. Because these all have the same gene positivity pattern on our swab test, we have not included a breakdown of infections by variant based on gene positivity patterns. We last published our main variant analysis in Coronavirus (COVID-19) Infection Survey, UK: 23 July 2021, where you can find more details. We will continue to monitor infections by variant and will reintroduce the charts and analysis by gene matching pattern when considered helpful.

To date, we have identified a very small number of infections consistent with the new Omicron variant (B.1.1.529) among our survey participants. It is only when we have sufficient participants testing positive with infections compatible with the Omicron variant that we can produce a meaningful estimate of the number of people infected in the population. We will continue to monitor this variant and other variants we detect in our sample. Please see our published statement explaining how we will detect this variant in our survey.

Our Coronavirus (COVID-19) Infection Survey: technical dataset contains several tables relating to analysis on variants, including the genetic lineages of the virus seen in the samples we sequence. More information on how we measure variants from positive tests on the survey can be found in our Understanding COVID-19 Variants blog . Our COVID-19 Infection Survey methods article gives more detail about how we sequence the virus' genetic material.

The sequencing is produced by Northumbria University and analysis is produced by research partners at the University of Oxford. Of particular note are Dr Katrina Lythgoe, Dr David Bonsall, Dr Tanya Golubchik, and Dr Helen Fryer. Genome sequencing is funded by the COVID-19 Genomics UK (COG-UK) consortium. COG-UK is supported by funding from the Medical Research Council (MRC) part of UK Research and Innovation (UKRI), the National Institute of Health Research (NIHR), and Genome Research Limited operating as the Wellcome Sanger Institute.

# 7 . Test sensitivity and specificity

The estimates provided in Sections 2 to 6 are for the percentage of the private-residential population testing positive for coronavirus (COVID-19), otherwise known as the positivity rate. We do not report the prevalence rate. To calculate the prevalence rate, we would need an accurate understanding of the swab test's sensitivity (true-positive rate) and specificity (true-negative rate).

While we do not know the true sensitivity and specificity of the test, our data and related studies provide an indication of what these are likely to be. In particular, the data suggest that the false-positive rate is very low - under 0.005%. We do not know the sensitivity of the swab test. However, other studies suggest that sensitivity (the rate of true-positive test results) may be somewhere between 85% and 98%.

You can find more information on sensitivity and specificity in our COVID-19 Infection Survey methods article and our blog that explains why we trust the data from the COVID-19 infection survey. You can find more information on the data suggesting that our test's false-positive rate is very low in a paper written by academic partners at the University of Oxford.

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

Coronavirus (COVID-19) Infection Survey: England
Dataset | Released 10 December 2021
Findings from the Coronavirus (COVID-19) Infection Survey for England.

Coronavirus (COVID-19) Infection Survey: Northern Ireland
Dataset | Released 10 December 2021
Findings from the Coronavirus (COVID-19) Infection Survey for Northern Ireland.

Coronavirus (COVID-19) Infection Survey: Scotland
Dataset | Released 10 December 2021
Findings from the Coronavirus (COVID-19) Infection Survey for Scotland.

Coronavirus (COVID-19) Infection Survey: Wales
Dataset | Released 10 December 2021
Findings from the Coronavirus (COVID-19) Infection Survey for Wales.

Coronavirus (COVID-19) Infection Survey: technical data
Dataset | Released 10 December 2021
Technical and methodological data from the Coronavirus (COVID-19) Infection Survey, England, Wales, Northern Ireland and Scotland.

# 9 . 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

# 10 . 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 methodology page on statistical uncertainty.

## 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.

## Cycle threshold (Ct) values

The strength of a positive COVID-19 test is determined by how quickly the virus is detected, measured by a cycle threshold (Ct) value. The lower the Ct value, the higher the viral load and stronger the positive test. Positive results with a high Ct value can be seen in the early stages of infection when virus levels are rising, or late in the infection, when the risk of transmission is low.

## False-positives and false-negatives

A false-positive result occurs when the tests suggest a person has coronavirus (COVID-19) when in fact they do not. By contrast, a false-negative result occurs when the tests suggest a person does not have COVID-19 when in fact they do. For more information on false-positives and false-negatives, see our methods article and our blog.

# 11 . Measuring the data

## Reference dates

We aim to provide the estimates of positivity rate (the percentage of those who test positive) and incidence that are most timely and most representative of each week. We decide the most recent week we can report on based on the availability of test results for visits that have already happened, accounting for the fact that swabs have to be couriered to the labs, tested and results returned. On most occasions, the reference dates align perfectly, but sometimes this is not feasible. This week, the reference week for positivity for England, Wales and Northern Ireland is 25 November to 1 December 2021. For Scotland, the reference week for positivity is 26 November to 2 December 2021.

Within the most recent week, we provide an official estimate for positivity rate based on a reference point from the modelled trends. For positivity rates, we can include all swab test results, even from the most recent visits. Therefore, although we are still expecting further swab test results from the labs, there was sufficient data for the official estimate for infection to be based on a reference point after the start of the reference week. To improve stability in our modelling while maintaining relative timeliness of our estimates, we are reporting our official estimates based on the midpoint of the reference week. This week, the reference day for positivity rates for England, Wales and Northern Ireland is Sunday 28 November 2021. For Scotland, the reference day for positivity is Monday 29 November 2021.

The reference date used for our official estimates of incidence of polymerase chain reaction (PCR)-positive cases is 14 days prior to the positivity reference day. This is necessary as estimates later than this date are more likely to change as we receive additional data. This week, the reference week for incidence is 11 to 17 November 2021 and the reference day is Wednesday 14 November 2021.

## Response rates

Response rates for England, Wales, Northern Ireland and Scotland cannot be regarded as final response rates to the survey since those who are invited are not given a time limit in which to respond, and different modes of sampling are not comparable. Response rates for each nation are found in the Coronavirus (COVID-19) Infection Survey: technical dataset. We provide response rates separately for the different sampling phases of the study. Additional information on response rates can be found in our COVID-19 Infection Survey methods article.

## Survey fieldwork

Survey fieldwork for the pilot study began in England on 26 April 2020. In Wales, fieldwork began on 29 June 2020, in Northern Ireland fieldwork began on 26 July 2020 and in Scotland fieldwork began on 21 September 2020.

## Sub-regional geographies

We have presented modelled estimates for the most recent week of data at the sub-regional level. To balance granularity with statistical power, we have grouped together local authorities into COVID-19 Infection Survey sub-regions. The geographies are a rules-based composition of local authorities, and local authorities with a population over 200,000 have been retained where possible.

The boundaries for these COVID-19 Infection Survey sub-regions can be found on the Open Geography Portal.

## Other Coronavirus Infection Survey (CIS) analysis and studies

This study is one of a number of studies that look to provide information around the coronavirus pandemic within the UK. For information on other studies see Section 11: Measuring the data in our previous bulletin dated 30 April 2021.

# 12 . Strengths and limitations

These statistics have been produced quickly in response to developing world events. The Office for Statistics Regulation (OSR), on behalf of the UK Statistics Authority, has reviewed them on 14 May 2020 and 17 March 2021 against several important aspects of the Code of Practice for Statistics and regards them as consistent with the Code's pillars of trustworthiness, quality and value.

The estimates presented in this bulletin contain uncertainty. There are many sources of uncertainty, including uncertainty in the test, in the estimates and in the quality of data collected in the questionnaire. Information on the main sources of uncertainty are presented in our Coronavirus (COVID-19) Infection Survey Quality and Methodology Information report, our methodology article, and our blog that explains why we trust the data from the COVID-19 infection survey.

# 13 . Related Links

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.

Coronavirus (COVID-19) latest insights
Interactive tool | Updated as and when data become available
The latest data and trends about the coronavirus (COVID-19) pandemic from the Office for National Statistics (ONS) and other official sources.

Deaths registered weekly in England and Wales, provisional
Bulletin | Updated weekly
Provisional counts of the number of deaths registered in England and Wales, including deaths involving COVID-19, by age, sex and region, in the latest weeks for which data are available.

Coronavirus (COVID-19) Infection Survey technical article: Analysis of characteristics associated with vaccination uptake
Technical article | Released 15 November 2021
Analysis of populations in the UK by likelihood of being vaccinated 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.

COVID-19 Infection Survey: methods and further information
Methodology article | Updated 24 August 2021
Information on the methods used to collect the data, process it, and calculate the statistics produced from the Coronavirus (COVID-19) Infection Survey.

The Coronavirus (COVID-19) Infection Survey QMI
Methodology article | Updated 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.