Office for National Statistics

Statistical bulletin

Coronavirus (COVID-19) Infection Survey, UK: 30 October 2020

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.

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1 . Main points

- The number of infections continues to increase; an estimated 568,100 people (95% credible interval: 536,500 to 600,400) within the community population in England had the coronavirus (COVID-19) during the most recent week, from 17 to 23 October 2020, equating to around 1 in 100 people (95% credible interval: 1 in 100 to 1 in 90).
- There has been growth in all age groups over the past two weeks; older teenagers and young adults continue to have the highest current rates while rates appear to be steeply increasing among secondary school children.
- The highest COVID-19 infection rates continue to be seen in the North West, and Yorkshire and The Humber; rates also remain high for the North East but have now levelled off and there is now a larger gap with the other two northern regions.
- For England, the incidence rate continues to increase; during the most recent week (17 to 23 October 2020), we estimate there were around 9.52 new COVID-19 infections for every 10,000 people per day (95% credible interval: 7.06 to 14.53) in the community population in England, equating to around 51,900 new cases per day (95% credible interval: 38,500 to 79,200).
- Positivity rates in Wales have increased in recent weeks; during the most recent week (17 to 23 October 2020), we estimate that 26,100 people in Wales had COVID-19 (95% credible interval: 12,600 to 47,900), equating to 1 in 120 people (95% credible interval: 1 in 240 to 1 in 60).
- Positivity rates in Northern Ireland have increased in recent weeks; during the most recent week (17 to 23 October 2020), we estimate that 24,300 people in Northern Ireland had COVID-19 (95% credible interval: 12,600 to 43,700), equating to 1 in 80 people (95% credible interval: 1 in 150 to 1 in 40).
- During the most recent two weeks of the study (10 October to 23 October 2020) we estimate that the weighted positivity rate in Scotland was 0.71% (95% confidence interval: 0.48% to 1.01%); we estimate that an average of 37,400 people in Scotland had COVID-19 (95% credible interval: 25,300 to 53,300), this equates to around 1 in 140 people (95% confidence interval: 1 in 210 to 1 in 100).

In this bulletin, we refer to the number of current COVID-19 infections 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.

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.

All analysis was produced with our research partners at the University of Oxford.

Have you been asked to take part in our survey?

- For more information, please visit the CIS participant guidance page
- If you have any further questions, please email the CIS operations team: COVID-19@ons.gov.uk.

How the data in this bulletin can be used

The data can be used for:

- estimating the number of current positive cases in the community, including cases where people do not report having any symptoms
- identifying differences in numbers of positive cases between different regions
- 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 institutional settings
- estimating the number of positive cases and new infections in smaller geographies, such as towns and cities
- providing information about recovery time of those infected

2 . Number of people in England who had COVID-19

During the most recent week of the study, we estimate that 568,100 people in England had the coronavirus (COVID-19) (95% credible interval: 536,500 to 600,400).[1] This equates to 1.04% (95% credible interval: 0.98% to 1.10%) of the population in England or around 1 in 100 people (95% credible interval: 1 in 100 to 1 in 90). The ratios presented are rounded to the nearest 10. This is based on statistical modelling of the trend in rates of positive nose and throat swab results.

Estimates of infection rates over time are presented in Figure 1. The most recent modelled estimate shows the infection rate continues to increase in recent weeks. In the latest six-week period, there were 609,777 swab tests, and a total of 3,547 positive tests, in 2,732 people from 2,133 households. In the latest two-week period, there were 242,726 swab tests, and a total of 2,058 positive tests, in 1,812 people from 1,423 households.

To provide stability in estimates, we advise using estimates we published in previous bulletins as these are our official estimates of the rate and spread of COVID-19 infections in the community in England. Both these and the modelled estimates are presented in Figure 1 and are used to interpret change over time.

As this is a household survey, our figures do not include people staying in hospitals, care homes or other institutional settings. In these settings, rates of COVID-19 infection are likely to be different. More information about rates of COVID-19 in care homes can be found in Impact of coronavirus in care homes in England: 26 May to 19 June 2020.

Figure 1: The most recent modelled estimate shows the number of infections in England continues to increase steeply

Estimated percentage of the population in England testing positive for the coronavirus (COVID-19) on nose and throat swabs based on modelled estimates from 12 September 2020

Download the data

Notes:

1. These results are provisional and subject to revision.

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. 95% credible intervals are calculated so that there is a 95% probability of the true value lying in the interval.

3. Official reported estimates are plotted at a reference point believed to be most representative of the given week. Details of which day was used for each week can be found in the dataset that accompanies this bulletin.

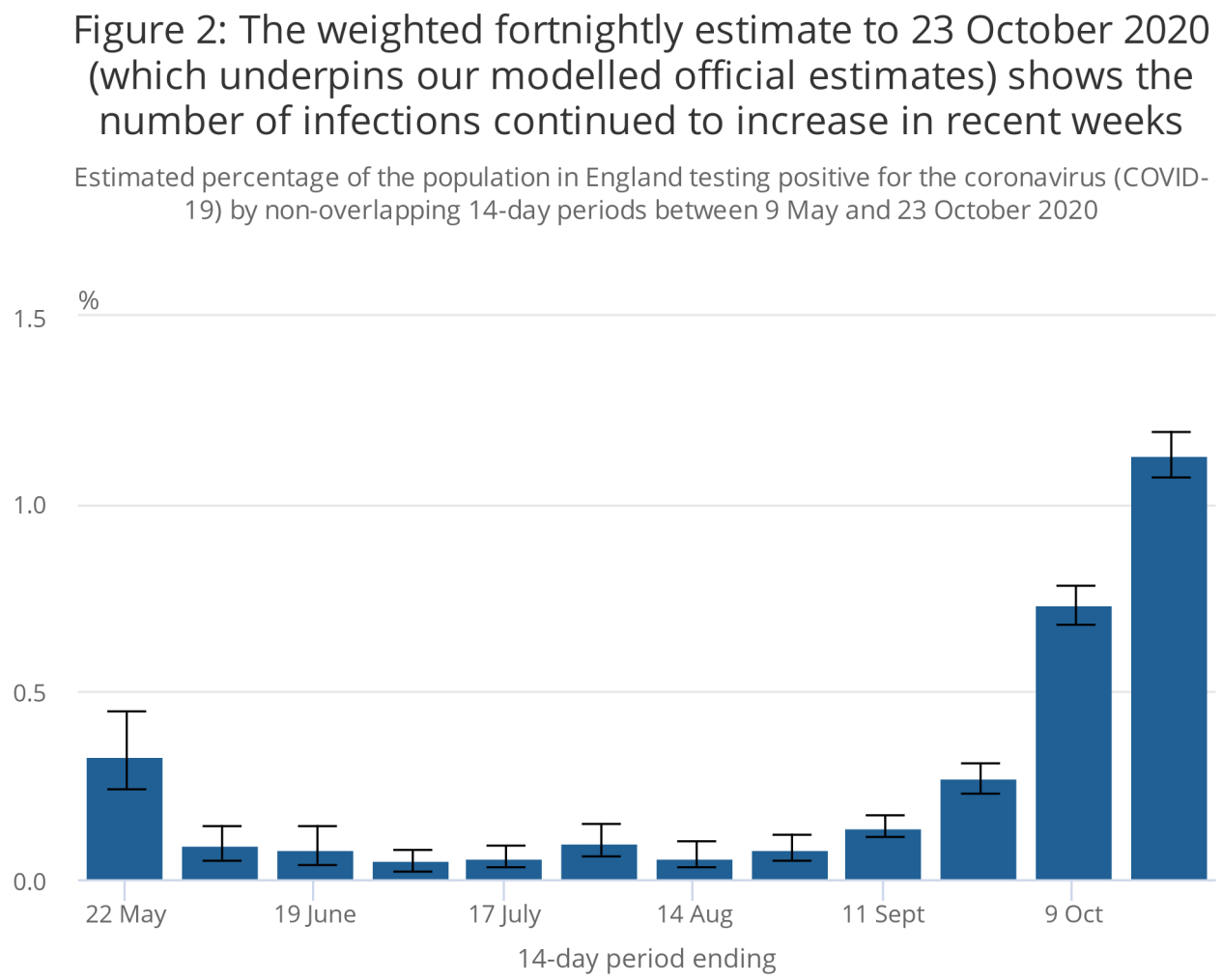
4. Modelled estimates include all swab results that are available at the time the official estimates are produced. Additional swab tests that become available after this are included in subsequent models, meaning that modelled estimates can change slightly as additional data is included.

The estimates for non-overlapping 14-day periods (which underpin our modelled official estimates) are presented in Figure 2. These 14-day estimates are provided for context. The dataset that accompanies this bulletin includes the 14-day estimates and the unweighted sample counts. They show a similar trend to the modelled estimates in Figure 1: that the most recent estimate shows the number of infections continues to increase in recent weeks. The 14-day time periods presented in Figure 2 overlap with those presented in the datasets in our previous publication, so direct comparisons are not possible.

The percentage testing positive in the latest 14-day period (10 to 23 October 2020) was 1.13% (95% confidence interval: 1.07% to 1.19%).

Figure 2: The weighted fortnightly estimate to 23 October 2020 (which underpins our modelled official estimates) shows the number of infections continued to increase in recent weeks

Estimated percentage of the population in England testing positive for the coronavirus (COVID-19) by non-overlapping 14-day periods between 9 May and 23 October 2020



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

Notes:

1. All results are provisional and subject to revision.

2. These statistics refer to infections reported in the community, by which we mean private households. These figures exclude infections reported in hospitals, care homes and/or other institutional settings.

Information about how the modelled and 14-day non-overlapping estimates are calculated can be found in our methods article.

We are continuously refining and looking to improve our modelling and presentations. We would welcome any feedback via email: infection.survey.analysis@ons.gov.uk.

For information about the potential impact of false-positive and false-negative test results, see our methods article.

More about coronavirus

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

Notes for: Number of people in England who had COVID-19

1. This is based on model estimates from the reference point of the most recent week (17 to 23 October 2020), Tuesday 20 October 2020. More information on reference dates can be found in Section 13: Measuring the data.

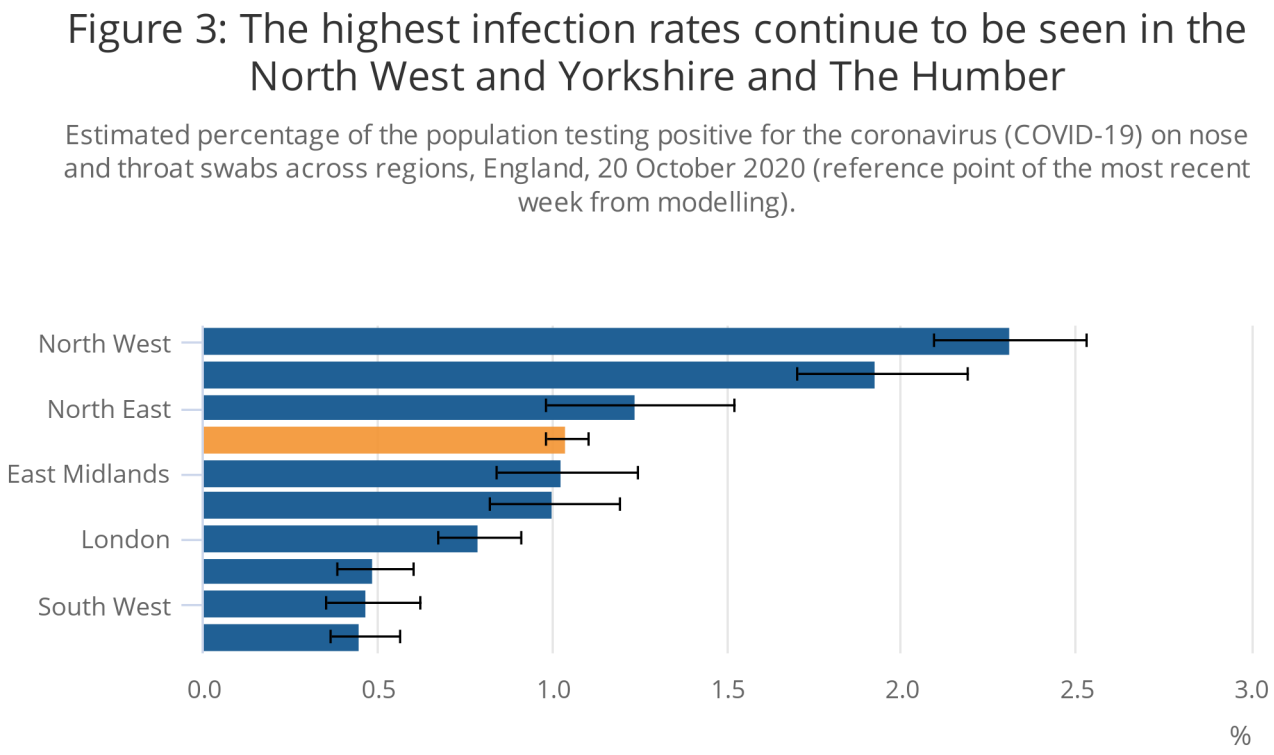
3 . Regional analysis of the number of people in England who had COVID-19

In the data used to produce these estimates, the number of people sampled in each region who tested positive for the coronavirus (COVID-19) is 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.

During the most recent week of the study (17 to 23 October 2020), the highest rates continue to be seen in the North West (2.3%) and Yorkshire and The Humber (1.9%). Positivity rates also remain high in the North East, but have now levelled off. A larger gap can now be seen between the North East and the North West and Yorkshire and The Humber. This is based on statistical modelling of nose and throat swab test results.

Figure 3: The highest infection rates continue to be seen in the North West and Yorkshire and The Humber

Estimated percentage of the population testing positive for the coronavirus (COVID-19) on nose and throat swabs across regions, England, 20 October 2020 (reference point of the most recent week from modelling).



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

Notes:

1. All results are provisional and subject to revision.

2. These statistics refer to infections reported in the community, by which we mean private households. These figures exclude infections reported in hospitals, care homes and/or other institutional settings.

Looking at trends over time, there has been growth in positivity in most regions of England over the last two weeks. Rates continue to increase steeply in the North West and Yorkshire and The Humber. Positivity rates in the North East have levelled off in recent weeks but remain above the England average. Previously, positivity rates in the South West were level, however, the rates appear to be increasing. But as the rates remain low, caution should be taken when interpreting whether rates are increasing in the South West.

The percentage of people testing positive by region was calculated using a similar modelling approach to the national daily estimates in Section 2: Number of people in England who had COVID-19.

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.

Figure 4: There has been growth in positivity in the majority of regions in England over the last two weeks

Estimated percentage of the population testing positive for the coronavirus (COVID-19) on nose and throat swabs, daily, by region since 12 September 2020, England

Download the data

Notes:

1. All results are provisional and subject to revision.
2. These statistics refer to infections reported in the community, by which we mean private households. These figures exclude infections reported in hospitals, care homes and/or other institutional settings.

Estimates for non-overlapping 14-day periods (which underpin our modelled estimates) for regions in England are available in our dataset, and are provided for context.

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

In recent weeks, there has been clear evidence of an increase in the number of people testing positive for the coronavirus (COVID-19). Our age categories to separate children and young people by school age:

- “age two years to school Year 6” includes those children in primary school and below
- “school Year 7 to school Year 11” includes those children in secondary school
- “school Year 12 to age 24 years” includes those young adults who may be in further or higher education

This means that 11- to 12-year-olds have been split between the youngest age categories depending on whether they are in school Year 6 or 7 (birthday before or after 1 September).

Similarly, 16- to 17-year-olds are split depending on whether they are in school Years 11 or 12 (birthday before or after 1 September).

There has been growth in positivity in all age groups over the past two weeks. Older teenagers and young adults continue to have the highest positivity rates, while rates appear to be steeply increasing among secondary school children. However, caution should be taken in over-interpreting small movements in the narrower age groups which have wider credible intervals. This is based on statistical modelling of nose and throat swab test results.

In the data used to produce these estimates, the number of people sampled in the different age groups who tested positive for COVID-19 is lower relative to England overall. This means there is a higher degree of uncertainty in estimates for individual age groups over this period, as indicated by larger credible intervals.

Figure 5: COVID-19 infection rates are highest among older teenagers and young adults

Estimated percentage of the population testing positive for the coronavirus (COVID-19) on nose and throat swabs, daily, by age group since 12 September 2020, England

Download the data

Notes:

1. All results are provisional and subject to revision.
2. These statistics refer to infections reported in the community, by which we mean private households. These figures exclude infections reported in hospitals, care homes and/or other institutional settings.
3. The modelled estimates are presented at the reference value for a region which is the East Midlands. This does not affect the overall trend over time, but estimated probabilities for other regions would vary in level.

Estimates for non-overlapping 14-day periods (which underpin our modelled estimates) by age group are available in our dataset, and are provided for context.

5 . Incidence rate in England

Based on statistical modelling, we estimate that during the most recent week of the study[1] (17 to 23 October 2020), there were 9.52 new coronavirus (COVID-19) infections per 10,000 people per day (95% credible interval: 7.06 to 14.53)[1]. This equates to 51,900 new infections per day (95% credible interval: 38,500 to 79,200).

The incidence rate has continued to increase in recent weeks. The credible intervals are larger in the most recent periods because the model does not include people after their last swab result in the study to date, so the sample size for the most recent days is smaller, resulting in wider credible intervals. Because of instability in the data in the most recent week, we are no longer modelling data beyond the reference date.

The modelling used to calculate the incidence rate is a Bayesian model that is based on the same approach used for estimating the positivity rates in this bulletin. The model uses all swab test results to estimate the incidence rate of new infections for each different type of respondent (by age, sex and region) who tested negative when they first joined the study. It is made to be representative of the overall population using population data. More information on the methodology of this approach is available.

We are continually refining the way we estimate incidence and continue to present the absolute numbers for transparency in the dataset that accompanies this bulletin.

Figure 6: The incidence rate has continued to increase in recent weeks

Estimated numbers of new infections with the coronavirus (COVID-19), England, based on nose and throat swabs with modelled estimates from 6 September 2020

Download the data

Notes:

1. All results are provisional and subject to revision.

2. Credible intervals are large at the end of plot because there is less information available. At the end, although we know that people have been visited, there is a short delay in getting the associated swab results. The model does not include people when their next swab result is not known, so the sample size for the most recent days is smaller, resulting in wider credible intervals.

3. This model does not control for household clustering, where multiple new cases derive from the same household.

4. Official reported estimates are plotted at a reference point believed to be most representative of the reference week. Details of which day was used for each week can be found in the dataset that accompanies this bulletin.

5. Modelled estimates include additional swab test results not available when the official reported estimates were produced.

6. Initial unweighted estimates covering the full study period to date are not included in the official reported estimates chart.

7. Due to instability in the modelled estimates in the most recent week, we are no longer modelling data beyond the reference date.

The incidence rate measures the occurrence of new cases of COVID-19, and the calculation of this is defined in Section 12: Glossary. The incidence rate is not the same as the reproduction rate (R), which is the average number of secondary infections produced by one infected person.

To calculate the estimated average number of people becoming newly infected per day, we multiply the daily incidence rate by the community population (see Coverage in Section 13: Measuring the data). We use the unrounded incidence rate to do this, so results will differ if calculated using the rounded estimates from the dataset.

Notes for: Incidence rate in England

1. This is based on model estimates from the reference point of the most recent week (17 to 23 October 2020), Saturday 17 October 2020. More information on reference dates can be found in Section 13: Measuring the data.

6 . Number of people in Wales who had COVID-19

During the most recent week of the study[1], we estimate that 26,100 people in Wales had the coronavirus (COVID-19) (95% credible interval: 12,600 to 47,900). This equates to 0.86% (95% credible interval: 0.41% to 1.58%) of the population in Wales or around 1 in 120 people (95% credible interval: 1 in 240 to 1 in 60). The ratios are rounded to the nearest 10. Our modelling suggests that the number of COVID-19 cases in Wales has increased in recent weeks. This is based on exploratory modelling of throat and nose swab results.

Because of the relatively small number of tests and a low number of positives in our sample, credible intervals are wide and therefore results should be interpreted with caution.

In Wales, the modelled estimates for the latest six-week period are based on 14,719 swab tests collected over this period. During these weeks, there were a total of 67 positive swabs taken from 52 people from 40 households.

Figure 7: Positivity rates in Wales have increased in recent weeks

Estimated percentage of the population in Wales testing positive for the coronavirus (COVID-19) on nose and throat swabs since 12 September 2020

Download the data

Notes:

1. These results are provisional and subject to revision.

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. 95% credible intervals are calculated so that there is a 95% probability of the true value lying in the interval.

3. Official reported estimates are plotted at a reference point believed to be most representative of the given week. Details of which day was used for each week can be found in the dataset that accompanies this bulletin.

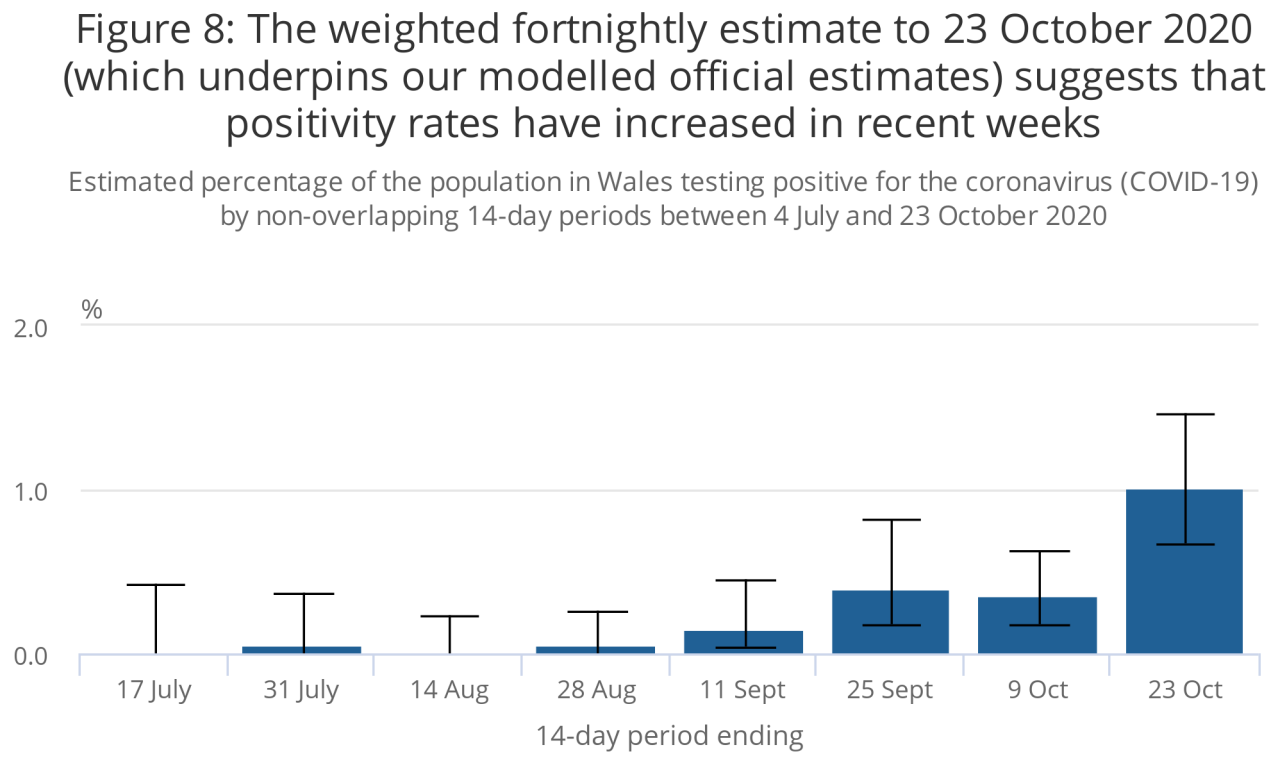
4. Modelled estimates include all swab results that are available at the time the official estimates are produced. Additional swab tests that become available after this are included in subsequent models, meaning that modelled estimates can change slightly as additional data is included.

The estimates for non-overlapping 14-day periods (which underpin our modelled official estimates) are presented in Figure 8. These 14-day estimates are provided for context. The dataset that accompanies this bulletin includes the 14-day estimates and the unweighted sample counts.

The percentage testing positive in Wales in the latest 14-day period (10 to 23 October 2020) was 1.01% (95% confidence interval: 0.67% to 1.46%).

Figure 8: The weighted fortnightly estimate to 23 October 2020 (which underpins our modelled official estimates) suggests that positivity rates have increased in recent weeks

Estimated percentage of the population in Wales testing positive for the coronavirus (COVID-19) by non-overlapping 14-day periods between 4 July and 23 October 2020



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

Notes:

1. All results are provisional and subject to revision.

2. These statistics refer to infections reported in the community, by which we mean private households. These figures exclude infections reported in hospitals, care homes and/or other institutional settings.

The Welsh Government also publishes results from this survey that describe COVID-19 infections in Wales in English and in Welsh.

Notes for: Number of people in Wales who had COVID-19

1. This is based on model estimates from the reference point of the most recent week (17 to 23 October 2020), Tuesday 20 October 2020. More information on reference dates can be found in Section 13: Measuring the data.

7 . Number of people in Northern Ireland who had COVID-19

During the most recent week of the study[1], we estimate that 24,300 people in Northern Ireland had the coronavirus (COVID-19) (95% credible interval: 12,600 to 43,700). This equates to 1.32% (95% credible interval: 0.68% to 2.38%) of the population in Northern Ireland or around 1 in 80 people (95% credible interval: 1 in 150 to 1 in 40). The ratios in this bulletin are rounded to the nearest 10. Our modelling suggests that the number of COVID-19 cases in Northern Ireland has increased in recent weeks. This is based on exploratory modelling of throat and nose swab results.

Because of the relatively small number of tests and a low number of positives in our sample, credible intervals are wide and therefore results should be interpreted with caution.

In Northern Ireland, the modelled estimates for the latest six-week period are based on 11,624 swab tests collected over this period. During these weeks, there were a total of 69 positive swabs taken from 54 people from 39 households.

Figure 9: Positivity rates in Northern Ireland have increased in recent weeks

Estimated percentage of the population in Northern Ireland testing positive for the coronavirus (COVID-19) on nose and throat swabs since 12 September 2020

Download the data

Notes:

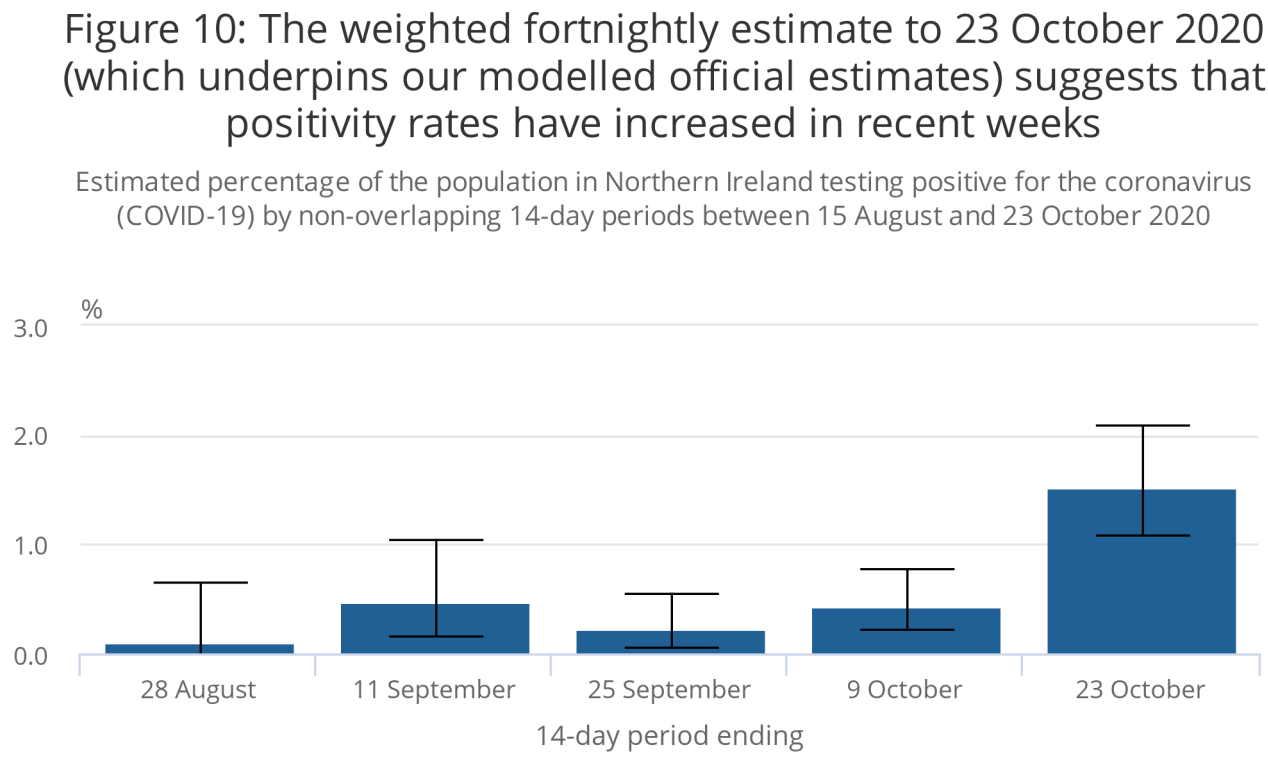
1. These results are provisional and subject to revision.
2. All estimates are subject to uncertainty, given that a sample is only part of the wider population. The model used to provide these estimates is a Bayesian model: these provide 95% credible intervals. A credible interval gives an indication of the uncertainty of an estimate from data analysis. 95% credible intervals are calculated so that there is a 95% probability of the true value lying in the interval.
3. Official reported estimates are plotted at a reference point believed to be most representative of the given week. Details of which day was used for each week can be found in the dataset that accompanies this bulletin.
4. Modelled estimates include all swab results that are available at the time the official estimates are produced. Additional swab tests that become available after this are included in subsequent models, meaning that modelled estimates can change slightly as additional data is included

The estimates for non-overlapping 14-day periods (which underpin our modelled official estimates) are presented in Figure 10. These 14-day estimates are provided for context. These data are also included in the accompanying dataset.

The percentage testing positive in Northern Ireland in the latest 14-day period (10 to 23 October 2020) was 1.52% (95% confidence interval: 1.07% to 2.09%).

Figure 10: The weighted fortnightly estimate to 23 October 2020 (which underpins our modelled official estimates) suggests that positivity rates have increased in recent weeks

Estimated percentage of the population in Northern Ireland testing positive for the coronavirus (COVID-19) by non-overlapping 14-day periods between 15 August and 23 October 2020



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

Notes:

1. All results are provisional and subject to revision.

2. These statistics refer to infections reported in the community, by which we mean private households. These figures exclude infections reported in hospitals, care homes and/or other institutional settings.

Notes for: Number of people in Northern Ireland who had COVID-19

1. This is based on model estimates from the reference point of the most recent week (17 to 23 October 2020), Tuesday 20 October 2020. More information on reference dates can be found in Section 13: Measuring the data.

8 . Number of people in Scotland who had COVID-19

During the most recent two weeks of the study (10 to 23 October 2020), we estimate that 0.71% of people in Scotland had the coronavirus (COVID-19) (95% confidence interval: 0.48% to 1.01%). We estimate that an average of 37,400 people in Scotland had COVID-19 (95% credible interval: 25,300 to 53,300). This equates to 1 in 140 people (95% confidence interval: 1 in 210 to 1 in 100). The ratios presented are rounded to the nearest 10.

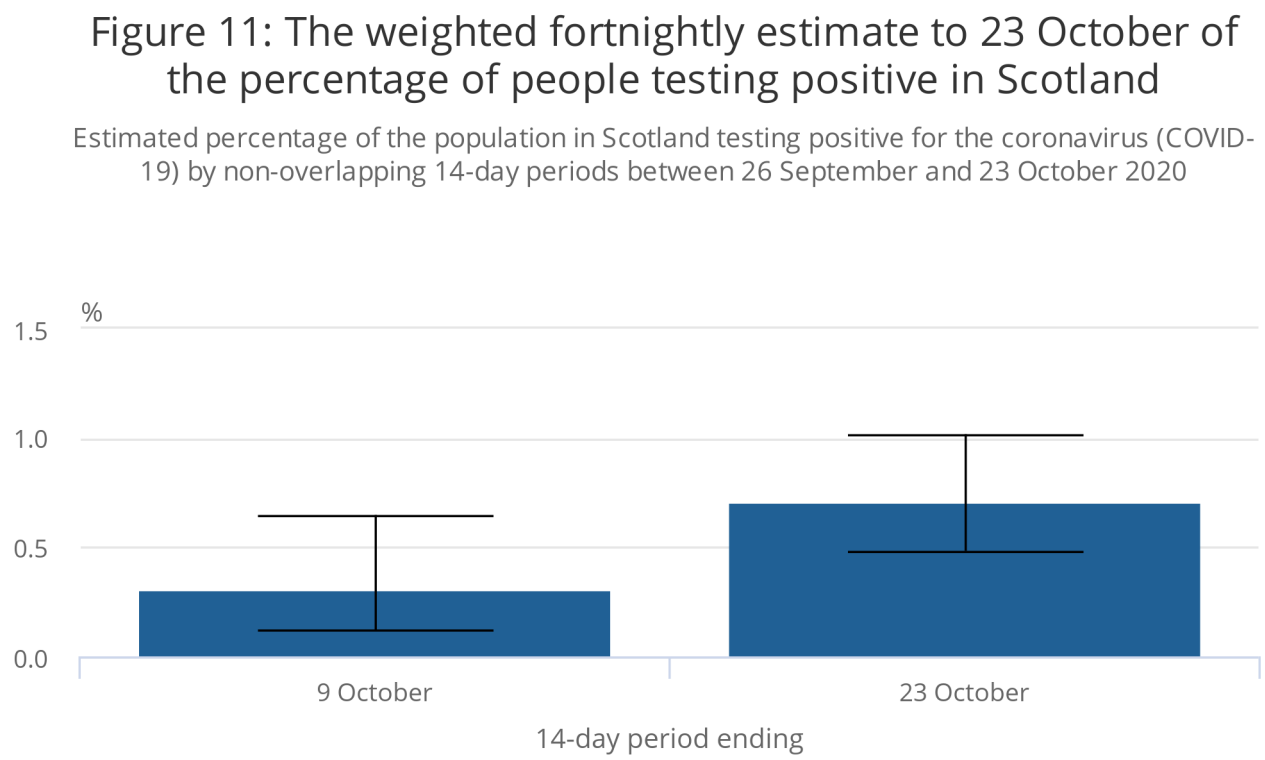
Estimates of the total national proportion of the population testing positive for COVID-19 are weighted to be representative of the population of Scotland that live in private residential households in terms of age (grouped), sex, and region. It is too early to comment on any trend on the proportion of the population testing positive for COVID-19 in Scotland.

Because of a relatively small number of tests and positive swab results within our sample, confidence intervals are wide and therefore results should be interpreted with caution.

In Scotland, the weighted estimates for the latest 14-day period are based on swab test results from 5,597 participants collected over this period. During the two weeks, there were 36 people from 32 households who tested positive.

Figure 11: The weighted fortnightly estimate to 23 October of the percentage of people testing positive in Scotland

Estimated percentage of the population in Scotland testing positive for the coronavirus (COVID-19) by non-overlapping 14-day periods between 26 September and 23 October 2020



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

Notes:

1. All results are provisional and subject to revision.

2. These statistics refer to infections reported in the community, by which we mean private households. These figures exclude infections reported in hospitals, care homes and/or other institutional settings.

9 . Test sensitivity and specificity

The estimates provided in Sections 2, 6, 7 and 8 are for the percentage of the private-residential population testing positive for the 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, as COVID-19 is a new virus, 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%. To understand the potential impact of false-positives and false-negatives, we have estimated what the prevalence would be in two scenarios using different test sensitivity and the same specificity rates. We do not know the sensitivity of the swab test. However, other studies suggest that sensitivity may be somewhere between 85% and 98%. Under a scenario where test sensitivity is between 85% and 95%, and test specificity is between 99.5% and 100%, the most recent weighted fortnightly estimate would be 1.13% (95% credible interval: 1.07% to 1.19%). In the unlikely situation where test sensitivity was lower, between 45% and 75%, the weighted fortnightly estimate would be 1.86% (95% credible interval: 1.50% to 2.44%).

For this reason, we do not produce prevalence estimates for every analysis, but we will continue to monitor the impacts of sensitivity and specificity in future.

You can find more information on sensitivity and specificity in our methods article. You can find more information on cycle thresholds in a paper written by academic partners at the University of Oxford.

10 . COVID-19 Infection Survey data

Coronavirus (COVID-19) Infection Survey
Dataset | Released 30 October 2020
Findings from the Coronavirus (COVID-19) Infection Survey, UK.

11 . 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, Public Health England (PHE) 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

12 . Glossary

Community

In this bulletin, we refer to the number of coronavirus (COVID-19) infections within the community. Community in this instance refers to private households, and it excludes those in hospitals, care homes and/or other institutional settings.

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. 95% credible intervals are calculated so that there is a 95% probability of the true value lying in the interval.

False-positives and false-negatives

A false-positive result occurs when the tests suggest a person has 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.

Incidence rate

The incidence rate is an estimate of how often new cases of COVID-19 occur over a given period of time. In our study, it is calculated by dividing the number of times a person has a positive test for the first time in the study, having first tested negative, by the total time everyone is in the study. We include the time people are in the study between successive negative tests for those who never have a positive test and the time up to halfway (or maximum of seven days, whichever is later) between their last negative and first positive test for those who have a positive test. This reflects the fact that we do not actually know when a person first becomes positive, only when we tested them. People who are positive when they join the study are not included in this calculation.

13 . Measuring the data

Data presented in this bulletin come from the Coronavirus (COVID-19) Infection Survey, which looks to identify the percentage of the population testing positive for COVID-19 and whether they have symptoms or not. The survey helps track the current extent of infection and transmission of COVID-19 among the population as a whole. This section of the bulletin provides a short summary of the study data and data collection methods. 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.

Reference dates

We aim to provide the estimates of positivity rate 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 data align perfectly, but sometimes this is not feasible. This week, the reference week falls between 17 and 23 October 2020.

Within the most recent week, we provide an official estimate for positivity rate and incidence 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 is sufficient data for the official estimate for positivity 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 is Tuesday 20 October 2020.

The calculation of incidence uses time between two tests; so, for example, a participant who was last seen two weeks ago and is not due their next visit for another two weeks only contributes to the model up to two weeks ago. Our official estimates of incidence are therefore based on the first day of the reference week. This week, the reference day for incidence is Saturday 17 October 2020. The model includes all information up to 17 October (the end of the reference week); people who tested negative on a test between 18 and 26 October are included as negative up to 23 October and people who tested positive on a test between 18 and 26 October are included as positive if the time halfway between their last negative and first positive test (or seven days before their positive test, whichever is later) is up to 17 October.

Response rates

At the beginning of the survey, our sample was largely made up of people in England who have taken part in previous ONS surveys and had agreed to future contact regarding research. We initially invited 20,276 households, and then a further 91,143 in extension weeks. Of those households invited, 39% have provided at least one swab. The likelihood of enrolment decreases over time and response rate information for those initially asked to take part in these first two phases can be considered as relatively final.

In England, we expanded our sampling at the end of July to invite a random sample of households from a list of addresses. As we have expanded, we reached out across the country to enrol new households, this different approach will affect response rates. The number of households invited to participate in the survey in this expansion in England, as of 23 October, was 908,124, of which 10% of households have provided a swab so far, increasing the number of households taking part to 132,627 to date.

Response rates for these expansion weeks 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 should not be compared with response rates for those that have taken part in a previous survey, as this is a different mode of sampling. The total number of households invited will contain households for which the mail was undeliverable and therefore could not respond.

Fieldwork began in Wales on 29 June, and the number of households initially invited to participate was 9,697, of which 31% have provided at least one swab so far. The initial sample was made up of people who had taken part in previous ONS surveys and had agreed to future contact regarding research. At the beginning of October, the survey in Wales was expanded to invite a random sample of households from a list of addresses, and as of 23 October, a further 12,696 households have been invited, of which 4% of households have provided at least one swab so far.

Fieldwork began in Northern Ireland on 26 July, and as of 23 October, 6,047 households in Northern Ireland have been invited to participate, of which 36% of households have provided at least one swab so far. The initial sample was made up of people who had taken part in previous ONS and Northern Ireland Statistics and Research Agency (NISRA) surveys and had agreed to future contact regarding research.

Fieldwork began in Scotland on 14 September, and as of 23 October, the number of households invited to participate in the survey in Scotland was 64,718, of which 5% have provided at least one swab. This initial sample is taken from a random sample of households from a list of addresses.

Response rates for 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.

Since the survey began, we have taken over 1 million swabs from participants across the UK.

Response rates for each nation are found in the dataset that accompanies this bulletin. We provide response rates separately for the different sampling phases of the study.

Coverage

Survey fieldwork for the pilot study began in England on 26 April 2020. Survey fieldwork in Wales began on 29 June, and since 7 August we have reported headline figures for Wales. Survey fieldwork began in Northern Ireland on 26 July and since 25 September we have reported headline figures for Northern Ireland. Survey fieldwork in Scotland began on 14 September, and we have reported headline figures for Scotland since 16 October.

Only private residential households, otherwise known as the target population in this bulletin, are included in the sample. People in hospitals, care homes and/or other institutional settings are not included.

The overall target population for England used in this study is 54,524,766. The overall target population for Wales used in the study is 3,039,465. The overall target population for Northern Ireland used in the study is 1,834,846. The overall target population for Scotland used in the study is 5,264,705.

Analysing the data

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.

We continue to develop our analysis methods, and these quality enhancements may lead to minor changes in estimates, for example, the positive test counts across the study period.

We are giving increasing prominence to the weighted estimates to ensure we are giving appropriate visibility to all available indicators.

Other CIS analysis

Our recent release, Coronavirus (COVID-19) Infection Survey: characteristics of people testing positive for COVID-19 in England, October 2020, offers more detailed analysis, including further exploration of the characteristics and behaviours of those with COVID-19, such as symptoms among those testing positive, region by age, and travel abroad by time.

Laboratory confirmed cases in the UK

Public Health England (PHE) presents data on the total number of laboratory-confirmed cases in the UK, which capture the cumulative number of people in the UK who have tested positive for COVID-19. These statistics present all known cases of COVID-19, both current and historical, for the UK, and by nation, by regions of England, and because of the large sample size, by local authority. Further information can be found on the Coronavirus Dashboard. A summary for each nation: England, Wales, Scotland and Northern Ireland is also available.

Testing and tracing systems

Each nation of the UK has a testing and tracing system: for England, Wales, Northern Ireland and Scotland. These ensure that anyone who develops symptoms of COVID-19 can quickly be tested to find out if they have the virus. Some nations also include targeted asymptomatic testing of NHS and social care staff and care home residents. Additionally, it helps trace close recent contacts of anyone who tests positive for COVID-19 and, if necessary, notify them that they must self-isolate. We have recently published an article that compares the methods used in the COVID-19 Infection Survey and NHS Test and Trace in England.

In comparison with Public Health data and Testing and Tracing data, the statistics presented in this bulletin take a representative sample of the community population (those in private residential households), including people who are not otherwise prioritised for testing. This means that we can estimate the number of people in the community population with COVID-19 who do not report any evidence of symptoms.

Other studies

This study is one of a number of studies that look to provide information around the coronavirus pandemic within the UK.

COVID Symptom Study (ZOE app and King's College London), UK

The COVID Symptom Study app allows users to log their health each day, including whether or not they have symptoms of COVID-19. The study aims to predict which combination of symptoms indicate that someone is likely to test positive for COVID-19. The app was developed by the health science company ZOE with data analysis conducted by King's College London. Anyone over the age of 18 years can download the app and take part in the study. Respondents can report symptoms of children.

The study estimates the total number of people with symptomatic COVID-19 and the daily number of new cases of COVID-19 based on app data and swab tests taken in conjunction with the Department of Health and Social Care (DHSC). The study investigates the "predictive power of symptoms", and so the data do not capture people who are infected with COVID-19 but who do not display symptoms.

Unlike the data presented in this bulletin, the COVID Symptom Study is not a representative sample of the population. It is reliant on app users and so captures only some cases in hospitals, care homes and other communities where few people use the app. To account for this, the model adjusts for age and deprivation when producing UK estimates. The larger sample size allows for detailed geographic breakdown.

Real-time Assessment of Community Transmission-1 and -2 (REACT-1 and -2), England

Like our study, the Real-time Assessment of Community Transmission-1 REACT-1 survey (PDF, 1.2MB) involves taking swab samples to test for COVID-19 antigens to estimate the prevalence and transmission of the virus that causes COVID-19 in the community. Each round of the study currently involves around 160,000 participants aged five years and over, selected from a random cross-section sample of the general public from GP registration data. Trends in infection by characteristics, such as age, sex, ethnicity, symptoms and key worker status, are also possible through the study. The REACT-2 study (PDF, 1.68MB) uses a finger prick test to generate data for antibody analysis.

One of the main differences from our COVID-19 Infection Survey is that the REACT surveys do not require follow-up visits, as the study is interested primarily in prevalence at a given time point. Consequently, the incidence rate cannot be calculated from the REACT studies.

Other antibody estimates

PHE also publish an estimate of the prevalence of antibodies in the blood in England using blood samples from healthy adult blood donors. PHE provide estimates by region and currently do not scale up to England. Estimates in this bulletin and those published by PHE are based on different tests; PHE estimates are based on testing using the Euroimmun assay method, while blood samples in our survey are tested for antibodies by research staff at the University of Oxford using a novel ELISA. For more information about the antibody test used in this bulletin, see the COVID-19 Infection Survey protocol.

In addition, the REACT study, led by Imperial College London, uses antibody finger-prick tests to track past infections and monitor the progress of the pandemic, and the estimates have been published (PDF, 603KB). Estimates in this bulletin and the REACT study use different tests and different methods, for example, the REACT estimates are based on self-administered and self-read finger prick tests, whereas tests in this survey are carried out by a trained nurse, phlebotomist or healthcare assistant.

14 . Strengths and limitations

These statistics have been produced quickly in response to developing world events. The Office for Statistics Regulation, on behalf of the UK Statistics Authority, has reviewed them 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 methodology article.

15 . Related links

COVID-19 Infection Survey (Pilot): methods and further information
Methodology article | Updated 21 September 2020
Information on the methods used to collect the data, process it, and calculate the statistics produced from the Coronavirus (COVID-19) Infection Survey (pilot).

Coronavirus (COVID-19) Infection Survey: characteristics of people testing positive for COVID-19 in England, October 2020
Article | Updated monthly
Analysis on the latest data about the characteristics of those who test positive for COVID-19 in England, from the COVID-19 Infection Survey.

Coronavirus (COVID-19) latest data and analysis
Web page | Updated as and when data become available
Latest data and analysis on the coronavirus pandemic in the UK and its effect on the economy and society.

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.

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.

Comparing methods used in the Coronavirus (COVID-19) Infection Survey and NHS Test and Trace, England: October 2020
Article | Released 6 October 2020
The methods used in the COVID-19 Infection Survey and NHS Test and Trace in England and why the data cannot be directly compared.

New survey results provide first snapshot of the current number of COVID-19 infections in England
Blog | Released 14 May 2020
A large study jointly led by the Office for National Statistics (ONS), in partnership with the Universities of Oxford and Manchester, Public Health England (PHE), and Wellcome Trust, is tracking infections within a representative sample of people of all ages across England. This blog explains what these mean, why they are important and how to compare this survey with other COVID-19 estimates.

COVID-19 Infection Survey
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.