Office for National Statistics

Statistical bulletin

Coronavirus (COVID-19) Infection Survey, UK: 23 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 433,300 people (95% credible interval: 407,500 to 459,300) within the community population in England had the coronavirus (COVID-19) during the most recent week, from 10 to 16 October 2020, equating to around 1 in 130 people (95% credible interval: 1 in 130 to 1 in 120).
- There has been growth in COVID-19 infection rates in all age groups over the past two weeks including those aged over 70 years, with the current rates highest in older teenagers and young adults.
- The highest COVID-19 infection rates continue to be seen in the North West, Yorkshire and The Humber, and the North East.
- During the most recent week (10 to 16 October 2020), we estimate there were around 6.46 new COVID-19 infections for every 10,000 people per day (95% credible interval: 5.46 to 8.55) in the community population in England, equating to around 35,200 new cases per day (95% credible interval: 29,800 to 46,600).
- The incidence rate has continued to increase in recent weeks.
- In England, an estimated 5.6% (95% confidence interval 5.0% to 6.2%) of people would have tested positive for antibodies against SARS-CoV-2 on a blood test in September, suggesting they had the infection in the past; the highest antibody positivity was seen in London, followed by the North East, Yorkshire and The Humber and the North West.
- The number of infections in Wales has increased in recent weeks; during the most recent week (10 to 16 October 2020), we estimate that 16,700 people in Wales had COVID-19 (95% credible interval: 7,600 to 30,400), equating to 1 in 180 people (95% credible interval: 1 in 400 to 1 in 100).
- In Wales, an estimated 4.2% (95% confidence interval 2.1% to 7.5%) of people would have tested positive for antibodies against SARS-CoV-2 on a blood test in September, suggesting they had the infection in the past.
- During the most recent two weeks (3 to 16 October 2020), we estimate that 1.01% of people in Northern Ireland had COVID-19 (95% confidence interval: 0.64% to 1.50%), which is around 1 in 100 people (95% credible interval: 1 in 160 to 1 in 70).
- For the first time we are reporting results for Scotland; during the most recent two weeks (3 to 16 October 2020), we estimate that 0.57% of people in Scotland had COVID-19 (95% confidence interval: 0.35% to 0.88%), which is around 1 in 180 people (95% confidence interval: 1 in 290 to 1 in 110).

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 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.

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 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
- producing a UK estimate; while we now have estimates for England, Scotland, Wales and Northern Ireland, these cannot be added up or averaged to understand the UK infection rate

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

During the most recent week of the study, we estimate that 433,300 people in England had the coronavirus (COVID-19) (95% credible interval: 407,500 to 459,300).[1] This equates to 0.79% (95% credible interval: 0.75% to 0.84%) of the population in England or around 1 in 130 people (95% credible interval: 1 in 130 to 1 in 120). 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 has continued to increase in recent weeks. In the latest six-week period, there were 507,946 swab tests, and a total of 2,040 positive tests, in 1,617 people from 1,265 households. In the latest two-week period, there were 244,279 swab tests, and a total of 1,398 positive tests, in 1,213 people from 941 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 has continued to increase in recent weeks

Estimated percentage of the population in England testing positive for the coronavirus (COVID-19) on nose and throat swabs based on modelled estimates from 5 September 2020

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.

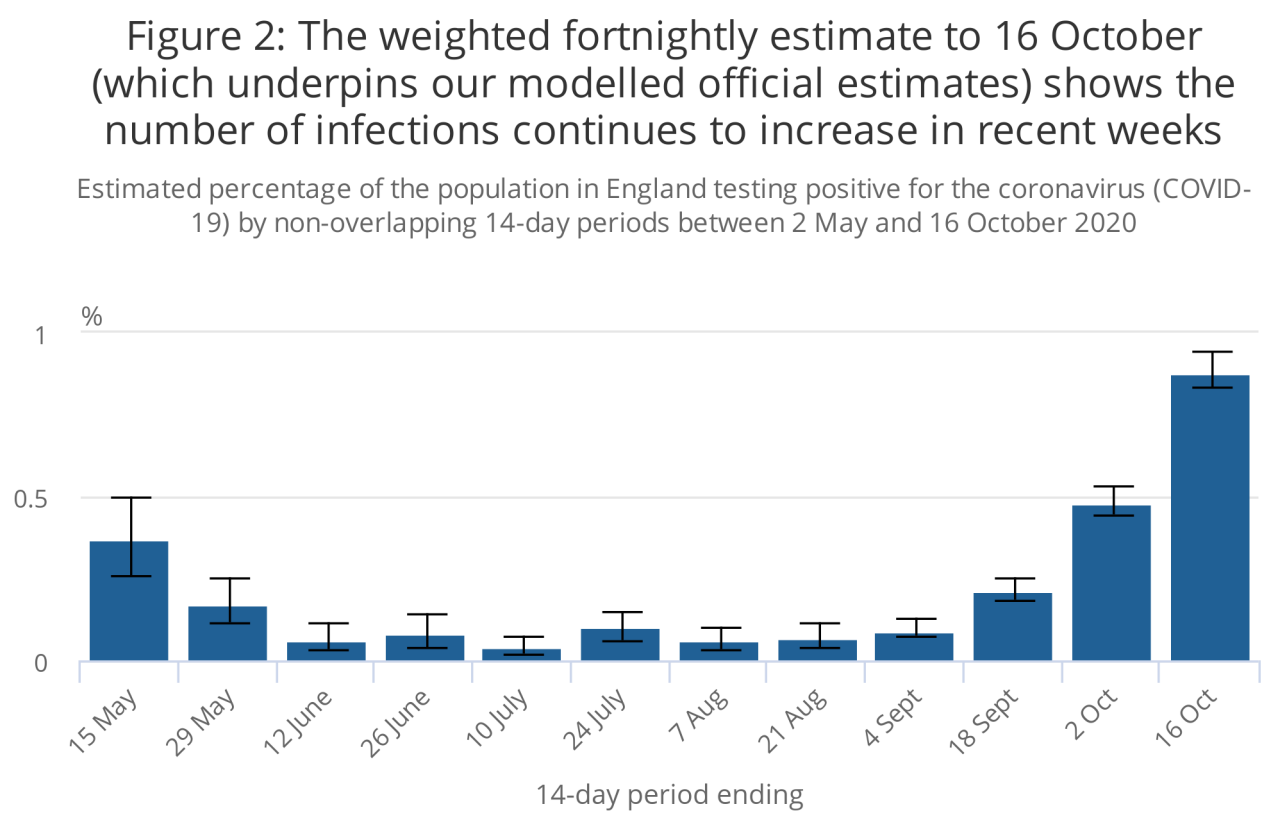
Download the data

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 has continued to increase in recent weeks. The 14-day time periods presented in Figure 2 overlap with those presented in the data tables in our previous publication, so direct comparisons are not possible.

The percentage testing positive in the latest 14-day period (3 to 16 October 2020) was 0.88% (95% confidence interval: 0.83% to 0.94%).

Figure 2: The weighted fortnightly estimate to 16 October (which underpins our modelled official estimates) shows the number of infections continues 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 2 May and 16 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 (10 to 16 October 2020), Tuesday 13 October 2020. More information on reference dates can be found in Section 16: Measuring the data.

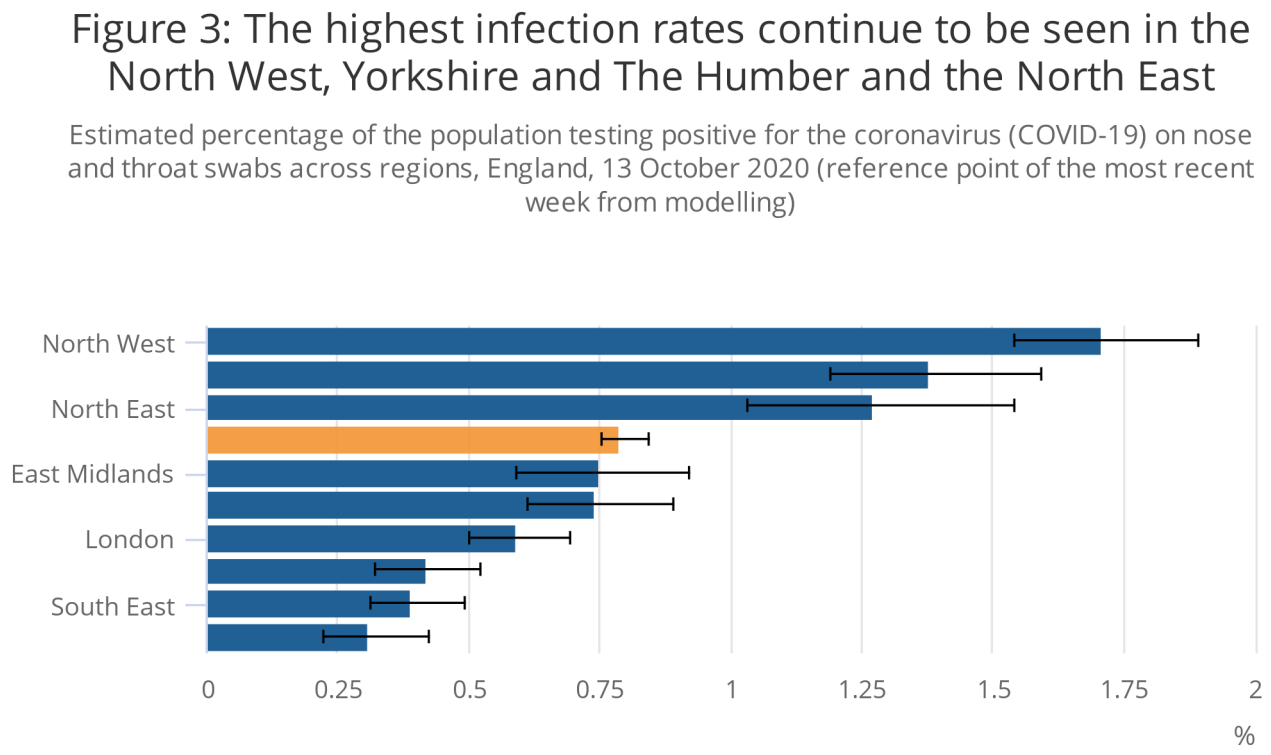
3 . Regional analysis of the number of people in England who had COVID-19

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 (10 to 16 October 2020), the highest infection rates continue to be seen in the North West, Yorkshire and The Humber and the North East. However, the gap between the northern regions and other areas seems to be narrowing. 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, Yorkshire and The Humber and the North East

Estimated percentage of the population testing positive for the coronavirus (COVID-19) on nose and throat swabs across regions, England, 13 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 with the exception of the South West. Three regions show positivity rates above 1%; while rates in the North West and Yorkshire and The Humber continue to grow, the trend in the North East is showing early indications of a levelling off, but with a rate over 1%.

Caution should be taken in over-interpreting these trends when positivity remains much higher in some regions than others, despite the narrowing gap between regions.

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 most regions of 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 5 September 2020, England

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.

Download the data

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.

Have you been asked to take part in our survey?

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

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). We have recently updated 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 the COVID-19 infection rate in all age groups over the past two weeks including those aged over 70 years, with the current rates highest in older teenagers and young adults. Extreme caution should be taken in over-interpreting small movements in the narrower age groups, particularly those in school Years 7 to 11, 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 5 September 2020, England

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.

Download the data

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] (10 to 16 October 2020), there were 6.46 new coronavirus (COVID-19) infections per 10,000 people per day (95% credible interval: 5.46 to 8.55)[1]. This equates to 35,200 new infections per day (95% credible interval: 29,800 to 46,600).

The incidence rate has continued to increase in recent weeks. The credible intervals are larger in the most recent periods because swab results take time to process. The model is not currently including 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.

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 5 September 2020

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 given 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.

Download the data

The incidence rate measures the occurrence of new cases of the COVID-19, and the calculation of this is defined in Section 15: 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 16: 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 (10 to 16 October 2020), Saturday 10 October 2020. More information on reference dates can be found in Section 16: Measuring the data.

6 . Antibody data for England

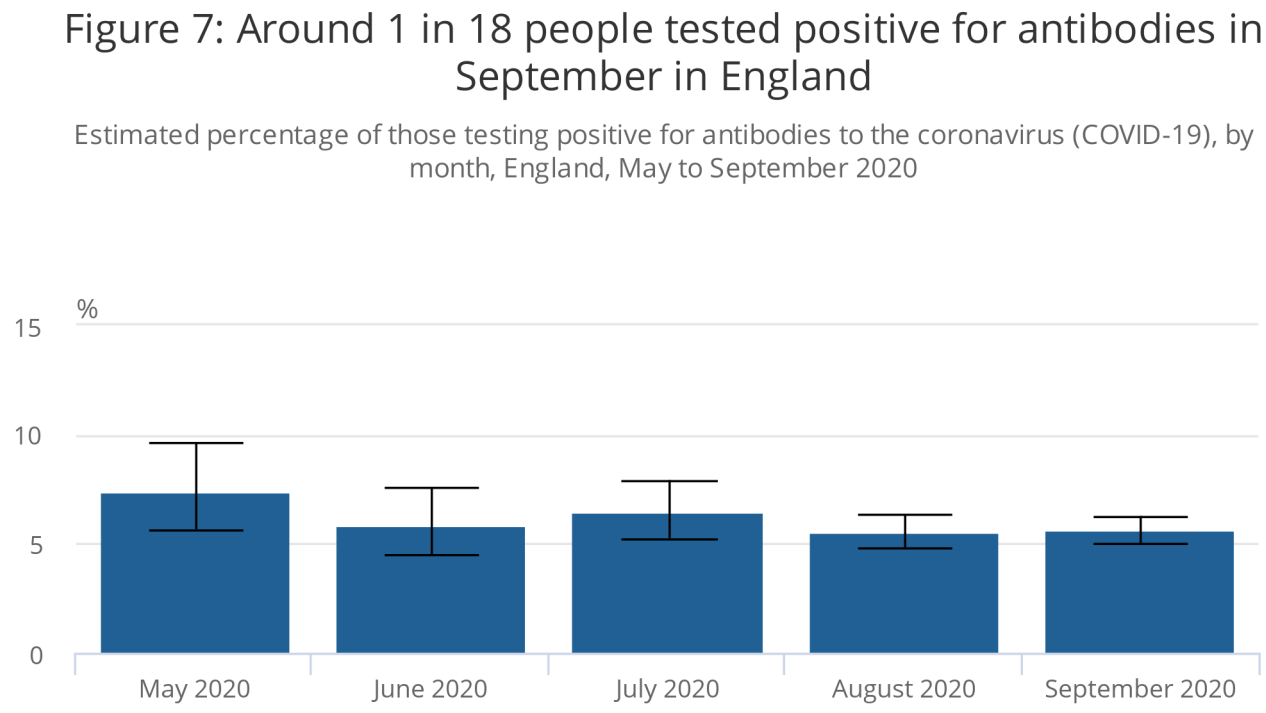
Increasing sample sizes and positive counts for our antibodies estimates mean we are now able to provide weighted monthly regional estimates for antibodies for the first time. Please note that these monthly estimates cannot be directly compared with previous antibodies estimates.

In September 2020, an estimated 5.6% (95% confidence interval 5.0% to 6.2%) of the population in England would have tested positive for antibodies to the coronavirus (COVID-19) from a blood sample. The estimate is weighted to be representative of the overall population and suggests that an average of 2.5 million people aged 16 years and over in England had antibodies to COVID-19 during this time (95% confidence interval: 2.2 million to 2.8 million). This equates to 1 in 18 people aged 16 years and over (95% confidence interval 1 in 20, to 1 in 16).[1]

Small reductions in the percentage testing positive for antibodies over time are consistent with antibody waning (at the population level). We will be doing further analysis to understand the extent of antibody waning within our study.

Figure 7: Around 1 in 18 people tested positive for antibodies in September in England

Estimated percentage of those testing positive for antibodies to the coronavirus (COVID-19), by month, England, May to September 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.

One way the body fights infections like COVID-19 is by producing small particles in the blood called antibodies. It takes between two and three weeks for the body to make enough antibodies to fight the infection but once a person recovers, 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, but other parts of the immune system can also protect people.

We measure the presence of antibodies to understand who has had COVID-19 in the past, although 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.

More information on how our estimates compare with other studies can be found in Section 16: Measuring the data.

Notes for: Antibody data for England

1. Changes in the rate of people testing positive for antibodies between bulletins should not be interpreted as a trend over time. This is because it relates to a change in the number of individuals whose blood has now been tested for antibodies.

7 . Regional analysis of antibody data for England

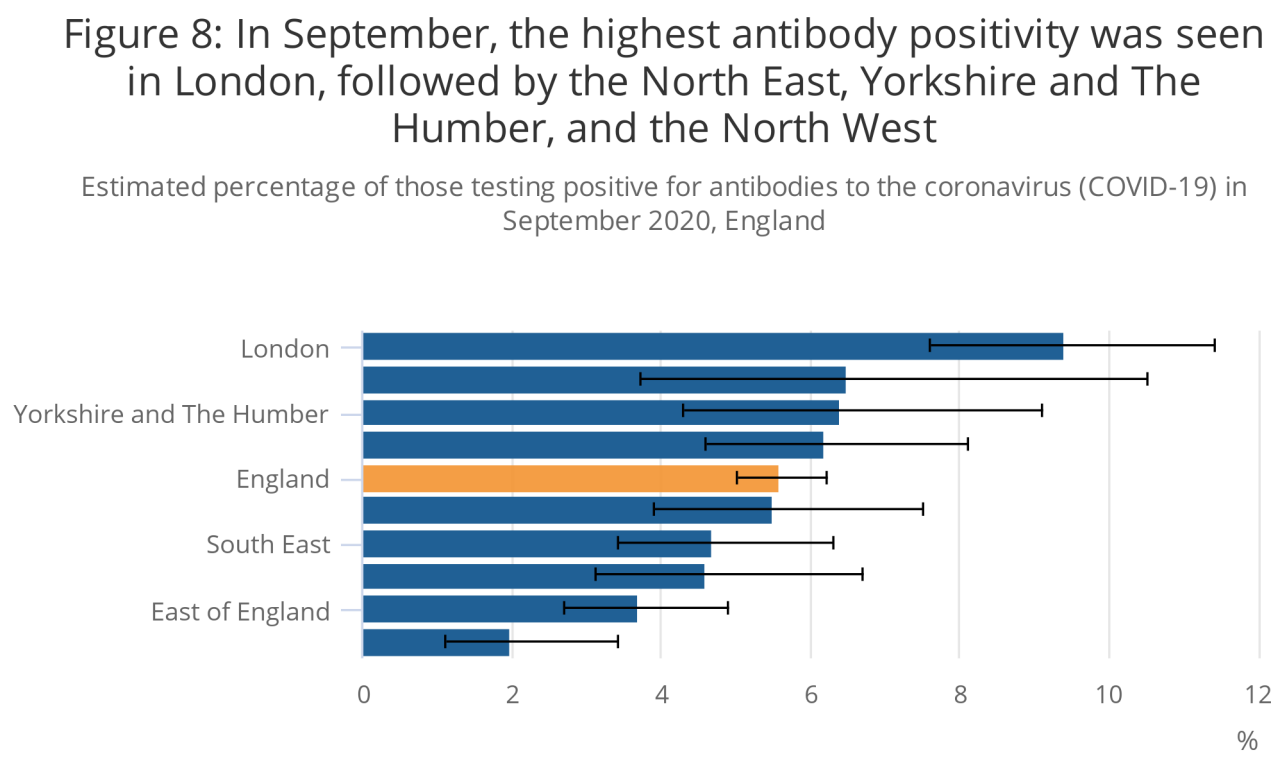
The analysis in this section uses data taken from September 2020 weighted antibodies estimates. There is clear evidence of variation between regions, with the highest antibody positivity seen in London, followed by the North East, Yorkshire and The Humber, and the North West.

Confidence intervals are large for some regions indicating high uncertainty in those estimates but there is still evidence of differences in the percentage of people testing positive for antibodies between regions.

Increasing sample sizes and positive counts for our regional estimates mean we are now able to provide weighted monthly regional estimates for antibodies. Please note that these monthly estimates cannot be directly compared with previous regional estimates.

Figure 8: In September, the highest antibody positivity was seen in London, followed by the North East, Yorkshire and The Humber, and the North West

Estimated percentage of those testing positive for antibodies to the coronavirus (COVID-19) in September 2020, England



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 or other institutional settings.

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

During the most recent week of the study[1], we estimate that 16,700 people in Wales had the coronavirus (COVID-19) (95% credible interval: 7,600 to 30,400). This equates to 0.55% (95% credible interval: 0.25% to 1.00%) of the population in Wales or around 1 in 180 people (95% credible interval: 1 in 400 to 1 in 100). 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 13,270 swab tests collected over this period. During these weeks, there were a total of 43 positive swabs taken from 33 people from 25 households.

Figure 9: 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 5 September 2020

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.

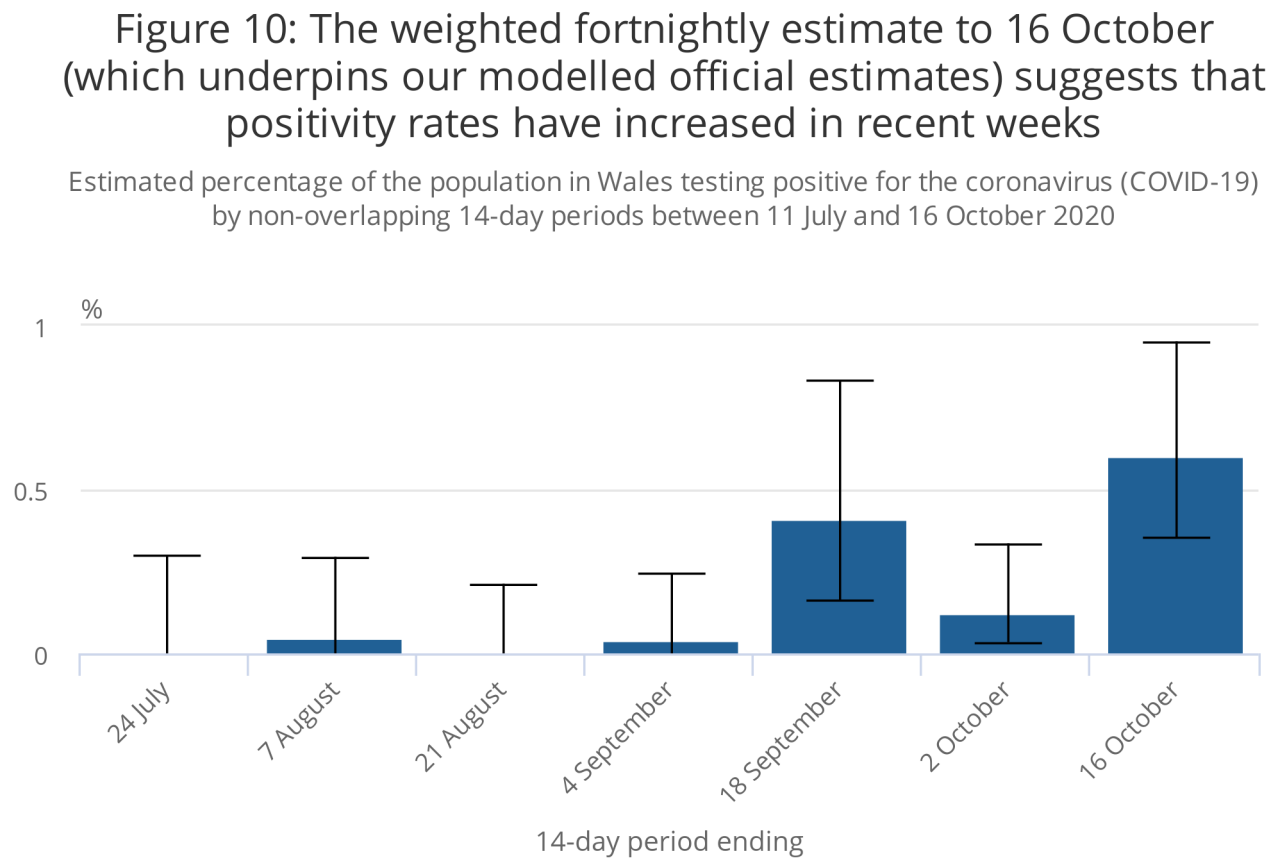
Download the data

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. 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 (3 to 16 October 2020) was 0.60% (95% confidence interval: 0.35% to 0.95%).

Figure 10: The weighted fortnightly estimate to 16 October (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 11 July and 16 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 (10 to 16 October 2020), Tuesday 13 October 2020. More information on reference dates can be found in Section 16: Measuring the data.

9 . Antibody data for Wales

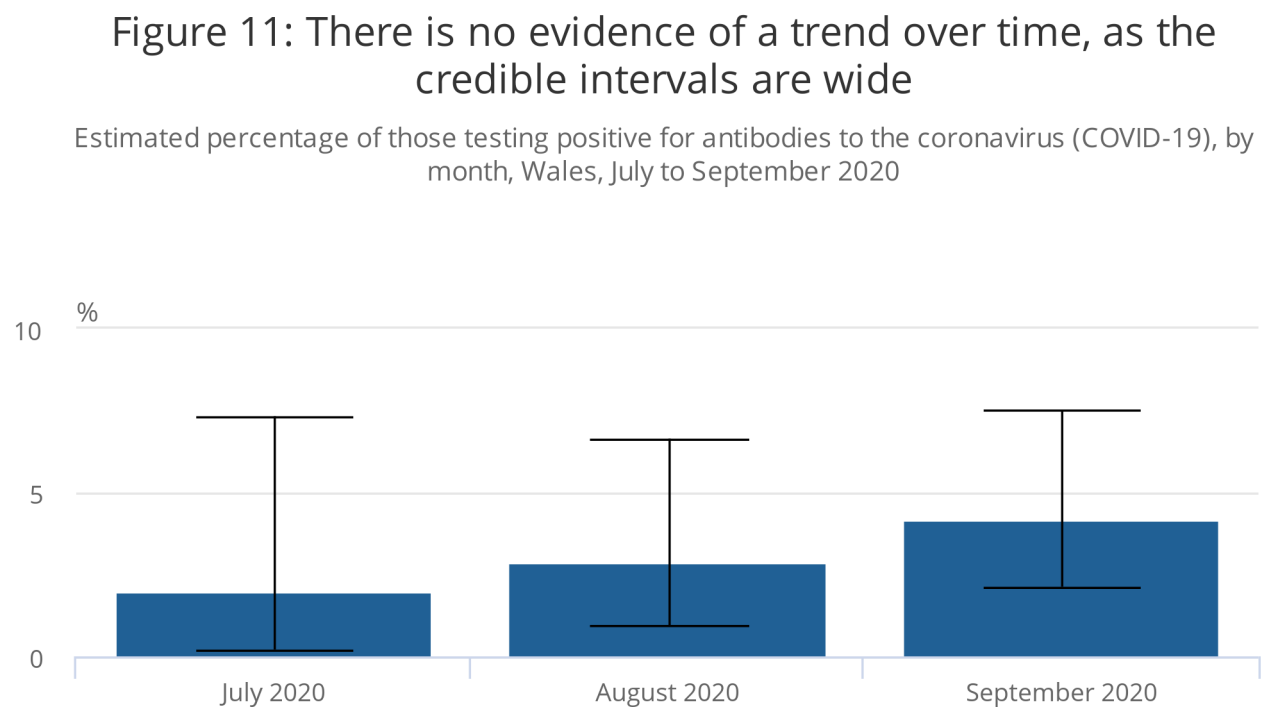
Increasing sample sizes and positive counts for our antibodies estimates means we are now able to provide weighted monthly antibodies estimates for Wales for the first time.

In September 2020, an estimated 4.2% of the population in Wales would have tested positive for the coronavirus (COVID-19) (95% confidence interval 2.1% to 7.5%) from a blood sample. It is estimated that an average of 107,000 people aged 16 years and over in Wales would have tested positive for antibodies during this time (95% confidence interval: 53,000 to 189,000). This equates to 1 in 24 people aged 16 years and over (95% confidence interval 1 in 48, to 1 in 13).

There is no evidence of a trend over time, as the credible intervals are wide.

Figure 11: There is no evidence of a trend over time, as the credible intervals are wide

Estimated percentage of those testing positive for antibodies to the coronavirus (COVID-19), by month, Wales, July to September 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.

One way the body fights infections like COVID-19 is by producing small particles in the blood called antibodies. It takes between two and three weeks for the body to make enough antibodies to fight the infection but once a person recovers, 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, although other parts of the immune system can also protect people.

We measure the presence of antibodies to understand who has had COVID-19 in the past, although 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.

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

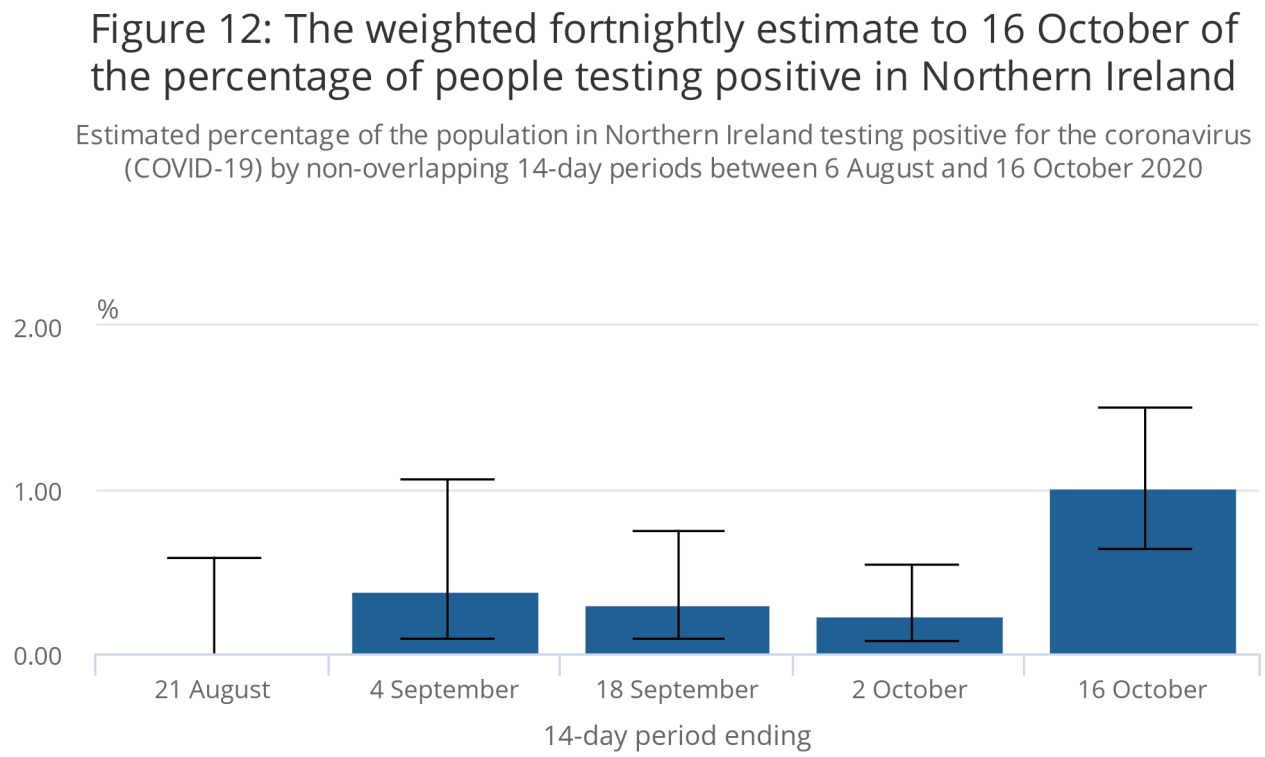
During the most recent two weeks of the study (3 to 16 October 2020), we estimate that 1.01 % of people in Northern Ireland had the coronavirus (COVID-19) (95% confidence interval: 0.64% to 1.50%). This equates to 1 in 100 people (95% confidence interval: 1 in 160 to 1 in 70).

Estimates of the total national proportion of the population testing positive for COVID-19 are weighted to be representative of the population of Northern Ireland that live in private residential households in terms of age (grouped), sex and region. The confidence intervals do not overlap between the two most recent 14-day periods, which may suggest an increase in rate, however it is too early to say that this constitutes a trend. 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 Northern Ireland, the weighted estimates for the latest two-week period are based on swab test results from 2,932 participants collected over this period. During these weeks, there were 28 people from 24 households who tested positive.

Figure 12: The weighted fortnightly estimate to 16 October of the percentage of people testing positive in Northern Ireland

Estimated percentage of the population in Northern Ireland testing positive for the coronavirus (COVID-19) by non-overlapping 14-day periods between 6 August and 16 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.

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

For the first time, we are able to include an estimate of the number of people testing positive for the coronavirus (COVID-19) in Scotland. During the most recent two weeks of the study (3 to 16 October 2020), we estimate that 0.57% of people in Scotland had the COVID-19 (95% confidence interval: 0.35% to 0.88%). This equates to 1 in 180 people (95% confidence interval: 1 in 290 to 1 in 110).

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 the 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 two-week period are based on swab test results from 4,639 participants collected over this period. During these weeks, there were 24 people from 20 households who tested positive.

12 . Test sensitivity and specificity

The estimates provided in Section 2, Section 8, Section 10 and Section 11 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. 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 0.96% (95% credible interval: 0.87% to 1.07%). In the unlikely situation where test sensitivity was lower, between 45% and 75%, the weighted fortnightly estimate would be 1.46% (95% credible interval: 1.17% to 1.94%).

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 a paper written by the Office for National Statistics' (ONS') academic partners and in our methods article.

13 . COVID-19 Infection Survey data

Coronavirus (COVID-19) Infection Survey
Dataset | Released 23 October 2020
Findings from the Coronavirus (COVID-19) Infection Survey, UK.

14 . 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

15 . 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 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.

16 . 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 10 and 16 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 13 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 10 October 2020. The model includes all information up to 16 October (the end of the reference week), and people who tested negative on a test between 16 and 19 October are included as negative up to 16 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 Office for National Statistics (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, 38% 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 have reached out across the country to enrol new households and this different approach will affect response rates. The number of households invited to participate in the survey in this expansion in England, as of 16 October, was 908,124, of which 9% of households have provided a swab so far, increasing the number of households taking part to 126,955 to date. Response rates for these expansion weeks cannot be regarded as final response rates to the survey as 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 2020, and the number of households initially invited to participate was 8,786, of which 33% 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 16 October, a further 6,725 households have been invited, of which 4% of household have provided at least one swab so far.

Fieldwork began in Northern Ireland on 26 July 2020, and as of 16 October, 5,549 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 21 September 2020, and as of 16 October, the number of households invited to participate in the survey in Scotland, as of 16 October, was 45,491, of which 6% 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 as 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 2020 and since 25 September we have reported headline figures for Northern Ireland. Survey fieldwork in Scotland began on 21 September, and we have reported headline figures for Scotland for the first time in this bulletin.

Only private residential households, otherwise known as the target population in this bulletin, are included in the sample. People in hospitals, care homes and 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, September 2020, offers more detailed analysis, including further exploration of the characteristics and behaviours of those with COVID-19, such as deprivation quintile, ethnicity, socially distanced direct contact, travel behaviour, working location and occupation.

Other studies

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

Department of Health and Social Care (DHSC) data, UK

Public Health England (PHE) presents data on the total number of laboratory-confirmed cases in the UK, which captures 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. A summary for each nation: England, Wales, Scotland and Northern Ireland is also available.

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, these systems help 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 PHE data and NHS Test and Trace 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.

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 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. The study currently involves around 120,000 participants aged five years and over, selected from a random cross-section sample of the general public from GP registration data, which allows for more detailed geographic breakdowns of infection rates than are currently possible within our study. 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 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. It is also important to note that blood samples in the REACT-2 study are self-administered, rather than taken by a trained nurse, phlebotomist or healthcare assistant.

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. 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.

Next steps

We are in the process of significantly expanding the COVID-19 Infection Survey to 400,000 people in England, making it the UK's largest study tracking COVID-19 in the general population. We have begun this expansion by increasing the sample size in local authorities of interest in the North West, Yorkshire and The Humber, and London. For more information, please see the Office for National Statistics (ONS) expansion press notice, released on 18 August 2020.

In Wales, the sample size has also been increased. In Scotland, the initial sample size was larger than the initial sample size used for England and Wales.

17 . 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.

18 . 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, September 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.