

Statistical bulletin

Coronavirus (COVID-19) Infection Survey pilot: 18 June 2020

Initial data from the COVID-19 Infection Survey. This survey is being delivered in partnership with IQVIA, Oxford University and UK Biocentre.

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1 . Main points

- In this bulletin, we refer to the number of coronavirus (COVID-19) infections within the community population; community in this instance refers to private households, and it excludes those in hospitals, care homes or other institutional settings.
- We estimate that an average of 1 in 1,700 individuals within the community population in England had COVID-19 at any given time between 31 May and 13 June 2020.
- An estimated average of 33,000 people (95% confidence interval: 12,000 to 74,000) within the community in England had COVID-19 between 31 May and 13 June 2020, a clear decrease from the average of 149,000 people infected (95% confidence interval: 75,000 to 264,000) between 3 May and 16 May.
- Modelling of the trend over time also shows evidence that the number of people in England testing positive has decreased since the study began on 26 April, and suggests that the decline may have slowed in recent weeks.
- Over the whole period of the study, which began on 26 April, there were an estimated five new COVID-19 infections for every 10,000 individuals per week in the community population in England, equating to an estimated 26,900 new cases per week (95% confidence interval: 19,200 to 36,600).
- Of those individuals providing blood samples, 5.4% tested positive for antibodies to COVID-19 (95% confidence interval: 4.3% to 6.5%); this equates to around 1 in 19 people.

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

Evidence shows that the number of people in England testing positive has decreased since the start of the study

Our latest estimates indicate that at any given time during the two weeks from 31 May to 13 June 2020, an average of 33,000 people in England had the coronavirus (COVID-19) (95% confidence interval: 12,000 to 74,000)¹. This equates to 0.06% (95% confidence interval: 0.02% to 0.13%) of the population in England or around 1 in 1,700 individuals. This estimate is based on swab tests collected from 24,413 participants, of which 10 individuals tested positive for COVID-19.

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.

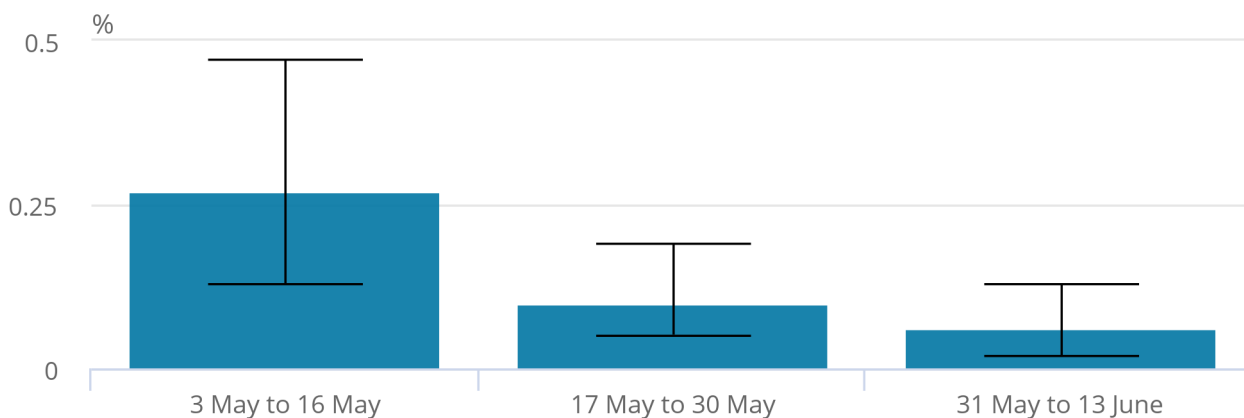
When analysing data for the three most recent non-overlapping 14-day periods, there is clear evidence of a decrease in the proportion testing positive (Figure 1), when comparing the most recent period (31 May to 13 June) with the start of the study (3 May to 16 May). Please note, the 14-day time periods presented in Figure 1 are different to those presented in [our previous publication](#) so direct comparisons should not be made.

Figure 1: There is clear evidence that the proportion of people testing positive with COVID-19 has decreased in recent weeks

Estimated percentage of the population in England who had the coronavirus (COVID-19), based on tests conducted between 3 May to 16 May, 17 May to 30 May and 31 May to 13 June 2020

Figure 1: There is clear evidence that the proportion of people testing positive with COVID-19 has decreased in recent weeks

Estimated percentage of the population in England who had the coronavirus (COVID-19), based on tests conducted between 3 May to 16 May, 17 May to 30 May and 31 May to 13 June 2020



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

Notes:

1. It is important to note that the results for the most recent period are provisional, as we are still receiving swab test results. This may result in further revisions to the figure.
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.

In addition to this analysis, a more complex regression modelling approach confirms that there is a clear downward trend (Figure 2) since the study began on 26 April, although the decline appears to have slowed in recent weeks. The significance of this downward trend is shown by the credible intervals², as the lower credible intervals for days near the start of the study period are higher than the upper credible intervals for more recent periods. This modelling is an exploratory analysis and was conducted by our research partners at the University of Oxford and the University of Manchester.

The estimates in Figure 1 are our most accurate reflection of the proportion of the population in England testing positive for COVID-19 at any given point in time. However, the modelling provides additional insight into the change over time that is not possible when comparing the 14-day estimates alone.

The modelling uses data from the whole survey period, since 26 April 2020, to inform the overall trend by controlling for age, sex and region. This is a different methodology to the weighted estimates provided in the 14-day headline and should not be compared directly.

More information about the methods used in the regression model is available in [our methodology article](#).

Figure 2: The latest exploratory modelling shows the downward trend in those testing positive for COVID-19 is statistically significant

Estimated percentage of the population in England testing positive for the coronavirus (COVID-19) daily since the start of the study, 26 April 2020

[Download the data](#)

Notes:

1. 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.
2. It is important to note that the results for the most recent period are provisional, as we are still receiving swab test results. This may result in further revisions to the figure.
3. The model has been developed since the version produced for our previous bulletin and now also controls for the interaction between region and time.

More information on how our estimates compare with other sources is available in [Section 7: Measuring the data](#).

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

1. All estimates are subject to uncertainty, given that a sample is only part of the wider population. The 95% confidence intervals are calculated so that, if we were to repeat this study many times, with many different samples of households, then 95% of the time the confidence intervals would contain the true value that we are seeking to estimate.
2. We present the regression modelling estimates along with credible intervals. These are more appropriate than confidence intervals for the approach used here. Under the model, there is a 95% probability that the true value being estimated lies within the credible interval. Again, a wider interval indicates more uncertainty in the estimate.

3 . Incidence rate

There were an estimated average of 26,900 new COVID-19 infections per week in England over the course of the study

We estimate that there were five new infections per 10,000 people followed for one week, based on results of people tested throughout the study period. This covers all new infections over the whole study period, which began on 26 April 2020, and does not relate to the latest week of the study only.

This equates to an incidence rate of 0.05% (95% confidence interval: 0.04% to 0.07%). It would represent an average of 26,900 new infections per week for people living in private-residential households in the community in England since the study began (95% confidence interval: 19,200 to 36,600), or roughly 3,800 new infections per day.

It is important to note that the analysis in this section relates to a different, albeit overlapping, time period to the analysis of the total number of people in England who have the coronavirus (COVID-19) presented in [Section 2](#). This means the numbers cannot be directly compared.

As the proportion of those testing positive in England is decreasing over time, it is likely that the incidence rate is also decreasing. However, because of the low number of new positive cases, we cannot currently measure a statistically significant reduction. The incidence rate measures the occurrence of new cases of COVID-19.

Incidence refers to the number of individuals who have a positive test in the study divided by the time from joining the study to their last test. Individuals who are positive when they join the study are not included in this calculation. This is not the same as the reproduction rate (R), which is the average number of secondary infections produced by one infected person. The Scientific Pandemic Influenza Group on Modelling (SPI-M), a sub-group of the Scientific Advisory Group for Emergencies (SAGE), [has built a consensus on the value of R](#) based on expert scientific advice from multiple academic groups.

Unlike the analysis in [Section 2: Number of people in England who had COVID-19](#) in this bulletin, these estimates have not been weighted to be representative of the target population in England. This is because of the relatively small numbers of positive cases in the sample.

4 . Antibody data

Around 5.4% of people who provided blood samples tested positive for antibodies to COVID-19

As of 13 June 2020, 5.4% (95% confidence interval: 4.3% to 6.5%) of individuals from whom blood samples were taken tested positive for antibodies to the coronavirus (COVID-19).

This is lower than the percentage presented in our previous publication, but compatible with the previous estimates of uncertainty. It is important to note that this change does not represent a trend over time, but relates to a change in our available sample of blood tests. The analysis in this bulletin is based on blood test results from 1,757 individuals since the start of the study on 26 April 2020, compared with 885 individuals tested in the previous bulletin.

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. This is what helps to prevent individuals from getting the same infection again. We try to measure the presence of antibodies in order to work out who has had COVID-19 in the past.

These estimates have not been weighted to be representative of the target population in England. This is because of the relatively small numbers of positive cases in the sample. We will do more work on the potential to weight these estimates in future publications.

More information on how our estimates compare with other sources in [Section 7: Measuring the data](#).

5 . COVID-19 Infection Survey data

[COVID-19 Infection Survey](#)

Dataset | Released 18 June 2020

Latest findings from the pilot phase of the COVID-19 Infection Survey. The data tables include analysis of the characteristics of people testing positive for COVID-19, which have not been updated since the previous bulletin.

6 . 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 and Wellcome Trust.

7 . 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 will help 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 \(PDF, 1.14MB\)](#) specifies the research for the study.

Response rates

Table 1 provides information regarding responses to our survey. The fieldwork is still ongoing and these cannot be regarded as final response rates to the survey. Additional households are being invited to take part in the study each week, this impacts the response rate as it takes time for those invited to respond and enrol.

Table 1: Current responses to the COVID-19 Infection Survey

	Households	Individuals
	% of total	% of total
Households invited to take part (total)	35,275	100%
Households enrolled	15,200	43%
Completed households (provided at least one swab)	12,654	36%
Eligible individuals in responding households (total)		32,382 100%
Individuals who provided first swab		26,995 83%
Individuals who agreed to continue		22,946 71%

Source: Office for National Statistics

Notes

1. The set sample for this study is based on the achieved sample from a previous social survey who agreed to take part in future studies. [Back to table](#)

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 during the pandemic](#).

Coverage

Only England is included in this pilot phase of the study. We intend for the full survey to expand the size of the sample over the next 12 months and look to cover people across all four UK nations. Only private households, otherwise known as the target population in this bulletin, are included in the sample. People in care homes, other communal establishments and hospitals are not included.

The overall target population used in this study is 54,628,600.

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.

This is a pilot study where the analysis is developed at pace and these quality enhancements may lead to minor changes in estimates, for example, the positive test counts across the study period.

Test sensitivity

The estimates provided in [Section 2: Number of people in England who had COVID-19](#) are for the percentage of the private-residential population testing positive for COVID-19, otherwise known as the positivity rate. We do not report on the prevalence rate within the analysis sections of this bulletin. To calculate the prevalence rate, we would need to adjust for imperfect test performance, requiring assumptions about the false-positive and false-negative rates.

Using Bayesian analysis we have calculated what prevalence would be in different scenarios and found that even if there was a relatively high rate of false-negative results, the positivity rate presented in [Section 2: Number of people in England who had COVID-19](#) would still be fairly close to the true figure.

Other studies

While this study looks to identify the proportion of the population testing positive for COVID-19, it is one of a number of studies that look to provide information around the coronavirus pandemic within the UK.

People testing positive for COVID-19: Public Health England (PHE) present data on the [total number of laboratory-confirmed cases in England](#), which capture the cumulative number of people in England who have tested positive for COVID-19. Equivalent data for [Wales](#), [Scotland](#) and [Northern Ireland](#) are also available.

These statistics present all known cases of COVID-19, both current and historical. They also only test people eligible for testing according to particular rules, for example, people in hospital with symptoms and certain at-risk groups of key workers. By comparison, the statistics presented in this bulletin take a representative sample of the whole population in England, including people who are not otherwise prioritised for testing, something that is currently missing from other studies.

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 this survey are tested by research staff at the University of Oxford for antibodies using a novel ELISA. For more information about the antibody test used in this bulletin, see the [COVID-19 Infection Survey protocol \(PDF, 1.14MB\)](#).

The government [has announced the start of a major new national antibody testing programme](#), to provide antibody tests to NHS and care staff in England. These tests prioritise NHS and care home staff who would like to be tested. It is important to note that this is a separate programme to the blood tests analysis conducted as part of our household study.

8 . 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 the quality of data collected in the questionnaire. Information on the main sources of uncertainty are presented in [our methodology article](#).

9 . Next steps

This edition of the bulletin presents headline analysis of the overall number of people infected with COVID-19, the incidence rate and the percentage of people testing positive for antibodies. Now that the survey has become more established, we plan to continue to provide these headline figures once a week, in order to give regular, concise and high-quality information on COVID-19 within the community.

We plan to provide more detailed analysis on a monthly basis, which will include further exploration of the characteristics of those with COVID-19, such as age, sex and working location. As the study progresses, we will continue to provide greater detail into the extent of the coronavirus (COVID-19) infection, for example, by providing regional breakdowns.

10 . Glossary

Community

Within 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. 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 test suggests an individual has COVID-19 when in fact they do not. By contrast, a false-negative result occurs when the tests suggest an individual does not have COVID-19 when in fact they do.

Incidence rate

Incidence is the rate of occurrence of new cases of the disease over a given period of time. Incidence refers to the number of individuals who have a positive test in the study divided by the time from joining the study to their last test. Individuals who are positive when they join the study are not included in this calculation.

11 . Related links

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

Methods article | Released 18 June 2020

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

[Coronavirus \(COVID-19\) latest data and analysis](#)

Web page | Updated as and when data become available

Latest data and analysis on the coronavirus (COVID-19) in the UK and its effect on the economy and society.

[Coronavirus \(COVID-19\) round-up](#)

Article | Updated as and when data become available

Catch up on the latest data and analysis related to the coronavirus (COVID-19) pandemic and its impact on our economy and society.

[Deaths registered weekly in England and Wales, provisional: week ending 5 June 2020](#)

Bulletin | Released 16 June 2020

Provisional counts of the number of deaths registered in England and Wales, including deaths involving the coronavirus (COVID-19), by age, sex and region, in the latest weeks for which data are available.

[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 ONS, in partnership with the Universities of Oxford and Manchester, Public Health England 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 coronavirus (COVID-19) estimates.

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

Article | Updated 14 May 2020

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