Office for National Statistics

Statistical bulletin

Coronavirus (COVID-19) Infection Survey pilot: England, 25 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 residential households, and it excludes those in hospitals, care homes or other institutional settings.

- We estimate that an average of 1 in 1,100 individuals within the community population in England had COVID-19 at any given time between 8 June and 21 June 2020.

- An estimated average of 51,000 people (95% confidence interval: 21,000 to 105,000) within the community in England had COVID-19 between 8 June and 21 June 2020.

- Modelling of the trend over time suggests that the decline in the number of people in England testing positive has levelled off in recent weeks.

- New modelling of the incidence rate trend over time suggests that incidence appears to have decreased between mid-May and early June, but has also since levelled off.

- During the 14-day period from 8 June to 21 June, there were an estimated 4 new COVID-19 infections for every 10,000 individuals per week in the community population in England, equating to an estimated 22,000 new cases per week (95% confidence interval: 10,000 to 49,000).

- New regional analysis shows a statistically significant reduction in people testing positive for COVID-19 in previous weeks; these trends are now levelling off.

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, and has now levelled off

Our latest estimates indicate that at any given time during the two weeks from 8 June to 21 June 2020, an average of 51,000 people in England had the coronavirus (COVID-19) (95% confidence interval: 21,000 to 105,000)[1] . This equates to 0.09% (95% confidence interval: 0.04% to 0.19%) of the population in England or around 1 in 1,100 individuals. This estimate is based on swab tests collected from 24,256 participants, of which 14 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 four most recent non-overlapping 14-day periods (Figure 1), these estimates suggest the percentage testing positive has clearly decreased over time since our first measurement on 26 April, and this downward trend has now flattened. The confidence intervals overlap with the previous two time periods. This suggests that the actual number of individuals testing positive in the period 8 June to 21 June could be higher or lower than in the two previous periods. We therefore do not at this point have evidence that the current trend is anything other than flat.
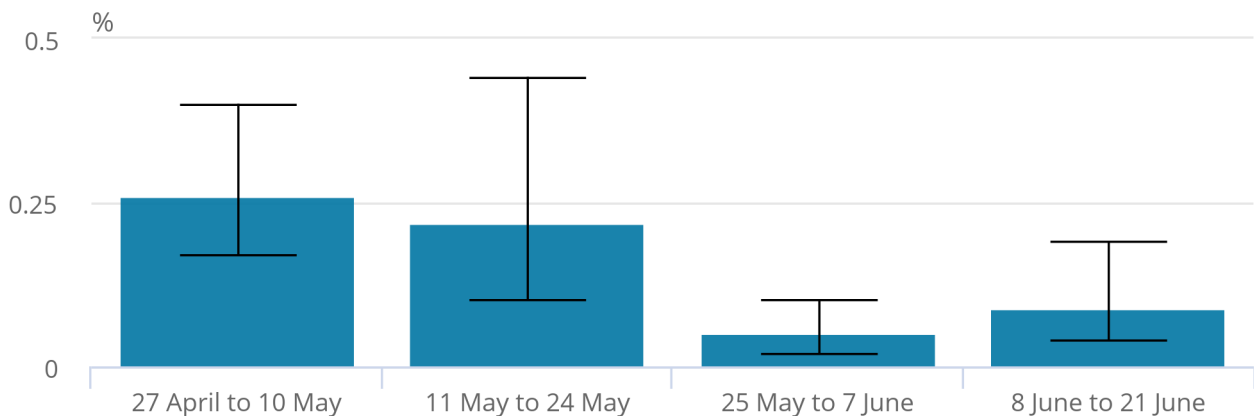
The 14-day time periods presented in Figure 1 overlap with those presented in our previous publication so direct comparisons are not possible.

Figure 1: The decrease in the proportion of people testing positive with COVID-19 seen in previous weeks has levelled off

Estimated percentage of the population in England who had the coronavirus (COVID-19), based on tests conducted between 27 April to 10 May, 11 May to 24 May, 25 May to 7 June and 8 June to 21 June 2020

Figure 1: The decrease in the proportion of people testing positive with COVID-19 seen in previous weeks has levelled off

Estimated percentage of the population in England who had the coronavirus (COVID-19), based on tests conducted between 27 April to 10 May, 11 May to 24 May, 25 May to 7 June and 8 June to 21 June 2020

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

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's important to note that the results for this period are provisional as we are still receiving swab test results. This may result in further revisions to the figure.

In addition to this analysis, a more complex regression modelling approach also confirms that there is a clear downward trend (Figure 2) since the study began on 26 April and, the decline seen in earlier weeks has now levelled off. This modelling is an exploratory analysis and was conducted by our research partners at the University of Oxford and the University of Manchester.

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 has now levelled off

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

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 are provisional and subject to revision.

3. This analysis was produced by our research partners at the University of Oxford and the University of Manchester.

Download the data

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.

More information on how our estimates compare with other sources is available in Section 8: 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.

3 . Regional analysis

New regional modelling indicates there is no evidence of difference in the proportion of people testing positive for COVID-19 between regions

The analysis in this section is exploratory and based on new modelling conducted by our research partners at the University of Oxford and the University of Manchester.
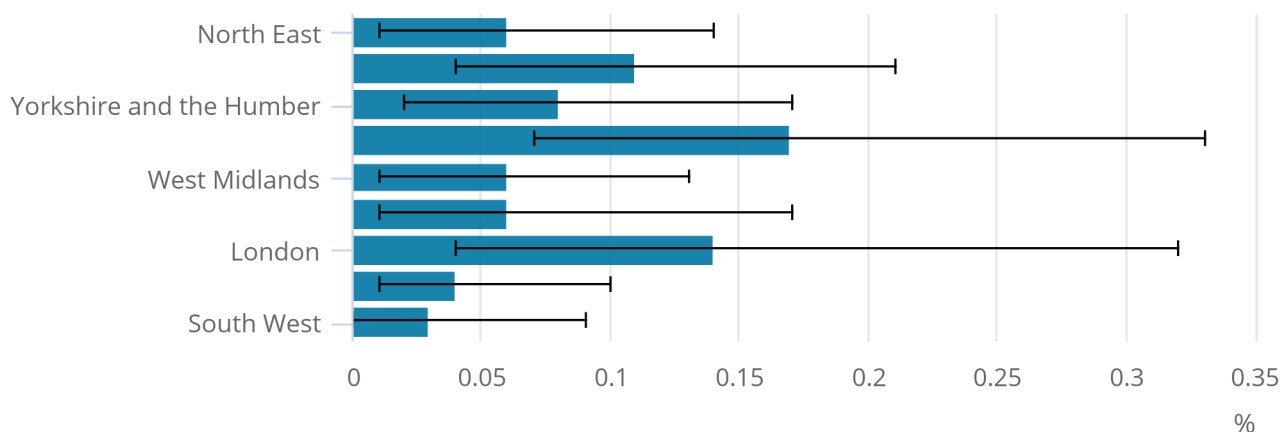
There is not enough evidence to say with confidence that there is a difference in infection rates between regions. Because of the low number of people testing positive sampled in the survey, there is high uncertainty in the regional estimates for this period as indicated by the relatively large credible intervals across most regions.

Figure 3: Proportion of population testing positive for COVID-19 by region

Estimated percentage of the population testing positive for the coronavirus (COVID-19) across region, 18 June 2020 (mid-point of the most recent week), England

Figure 3: Proportion of population testing positive for COVID-19 by region

Estimated percentage of the population testing positive for the coronavirus (COVID-19) across region, 18 June 2020 (mid-point of the most recent week), England

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

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's important to note that the results for this period are provisional as we are still receiving swab test results. This may result in further revisions to the figure.

When comparing over time, some regions have experienced a significant downward trend in the number testing positive in previous weeks, although those trends appear to be leveling off (Figure 4). The proportion testing positive by region has been calculated using a similar modelling approach as the national daily trend.

Figure 4: New exploratory modelling shows that downward trends experienced in some regions appear to be levelling off

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

Notes:

1. The modelling uses data from the whole survey period, since 26 April 2020, to inform the overall trend by controlling for age and sex. This is a different methodology to the national weighted estimates for England and should not be compared directly.

[Download the data](#)

4 . Incidence rate

There was an estimated average of 22,000 people who became newly infected with COVID-19 per week in England, for the period from 8 June to 21 June 2020

We estimate that there were 4 new infections per 10,000 people followed for 1 week. This is based on the number of new people testing positive for the coronavirus (COVID-19) in the period from 8 June to 21 June 2020. This equates to an incidence rate of 0.04% (95% confidence interval: 0.02% to 0.09%) of people followed for one week.

We now use non-overlapping 14-day periods starting from 11 May as the basis for our incidence calculation to allow us to explore trends over time. This means that this analysis cannot be directly compared with that presented in previous bulletins.

When comparing incidence rates across the three 14-day periods of the study, together with the trend in positivity rate, incidence appears to have decreased between mid-May and early June, but has since levelled off (Figure 5). Note, there is uncertainty in the incidence trend over time because of the low number of new infections, and the confidence intervals overlap between all time periods.
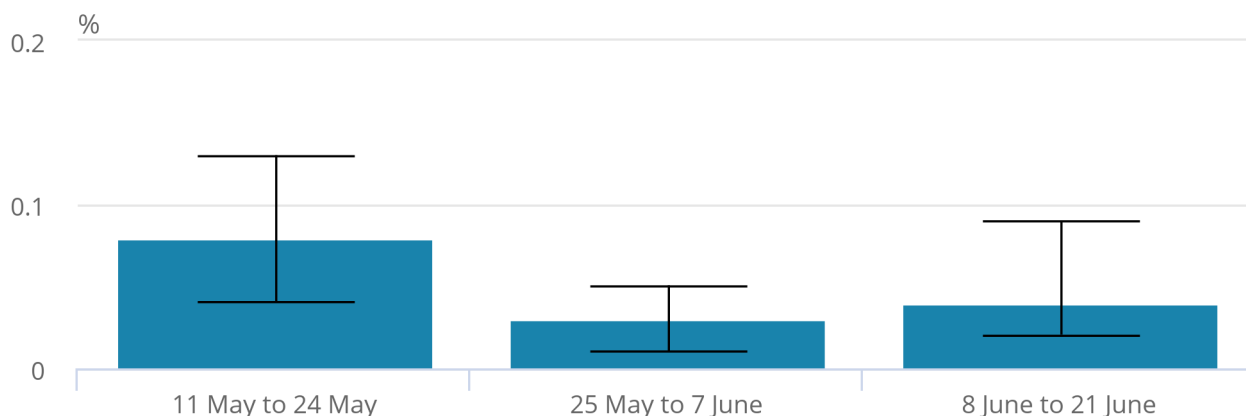
We have also looked at household incidence to see whether infections clustered together within households affect the incidence analysis. We found that the infection rates within households follow a similar trend as for individuals. We calculated that 7.5 households per 10,000 households followed for a week were newly infected with COVID-19 in the period from 8 June to 21 June (95% confidence interval: 36 to 157).

Figure 5: The rate of new infections of COVID-19 appears to have decreased between mid-May and early June, but has since levelled off

Estimated numbers of new infections of coronavirus (COVID-19), based on tests conducted between 11 May to 24 May, 25 May to 7 June and 8 June to 21 June 2020, England

Figure 5: The rate of new infections of COVID-19 appears to have decreased between mid-May and early June, but has since levelled off

Estimated numbers of new infections of coronavirus (COVID-19), based on tests conducted between 11 May to 24 May, 25 May to 7 June and 8 June to 21 June 2020, England

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

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's important to note that the results for this period are provisional as we are still receiving swab test results. This may result in further revisions to the figure.

A more complex modelling approach (Figure 6) supports findings that incidence appears to have decreased between mid-May and early June, but has since levelled off. This modelling is an exploratory analysis and was conducted by our research partners at the University of Oxford.

Rather than grouping the number of infections in 14-day periods, the model estimates a smooth change in incidence day by day taking into account how incidence changes over the period as well as the daily estimates. This smoothing averages out sharp changes between the 14-day periods seen in Figure 6. Therefore, the estimates provided by the model do not match the exact figures provided in the 14-day estimates.

Figure 6: The latest exploratory modelling shows incidence appears to have decreased between mid-May and early June

Estimated numbers of new infections of coronavirus (COVID-19), based on tests conducted daily since 11 May 2020

Notes:

1. Confidence intervals are large at the end of the plot because while we know when the visits take place, there is a delay in getting the associated swab results. The model does not include people when their next swab result isn't known, so the sample the size for the most recent days is smaller, resulting in wider credible intervals .

2. The model does not control for within household clustering

The incidence rate measures the occurrence of new cases of COVID-19. This is not the same as the reproduction rate (R), which is the average number of secondary infections produced by one infected person.

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. is because of the relatively small numbers of new infections in the sample.

Download the data

5 . COVID-19 Infection Survey data

COVID-19 Infection Survey
Dataset | Released 25 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. The antibody data are the same as in last week's bulletin (18 June). We will update these antibody statistics when new data become available.

6 . Collaboration

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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 . 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.

8 . 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 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)	40,803	100%		
Households enrolled	17,139	42%		
Completed households (provided at least one swab)	15,319	38%		
Eligible individuals in responding households (total)			36,492	100%
Individuals who provided first swab			32,346	89%
Individuals who agreed to continue			27,494	75%

Source: 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 residential 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.

Incidence modelling

The model for incidence considers every day that each participant is in the study from the date of their first negative test to the earlier of their latest negative test or first positive test, called "days at risk" (for a new infection). Each new infection is counted as a positive on the day of the test. We use a Poisson model to estimate the rate of new infections by the number of days at risk. Because we have few new infections, counting the positive as happening at a different time, for example, halfway between the last negative and first positive test, does not change the results. The modelled estimates use a non-linear function for time called a natural cubic spline to better fit to the most recent data and to allow for likely departures from a linear trend in the future.

We only started recruiting participants on 26 April, and started repeating tests on 1 May. Our analysis therefore starts at 11 May (giving us six full weeks to include in analysis) as before this too few participants had repeated test results to produce robust estimates of incidence over time. The model is not weighted because of small numbers of new infections. We exclude from this analysis everyone whose first swab test in the study was positive, so this analysis just looks at new infections in people that we do not know had COVID-19 before.

For information about the modelling of national prevalence rates, please see the Methodology article.

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.

Next steps

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

We plan to make available more detailed analysis on a monthly basis, which will include further exploration of the characteristics of those with COVID-19, such as age, sex, working location and occupation.

9 . 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]().

10 . 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 12 June 2020
Bulletin | Released 23 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.