

Statistical bulletin

Coronavirus (COVID-19) Infection Survey pilot: England, 21 May 2020

Provisional results from the Coronavirus (COVID-19) Infection Survey for England. This survey is being delivered in partnership with the University of Oxford, the University of Manchester, Public Health England and Wellcome Trust.

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Table of contents

1. [Main points](#)
2. [Number of people in England who had COVID-19](#)
3. [Number of new COVID-19 cases in England](#)
4. [Breakdowns of the number of people in England who had COVID-19](#)
5. [Coronavirus \(COVID-19\) Infection Survey data](#)
6. [Collaboration](#)
7. [Measuring the data](#)
8. [Strengths and limitations](#)
9. [Next steps](#)
10. [Glossary](#)
11. [Related links](#)

1 . Main points

- Within 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.
- At any given time between 4 May and 17 May 2020, it is estimated that an average of 0.25% of the community population had COVID-19 (95% confidence interval: 0.16% to 0.38%).
- This equates to an average of 137,000 people in England (95% confidence interval: 85,000 to 208,000); a similar level to the previous estimate indicating that the number of people with COVID-19 is relatively stable.
- There were an estimated 61,000 new COVID-19 infections per week in England (95% confidence interval: 29,000 to 111,000); the incidence rate per week was 0.11 new cases per 100 people.
- There is no evidence of differences in the proportions testing positive between men and women, or between the age categories 2 to 11, 12 to 19, 20 to 49, 50 to 69 and 70 years and over.
- There is no evidence of a difference between the proportions testing positive for patient-facing healthcare or resident-facing social care roles and people not working in these roles.

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

Based on tests conducted between 4 May and 17 May 2020, we estimate 137,000 people in England had COVID-19

Our latest estimates indicate that at any given time during the two weeks from 4 May to 17 May 2020, an average of 137,000 people in England had the coronavirus (COVID-19) (95% confidence interval: 85,000 to 208,000). This equates to 0.25% (95% confidence interval: 0.16% to 0.38%) of the population in England. This estimate is based on tests performed on 14,599 people in 7,054 households.

When comparing the estimated number of people in England that had COVID-19 in this publication against the results published in the [previous publication](#), it should be noted that the change is relatively small and it should be interpreted that the number of people in England that have COVID-19 is relatively stable.

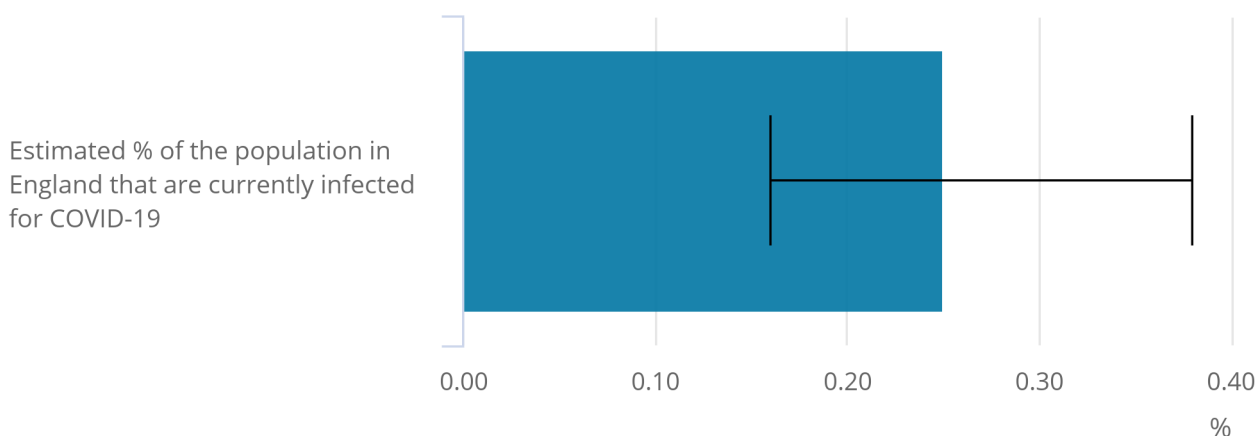
Out of the 14,599 participants' swab tests included in this analysis, 35 individuals in 32 households tested positive for COVID-19. As a household survey, our figures do not include people staying in hospital or care homes. In these settings, rates of COVID-19 infection are likely to be higher.

Figure 1: An estimated 0.25% of the community population in England would test positive for COVID-19

Estimated percentage of the population in England who had the coronavirus (COVID-19), based on tests conducted between 4 May and 17 May 2020

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Estimated percentage of the population in England who had the coronavirus (COVID-19), based on tests conducted between 4 May and 17 May 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.

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.

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

3 . Number of new COVID-19 cases in England

There were an estimated 61,000 new COVID-19 infections per week in England

Based on results of people tested throughout the study period, which began 26 April, we estimate that there were 0.11 new infections per 100 people followed for one week (95% confidence interval: 0.05 to 0.20). This would represent 61,000 new infections per week for people living in private-residential households in the community in England (95% confidence interval 29,000 to 111,000).

The rate is known as the incidence rate and 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). R is described in the next section.

As of 17 May 2020, 6,862 individuals who were negative on their first test in the study have had one or more follow-up swab tests. The median time between tests was seven days.

Unlike the other analysis 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 but analysis suggests that weighting would not significantly change the results. We will do more work on the potential to weight this figure in future publications.

The reproduction rate (R) is being published by the Scientific Advisory Group for Emergencies

The reproduction number (R) 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. As of 15 May 2020, the [latest estimate of R](#) was between 0.7 and 1.0.

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

The following breakdowns estimate the percentage of people in different groups that tested positive for the coronavirus (COVID-19) within our sample. These estimates are then weighted to make them representative of target population.

There is no evidence suggesting sex or age have an impact on the likelihood of an individual having COVID-19

Based on test results from 4 May to 17 May, there is no evidence of differences in the proportions of men or women testing positive for COVID-19.

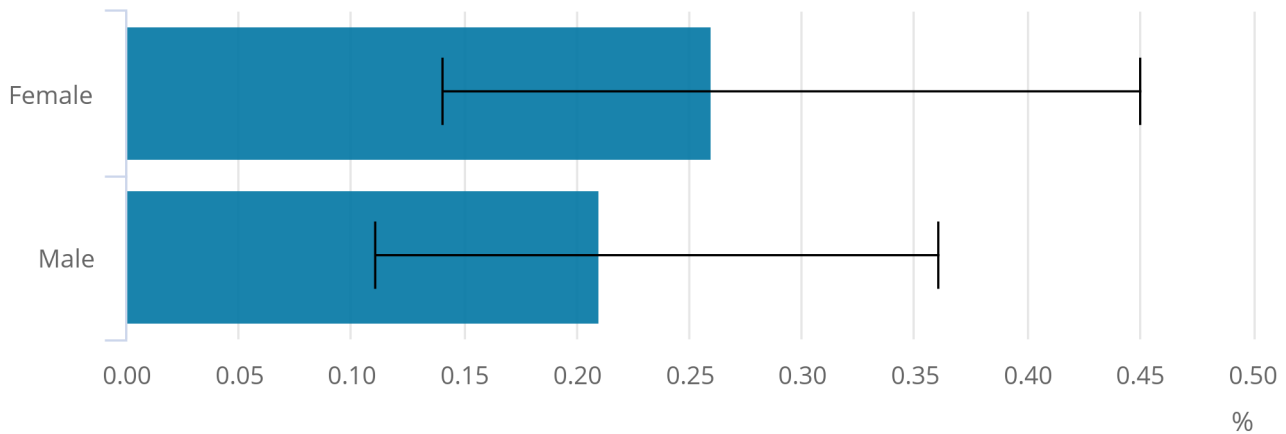
The black lines on Figure 2 show the confidence interval for the estimated percentage of the population infected with COVID-19 for both men and women. Given the range of values overlap substantially, this indicates that there is no evidence of different infection rates between men and women.

Figure 2: There is no evidence of differences in the proportions of men and women testing positive for COVID-19

Estimated percentage testing positive for the coronavirus (COVID-19), by sex, England, 4 May to 17 May 2020

Figure 2: There is no evidence of differences in the proportions of men and women testing positive for COVID-19

Estimated percentage testing positive for the coronavirus (COVID-19), by sex, England, 4 May to 17 May 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.

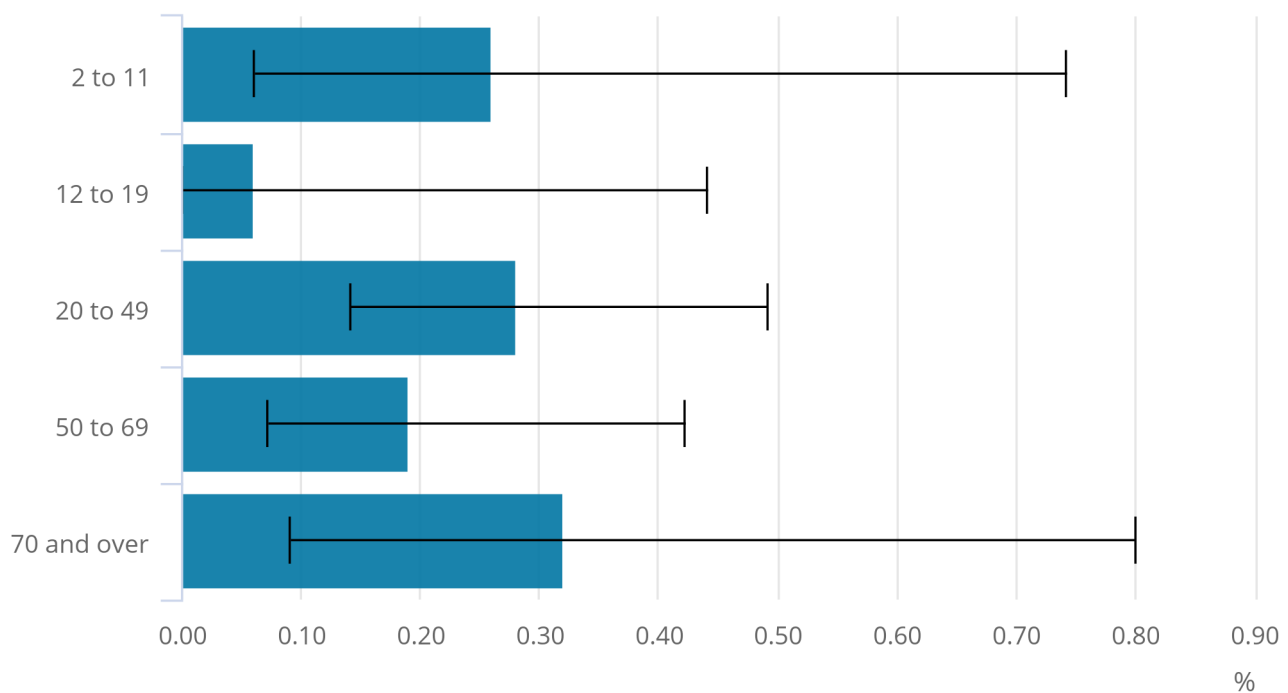
The same is true when examining people testing positive for COVID-19 between different age categories. The range of values for the black lines on Figure 3 are again large and overlap substantially for all age groups. This indicates that there is no evidence of different infection rates between age groups.

Figure 3: There is no evidence of differences in the proportions of individuals testing positive for COVID-19 between different age categories

Estimated percentage testing positive for the coronavirus (COVID-19), by age bands, England, 4 May to 17 May 2020

Figure 3: There is no evidence of differences in the proportions of individuals testing positive for COVID-19 between different age categories

Estimated percentage testing positive for the coronavirus (COVID-19), by age bands, England, 4 May to 17 May 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.

There is no evidence of differences in the proportions of individuals testing positive for COVID-19 between those working in patient-facing roles in health or social care role, compared with those not working in these roles

Of those working in patient-facing healthcare or resident-facing social care roles ¹, 0.24% tested positive for COVID-19 (95% confidence interval: 0.01% to 1.08%). This includes NHS professionals, such as nurses and doctors, as well as social care workers, such as nursing home or home care workers.

The percentage of people reporting not working in these types of roles testing positive for COVID-19 was also 0.24% (95% confidence interval: 0.15% to 0.35%). Given the confidence intervals for these groups are large and overlap there is no evidence of a difference between patient-facing healthcare or resident-facing social care roles and people not working in these roles.

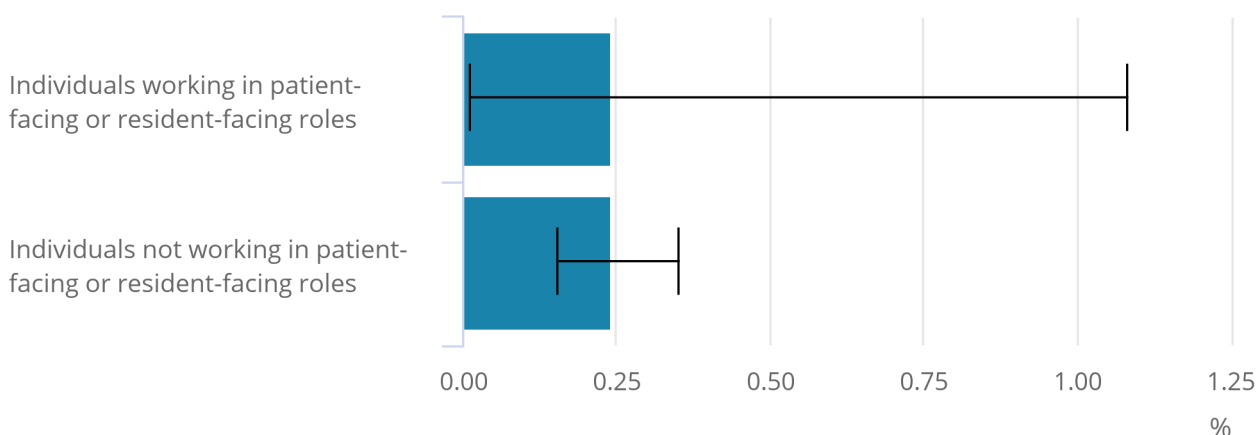
The estimates presented here are different from our [previous publication](#) (14 May), which showed evidence of an increased level of infection amongst those working in patient-facing healthcare or resident-facing social care roles. Using the latest data, there are fewer individuals testing positive among patient-facing healthcare workers and resident-facing social care workers. This means the pattern and degree to which the confidence intervals overlap has changed. We will continue to explore this in future publications.

Figure 4: No differences in the proportions of those in patient-facing health or social care roles testing positive for COVID-19, compared with those not in these roles

Estimated percentage testing positive for the coronavirus (COVID-19), by health and social care workers and other individuals, England, 4 May to 17 May 2020

Figure 4: No differences in the proportions of those in patient-facing health or social care roles testing positive for COVID-19, compared with those not in these roles

Estimated percentage testing positive for the coronavirus (COVID-19), by health and social care workers and other individuals, England, 4 May to 17 May 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. We asked individuals to self-report whether they worked in patient-facing healthcare or resident-facing social care, where that information was missing or uncertain, we used the other information they gave us about their occupation to inform this coding.

Notes for: Breakdowns of the number of people in England who had COVID-19

1. We asked individuals to self-report whether they worked in patient-facing healthcare or resident-facing social care; where that information was missing or uncertain, we used the other information they gave us about their occupation to inform our coding.

5 . Coronavirus (COVID-19) Infection Survey data

[Coronavirus \(COVID-19\) Infection Survey data tables](#)

Dataset | Released 21 May 2020

Initial findings from the first wave of the pilot phase of the Coronavirus (COVID-19) Infection Survey.

6 . Collaboration



The Coronavirus (COVID-19) Infection Survey was produced by the Office for National Statistics (ONS) in partnership with the University of Oxford, the University of Manchester, Public Health England and the 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.

COVID-19 Infection Survey

We are initially conducting a pilot survey of households in England, working with the University of Oxford, IQVIA and UK Biocentre Milton Keynes to collect and analyse the samples. All individuals aged two years and over in sampled households were invited to provide samples for testing.

At the start of the pilot study, 20,000 households were invited to take part, with the aim of collecting data from around 10,000 households. The sample size is currently increasing to this level. We do not have a response rate for the COVID-19 Infection Survey yet because people and households are still being enrolled in the pilot. We will provide a response rate once we have completed the enrolment of the pilot phase.

Following completion of the pilot survey, we intend 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.

This study addresses an important clinical priority: finding out how many people across the UK have a COVID-19 infection at a given point in time, or at least test positive for it, either with or without symptoms; how many new cases have occurred in a given time period; and how many people are ever likely to have had the infection. It will also contribute to the Scientific Advisory Group for Emergencies (SAGE) estimates of the rate of transmission of the infection, often referred to as "R".

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 our studies and surveys are [serving public need](#).

The data being collected

The survey involves all participants over the age of two years. We test whether they currently have the virus using self-administered throat and nose swabs, where parents or carers take swabs from younger children. Every participant is swabbed once; participants are also invited to have repeat tests every week for the first five weeks as well as monthly for a period of 12 months in total.

Adults from around 2,000 households will also provide a blood sample taken by a trained nurse, phlebotomist or healthcare assistant. These tests, the results of which are not yet available, will help determine what proportion of the population has developed antibodies to COVID-19.

We collect information from each participant, including those under 16 years of age, concerning socio-demographic characteristics, symptoms, whether self-isolating or shielding, and whether the participant has come into contact with a suspected carrier of COVID-19.

The sample for this initial survey has been drawn from households in which someone has already participated in an Office for National Statistics (ONS) survey and has consented to be approached for future research. Households cannot request to be part of the survey; this ensures the sample is representative of the wider population.

More information on what data are collected and how is available within the [COVID-19 Infection Survey protocol](#) and our [COVID-19 Infection Survey study guide](#).

Coverage

Only England is included in this pilot phase of the study. Discussions are underway with the devolved administrations in Scotland, Wales and Northern Ireland to include the whole of the UK in the main study. 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.

Analysing the data

We calculate the estimated proportion of the population testing positive for COVID-19 based on the results of swab tests performed between 4 May and 17 May 2020. Where individuals have had more than one swab test during this time, we have included only the latest test for each individual.

The incidence analysis in [Section 3](#) includes all swab results from 26 April onwards. It is important to note that the 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.

The estimates provided in this analysis 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. To derive estimates for the prevalence rate instead, we would need to adjust for imperfect tests results. Since we do not have accurate information on the rate of false-positive and false-negative results, we are not providing estimates for prevalence at this time.

The estimates are based on weighted data to ensure they are representative of the target population in England. While the pilot is based on a nationally representative survey sample, some individuals in the original ONS survey samples will have dropped out, while others will not have responded to the pilot. To address this, we apply weighting to ensure the responding sample is representative of the population in terms of age (grouped), sex, region, housing tenure and household size.

Confidence intervals are calculated using the Korn–Graubard method to take into account the expected small number of positive cases and the complex survey design. The confidence intervals are calculated so that if we were to repeat the survey many times on the same occasion and in the same conditions, in 95% of these surveys the true population value would be contained within the 95% confidence intervals.

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 COVID-19 pandemic within the UK.

Some of the main studies identified include Public Health England 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.

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](#).

Timeliness

The results presented in this bulletin are based on the results of swab tests performed between 4 May and 17 May 2020, providing users with the most timely estimates for the percentage of the target population in England testing positive for the coronavirus (COVID-19).

Uncertainty in this data

The estimates presented in this bulletin contain [uncertainty](#). There are many sources of uncertainty, but the main sources in the information presented include each of the following.

Uncertainty in the test (false-positives, false-negatives and timing of the infection)

These results are directly from the test, and no test is perfect. There will be false-positives and false-negatives from the test, and false-negatives could also come from the fact that participants in this study are self-swabbing. We also do not know if all individuals testing positive are still infectious; it is possible some may have had COVID-19 in the past but still test positive.

We do not know the exact false-positive or false-negative rate of the current swab test for the virus. However, based on the very low number of positives in the results so far, we know the false-positive rate is very low. We do not have information on the false-negative rate.

The data are based on a sample of people, so there is some uncertainty in the estimates

Any estimate based on a random sample contains some uncertainty. If we were to repeat the whole process many times, we would expect the true value to lie in the 95% confidence interval on 95% of occasions. A wider interval indicates more uncertainty in the estimate.

Quality of data collected in the questionnaire

As in any survey, some data can be incorrect or missing. For example, participants and interviewers sometimes misinterpret questions or skip them by accident. To minimise the impact of this, we clean the data, editing or removing things that are clearly incorrect. In these initial data, we identified some specific quality issues with the healthcare and social care worker question responses and have therefore applied some data editing (cleaning) to improve the quality. Cleaning will continue to take place to further improve the quality of the data on healthcare and social care workers, which may lead to small revisions in future releases.

9 . Next steps

As the study progresses, we will be able to provide greater detail into the extent of coronavirus (COVID-19) infection, for example, by providing regional breakdowns.

Blood samples collected to date are still being analysed by the laboratories, but we hope to start receiving this data soon. Once the Office for National Statistics (ONS) has received sufficient data to calculate good quality estimates of antibodies in the population we will include results in a future publication.

The information on spread of infection will form an important component for estimating the rate of transmission, often referred to as “R”, which is central to planning for easing of lockdown conditions. There are different approaches for estimating R, and the agreement of the most appropriate estimate for any period is the responsibility of the Scientific Advisory Group for Emergencies (SAGE). They will use information from our study in their deliberations.

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. 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](#).

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

[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 8 May 2020](#)

Bulletin | Released 19 May 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.

[Coronavirus \(COVID-19\) Infection Survey pilot: England, 10 May 2020](#)

Bulletin | Released 10 May 2020

Estimates of people testing positive for the coronavirus (COVID-19) in England. Provisional results from COVID-19 Infection Survey pilot.

[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.

