Office for National Statistics

Article

# Coronavirus (COVID-19) Infection Survey: characteristics of people testing positive for COVID-19 incountriesof the UK,5May 2021

Characteristics of people testing positive for COVID-19 from the Coronavirus (COVID-19) Infection Survey. This survey is being delivered in partnership with University of Oxford, University of Manchester, Public Health England andWellcomeTrust.

Contact:
Kara Steel and Eleanor Fordham
infection.survey.analysis@ons.gov.uk
+44 (0)1633 651689

Release date:
5 May 2021

Next release:
20 May 2021

## Table of contents

# 1 . Main points

- Transmission of the coronavirus (COVID-19) is a complex, continuous risk that can occur in any setting; although work location, mode of travel to work, and ability to socially distance at work were associated with the likelihood of testing positive, these factors alone cannot be assumed to be the only cause of the spread of the virus.
- Between 1 December 2020 and 4 April 2021, over half the people who tested positive for COVID-19 with a strong positive test reported having one or more symptoms within 35 days of the test in England, Wales and Scotland; just under half reported symptoms in Northern Ireland.
- Across all four UK countries, cough, fatigue and headache were the most common symptoms reported in strong positive COVID-19 cases between 1 December 2020 and 4 April 2021.

# 2 . Overview

In this article, 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 and/or other institutional settings in the UK.

This article presents analysis on the characteristics of those testing positive for SARS-CoV-2 – the coronavirus causing the COVID-19 disease in the UK. We include current COVID-19 infections, which we define as testing positive for SARS-CoV-2, with or without having symptoms, on a swab taken from the nose and throat.

**More about coronavirus**

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

More information on our headline estimates of the overall number of positive cases in England, Wales, Northern Ireland and Scotland are available in our latest bulletin. It should be noted that the analysis on the characteristics and behaviours of those testing positive in this article is for a different time period than the headline figures presented in the most recent bulletin. The reference periods for the various analyses are clearly stated at the start of each section.

Further information on what the analysis covers is provided at the start of each section. More information about the methods used for our models is available in our methodology article.

# 3 . Likelihood of testing positive for COVID-19 by work location, mode of travel to work and reported ability to socially distance in the workplace in the UK

## About this analysis

This section looks at the likelihood of people testing positive for the coronavirus (COVID-19) from nose and throat swabs by work location and mode of travel to work, as well as ability to socially distance at work. This analysis is based on data from UK survey participants aged 16 to 74 years who are currently working and were tested at any point between 3 October 2020 and 16 April 2021.

Estimates are calculated using a logistic regression model. The logistic regression model accounts for age, sex, region, urban or rural status, ethnicity, household size, multigenerational households, deprivation, whether individuals are currently working from home and their ability to socially distance at work if not working from home, method of travel to work and face coverings in the workplace. For more information on the methods used in this analysis, please see Section 8: Data sources and quality.

It is important to note that when attributing risk to working outside of the household, a broader range of factors beyond the mode of travel and ability to socially distance must also be considered to reflect the complexity of risk. Work-related risks are interlinked with a wide variety of other factors such as household size, socio-economic status and existing co-morbidities. The general contact individuals have with others both inside and outside of work will also contribute to their likelihood of testing positive. Transmission is therefore complex, and caution must be applied in over-simplifying the findings. Evidence from a range of studies needs to be synthesised to understand the complexity of transmission. This analysis is a contribution to the important and growing understanding of risks associated with testing positive for COVID-19. These findings build upon previously published analysis on the likelihood of testing positive for COVID-19 by occupation.

## Interpreting the charts

Results are presented as odds ratios. When a characteristic (for example, travelling to work by car or taxi) has an odds ratio of one, this means that there is neither an increase nor a decrease in the likelihood of infection compared with a reference category (for example, working from home). An odds ratio of more than one means that there is an increased likelihood of infection compared with the reference category. An odds ratio of lower than one means that there is a reduced likelihood of infection compared with the reference category. For the purpose of this analysis, the models always show the likelihood of individuals working outside the home testing positive for COVID-19 compared with individuals working from home.

The odds ratios are presented with 95% confidence intervals. If the range of the confidence interval crosses the threshold of one, we cannot say with any certainty whether infection is more or less likely for that characteristic compared with the reference category, even if the estimate is not close to one. In some instances, this will be because we estimate there to be no differences (where the odds ratio estimate is close to one), but it can also reflect less information about a characteristic in our sample meaning greater uncertainty as to whether the observed effect could just be due to chance.

## Work location, mode of travel to work, and ability to socially distance at work were all associated with the likelihood of testing positive for COVID-19

Figure 1 presents analysis that considers the likelihood of testing positive for COVID-19 according to mode of transport used to travel to work (car/taxi, train/bus and foot/bike/other) for those working outside the home, compared with individuals who work from home.

Between the end of November 2020 and the middle of February 2021, people who travelled to work were more likely to test positive for COVID-19 than those working from home, regardless of mode of travel. There is limited evidence that those who travelled on foot, by bike or "other" means were less likely to test positive than those who travelled to work by train, bus, car or taxi, but this finding is less certain as confidence intervals are wide. However, there was no evidence that the likelihood of testing positive differed between people travelling to work by train or bus, compared with those travelling to work by car or taxi.

It is important to note that a broad range of factors including the general contact individuals have with others both in and out of work will contribute to their likelihood of testing positive. Transmission is therefore complex, and caution must be applied in over-simplifying the findings.

Any potential effects are far weaker in the last 28 days considered (up to 16 April 2021), or for the first 28 days (up to 30 October 2020) for those travelling by foot or bike or other. In the most recent period this may be because the uncertainty in the model estimate is greater because of lower numbers of positives.

### Figure 1: People who travelled to work were more likely to test positive for COVID-19 than those working from home, regardless of mode of travel

Odds ratios of individuals who travelled to work testing positive for coronavirus (COVID-19) on a swab test compared with individuals working from home by mode of travel, UK, 3 October 2020 to 16 April 2021

Data download

**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.

Figure 2 presents analysis that considers the likelihood of testing positive for COVID-19 for individuals who work outside of the home compared with those who work from home, by self-reported ability to socially distance at work. This analysis also adjusts for how individuals working outside the home travel to work.

For those working outside the home, there is evidence that the more difficult it is to maintain social distancing, the more likely they are to test positive for COVID-19. Those who reported that maintaining social distancing at work was easy had the same likelihood of testing positive as those working from home, while those who reported that maintaining social distancing at work was very difficult were more likely to test positive in four months out of the seven considered.

### Figure 2: There is evidence that the more difficult it is for people to maintain social distancing in the workplace, the more likely they are to test positive for COVID-19

Odds ratios of individuals who work outside the home testing positive for coronavirus (COVID-19) on a swab test compared with individuals working from home by ability to socially distance, UK, 3 October 2020 to 16 April 2021

Data download

**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.

Results show that a broad range of factors beyond the mode of travel and ability to socially distance must also be considered to reflect the complexity of risk of transmission. Therefore, although Figure 1 and Figure 2 suggest that work location, mode of travel to work, and ability to socially distance at work were all associated with the likelihood of testing positive for COVID-19, positivity is associated with a wider range of human and environmental factors.

# 4 . Symptoms profile of strong positive cases for England, Wales, Northern Ireland and Scotland

## About this analysis

This section looks at each person who tested positive for the coronavirus (COVID-19) who had a strong positive test. The strength of the test is determined by how quickly the virus is detected, measured by a cycle threshold (Ct) value. The lower the Ct value, the higher the viral load and stronger the positive test. Positive results with a high Ct value can be seen in the early stages of infection when virus levels are rising, or late in the infection, when the risk of transmission is low.

Participants who only have positive tests with these high values are excluded from this analysis to exclude the possibility that symptoms are not identified because we pick up individuals very early or later on in their infection. You can find more information on Ct values in a paper written by academic partners at the University of Oxford.

This analysis considers individuals with any positive test (including repeated positive tests) that had a Ct value less than 30 between 1 December 2020 and 4 April 2021. This analysis considers all symptoms reported at visits within 35 days of the first positive test of the episode, and at each visit we ask about symptoms in the last seven days. This includes symptoms reported even when there is a negative test within this timeframe or a positive test with a higher Ct value. The methodology has changed since this analysis was last published. More details on the method used can be found in Section 8.

Individuals taking part in the survey were asked at each visit whether they had experienced a range of possible symptoms[1] in the seven days before they were tested and also separately whether they felt that they had symptoms compatible with COVID-19 infection in the last seven days.

In Figure 4 we have categorised reported symptoms into the following:

- any: any specific self-reported symptom, including cough, fever, shortness of breath, loss of taste, loss of smell, myalgia, fatigue, sore throat, headache, abdominal pain, diarrhoea, nausea or vomiting
- classic: cough, fever, shortness of breath, loss of taste or loss of smell
- gastrointestinal (GI): abdominal pain, nausea or vomiting, or diarrhoea
- loss of taste or smell only

## People testing positive for COVID-19 with a strong positive test were more likely to report "classic" symptoms than gastrointestinal or loss of taste or smell only

In England, 57.7% (95% confidence interval: 56.5% to 58.8%) of people who tested positive for COVID-19 with a strong positive test between 1 December 2020 and 4 April 2021 reported having one or more symptoms[1].

In Wales, 63.3% (95% confidence interval: 57.1% to 69.2%) of people who tested positive for COVID-19 with a strong positive test between 1 December 2020 and 4 April 2021 reported having one or more symptoms[1].

In Northern Ireland, 48.4% (95% confidence interval: 41.1% to 55.8%) of people who tested positive for COVID-19 with a strong positive test between 1 December 2020 and 4 April 2021 reported having one or more symptoms[1].

In Scotland, 55.3% (95% confidence interval: 49.7% to 60.8%) of people who tested positive for COVID-19 with a strong positive test between 1 December 2020 and 4 April 2021 reported having one or more symptoms[1].

Over half the people who tested positive for COVID-19 with a strong positive test reported having one or more symptoms within 35 days of the test in England, Wales and Scotland. Across all four UK countries, people who tested positive for COVID-19 with a strong positive test were more likely to report "classic" symptoms than gastrointestinal or loss of taste or smell only.

### Figure 3: Over half the people who tested positive reported having one or more symptoms within 35 days of the test in England, Wales and Scotland

Percentage of people with symptoms, including only those who have strong positive tests (Ct less than 30), UK countries, 1 December 2020 to 4 April 2021

Data download

**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. Symptoms are self-reported and were not professionally diagnosed.
4. The data presented are unweighted percentages of people with any positive test result that had a Ct value less than 30.

### Figure 4: People testing positive for COVID-19 with a strong positive test were more likely to report “classic” symptoms than gastrointestinal or loss of taste or smell only

Percentage of people with symptoms, including only those who have strong positive tests (Ct less than 30), UK countries, 1 December 2020 to 4 April 2021

Data download

**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. Symptoms are self-reported and were not professionally diagnosed.

4. The data presented are unweighted percentages of people with any positive test result that had a Ct value less than 30.

Figure 5 shows that cough, fatigue and headache were the most common symptoms reported in strong positive COVID-19 cases across the four UK countries. Abdominal pain, diarrhoea and nausea or vomiting were less commonly reported symptoms in strong positive COVID-19 cases. Similar patterns in reported symptoms can be seen in all four UK countries.

Results should be interpreted with caution for Wales, Northern Ireland and Scotland because of smaller sample sizes of people who have a strong positive test (Ct less than 30) than for England, resulting in wider confidence intervals.

## Figure 5: The most commonly reported symptoms among people testing positive for COVID-19 with a strong positive test were cough, fatigue and headache

Percentage of people with symptoms, including only those who have strong positive tests (Ct less than 30), UK countries, 1 December 2020 to 4 April 2021

Data download

**Notes:**

1. These 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.

3. Symptoms are self-reported and were not professionally diagnosed.

4. The data presented are unweighted percentages of people with any positive test result that had a Ct value less than 30.

**Notes for: Symptoms profile of strong positive cases for England, Wales, Northern Ireland and Scotland**

1. The symptoms respondents were asked to report are: fever, muscle ache (myalgia), fatigue (weakness or tiredness), sore throat, cough, shortness of breath, headache, nausea or vomiting, abdominal pain, diarrhoea, loss of taste or loss of smell.

# 5 . Coronavirus (COVID-19) Infection Survey data

Coronavirus (COVID-19) infections in the community in the UK
Dataset | Released 5 May 2021
Characteristics of people testing positive for the coronavirus (COVID-19) in England taken from the COVID-19 Infection Survey.

# 6 . Collaboration

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

# 7 . Glossary

## 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.

## Odds ratio

An odds ratio is a measure of how likely an outcome is given a particular characteristic. In the coronavirus (COVID-19) context, they can be used to determine whether a characteristic (for example, age) is a risk factor for testing positive for the disease. The odds ratio measures can also be compared with each other to compare the different levels of risk associated with different characteristics (for example, age groups).

# 8 . Data sources and quality

More information on measuring the data and its strengths and limitations is available in the Coronavirus (COVID-19) Infection Survey statistical bulletin.

Our methodology article provides further information around the survey design, how we process data and how data are analysed.

## Odds ratios analysis

The analysis on the likelihood of people in the UK testing positive for the coronavirus (COVID-19) from nose and throat swabs by work location, mode of travel to work and ability to socially distance at work considers non-overlapping 28-day periods. In each period the first positive test is taken or the latest negative if all tests in the interval are negative, together with the work factors reported at that visit. It excludes all individuals who are not currently working. Students, furloughed individuals and those on long-term leave are not included.

Estimates are calculated using a logistic regression model. The logistic regression model accounts for age, sex, region, urban or rural status, ethnicity, household size, multigenerational households, deprivation, whether individuals are currently working from home and their ability to socially distance at work if not working from home, method of travel to work and face coverings in workplace. Because this analysis is estimating the effects of these factors and adjusting for these other remaining factors, the data are unweighted.

Results are presented as odds ratios with 95% confidence intervals. The odds ratio analyses in this article uses "working from home" as a reference category, so odds ratios should be interpreted as giving the odds relative to someone who works from home.

The two analyses are connected. How easy it is to socially distance at work is adjusted for in the model showing how likely it is to test positive by mode of transport to work, and vice versa. Because the analyses are connected, the odds ratios can be multiplied together. For example, the likelihood of testing positive if you travel by bus or train and find it very difficult to distance at work is found by multiplying the likelihood for "travel by bus or train" by the likelihood for "distancing very difficult".

## Symptoms analysis

The analysis on the symptoms profile of strong positive cases for England, Wales, Northern Ireland and Scotland considers individuals with any positive test (including repeated positive tests) that had a Ct value less than 30 between 1 December 2020 and 4 April 2021. Positive episodes are now being defined as "a new positive test 90 days or more after an initial first positive test and following a previous negative test, or, if within 90 days, a subsequent positive test following four consecutive negative tests", rather than using a 90-day threshold alone. As a part of implementing this improvement we identified some coding issues which have now been resolved. This affects some of our previously reported estimates but does not affect the main trends. Therefore, the estimates presented today supersede our previous estimates.

# 9 . Related links

Coronavirus (COVID-19) Infection Survey, UK
Bulletin | Updated weekly
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.

Coronavirus (COVID-19) Infection Survey: antibody and vaccination data for the UK
Article | Updated fortnightly
Antibody data by UK country and regions in England from the Coronavirus (COVID-19) Infection Survey. This survey is being delivered in partnership with University of Oxford, University of Manchester, Public Health England and Wellcome Trust.

COVID-19 Infection Survey: methods and further information
Methods article | Updated 26 March 2021
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 insights
Interactive tool | Updated as and when data become available
Explore the latest data and trends about the coronavirus (COVID-19) pandemic from the ONS and other official sources.

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.

COVID-19 Infection Survey (CIS)
Article | Updated regularly
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.