Office for National Statistics

Statistical bulletin

Coronavirus (COVID-19) Infection Survey, characteristics of people testing positive for COVID-19, UK: 16 December 2021

Characteristicsof 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, UK Health Security Agency andWellcomeTrust.This study is jointly led by the ONS and the Department for Health and Social Care (DHSC) working with the University of Oxford and Lighthouse Laboratory to collect and test samples.

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Release date:
16 December 2021

Next release:
19 January 2022

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1 . Main points

- In the fortnight ending 28 November 2021, those who have received at least one dose of a coronavirus (COVID-19) vaccine continued to be less likely to test positive for COVID-19 than those not vaccinated; people who reported receiving three vaccinations (including booster vaccinations) were even less likely to test positive than those who had a second dose of AstraZeneca, or a second Pfizer vaccination more than 90 days ago.

- People working in the education sector continued to be more likely to test positive for COVID-19 in comparison with other working adults in the fortnight ending 28 November 2021; the higher risk is likely related to the recent high infection levels among school-aged children.

- From 2 July 2020 to 29 November 2021, people who are unvaccinated were approximately three times more likely to be reinfected with COVID-19 than people who had their second vaccination 14 to 89 days ago.

- In the UK, people testing positive for COVID-19 with a strong positive test continued to be more likely to report "classic" symptoms than gastrointestinal or loss of taste or smell only, in November 2021.

- Up to 1 December 2021, we identified a very small number of infections consistent with the Omicron variant (B.1.1.529) among our survey participants, which is not sufficient to impact the analysis in this bulletin; we will continue to monitor this variant and will report relevant analysis if the Omicron variant becomes more prevalent among the population.

About this bulletin

In this bulletin, we present the latest analysis of the characteristics associated with testing positive for SARS-CoV-2, the coronavirus causing the COVID-19 disease in the UK. Then we focus on reinfections and present analysis on characteristics associated with getting reinfected with coronavirus (COVID-19). Finally, we present analysis on the symptoms profile of strong positive cases, and then on socially distanced and physical contacts. This is part of our series of analysis on the characteristics of people testing positive for COVID-19.

In this bulletin, we refer to the number of current COVID-19 infections within the population living in private residential households. We exclude those in hospitals, care homes and/or other communal establishments. In communal establishments, rates of COVID-19 infection are likely to be different.

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 weekly bulletin. Our methodology article provides more information on the methods used for our models.

2 . Characteristics associated with testing positive, UK

This analysis was first presented in our analysis of populations in the UK by risk of testing positive for coronavirus (COVID-19) September 2021 publication, which provides a more detailed explanation of the methods used. We present findings for the most recent fortnight in this section, but a longer data time series covering 14 June to 28 November 2021 is available in the Coronavirus (COVID-19) Infection Survey, characteristics of people testing positive for COVID-19, UK dataset.

Estimates of the likelihood of some specific characteristics affecting an individual testing positive can fluctuate from one fortnight to another, meaning that findings that were significant in one period may not necessarily be significant in another period. This may be because the effect of a characteristic is genuinely changing, or because we do not have sufficient individuals with that characteristic in a particular fortnight to exclude any differences we find being down to chance.

Our latest data for the fortnight ending 28 November 2021 show similar conclusions to our last publication, namely:

- those who reported receiving at least one dose of a coronavirus vaccine continued to be less likely to test positive for COVID-19 than those not vaccinated; those who reported receiving three vaccinations (including booster vaccinations) were even less likely to test positive than those who had a second AstraZeneca vaccination, or a second Pfizer vaccination more than 90 days ago
- those who have had a COVID-19 infection previously continued to be less likely to test positive than those who had not
- those living in a household of three or more people were more likely to test positive than those living in single-occupancy households
- school-aged children and adults aged around 40 to 50 years continued to be more likely to test positive than other ages
- females were less likely to test positive than males
- people working in the education sector continued to be more likely to test positive in comparison with other working adults; this is likely related to the continuing higher infection levels among school-aged children compared with other age groups; we have seen this result consistently since mid-September
- those living in major urban areas were less likely to test positive than those living in rural villages, this is the second fortnight in a row where this result has been observed; in contrast, in periods over the spring and summer, those in major urban areas were more likely to test positive
- people who report regularly using lateral flow tests continued to be more likely to test positive compared with those who do not; this is likely related to those at a higher risk of infection being required to take regular lateral flow tests

In the same fortnight:

- ethnic minorities were less likely to test positive than people of White ethnicity
- people who are retired were less likely to test positive than those who are employed and working
- people who had contact with a care home were less likely to test positive, in comparison with households where no-one had contact
- people aged under 70 years living with someone aged 70 years or over were less likely to test positive than those not living with the elderly

Figure 1: Those who have received at least one coronavirus (COVID-19) vaccine were less likely to test positive for COVID-19 than those not vaccinated in the fortnight ending 28 November 2021

Estimated likelihood of testing positive for coronavirus on nose and throat swabs by vaccination status and previous infection, UK, 15 to 28 November 2021

Notes:

1. The core demographic variables, sex, ethnicity, age, geographical region, urban or rural classification of address, deprivation percentile, household size, and whether the household was multigenerational are included to adjust for these factors. The effect of core demographic variables reported in this section are from a separate model that includes only core demographic variables.

2. An odds ratio indicates the likelihood of an individual testing positive for COVID-19 given a particular characteristic/variable. See glossary for full definition.

3. Figures 1 and 2 present results from the same model. We have divided up the results to make the graphs more accessible.

4. The group '2 doses, AstraZeneca, 15 to 180 days ago' is predominantly made up of people who had a vaccine at least 90 days ago.

Download the data

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Figure 2: People aged under 70 years living with someone aged 70 years or over were less likely to test positive for coronavirus (COVID-19) than those not living with the elderly, in the fortnight ending 28 November 2021

Estimated likelihood of testing positive for coronavirus on nose and throat swabs by screened characteristics, UK, 15 to 28 November 2021

Notes:

1. The core demographic variables, sex, ethnicity, age, geographical region, urban or rural classification of address, deprivation percentile, household size, and whether the household was multigenerational are included to adjust for these factors. The effect of core demographic variables reported in this section are from a separate model that includes only core demographic variables.

2. An odds ratio indicates the likelihood of an individual testing positive for COVID-19 given a particular characteristic/variable. See glossary for full definition.

3. Figures 1 and 2 present results from the same model. We have divided up the results to make the graphs more accessible.

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An additional model examines the effect of behavioural characteristics on the likelihood of testing positive, while controlling for the core demographic variables and significant screening characteristics shown earlier in this section. This means that we can identify which behavioural characteristics are associated with testing positive while taking other differences into account.

Our findings suggest that in the fortnight ending 28 November 2021:

- people who had physical contact with those aged under 18 years were more likely to test positive than those who had not

- those who spent more time socialising with others outside their household continued to be more likely to test positive

After adjusting for time socialising outside the household and physical contact with people aged under 18 years, alongside the core demographic variables and characteristic variables displayed in Figures 1 and 2, there was no statistical evidence that face coverings affected a person's likelihood of testing positive, in the fortnight ending 28 November 2021. This has not always been a consistent finding and while there is no statistical evidence of an impact on wearing face coverings during this period analysed, it does not mean that we have statistical evidence to suggest that face coverings have no impact on testing positive. Results of the use of face coverings over time can be found in the accompanying dataset alongside other variables used in the model.

Figure 3: Those who spent more time socialising with others outside their household continued to be more likely to test positive for coronavirus (COVID-19), in the fortnight ending 28 November 2021

Estimated likelihood of testing positive for coronavirus on nose and throat swabs by behavioural characteristic variables, UK, 15 to 28 November 2021

Notes:

1. The core demographic variables and screened characteristic variables presented in Figure 1 are included to adjust for these factors. Conclusions about the core demographic variables and screened characteristic variables are taken from separate, different models.

2. An odds ratio indicates the likelihood of an individual testing positive for COVID-19 given a particular characteristic/variable. See glossary for full definition.

3. For "time spent socialising outside the home", the odds ratio is per additional occasion spent socialising with people outside of the participant's household in the last seven days.

Download the data

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About this analysis

This analysis is based on statistical models at the UK level and include all participants aged two years and over. Demographic variables used are age, region, sex, ethnicity, deprivation, household size, multi-generational household, and urban or rural classification. Additional variables are included only if found to be significant in the two weeks presented in the bulletin. More information on the methods used in this analysis can be found in our Coronavirus (COVID-19) Infection Survey technical article: analysis of populations in the UK by risk of testing positive for COVID-19, September 2021.

3 . Reinfections with COVID-19, UK

This section looks at the rate of coronavirus (COVID-19) reinfections in the UK, from 2 July 2020 to 2 December 2021.

We first presented results of reinfection analysis in our Coronavirus (COVID-19) Infection Survey technical article: analysis of reinfections of COVID-19: June 2021. The technical article provides a more detailed explanation of the methods used, some of which have since been updated. Improvements to our modelling approach apply to data published from 6 October 2021 onwards. Tables 5a to 5e in the accompanying dataset for this bulletin contain our updated reinfections data.

The analysis presented in this section includes individuals who have had at least one positive test recorded in the survey and meet our criteria for being "at risk" of reinfection where:

- 120 days have elapsed since an individual's first positive test in the survey and their most recent test result was negative
- if 120 days have not passed since their first positive test in the survey, the individual's last positive test has been followed by four consecutive negative tests

An individual being classified as "at risk" reflects that it was possible for a test of theirs to be considered a reinfection if it turns out to be positive. The "at-risk period" refers to the period following the first time we could have defined a reinfection. A reinfection is therefore defined as when an "at risk" individual has a positive test.

All estimates of COVID-19 reinfections in this analysis were unweighted. The sample for this analysis includes only those who have tested positive for COVID-19 on a swab test, and so there was no known population of which weighted estimates could be representative.

The analysis included 23,295 participants "at risk" of reinfection and 476 reinfections identified between 2 July 2020 and 1 December 2021. The median time between positive episodes in those with reinfections was 252 days or about eight months (Table 5b in the accompanying dataset for this bulletin).

Viral loads at reinfection are higher where the main variant circulating was the Delta variant, compared with other variants

The rate of reinfections was low overall, and the rate of reinfections with a high viral load (which are more likely to cause illness) was even lower. The estimated rate for all reinfections including those with a lower viral load was 12.7 per 100,000 participant days at risk (95% confidence interval: 11.6 to 13.9) over the entire at-risk period.

Viral load is approximated by Cycle threshold (Ct) values, which are lower with a high viral load. The estimated rate for reinfections with a high viral load (strong positive test where the Ct value was less than 30) was 7.2 per 100,000 participant days at risk (95% confidence interval: 6.4 to 8.1) over the entire at-risk period. Participant days at risk and Ct values are further defined in our Glossary.

From 17 May 2021, substantial numbers of infections compatible with the Delta variant were observed in the survey. We looked at the difference between initial infections and reinfections in terms of viral load both before and after this time to examine the impact variants had on the viral load of reinfections. Our findings indicate that viral loads at reinfection are higher (lower Ct value) where reinfections are likely to be predominantly with the Delta variant, compared with the Alpha or earlier variants. Because of the time period contributing to this analysis, Omicron infections will not be impacting this data.

Before 17 May 2021, the likelihood of an individual having symptoms of COVID-19 in their second infection was lower compared with their first infection. From 17 May 2021 onwards, people were just as likely to have symptoms of COVID-19 in their second infection as their first infection.

Table 1: Rate of reinfections per 100,000 participant days at risk
Estimated rate of COVID-19 reinfections per 100,000 participant days at risk, averaged for entire at-risk period, 2 July 2020 to 1 December 2021, UK

Definition	Number of participants at risk	Number of identified reinfections	Estimated rate of reinfections (per 100,000 participant days at risk)	Lower 95% confidence interval	Upper 95% confidence interval
All reinfections definition	23,295	476	12.7	11.6	13.9
Reinfections with Ct less than 30	23,295	271	7.2	6.4	8.1

Source: Office for National Statistics - Coronavirus (COVID-19) Infection Survey

Notes

1. For this analysis we define reinfection as a new positive test 120 days or more after an individual's initial first positive test, which was preceded by at least one negative test, or where an individual has had a subsequent positive test following four consecutive negative tests, regardless of the time since the first positive.

2. A confidence interval gives an indication of the degree of uncertainty of an estimate, showing the precision of a sample estimate. A wider interval indicates more uncertainty in the estimate.

4 . Risk factors associated with COVID-19 reinfections, UK

This section presents updated analysis of the risk factors associated with a coronavirus (COVID-19) reinfection identified among participants across the UK between 2 July 2020 and 29 November 2021.

Coronavirus (COVID-19) Infection Survey technical article: analysis of reinfections of COVID-19: June 2021 outlines the model used to investigate how the rate of reinfection varies over time and between individuals. This model explores multiple factors including age, sex, ethnicity, Cycle threshold (Ct) value observed in the initial infection, deprivation, household size, work in patient-facing healthcare, long-term health conditions, vaccination status and the period during which an individual was at risk.

We define the Alpha-dominant period as prior to 17 May 2021, and the Delta-dominant period from 17 May 2021 onwards. Because of the time period contributing to this analysis, Omicron infections will not be impacting these estimates.

For updated methodology, please refer to our technical article.

This analysis included 22,869 participants "at risk" of reinfection and 457 reinfections identified between 2 July 2020 and 29 November 2021. The median time between positive episodes in those with reinfections was 245 days or about eight months. The number of "at risk" participants and reinfections reported here are slightly different to those reported in the previous section because this model covers a different time period.

Risk of reinfection by characteristic

The risk of reinfection continued to be lower in the Alpha-dominant period (prior to 17 May 2021), compared with the Delta-dominant period (17 May 2021 onwards). This is measured by a hazard ratio of 0.46 (95% confidence interval: 0.33 to 0.64), which implies a 54% lower risk (95% confidence interval: 36% to 67%) of reinfection during the Alpha-dominant period compared with the Delta-dominant period.

People who are unvaccinated were approximately three times more likely to be reinfected than people who had their second vaccine 14 to 89 days ago (hazard ratio: 2.99, 95% confidence interval: 2.07 to 4.33). People who had their second vaccine dose over 90 days ago were also more likely to be reinfected than people who had their second vaccine 14 to 89 days ago (hazard ratio: 1.50, 95% confidence interval: 1.10 to 2.05).

People who reported symptoms within 35 days of the first positive test in their first infection were less likely to be reinfected, with a hazard ratio of 0.70 (95% confidence interval: 0.56 to 0.87). People were more likely to be reinfected if they had a lower viral load (higher Ct value) at the first positive episode.

Hazard ratios for all characteristics included in the model and for Ct values can be found in Tables 6a and 6b in the accompanying dataset.

Figure 4: People who are unvaccinated were approximately three times more likely to be reinfected with coronavirus (COVID-19) than people who had their second vaccine 14 to 89 days ago

Reinfection hazard ratios for factors included in the model, UK, 2 July 2020 to 29 November 2021

Notes:

1. This figure includes hazard ratios for all factors in the model except for Ct value.

2. A hazard ratio of greater than 1 indicates more risk in the specified group compared with the reference group, and a hazard ratio of less than 1 indicates less risk.

3. Deprivation is based on an index of multiple deprivation (IMD) score or equivalent scoring method for the devolved administrations, from 1, which represents most deprived up to 100, which represents least deprived. The odds ratio shows how a 10 unit increase in deprivation score, which is equivalent to 10 percentiles or 1 decile, affects the likelihood of testing positive for COVID-19.

4. We define the Alpha dominant period as before 17 May 2021, and the Delta dominant period as from 17 May 2021 onwards.

5. Although included in the model, the effect of Ct values is not included in this figure but is presented in Table 6b of the accompanying dataset.

Download the data

.xlsx

Risk of reinfection by viral load

Data for the risk of reinfection by Ct value and associated confidence intervals as compared with the reference category (Ct value of 20) are available in Table 6b of the accompanying dataset. The data show that the risk of reinfection is higher in individuals who had a higher Ct value (lower viral load) at their first infection; this may be because of a weaker immune response in "milder" primary infections.

Risk of reinfection over time

Data for the risk of reinfection over time are available in Table 6c in the accompanying dataset.

Since this analysis was last published, we have improved our method for defining vaccination status, and have therefore changed the reference category. The reference category previously included individuals with no second dose (including unvaccinated individuals and those who had received a first dose only), and is now based on people who are 14 to 89 days after their second dose. Since the rate of reinfection is estimated for those in the reference category, this change has caused the reinfection rate to become lower than in our previous analysis, because the rate is estimated for a different group to our previous analyses.

5 . Symptoms profile of strong positive cases, UK

This section presents analysis based on all individuals who tested positive for COVID-19 with a strong positive test (Cycle threshold (Ct) value less than 30) between 1 December 2020 and 28 November 2021 in the UK.

The analysis considers what percentage of these individuals reported symptoms within 35 days of the first positive test. Because of the time period contributing to this analysis, Omicron infections will not be impacting these estimates. We present grouped and individual symptoms analysis for the whole of the UK split by month, and for the whole time period split by UK country, all of which can be found in Tables 8a to 8f in the accompanying dataset.

The analysis looks at 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, or any symptom compatible with coronavirus (COVID-19). Symptoms are self-reported and were not professionally diagnosed.

We identify the Delta dominant period as being from mid-May 2021 onwards. Prior to this, very few positive cases were identified as compatible with the Delta variant and were likely to be compatible with Alpha or other variants. This means that any change from May onwards when compared with previous months may be because the Delta variant has a different symptoms profile to the Alpha variants.

In addition, when the percentage of the population testing positive for COVID-19 is increasing, as it has been since June 2021, the survey is likely to identify more people closer to the start of their infection with higher viral loads (lower Ct values) when they are more likely to be experiencing symptoms. We have seen that the viral load of strong positive results increased during June and July 2021, as measured by decreases in the average Ct value (see Glossary, for more information on Ct values). This will also affect the prevalence of symptoms within these strong positive cases.

Across the UK, 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

From 1 to 28 November 2021, 62% (95% confidence interval: 60% to 64%) of people testing positive for COVID-19 in the UK with a strong positive test reported any specific symptoms[1]. This was a small decrease from October 2021, where 66% (95% confidence interval: 64% to 67%) of people testing positive reported symptoms.

The percentage of people reporting symptoms was lower in the period between March and May 2021. During this period, the positivity rate was also lower in comparison with other months, and there was a lower average viral load during this time. This could potentially explain the lower percentage of people reporting symptoms between March and May 2021.

Symptoms reported were more likely to be "classic" symptoms than gastrointestinal or loss of taste or smell only. The prevalence of "classic", "loss of taste or smell" and any symptoms was generally lower between March and May 2021 compared with other months, where prevalence was higher. A similar pattern is seen when the data are broken down by UK country.

Figure 5: In the UK, people testing positive for COVID-19 with a strong positive test continued to be more likely to report “classic” symptoms than gastrointestinal or loss of taste or smell only

Unweighted percentage of people with symptoms, including only those who have strong positive tests (Ct less than 30) by month, UK, 1 December 2020 to 28 November 2021

Notes:

1. All results are provisional and subject to revision.

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

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

4. "Classic symptoms" include any of the following: cough, fever, loss of taste, loss of smell.

5. "Gastrointestinal (GI) symptoms" include any of the following: abdominal pain, nausea or vomiting, diarrhoea.

6. These statistics refer to infections reported in private households. These figures exclude infections reported in hospitals, care homes or other communal establishments.

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In the UK, the most commonly reported symptoms have consistently been cough, fatigue and headache. The least commonly reported symptoms have consistently been abdominal pain, diarrhoea, and nausea or vomiting. The prevalence of loss of smell, loss of taste, fever, cough, fatigue, headache, myalgia, diarrhoea, and nausea or vomiting was lower in the period between March and May 2021 when positivity was lower in comparison with other months. However, confidence intervals are wide and overlap with previous months' estimates.

The percentage of strong positive cases where any symptoms were reported appears to be slightly lower in Northern Ireland, although confidence intervals overlap with other UK countries. This may be driven by slightly fewer people reporting loss of taste and smell (which is a classic symptom) compared with England, Wales and Scotland. In addition, our sampling method for Northern Ireland is different to the other nations, inviting only people who have previously participated in a Northern Ireland Statistics and Research Agency (NISRA) survey, which could result in a sample of individuals who are less likely to report symptoms.

Patterns of the prevalence of specific symptoms are similar for each UK country, and align with data for the whole of the UK.

Because of a smaller number of tests in Wales, Northern Ireland and Scotland in comparison with England in our sample, the confidence intervals are wider indicating higher uncertainty.

About this analysis

This analysis considers all symptoms reported[1] at survey visits within 35 days of the first positive test of the episode, and at each survey visit we ask about symptoms in the last seven days. This includes symptoms reported even when there is a negative test result within the episode or a positive test result with a lower viral load (higher Ct value). We look at strong positive test results with a Ct of less than 30 to exclude the possibility that symptoms are not identified because we pick up individuals very early or later on in their infection. More details on this analysis can be found in Section 10.

Notes for: Symptoms profile of strong positive cases, UK

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.

6 . Number and age of people with whom individuals had contact

We report on recent trends in this section, but the full data time series for this analysis, which covers the period between 13 July 2020 and 28 November 2021 for England, and 21 September 2020 to 28 November 2021 for Wales, Northern Ireland and Scotland, is available in the accompanying dataset. The analysis for Wales, Northern Ireland and Scotland starts at a later date because data collection started later in these countries. Our estimates have been weighted to be representative of the total population in each of the four UK countries.

Number of reported contacts with people outside the household continued to increase across the UK

The trends in socially distanced and physical contacts are very similar for England, Wales, Northern Ireland and Scotland, and are broadly unchanged since our last bulletin.

Across all four UK nations, the number of socially distanced and physical contacts that adults and school-age children reported with people of all ages outside their household has been increasing since March 2021, although school-age children had fewer contacts during the school holidays. Adults appear to consistently have more socially distanced and physical contacts with those aged 18 to 69 years than with those aged under 18 years or aged 70 years and over. School-age children appear to have had more socially distanced and physical contacts with those aged under 18 years.

School term dates, and coronavirus (COVID-19) related school policies vary by nation and this is reflected in the data. Information on the schedule for school re-openings can be viewed for England, Wales, Northern Ireland and Scotland. Information on lockdown easing can be viewed for England, Wales, Northern Ireland and Scotland.

Our findings are generally similar to findings on socially distanced and physical contact reported in the Opinions and Lifestyle Survey (OPN), which examines the impact of the coronavirus pandemic on people, households and communities in Great Britain.

7 . Characteristics of people testing positive for COVID-19 data

Coronavirus (COVID-19) Infection Survey, characteristics of people testing positive for COVID-19, UK
Dataset | Released 16 December 2021
Characteristics of people testing positive for coronavirus (COVID-19) taken from the COVID-19 Infection Survey.

8 . 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, UK Health Security Agency and Wellcome Trust. Of particular note are:

- Sarah Walker – The University of Oxford, Nuffield Department for Medicine: Professor of Medical Statistics and Epidemiology and Study Chief Investigator
- Koen Pouwels – The University of Oxford, Health Economics Research Centre, Nuffield Department of Population Health: Senior Researcher in Biostatistics and Health Economics
- Thomas House – The University of Manchester, Department of Mathematics: Reader in mathematical statistics

9 . 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.

Cycle threshold (Ct) values

The strength of a positive coronavirus (COVID-19) 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.

Deprivation

Deprivation is based on an index of multiple deprivation (IMD) (PDF, 2.18MB) score or equivalent scoring method for the devolved administrations, from 1, which represents most deprived up to 100, which represents least deprived. The odds ratio shows how a 10-unit increase in deprivation score, which is equivalent to 10 percentiles or 1 decile, affects the likelihood of testing positive for COVID-19.

Education sector

Work sectors are self-reported and cover a wide variety of occupations; for example, someone working in the education sector could be a teacher at a primary school or could be a chef at a college.

Hazard ratio

A measure of how often a particular event happens in one group compared with how often it happens in another group, over time. When a characteristic (for example, being male) has a hazard ratio of one, this means that there is neither an increase nor a decrease in the risk of reinfection compared with a reference category (for example, being female).

Multi-generational household

A household was classed as multi-generational if it included individual(s) aged school Year 11 or younger and individual(s) aged school Year 12 to those aged 49 years and individual(s) aged 50 years and over.

Odds ratio

An odds ratio indicates the likelihood of an individual testing positive for COVID-19 given a particular characteristic or variable. When a characteristic or variable has an odds ratio of one, this means there is neither an increase nor a decrease in the likelihood of testing positive for COVID-19 compared with the reference category. An odds ratio greater than one indicates an increased likelihood of testing positive for COVID-19 compared with the reference category. An odds ratio less than one indicates a decreased likelihood of testing positive for COVID-19 compared with the reference category.

For more information, see our methodology page on statistical uncertainty.

Participant days at risk

The risk of reinfection varies from person to person, depending on when they were first infected. People who were first infected in the early part of the survey have had more opportunity to become reinfected compared with someone who has experienced their first infection more recently. Therefore, this analysis uses "participant days at risk" to determine the number of reinfections.

10 . Measuring the data

More information on measuring the data 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.

Symptoms analysis

The analysis in Section 5 looks at each person who tested positive for coronavirus (COVID-19) and had a strong positive test in the UK. 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.

Participants who only have positive tests with high Ct values (see Glossary) within a positive episode are excluded from this analysis to exclude the possibility that symptoms are not identified because we pick up individuals either 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.

The analysis considers all symptoms reported at survey visits within 35 days of the first positive test of the episode, and at each survey visit we ask about symptoms in the last seven days. This includes symptoms reported even when there is a negative test result within this timeframe or a positive test result with a higher Ct value. Positive episodes are now being defined as "a new positive test 120 days or more after an initial first positive test and following a previous negative test, or, if within 120 days, a subsequent positive test following four consecutive negative tests". We now take 120 days as a cut-off point, whereas previously we used 90 days.

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 a coronavirus (COVID-19) infection in the last seven days.

Notes for: Measuring the data

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.

11 . Strengths and limitations

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

12 . Related links

Coronavirus (COVID-19) Infection Survey, UK
Bulletin | Updated weekly
Estimates for England, Wales, Northern Ireland and Scotland.

Coronavirus (COVID-19) Infection Survey: antibody and vaccination data for the UK
Article | Updated fortnightly
Antibody and vaccination data by UK country and regions in England from the Coronavirus (COVID-19) Infection Survey.

Coronavirus (COVID-19) Infection Survey technical article: predictors of positivity across countries of the UK, 28 October 2021
Technical article | Released 28 October 2021
Analysis of predictors of positivity across countries of the UK for coronavirus (COVID-19) from the COVID-19 Infection Survey.

Coronavirus (COVID-19) Infection Survey technical article: analysis of reinfections of COVID-19: June 2021
Technical article | Released 29 June 2021
Data about reinfections from the Coronavirus (COVID-19) Infection Survey.

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.

The Coronavirus (COVID-19) Infection Survey QMI
Methodology article | Updated 16 July 2021
Quality and Methodology Information for the Coronavirus (COVID-19) Infection Survey (CIS), detailing the strengths and limitations of the data, methods used, and data uses and users.