Office for National Statistics

Article

Self-reported coronavirus (COVID-19) infections and associated symptoms, England and Scotland: November 2023 to March 2024

In-depth analysis of Winter Coronavirus (COVID-19) Infection Study data looking attrends in self-reported symptoms of coronavirus (COVID-19), including ongoing symptoms and associated risk factors.

Contact:
Winter COVID Analysis team
health.data@ons.gov.uk
+44 20 8039 0326

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1 . Main points

- An estimated 3.3% (2 million) of people living in private households in England and Scotland were experiencing self-reported long COVID (symptoms continuing for more than four weeks after a confirmed or suspected coronavirus (COVID-19) infection that were not explained by something else).
- Long COVID symptoms adversely affected the day-to-day activities of 1.5 million people (74.7% of those with self-reported long COVID), with 381,000 (19.2% of those with self-reported long COVID) reporting that their ability to undertake their day-to-day activities had been "limited a lot".
- Those in the youngest (aged 3 to 17 years) and oldest (65 years and over) age groups were the least likely to test positive for COVID-19 during the study period.
- Those who have had a vaccination since September 2023 were less likely to test positive in the early waves of the study period (1 and 2); in later waves of the study period (3 and 4) there was no statistical difference.
- Participants in the oldest and youngest age groups who did test positive in the study period were also less likely to report symptoms consistent with "influenza-like illness" compared with those in the middle age groups.

2 . Overview of the study

The Winter Coronavirus (COVID-19) Infection Study (Winter CIS) was a joint study with the UK Health Security Agency (UKHSA), carried out between November 2023 and March 2024 for England and Scotland. The study was structured as a longitudinal panel survey, with each participant sent a questionnaire and asked to take a lateral flow device (LFD) test every four weeks for the detection of SARS-CoV-2 (COVID-19).

Each participant was invited to do this four times over the course of the study, referred to as a "wave". Wave 1 ran from 14 November to 14 December 2023, wave 2 from 12 December 2023 to 11 January 2024, wave 3 from 9 January to 8 February 2024 and wave 4 from 6 February to 7 March 2024.

3 . Long COVID

The Winter Coronavirus (COVID-19) Infection Study (Winter CIS) asked participants if they would describe themselves as currently having long COVID (defined as experiencing symptoms more than four weeks after a coronavirus (COVID-19) infection, that are not explained by something else). Therefore, estimates in this article relate to self-reported long COVID, as experienced by study participants, rather than clinically diagnosed ongoing symptomatic COVID-19 or post-COVID-19 syndrome.

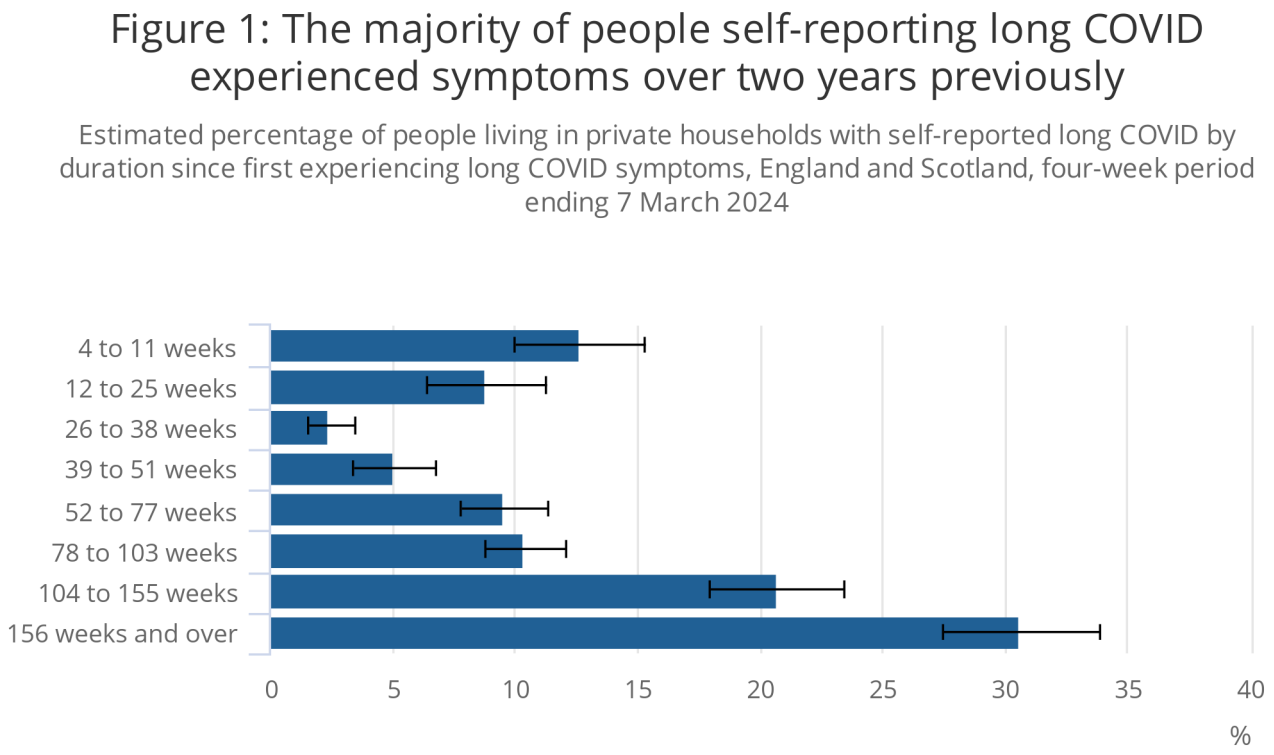
An estimated 3.3% (95% confidence interval: 3.1 to 3.5%) of individuals in England and Scotland were experiencing self-reported long COVID during wave 4 (6 February to 7 March 2024). This is slightly higher than the estimated percentage reported at the end of the UK Coronavirus (COVID-19) Infection Survey (CIS) in March 2023 (2.9%, 95% confidence interval: 2.8 to 3.0%). As the Winter CIS contains a sub-sample of CIS participants, the figures reported here may not be directly comparable with those reported previously in CIS (see Section 8: Data sources and quality for more details).

Respondents who self-reported currently having long COVID were asked to provide a date for the following question, "When did you first experience symptoms of long COVID?". Of those who self-reported long COVID and provided a date, 87.3% had experienced symptoms at least 12 weeks previously, 71.1% one year previously, 51.3% at least two years previously and 30.6% at least three years previously during wave 4 (ending 7 March 2024).

The duration of long COVID symptoms within the Winter CIS has been calculated from a self-reported date, while within the CIS the duration was calculated from the first suspected coronavirus infection. Figures are not directly comparable. The question around onset of long COVID symptoms is asked only of those who currently self-reported having long COVID, therefore figures do not represent time to recovery. Figures representing more recent onset of long COVID may also include those with long-lasting COVID-19 infection who have not yet had time to recover.

Figure 1: The majority of people self-reporting long COVID experienced symptoms over two years previously

Estimated percentage of people living in private households with self-reported long COVID by duration since first experiencing long COVID symptoms, England and Scotland, four-week period ending 7 March 2024



Source: Winter Coronavirus (COVID-19) Infection Study (Winter CIS) from the Office for National Statistics

Notes:

1. Number of weeks has been calculated by subtracting the date given in response to the questions “When did you first experience symptoms of long COVID from the date of questionnaire submission?”. Respondents were given the option to respond, “Do not know” and “Prefer not to say”.

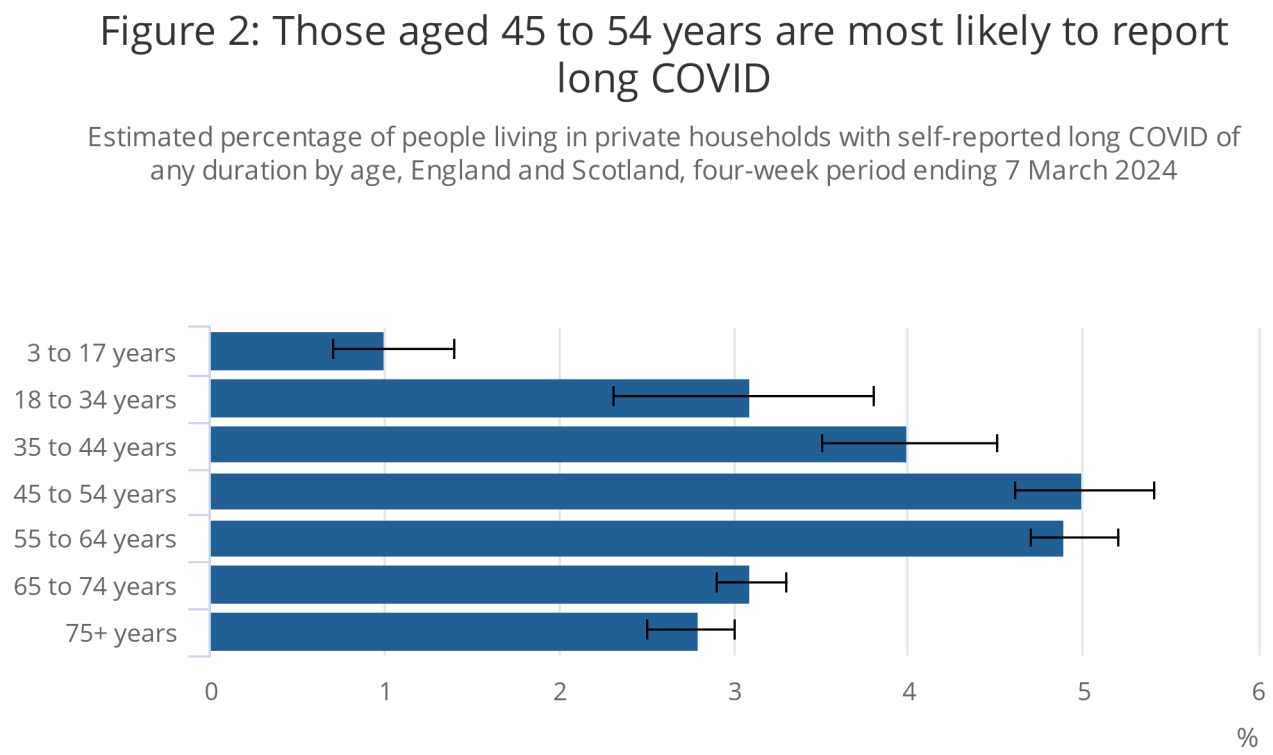
2. Percentages are calculated based on those who have self-reported long COVID and provided a date for when symptoms were first experienced; 34.3% (680,980) did not provide a date so were excluded from the percentages in Figure 1.

The characteristics of those most likely to have self-reported long COVID followed a similar trend to that previously reported at the end of CIS in March 2023. As a proportion of the England and Scotland population during wave 4 in the Winter CIS, the prevalence of self-reported long COVID was greatest in people aged 45 to 64 years, in females (3.6% compared with 3.0% in males), in those who were not working and not looking for work (9.1%) and highest in the North West (3.8%) and the North East (3.6%) regions of England.

Further breakdowns showing Scotland and England separately, ethnic group and Index of Multiple Deprivation can be found in the datasets accompanying this release.

Figure 2: Those aged 45 to 54 years are most likely to report long COVID

Estimated percentage of people living in private households with self-reported long COVID of any duration by age, England and Scotland, four-week period ending 7 March 2024



Source: Winter Coronavirus (COVID-19) Infection Study (Winter CIS) from the Office for National Statistics

Participants were asked whether long COVID reduced their ability to carry out day-to-day activities compared with the time before having COVID-19, with options of "Yes a lot", "Yes a little" or "Not at all". During wave 4 (ending 7 March 2024), long COVID symptoms adversely impacted the day-to-day activities for 74.7% of those with self-reported long COVID, with 19.2% reporting that their ability to undertake day-to-day activities have been "limited a lot". In addition, 56.4% reported that symptoms worsen following "mental and/or physical effort".

The most common symptom reported as part of an individual's experience of long COVID was weakness or tiredness (54.0%) followed by shortness of breath (43.7%), difficulty concentrating (39.4%) and muscle ache (36.7%). The four most common symptoms reported in the Winter CIS were the same as those in the CIS, however, the percentages for each symptom were lower in this study. Because of an expansion in the list of possible symptoms presented to participants to select, we cannot infer that changes in the percentage reporting each symptom represent a change in the impact of the disease.

In every wave, those who self-report long COVID of any duration (who are aged 16 to 64 years and are not in education) are less likely to be employed or self-employed compared with those who have not reported long COVID (see Table 13 in supporting data). During wave 4 (ending 7 March 2024) the odds of a participant who self-reported long COVID being employed or self-employed was 19.5% (odds ratio 0.81, 95% confidence interval: 0.73 to 0.89) lower than those who did not report long COVID.

This analysis controls for other characteristics that impact employment status (see Section 8: Data sources and quality), but often we do not know the employment status prior to the participant developing long COVID. We therefore cannot determine if participants with long COVID were more likely to leave the paid labour market after developing long COVID or if those already out of the paid labour market were more likely to develop long COVID.

4 . Risk factors associated with a positive coronavirus (COVID-19) test

Estimates of the likelihood of some specific characteristics affecting an individual testing positive can fluctuate from one time period to another, meaning that findings that are statistically significant in one period may not necessarily be statistically 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 wave to exclude any differences we find being down to chance. It is easier to detect real differences when positivity rates are higher.

Between 14 November 2023 and 13 March 2024 we found the following.

- Those who have had a vaccination since September 2023 were less likely to test positive in the early waves of the study period (1 and 2); in later waves of the study period (3 and 4) there was no statistical difference.
- In every wave those in the oldest age groups (those aged 65 to 74 years and aged 75 years and over) and youngest age groups (those aged 3 to 17 years) were less likely to test positive for coronavirus (COVID-19) than those aged 45 to 54 years.
- People living in Scotland were less likely to test positive than those living in the South East of England; there were no consistent differences between the English regions and the South East.
- For participants of working age (those aged 18 to 64 years), those working in teaching and education were more likely to test positive compared with those who were unemployed or economically inactive.
- This model also controlled for sex, ethnicity, household size, deprivation and smoking status; there was evidence of a significant effect in some waves for deprivation and household size, the other factors had no evidence for impacting positivity rates.

Figure 3: People in the oldest and youngest age groups were consistently less likely to test positive for coronavirus (COVID-19)

Estimated likelihood of testing positive for coronavirus on lateral flow devices by wave and demographic factors, England and Scotland, 14 November 2023 to 13 March 2024

Notes:

1. The positivity is measured by a lateral flow device (LFD).
2. Only categories where participants were consistently more or less likely than the reference category to test positive are shown. Results for all categories are available in the datasets accompanying this release.

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5 . Self-reported symptoms

Of those who tested positive for coronavirus (COVID-19), the top five most reported symptoms, in the seven days prior to taking the test (each reported by over half of those tested positive), were:

- runny nose (86.1%)
- cough (73.8%)
- tiredness (65.2%)
- sore throat (64.6%)
- headache (61.3%)

The five least reported symptoms for those testing positive were:

- nausea (14.1%)
- abdominal pain (13.4%)
- diarrhoea (13.2%)
- anxiety (12.8%)
- memory loss (8.2%)

These five most reported symptoms were also the most reported for those who tested negative in the seven days prior to taking the test but the percentage reporting each was lower:

- runny nose (27.0%)
- cough (20.9%)
- headache (19.7%)
- tiredness (18.0%)
- sore throat (13.2%)

The proportion of participants who tested negative and reported symptoms consistent with the United States Centers for Disease Control and Prevention (CDC) definition of influenza-like illness (ILI-CDC) was 2.3% compared with 27.5% of those who tested positive.

The most and least commonly reported symptoms in the Winter CIS are similar to the results seen in the Coronavirus (COVID-19) Infection Survey (CIS), which last reported data on symptoms for those with a strong positive PCR test up to June 2022, however, the proportion of participants reporting each symptom is higher in the Winter CIS. It is hard to know whether there has been a genuine increase in symptoms among those testing positive or if differences between the two studies have led to a reported increase. See Section 8: Data sources and quality for more detail.

Runny nose, cough and sore throat had the biggest absolute difference between those testing positive compared with those testing negative (the reporting rate being over 50 percentage points higher in those who tested positive).

The symptoms with the biggest relative difference between those testing positive and those testing negative, respectively, were: fever (29.0% compared with 2.7%) and loss of taste (18.8% compared with 2.0%). Although the relative proportion reporting these symptoms was a lot higher among those testing positive, participants in the study who reported a fever or loss of taste were still much more likely than not to test negative for COVID-19 via a lateral flow device (LFD); 18.5% of those who reported a fever tested positive, and 12.1% of those reporting loss of taste.

Figure 4: Of those who tested positive for coronavirus (COVID-19), runny nose was the most commonly reported symptom

Percentage of respondents reporting symptoms of illness by lateral flow device test status, England and Scotland

Notes:

1. The positivity is measured by a Lateral Flow Device (LFD).
2. Symptoms are self-reported.
3. Weighted percentages ensure that the sample reflects the larger population accurately. These have been adjusted for differential consent or response rates of demographic groups, which could otherwise cause under-representation in the sample.
4. The United States Centers for Disease Control and Prevention (CDC)classifiesInfluenza-like illness (ILI)as that which presents as a fever (temperature of 100 degrees Fahrenheit or greater) and is accompanied by a cough and, or sore throat.The European Centre for Disease Control (ECDC)classifies ILI as that which presents as at least one of fever, fatigue, headache or myalgia and at least one of cough, sore throat or shortness of breath.

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Underlying data tables 16 to 20 provide further breakdowns of those testing positive for COVID-19 by selected demographic characteristics. Of those who tested positive for COVID-19, for the 20 symptoms listed, females were more likely than males to report nine of these symptoms. Of the remaining 11 symptoms, the confidence intervals for males and females overlapped, suggesting there may not be a true difference between the percentage of males and females experiencing these symptoms.

The largest percentage point differences between males and females were for appetite loss, nausea and headache. Males were more likely than females to report a cough, but the confidence intervals overlapped. Females were more likely than males to report symptoms consistent with ILI-CDC (29.8% compared with 24.7%), but the confidence intervals overlapped.

For those who tested positive, those aged 35 to 44 years were the most likely to report 13 of the 20 symptoms. Reported symptoms generally were lowest in those aged over 65 and those under 17 years. The main exceptions were for appetite loss and cough, where those aged over 75 years were most likely to report this symptom. Nausea was also relatively more common in the youngest age group (3 to 17 years).

For those who tested positive, those aged 35 to 44 years were also the most likely to report symptoms consistent with ILI-CDC (31.8%). This was significantly higher than those in the oldest age groups (24.2% for those aged 65 to 74 years and 18.6% for those aged over 75 years).

To examine if the lower proportions reporting ILI-CDC in the older age groups was associated with the higher rate of recent COVID-19 vaccination in the older age groups (all those over the age of 65 years were eligible for a booster from September 2023) a model predicting ILI-CDC symptoms using demographic factors and vaccination status as predictors was produced. This model showed a similar pattern to that seen in the raw data, with those aged 35 to 44 years the most likely to report symptoms consistent with ILI-CDC. Vaccination status only had a small impact on the likelihood of those who tested positive reporting symptoms consistent with ILI-CDC; it was 2.4% lower for those who had been vaccinated since September 2023 compared with those who had not (odds ratio 0.976, 95% confidence interval: 0.946 to 1.01).

Figure 5: Of those who tested positive, those aged 35 to 44 years were the most likely to report 13 of the 20 symptoms

Percentage of respondents with coronavirus (COVID-19) who reported experiencing symptoms of illness by age band, England and Scotland

Notes:

1. The positivity is measured by a lateral flow device (LFD).
2. Symptoms are self-reported.
3. Weighted percentages ensure that the sample reflects the larger population accurately. These have been adjusted for differential consent or response rates of demographic groups, which could otherwise cause under-representation in the sample.
4. The United States Centers for Disease Control and Prevention (CDC)classifiesInfluenza-like illness (ILI)as that which presents as a fever (temperature of 100 degrees Fahrenheit or greater) and is accompanied by a cough and, or sore throat.The European Centre for Disease Control (ECDC)classifies ILI as that which presents as at least one of fever, fatigue, headache or myalgia and at least one of cough, sore throat or shortness of breath.

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6 . Self-reported coronavirus (COVID-19) infections and associated symptoms data

Self-reported coronavirus (COVID-19) infections and associated symptoms, England and Scotland
Dataset | Released 25 April 2024
In-depth analysis of Winter Coronavirus (COVID-19) Infection Study data looking attrends in self-reported symptoms of coronavirus (COVID-19), including ongoing symptoms and associated risk factors.

7 . Glossary

Confidence interval

Confidence intervals use a standard error to derive a range in which we think the true value is likely to lie.

A confidence interval gives an indication of the degree of uncertainty of an estimate and helps to decide how precise a sample estimate is. It specifies a range of values likely to contain the unknown population value. These values are defined by lower and upper limits.

The width of the interval depends on the precision of the estimate and the confidence level used. A greater standard error will result in a wider interval; the wider the interval, the less precise the estimate is.

Coronavirus and COVID-19

Coronaviruses are a family of viruses that cause disease in people and animals. They can cause the common cold or more severe diseases, such as COVID-19. COVID-19 is the name used to refer to the disease caused by the SARS CoV-2 virus, which is a type of coronavirus.

Influenza-like Illness (ILI)

The United States Centers for Disease Control and Prevention (CDC) defines ILI as a fever (temperature of 100 degrees Fahrenheit or greater), accompanied by a cough or sore throat (or both).

Symptoms consistent with ILI as defined by the European Centre for Disease Prevention and Control (ECDC) include at least one of the following symptoms: fever, fatigue, headache and myalgia. as well as at least one of the following symptoms: cough, sore throat, shortness of breath.

Odds ratio

A measurement of the strength of the relationship between a particular exposure and an outcome occurring without that exposure.

8 . Data sources and quality

Our Winter Coronavirus (COVID-19) Infection Survey Quality and Methodology Information article provides further information around the survey design, how we process data and how data are analysed.

Study dates

The Winter CIS ran from 14 November 2023 to 7 March 2024. The study was structured as a longitudinal panel survey, with each participant sent a questionnaire and asked to take a COVID-19 lateral flow device (LFD) test every four weeks. Each participant was invited to do this four times over the course of the study (each "wave"). The dates of each wave were:

- wave 1: 14 November to 14 December 2023
- wave 2: 12 December 2023 to 11 January 2024
- wave 3: 9 January to 8 February 2024
- wave 4: 6 February to 7 March 2024

Differences between the Winter CIS and Coronavirus (COVID-19) Infection Survey (CIS)

Trends in the characteristics of those reporting long COVID, testing positive for coronavirus (COVID-19) and also the type of symptoms reported by those testing positive as part of the Winter CIS are similar to the trends seen in the analysis from the Coronavirus (COVID-19) Infection Survey (CIS) towards the end of the study in March 2023. However, there are some important differences (for example, the actual percentages reporting each symptom when testing positive for COVID-19 are higher in the Winter CIS).

Because of differences between the two studies, we cannot say whether this is an actual change in the disease profile or caused by differences between the two studies. Some of the differences between the two studies include a different sample and geographic coverage, changes to the questionnaire and the type of tests used to detect the SARS-CoV-2 coronavirus.

Strengths and limitations

The Winter Coronavirus (COVID-19) Infection Study (Winter CIS) was commissioned by the UK Health Security Agency (UKHSA) and jointly delivered by the UKHSA and Office for National Statistics (ONS). Participants were sent lateral flow devices (LFDs) for the detection of the SARS-CoV-2 coronavirus to self-swab, self-complete and report results. These results were used alongside a questionnaire to understand the impact of COVID-19, long COVID and symptoms of other respiratory infections on people's lives, the community and health services.

Some of the Winter CIS main strengths include:

- a large sample of participants (approximately 139,000)
- high levels of participant engagement
- a questionnaire which examines various symptoms and characteristics across all age groups

Long COVID

Long COVID status was self-reported by study participants and so misclassification is possible. For example, some participants may be experiencing symptoms because of a health condition unrelated to COVID-19 infection. Others who do have symptoms caused by COVID-19 may not describe themselves as experiencing long COVID (for example, because of lack of awareness of the term or not knowing they were initially infected with COVID-19, the number of people in this latter category may grow over time as testing rates are lower now the provision of free LFDs has ended). In addition the question asked is retrospective and some respondents may not be able to accurately remember when symptoms first started and does not take into account those experiencing long COVID multiple times.

Work was undertaken to examine whether previously self-reporting long COVID as part of the Coronavirus (COVID-19) Infection Survey (CIS) changed the likelihood of responding to the Winter CIS. It was found that individuals self-reporting long COVID in CIS were less likely to respond to the Winter CIS. For this reason, we include previous long COVID status as reported in CIS in our weighting methodology.

The sample is derived from a sub-sample of COVID-19 Infection Survey (CIS) participants. The weighting methodology attempts to correct for sample bias by accounting for factors that could be related to both the likelihood of responding to the survey and reporting long COVID symptoms, such as age, sex and previous long COVID responses from the Coronavirus Infection Survey (CIS). However, some sample bias may remain after weighting. Because of the difference in sample and collection methods it is not advisable to compare with previous estimates for long COVID.

Symptoms

As LFD tests are imperfect, some participants that tested negative will actually have a COVID-19 infection, so the symptoms reported in the group may also be because of a COVID-19 infection. The question also asks about symptoms in the seven days prior to taking the test, some participants that report no symptoms in this time period may go on to develop symptoms. The symptoms reported may not necessarily be because of an acute infection, some symptoms could be chronic conditions (for example, tiredness or wheezing) although this is less likely with symptoms such as fever and sore throat.

The estimates presented in this article contain uncertainty. There are many sources of uncertainty, including uncertainty in the test, in the estimates and in the quality of data collected in the questionnaire. Information on the main sources of uncertainty is presented in the Winter Coronavirus (COVID-19) Infection Survey Quality and Methodology Information article.

9 . Related links

Winter Coronavirus (COVID-19) Infection Study, England and Scotland
Dataset | Last updated 14 March 2024
Self-reported COVID-19 infections and other respiratory illnesses, including associated symptoms and health outcomes. Joint study with the UK Health Security Agency. These are official statistics in development.

About the study
Information about the Winter Coronavirus (COVID-19) Infection Study (Winter CIS) and why it was created.

Coronavirus (COVID-19) Infection Survey, UK
Bulletin | Last updated 24 March 2023
Estimates of people testing positive for coronavirus (COVID-19) for England, Wales, Northern Ireland and Scotland from the COVID-19 Infection Survey. This survey was delivered in partnership with the University of Oxford, the University of Manchester, UK Health Security Agency and Wellcome Trust.

Prevalence of ongoing symptoms following coronavirus (COVID-19) infection in the UK
Bulletin | Last updated 30 March 2023
Estimates of the prevalence of self-reported long COVID and associated activity limitation, using UK Coronavirus (COVID-19) Infection Survey data.

Coronavirus (COVID-19) Infection Survey, characteristics of people testing positive for COVID-19, UK
Bulletin | Last updated 14 December 2022
The characteristics of people testing positive for coronavirus (COVID-19) from the COVID-19 Infection Survey. This survey was delivered in partnership with the University of Oxford, the University of Manchester, UK Health Security Agency and Wellcome Trust.

10 . Cite this article

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