

## Article

# Symptoms consistent with influenza-like illness in those who tested negative for COVID-19 in England: Coronavirus (COVID-19) Infection Survey, UK

Percentage of those testing negative for coronavirus (COVID-19) in England reporting symptoms consistent with influenza-like illnesses (ILI) by age group.

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# 1 . Main points

Symptoms reported in the Coronavirus (COVID-19) Infection Survey among people who test negative for COVID-19 provide valuable information about other respiratory infections that are circulating among the population. These are categorised as influenza-like illness and show that for the most recent week (up until 28 November 2022).

- The percentage of those who tested negative for coronavirus (COVID-19) and reported flu-like symptoms consistent with influenza-like illness (ILI), increased throughout November 2022.
- Children in school Year 7 to school Year 11 who were COVID-19 negative reported the highest levels of symptoms consistent with [influenza-like illnesses](#).
- For those in school Years 7 to 11 and who were COVID-19 negative, 1 in 5 reported having a sore throat (20.7%, 95% confidence interval: 16.5% to 24.8%) while approximately 1 in 4 reported having a cough (22.9%, 95% confidence interval: 18.5% to 27.3%).
- For those aged 2 years to school Year 6 and who were COVID-19 negative, approximately 1 in 4 reported having a cough (23.8%, 95% confidence interval: 19.0% to 28.7%).

## 2 . Overview

Oxford University, in partnership with the Office for National Statistics (ONS), are conducting analyses to find out whether the Coronavirus (COVID-19) Infection Survey could be used to monitor self-reported symptoms of influenza-like illness (ILI) among those who test negative for COVID-19 in England. Age group-specific daily rates of ILI, as classified by [the United States Centers for Disease Control and Prevention \(CDC\)](#) and the [European Centre for Disease Control \(ECDC\)](#), along with daily rates of a range of NHS-defined symptoms associated with influenza, were estimated. This was to monitor trends in ILI and examine the differences between age groups during the current flu season.

The [CDC](#) classifies [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.

All estimates contained in this article are unweighted and present the percentage of the private-residential population in England, who tested negative for coronavirus (COVID-19) on a polymerase chain reaction (PCR) test and self-reported symptoms.

Only data from participants with a confirmed negative PCR test for COVID-19 were included in this analysis. This was to minimise the influence of COVID-19 illness on reported symptoms. As we cannot exclude the possibility that some participants who have COVID-19 still test negative, there may be a small number of COVID-19 positive cases included in these analyses.

This analysis is exploratory, and more detailed information will be published on this work in due course.

### 3 . ILI symptoms in those testing negative for COVID-19 by age group

The percentage of those testing negative for coronavirus (COVID-19) in England and who reported symptoms consistent with influenza-like illness as classified by the Centers for Disease Control and Prevention (ILI-CDC) (a fever and a cough or sore throat) increased for all ages throughout November 2022 up until the most recent week, ending 28 November 2022, to 2.5% (95% confidence interval: 2.2% to 2.9%).

The percentage of those testing negative for COVID-19 reporting symptoms consistent with ILI-CDC was highest for those in school Year 7 to school Year 11 at 7.6% (95% confidence interval: 5.3% to 10.0%) and lowest for those aged 65 years and over at 0.8% (95% confidence interval: 0.6% to 1.0%).

**Figure 1: The percentage of participants who tested negative for coronavirus (COVID-19) and reported symptoms consistent with ILI-CDC was highest for those in school Year 7 to school Year 11**

**Predicted percentage of the sample testing negative for COVID-19 on nose and throat swabs, and reported symptoms consistent with ILI-CDC by age group, England, 1 August to 28 November 2022**

**Notes:**

1. [ILI-CDC symptoms](#) are those which present as a fever and accompanied by a cough and, or sore throat.
2. Trends are described by comparing the predicted prevalence of the most recent data across age groups.
3. A higher degree of uncertainty in our estimates is shown by wider [confidence intervals](#).
4. Our [age group](#) analysis separates children and young people by school age.
5. These analyses are for those who live in England only.
6. All estimates are provisional and subject to revision.

**Download the data**

[.xlsx](#)

The percentage of those testing negative for coronavirus (COVID-19) in England and who reported symptoms consistent with influenza-like illness as classified by the European Centre for Disease Control (ILI-ECDC) (at least one of fever, fatigue, headache or myalgia and at least one of cough, sore throat or shortness of breath) increased for all ages up until the most recent week, ending 28 November 2022, to 13.1% (95% confidence interval: 12.3% to 13.9%).

The percentage of those testing negative for COVID-19 reporting symptoms consistent with ILI-ECDC was highest for those in school Year 7 to school Year 11 at 20.4% (95% confidence interval: 16.3% to 24.5%) and lowest for those aged 65 years and over at 9.1% (95% confidence interval: 8.4% to 9.9%).

**Figure 2: The percentage of participants who tested negative for COVID-19 and reported symptoms consistent with ILI-ECDC was highest in those in school Year 7 to school Year 11**

**Predicted percentage of the sample testing negative for COVID-19 on nose and throat swabs, and reported symptoms consistent with ILI-ECDC by age group, England, 1 August to 28 November 2022**

**Notes:**

1. ILI-[ECDC](#) is defined as at least one of fever, fatigue, headache or myalgia and at least one of cough, sore throat or shortness of breath.
2. We describe trends by comparing the predicted prevalence of the most recent data across age groups.
3. A higher degree of uncertainty in our estimates is shown by wider [confidence intervals](#).
4. Our [age group](#) analysis separates children and young people by school age.
5. These analyses are for those who live in England only.
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### About our estimates

To estimate the trends in symptoms reported by COVID-19 negative participants over time, generalised additive models (GAM) were fitted on data from study participants in England between 1 August 2022 and the most recently available data. Models were estimated separately by age group and for the overall population. Reported symptoms refer to symptoms that participants reported they experienced in the past seven days.

The GAMs used a negative-binomial distribution with log link, estimating the association between daily rates and calendar time with thin plate splines ( $k=40$ ), penalised based on the third derivative. No other explanatory variables than time (measured in the number of days since 1 August 2022) were included in the models, that is, estimates are unweighted.

This analysis was carried out by our research partners at University of Oxford. More detailed information is available on their website, [the Nuffield Department of Medicine](#).

## 4 . Sore throat symptoms in those testing negative for COVID-19 by age group

Findings for the week ending 28 November 2022:

- The percentage of those testing negative for coronavirus (COVID-19) and reporting a sore throat was highest for those in school Years 7 to 11, those in school Year 12 to aged 34 years, and those aged 35 to 49 years when compared with all ages.
- Those in school Year 7 to school Year 11 reported the highest prevalence of a sore throat, with 20.7% (95% confidence interval: 16.5% to 24.8%) of those testing negative for COVID-19 reporting this symptom, equating to approximately 1 in 5.

**Figure 3: The percentage of participants testing COVID-19 negative and who reported a sore throat was highest for those in school Years 7 to 11 in the most recent week**

**Predicted percentage of the sample testing negative for COVID-19 on nose and throat swabs, and reporting a sore throat by age group, England, 1 August to 28 November 2022**

**Notes:**

1. We describe trends by comparing the predicted prevalence of the most recent data across age groups.
2. A higher degree of uncertainty in our estimates is shown by wider [confidence intervals](#).
3. Our [age group](#) analysis separates children and young people by school age.
4. These analyses are for those who live in England only.
5. All estimates are provisional and subject to revision.

**Download the data**

[.xlsx](#)

## 5 . Fever symptoms in those testing negative for COVID-19 by age group

Findings for the week ending 28 November 2022:

- The percentage of those testing negative for coronavirus (COVID-19) and reporting a fever was highest for those aged 2 years to school Year 6 at 7.8% (95% confidence interval: 5.6% to 9.9%) and those in school Years 7 to 11 at 7.7% (95% confidence interval: 5.5% to 10.0%), when compared with all other age groups.
- The percentage of those testing negative for COVID-19 and reporting a fever was lowest for those aged 65 years and over at 0.9% (95% confidence interval: 0.6% to 1.2%).

**Figure 4: The percentage of participants testing negative for coronavirus (COVID-19) and who reported a fever was highest for those aged 2 years to school Year 6 and those in school Years 7 to 11**

**Predicted percentage of the sample testing negative for COVID-19 on nose and throat swabs, and reporting a fever by age group, England, 1 August to 28 November 2022**

**Notes:**

1. We describe trends by comparing the predicted prevalence of the most recent data across age groups.
2. A higher degree of uncertainty in our estimates is shown by wider [confidence intervals](#).
3. Our [age group](#) analysis separates children and young people by school age.
4. These analyses are for those who live in England only.
5. All estimates are provisional and subject to revision.

**Download the data**

[.xlsx](#)

## 6 . Cough Symptoms in those testing negative for COVID-19 by age group

Findings for the week ending 28 November 2022:

- The percentage of those testing negative for coronavirus (COVID-19) and reporting symptoms of a cough was highest for those aged 2 years to school Year 6 and in school Years 7 to 11, when compared with all other age groups.
- For those aged 2 years to school Year 6, 23.8% (95% confidence interval: 19.0% to 28.7%) reported symptoms of a cough.
- For those in school Year 7 to school Year 11, 22.9% (95% confidence interval: 18.5% to 27.3%) reported symptoms of a cough.

**Figure 5: The percentage of participants testing negative for coronavirus (COVID-19) and who reported a cough was highest for those aged 2 years to school Year 6 and those in school Years 7 to 11**

**Predicted percentage of the sample testing negative for COVID-19 on nose and throat swabs, and reporting a cough by age group, England, 1 August to 28 November 2022**

### Notes:

1. We describe trends by comparing the predicted prevalence of the most recent data across age groups.
2. A higher degree of uncertainty in our estimates is shown by wider [confidence intervals](#).
3. Our [age group](#) analysis separates children and young people by school age.
4. These analyses are for those who live in England only.
5. All estimates are provisional and subject to revision.

### Download the data

[.xlsx](#)

## 7 . Symptoms reported in those testing negative for COVID-19 in England data

[Symptoms consistent with influenza-like illness in those who tested negative for COVID-19 in England: Coronavirus \(COVID-19\) Infection Survey. UK](#)

Dataset | Released 19 December 2022

The percentage of those testing negative for coronavirus (COVID-19) in England reporting symptoms consistent with influenza-like illnesses (ILI) by age group.

## 8 . Colloboration



The Coronavirus (COVID-19) Infection Survey analysis was produced by the Office for National Statistics (ONS) in collaboration with our research partners at the University of Oxford, the University of Manchester, UK Health Security Agency (UKHSA) and Wellcome Trust. Of particular note are:

- Elisabeth Dietz - University of Oxford, Nuffield Department for Medicine: Research Biostatistician
- 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

## 9 . Glossary

### Influenza-like illness (ILI) definition

[The United States Centers for Disease Control and Prevention \(CDC\)](#) classifies [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.

### Age groups for children and young people

- "Aged 2 years to school Year 6" includes children in primary school and below
- "school Year 7 to school Year 11" includes children in secondary school
- "school Year 12 to those aged 24 years" includes young adults who may be in further or higher education

Those aged 11 to 12 years and those aged 16 to 17 years have been split between different age categories depending on whether their birthday is before or after 1 September.

## 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](#).

## False-positives and false-negatives

A false-positive result occurs when a test suggests a person has COVID-19 when in fact they do not. By contrast, a false-negative result occurs when a test suggests a person does not have COVID-19 when in fact they do.

# 10 . Data sources and quality

## Remote data collection

The Office for National Statistics (ONS) Coronavirus (COVID-19) Infection Survey has moved from collecting data and samples through home visits by a study worker to a more flexible approach for participants. We have introduced an online questionnaire, and swab and blood samples are returned through the post (or by courier for some participants). Further information on what these changes mean and how the survey will continue to be valuable can be found in our recent [blog post: The COVID-19 Infection Survey is changing](#).

There were minimal differences between estimates of swab positivity produced from remote data collection methods, compared with data collected by study worker home visits. As a result, data in this release combine data collected from these two methods for time points where both are in use. Further information on the effects of the change in data collection method can be found in our [Quality Report: August 2022](#).

## Laboratories

The nose and throat swabs taken from participants of the Coronavirus (COVID-19) Infection Survey are sent to the Lighthouse Laboratory in Glasgow for processing. Recently, some of our swabs have been sent to the Rosalind Franklin as well as Berkshire and Surrey Pathology Services laboratories for testing. This is to ensure resilience for testing capacity and to enable a small pilot community respiratory surveillance study. We have investigated potential effects of using multiple laboratories on our positivity results and, where necessary, have made minor statistical adjustments within our existing models to ensure consistency.

## Inconclusive and failed tests

Our estimates are based on confirmed negative test results. Positive or inconclusive swabs are not included in this analysis. Some swabs are test failures, which also are not included in analysis. The impact of excluding inconclusive results from our estimates is likely to be very small and unlikely to affect the findings.

## The Coronavirus Infection Survey (CIS) analysis and studies

The CIS provides the main measure of coronavirus infection in the UK. Other sources have provided data during previous stages of the pandemic. For information on other studies see [Section 4: Quality characteristics of the Coronavirus \(COVID-19\) Infection Survey](#) (coherence and comparability) of the [Coronavirus \(COVID-19\) Infection Survey QMI](#), revised 8 August 2022.



## Uncertainty in our estimates

The estimates presented in this bulletin 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 available in our methodology page on [statistical uncertainty](#).

## 11 . Related links

### [Coronavirus \(COVID-19\) Infection Survey, Quality Report: September 2022](#)

Article | Released 23 September 2022

This quality report presents information on the Coronavirus (COVID-19) Infection Survey data collection method change from study worker home visit to remote data collection.

### [Coronavirus \(COVID-19\) Infection Survey, Quality Report: August 2022](#)

Article | Released 18 August 2022

This quality report presents information on the Coronavirus (COVID-19) Infection Survey data collection method change from study worker home visit to remote data collection.

### [Coronavirus \(COVID-19\) latest insights](#)

Interactive tool | Updated as and when data become available

The latest data and trends about the coronavirus (COVID-19) pandemic from the Office for National Statistics (ONS) and other official sources.

### [Deaths registered weekly in England and Wales, provisional](#)

Bulletin | Updated weekly

Provisional counts of the number of deaths registered in England and Wales, including deaths involving COVID-19, by age, sex and region, in the latest weeks for which data are available.

### [Coronavirus \(COVID-19\) Infection Survey technical article: Cumulative incidence of the number of people who have tested positive for COVID-19, UK](#)

Technical article | Released 22 April 2022

Analysis of the number of people in the UK who have tested positive for COVID-19 using the Coronavirus (COVID-19) Infection Survey. This survey is being delivered in partnership with University of Oxford, University of Manchester, UK Health Security Agency and Wellcome Trust.

## 12 . Cite this article

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