

Statistical bulletin

COVID-19 Schools Infection Survey, England: pupil antibody data, November to December 2021

Estimates of pupils testing positive for SARS-CoV-2 antibodies from the COVID-19 Schools Infection Survey based on a sample of schools. The Schools Infection Survey (SIS) is jointly led by the London School of Hygiene and Tropical Medicine, UK Health Security Agency and the Office for National Statistics.

Contact:
Rebecca Leeson, Ben Ford,
Andrea Lacey
schools.infection.survey@ons.
gov.uk
+44 1633 651663

Release date:
28 February 2022

Next release:
To be announced

Table of contents

1. [Main points](#)
2. [Pupils testing positive for coronavirus \(COVID-19\) antibodies](#)
3. [COVID-19 Schools Infection Survey, questionnaire and antibody data](#)
4. [Collaboration](#)
5. [Glossary](#)
6. [Measuring the data](#)
7. [Strengths and limitations](#)
8. [Related links](#)

1 . Main points

- It is estimated that 82% of secondary school pupils and 40% of primary school pupils had coronavirus (COVID-19) SARS-CoV-2 antibody levels above the limit of detection in Round 1 of the COVID-19 Schools Infection Survey (SIS) during the academic year ending 2022, after adjusting for sensitivity and specificity.
- Antibody prevalence was higher in secondary school pupils as most secondary school pupils testing positive for SARS-CoV-2 antibodies were vaccinated.
- SARS-CoV-2 antibody prevalence steadily increased by age for all pupils.
- A third (33.9%) of pupils aged 4 to 7 years tested positive for SARS-CoV-2 antibodies.

Have you been asked to take part in the study?

For more information, please visit the SIS participant [guidance page](#).

If you have any further questions, please email the SIS operations team: Schools.Studies.Mailbox@ons.gov.uk.

2 . Pupils testing positive for coronavirus (COVID-19) antibodies

Results presented are from Round 1 (10 November to 10 December) of the Schools Infection Survey (SIS) during the academic year ending 2022. The pupil antibody test used in the COVID-19 Schools Infection Survey (SIS) is based on oral fluid collection as this is a non-invasive alternative to collecting blood but this test has a lower sensitivity (estimated at 80%). Antibody testing does not provide the full picture of immunity to coronavirus (COVID-19), as antibody levels are not static so can change over time, as explained further in a [blog](#).

The unadjusted percentage of pupils testing positive for SARS-CoV-2 antibodies was 32.7% in primary school pupils (95% confidence intervals: 30.0% to 35.4%) and 75.2% in secondary school pupils (95% confidence intervals: 71.9% to 78.2%).

Pupils were tested for both anti-N (antibodies from natural infection) and anti-S (antibodies from natural infection or vaccination) SARS-CoV-2 antibodies. Further information about the antibody tests used can be found in our [methodology article](#).

Figure 1 shows the percentage of pupils with SARS-CoV-2 antibody levels, in schools sampled, above the limit of detection where results from unvaccinated pupils were additionally adjusted for the sensitivity and specificity of the antibody tests.

After adjusting for the sensitivity and specificity of the SARS-CoV-2 antibody tests and the vaccination status of pupils tested, we estimate that 40.1% of primary school pupils (95% confidence intervals: 37.3% to 43.0%) and 82.4% of secondary school pupils (95% confidence intervals: 79.5% to 85.1%) had SARS-CoV-2 antibody levels above the limit of detection.

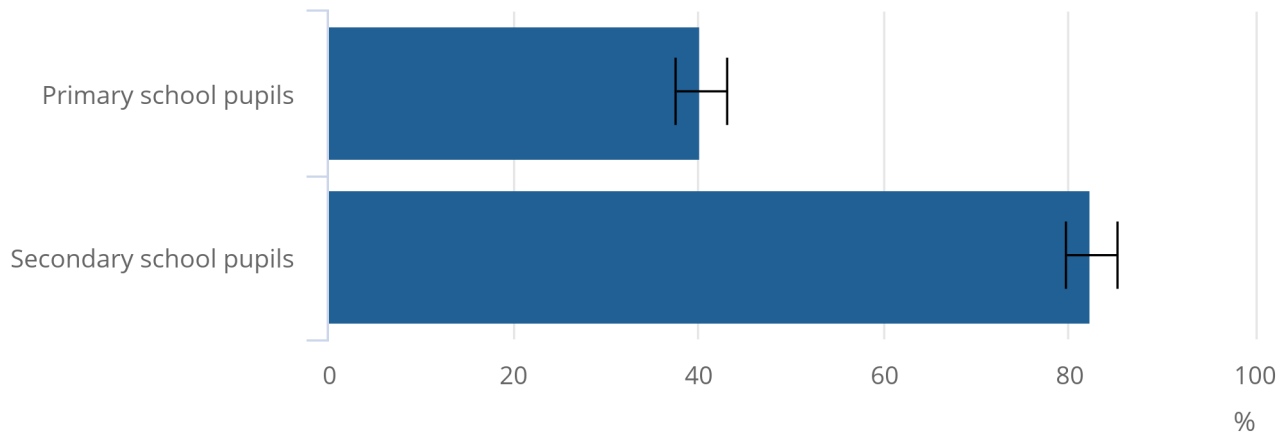
Results from unvaccinated pupils were adjusted for the sensitivity and specificity of the antibody tests. Adjusted estimates are a more reliable indication of SARS-CoV-2 antibody positivity because unadjusted estimates underestimate the prevalence of SARS-CoV-2 antibodies in unvaccinated pupils when using oral-fluid antibody tests. It is assumed sensitivity and specificity will be higher in vaccinated pupils and antibody test results for these pupils do not require adjustment. Further information about the statistical adjustments applied can be found in the [strengths and limitations section](#) and in our [methodology article](#).

Figure 1: More secondary school pupils than primary school pupils tested positive for antibodies to COVID-19

Adjusted percentage of pupils testing positive for antibodies to COVID-19, England, November to December 2021

Figure 1: More secondary school pupils than primary school pupils tested positive for antibodies to COVID-19

Adjusted percentage of pupils testing positive for antibodies to COVID-19, England, November to December 2021



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

Notes:

1. Figures have been adjusted to account for the sensitivity and specificity of the antibody tests for unvaccinated pupils.

Antibody estimates by vaccination status

Pupil vaccination data were obtained by linking to the National Immunisation Management System (NIMS).

Figure 2 shows the percentage of pupils that tested positive for SARS-CoV-2 antibodies by their vaccination status. At the time of antibody testing, most secondary school pupils (those aged 12 years and over) were [eligible for a COVID-19 vaccine](#). Our adjusted figures show that 43.1% of secondary school pupils tested positive for SARS-CoV-2 antibodies and were vaccinated (95% confidence intervals: 37.8% to 48.5%), and 39.4% were unvaccinated and tested positive for antibodies (95% confidence intervals: 34.6% to 44.3%). Further analysis by vaccination status, including by region and age, can be found in our [accompanying dataset](#).

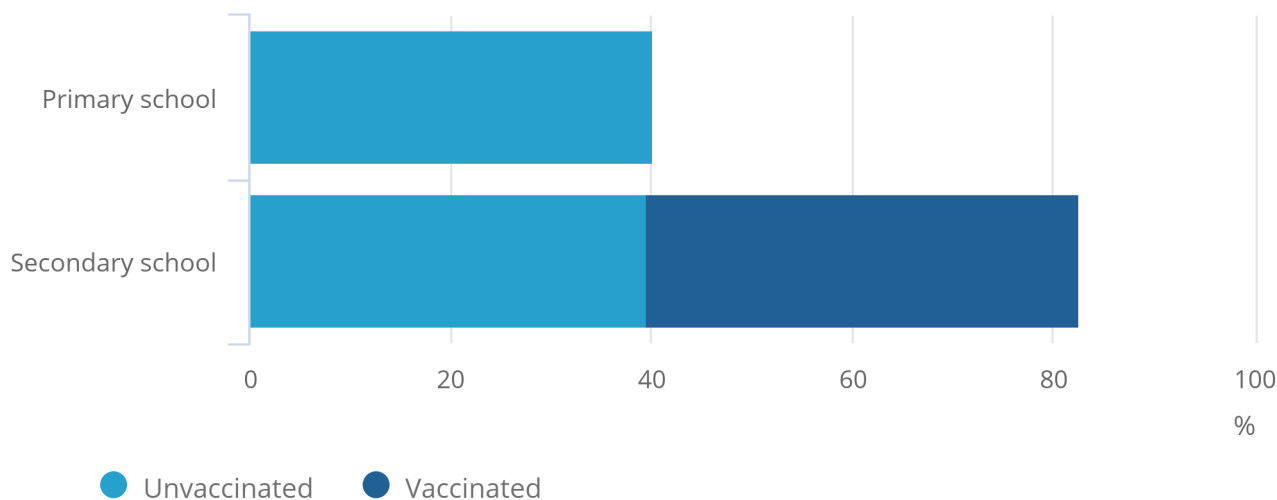
Results based on vaccination status should be treated as an indication only. Secondary school pupils who had been vaccinated could have developed antibodies from their vaccination and/or natural infection, whereas unvaccinated pupils will only have antibodies following natural infection. Antibodies following natural infection could fall below levels of detection faster than antibodies following vaccination. Further information can be found in the [strengths and limitations section](#).

Figure 2: Most secondary school pupils testing positive for antibodies to COVID-19 were vaccinated

Adjusted percentage of pupils testing positive for antibodies to COVID-19 by vaccination status, England, November to December 2021

Figure 2: Most secondary school pupils testing positive for antibodies to COVID-19 were vaccinated

Adjusted percentage of pupils testing positive for antibodies to COVID-19 by vaccination status, England, November to December 2021



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

Notes:

1. Figures have been adjusted to account for the sensitivity and specificity of the antibody tests for unvaccinated pupils.
2. "Vaccinated" is defined as the pupil has had at least one COVID-19 vaccine.

Regional antibody estimates

Table 1 shows the adjusted percentage of pupils in primary and secondary schools testing positive for SARS-CoV-2 antibodies by region. The highest levels of SARS-CoV-2 antibodies in secondary school pupils were identified in Yorkshire and The Humber (89.0%; 95% confidence intervals: 83.6% to 93.1%) and London (88.7%; 95% confidence intervals: 78.1% to 95.3%).

In primary school pupils, the highest levels of SARS-CoV-2 antibodies were identified in the West Midlands (53.8%; 95% confidence intervals: 43.1% to 64.3%). In all regions, more secondary school pupils tested positive for SARS-CoV-2 antibodies than primary school pupils. More information on breakdowns by region, including unadjusted figures, is available in our [accompanying dataset](#).

Table 1: A larger proportion of secondary school pupils in all regions tested positive for antibodies to COVID-19
Adjusted percentage of pupils testing positive for antibodies to COVID-19 by region, England, November to December 2021

Region	Primary School Secondary School	
	%	%
East Midlands	39.5	72.4
East of England	50.3	82.1
London	34.8	88.7
North East	46.5	75.1
North West	49.3	87.5
South East	30.2	79.7
South West	21.9	70.2
West Midlands	53.8	88.3
Yorkshire and The Humber	39.1	89.0

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

Notes

1. Figures have been adjusted to account for the sensitivity and specificity of the antibody tests for unvaccinated pupils.

Antibody estimates by age

Figure 3 shows the adjusted percentage of pupils testing positive for SARS-CoV-2 antibodies by age. The number of primary school-aged pupils (those aged 4 to 10 years) testing positive for antibodies steadily increased by age. A third of pupils aged 4 to 7 years (33.9%; 95% confidence intervals: 30.1% to 37.9%) tested positive for antibodies.

Among secondary school-aged pupils, over 75% of pupils aged between 12 and 17 years tested positive for SARS-CoV-2 antibodies. Pupils aged 11 years, who were not eligible for a vaccine at the time of Round 1, had a significantly lower proportion testing positive for antibodies (56.8%; 95% confidence intervals: 49.1% to 64.2%) compared with 12-year-olds who were eligible for a vaccine (79.4%; 95% confidence intervals: 72.4% to 85.2%). More information on breakdowns by age, including unadjusted figures, is available in our [accompanying dataset](#).

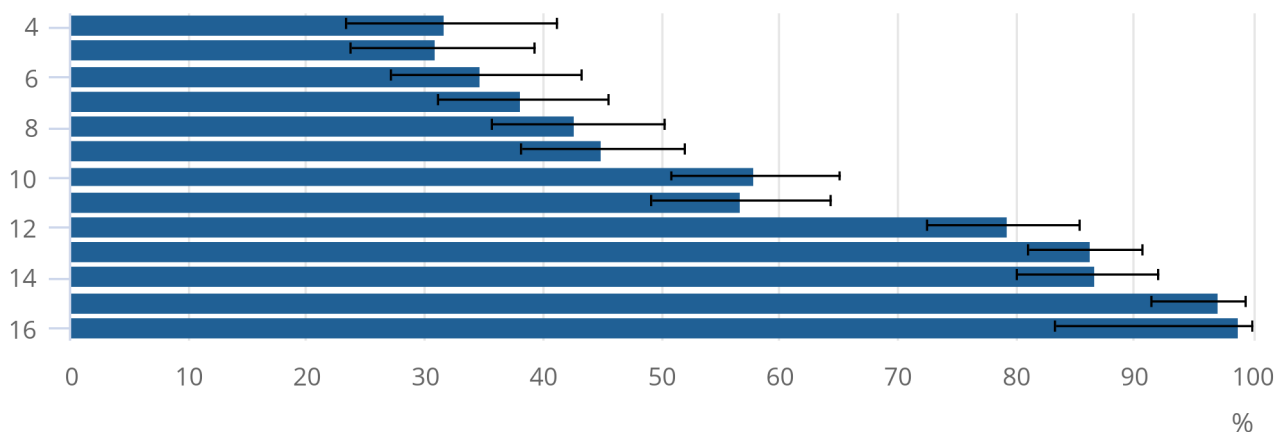
The [ONS Coronavirus \(COVID-19\) Infection Survey](#) (CIS) also produce antibody estimates for pupils aged 8 to 11 years and 12 to 15 years. Compared with SIS, the CIS uses a different antibody test (fingerprick blood test) to determine antibody levels and has important differences in methodologies, including a slightly different sample population, testing methods and data collection periods. While we estimate different levels of antibody positivity, both studies record a similar level of antibodies across the populations they cover. For more information please see our [accompanying blog](#).

Figure 3: The percentage of pupils testing positive for antibodies to COVID-19 increased by age

Adjusted percentage of pupils testing positive for antibodies to COVID-19 by age, England, November to December 2021

Figure 3: The percentage of pupils testing positive for antibodies to COVID-19 increased by age

Adjusted percentage of pupils testing positive for antibodies to COVID-19 by age, England, November to December 2021



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

Notes:

1. Figures have been adjusted to account for the sensitivity and specificity of the antibody tests for unvaccinated pupils.
2. Pupils aged 17-years-old have been excluded from Figure 3 due to small counts; data for these ages are available in our [accompanying dataset](#).

More about coronavirus

- Find the latest on [coronavirus \(COVID-19\) in the UK](#).
- [Explore the latest coronavirus data](#) from the ONS and other sources.
- View [all coronavirus data](#).
- Find out how we are [working safely in our studies and surveys](#).

3 . COVID-19 Schools Infection Survey, questionnaire and antibody data

[COVID-19 Schools Infection Survey, antibody data, England](#)

Dataset | Released 28 February 2022

Estimates from the Schools Infection Survey of pupils testing positive for SARS-CoV-2 antibodies. Including breakdowns by age, sex and region where possible.

4 . Collaboration

LONDON
SCHOOL of
HYGIENE
& TROPICAL
MEDICINE



UK Health
Security
Agency

The Coronavirus (COVID-19) Schools Infection Survey analysis was produced by the Office for National Statistics (ONS) in collaboration with our research partners at the London School of Hygiene and Tropical Medicine, and UK Health Security Agency.

5 . 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.

Statistical significance

A result is said to be statistically significant if it is likely not caused by chance or the variable nature of the samples. For more information, see our [methodology article](#).

6 . Measuring the data

Data presented in this bulletin are from Round 1 of the COVID-19 Schools Infection Survey (SIS) during the academic year ending 2022. These findings are for SARS-CoV-2 antibodies for pupils only.

Estimates have been weighted and are representative of the pupil population in state-funded schools in England.

Our [methodology article](#) provides further information about response rates, survey design, how we process data and how data are analysed.

Age in this bulletin is calculated using the pupil's date of birth as of 31 August 2022.

Reference period

The results presented in this bulletin are from antibody tests conducted in schools in England between 10 November and 10 December 2021 — referred to as Round 1.

Response rates

In Round 1, 117 schools took part in testing (34 primary and 83 secondary); 5,972 pupils (3,183 primary and 2,789 secondary) took part in the COVID-19 antibody test. The total estimated antibody testing response rate for Round 1 was 10%. The estimated response rate for primary school pupils was 15% and secondary school pupils was 8%.

Quality

More quality and methodology information on strengths, limitations, appropriate uses, and how the data were created is available in our [methodology article](#).

Data cleaning and quality assurance is being carried out on data collected as part of the study on an ongoing basis. All estimates presented in this bulletin are provisional results. Estimates may therefore be revised in future publications.

7 . Strengths and limitations

Strengths

The antibody assays (UKHSA Oral Fluids tests) used test oral fluid samples for IgG antibodies against SARS-CoV-2 nucleocapsid Protein (anti-N; from natural infection) and against SARS-CoV-2 Spike protein (anti-S; from natural infection or vaccination) allowing for a robust measurement of SARS-CoV-2 antibodies in school-aged pupils, which differs from the antibody test used in [Schools Infection Survey \(SIS\) \(academic year ending 2021\)](#), which measured antibodies following natural infection only.

The SIS is a longitudinal study and participants that do not withdraw after Round 1 will be invited to be tested for antibodies in future rounds. This will allow for comparisons to be made across different study rounds and help monitor the prevalence of antibody positivity over time. These results across different rounds will also provide an opportunity to present antibody conversion rates in future publications.

Limitations

Pupils provide an oral fluid (saliva) sample as a non-invasive measure for testing for antibodies compared with a finger prick blood test, which is typically used to test for antibodies in adults. The anti-N antibody test is estimated to have an 80% sensitivity and 99% specificity for unvaccinated pupils compared with the finger prick blood test. Therefore, a statistical adjustment has been applied to our figures for unvaccinated pupils to account for this.

Antibodies following natural infection could fall below levels of detection faster than antibodies following vaccination. Therefore, some pupils that appear to have antibodies following vaccination only could have in fact have had antibodies following natural infection.

Test results are currently only available for those who had enrolled in the survey and were present in the school building on the day of testing.

Those absent from school on the day of testing for non-COVID-19 infection reasons were unable to participate in the testing round, and those with symptomatic infections and those self-isolating would not be included.

8 . Related links

[COVID-19 Schools Infection Survey, England: attitudes to vaccines and preventative measures, November to December 2021](#)

Bulletin | Released 1 February 2022

Analysis of COVID-19 vaccines and preventative measures findings from the Schools Infection Survey's headteacher, parent and pupil questionnaires. The Schools Infection Survey is jointly led by the London School of Hygiene and Tropical Medicine, UK Health Security Agency and the Office for National Statistics.

[Coronavirus \(COVID-19\) vaccination uptake in school pupils, England: up to 9 January 2022](#)

Article | Released 1 February 2022

Coronavirus (COVID-19) vaccination uptake in school pupils aged 12 to 17 years attending state-funded schools. Including detailed analysis by demographic and geographic characteristics for those aged 12 to 15 years. Experimental statistics.

[Coronavirus \(COVID-19\) Infection Survey, UK: antibody and vaccination data, 23 February 2022](#)

Bulletin | Released 23 February 2022

Headline results of antibody data by UK country and regions in England from the Coronavirus (COVID-19) Infection Survey. This analysis has been produced in partnership with University of Oxford, University of Manchester, UK Health Security Agency and Wellcome Trust. This study is jointly led by Office for National Statistics and the Department for Health and Social Care working with the University of Oxford and Lighthouse Laboratory to collect and test samples.