Office for National Statistics

Statistical bulletin

COVID-19 Schools Infection Survey, England: pupil antibody data and vaccine sentiment, March to April 2022

Estimates of pupils testing positive for SARS-CoV-2 antibodies and analysis of vaccine sentiment from the COVID-19 Schools Infection Survey (SIS). 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.

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Table of contents

1 . Main points

- An estimated 99% of secondary school pupils and 82% of primary school pupils had coronavirus (COVID-19) SARS-CoV-2 antibody levels above the limit of detection in March 2022, after adjusting for sensitivity and specificity.
- SARS-CoV-2 antibody prevalence was significantly higher in Round 3 (March) than Round 2 (January to February 2022) for both primary and secondary school pupils.
- Over three in four pupils (78%) aged four to seven years tested positive for SARS-CoV-2 antibodies.
- Less than 1 in 10 (6%) primary school pupils (aged 5 to 11 years) had received at least one COVID-19 vaccine by Round 3 of the Schools Infection Survey (SIS).
- The proportion of primary school pupils who were unvaccinated and whose parents said they were “unlikely” to agree to their child being vaccinated significantly increased from 24% in Round 1 (November and December 2021) to 36% in Round 3 of the SIS.
- The proportion of secondary school pupils who were unvaccinated and who reported being “unlikely” to agree to receiving a vaccine was similar in Round 3 (13%) to in Round 1 (November and December 2021) of the SIS (15%).

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) SARS-CoV-2 antibodies

Results presented are from Round 3 (3 March to 25 March 2022) of the Schools Infection Survey (SIS). The pupil antibody test used in SIS is based on oral fluid collection because this is a non-invasive alternative to collecting blood. However, this test has a lower sensitivity (estimated at 80.0%) for unvaccinated pupils. To account for this, results from unvaccinated pupils were adjusted for the sensitivity and specificity of the antibody tests. Please see the Glossary for more information.

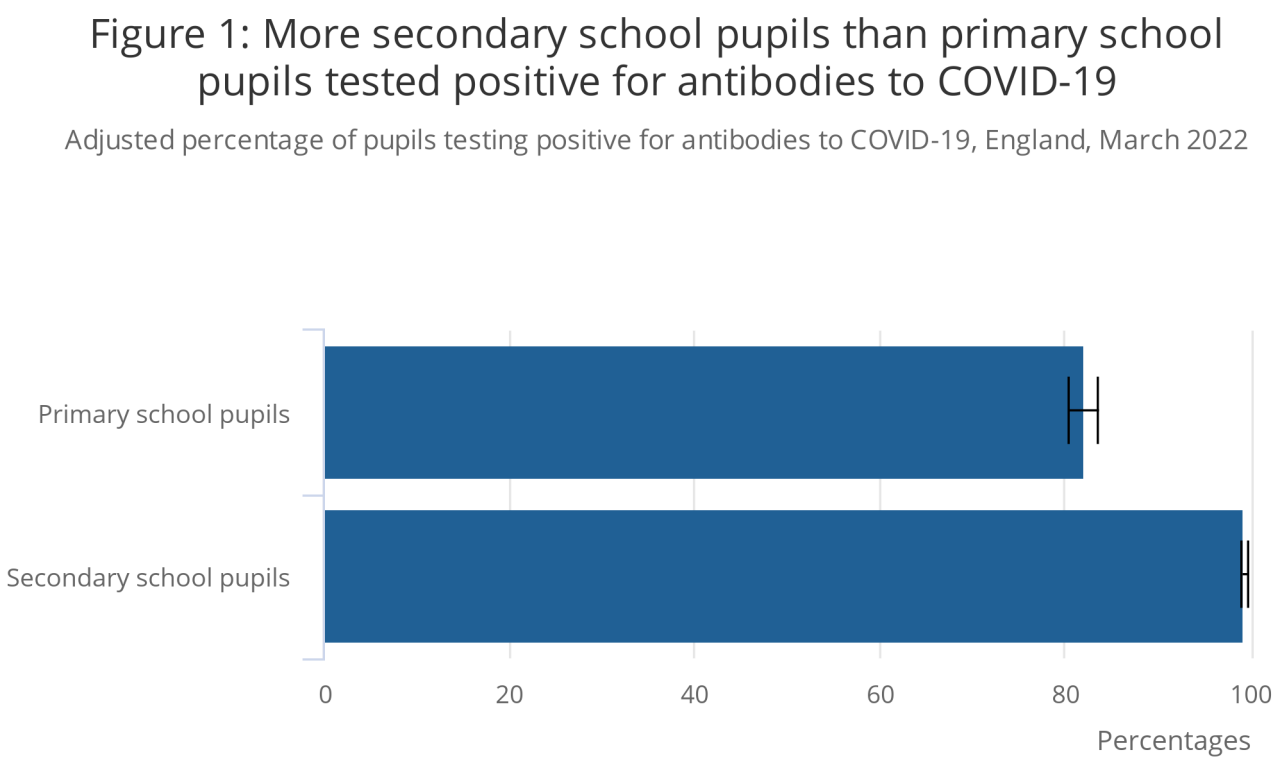
The unadjusted percent of pupils testing positive for SARS-CoV-2 antibodies was 65.9% in primary school pupils (95% confidence interval (CI): 63.9% to 67.8%) and 93.1% in secondary school pupils (95% CI: 92.0% to 94.1%). Secondary school pupils are in school Years 7 to 13, so include sixth form pupils.

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 COVID-19 Schools Infection Survey, 2021 to 2022: methods and further information article.

After adjusting for the sensitivity and specificity of the SARS-CoV-2 antibody tests and the vaccination status of pupils tested, 82.0% of primary school pupils (95% CI: 80.3% to 83.5%) and 99.3% of secondary school pupils (95% CI: 98.9% to 99.6%) had SARS-CoV-2 antibody levels above the limit of detection (Figure 1).

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, March 2022



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

Notes:

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

Comparisons between Round 1, Round 2 and Round 3

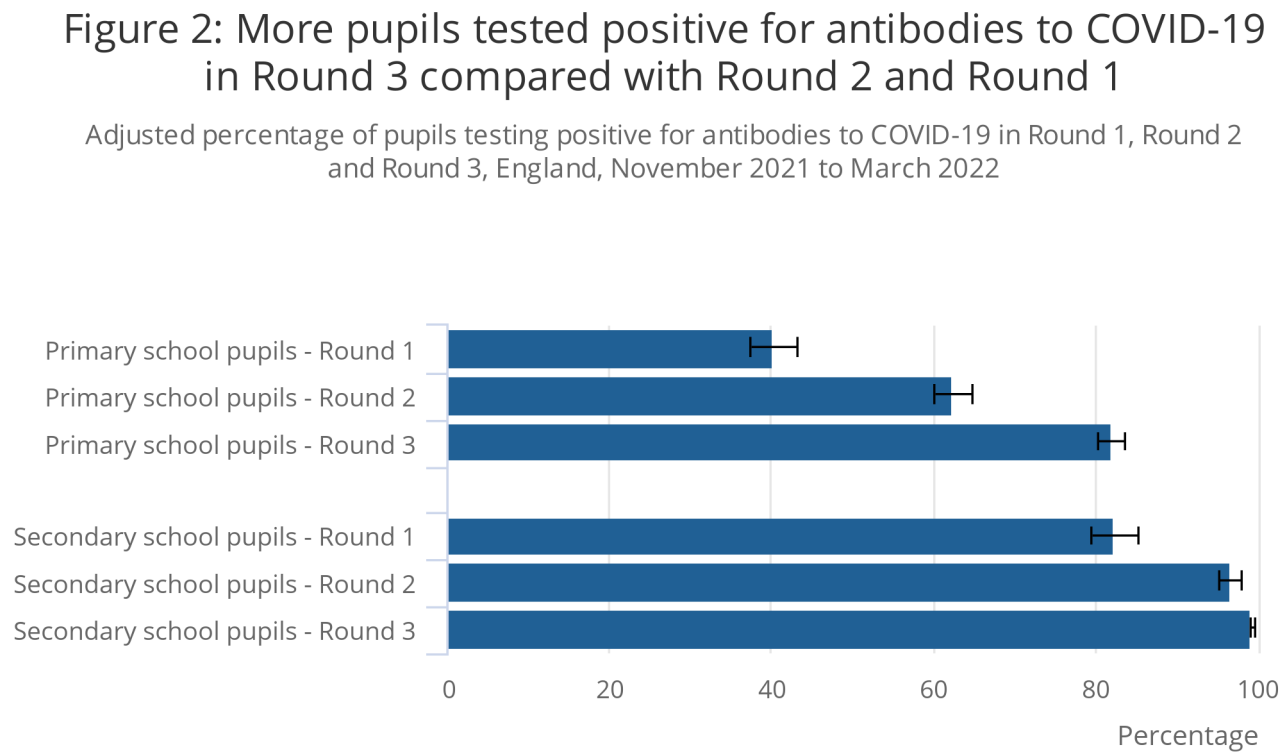
The percentage of pupils testing positive for SARS-CoV-2 antibodies increased significantly for both primary school and secondary school pupils between Round 1 (10 November to 10 December) and Round 2 (10 January to 3 February), and again between Round 2 and Round 3, as shown in Figure 2.

In Round 1, 40.1% of primary school pupils (95% CI: 37.3% to 43.0%) had SARS-CoV-2 antibody levels above the limit of detection, after adjusting for sensitivity and specificity. This increased to 62.4% in Round 2 (95% CI: 60.0% to 64.7%). For secondary school pupils in Round 1, 82.4% (95% CI: 79.5% to 85.1%) had SARS-CoV-2 antibody levels above the limit of detection. This increased to 96.6% in Round 2 (95% CI: 95.1% to 97.8%).

Antibody testing in Round 3 took place while coronavirus (COVID-19) cases in England were increasing, especially among school aged children, because of the Omicron BA.1 variant (declared a variant of concern on 27 November 2021). It is likely that antibody prevalence is higher in Round 3 than in Round 2, owing to an increase in community infections and the continuing vaccination programme targeting secondary school-aged pupils.

Figure 2: More pupils tested positive for antibodies to COVID-19 in Round 3 compared with Round 2 and Round 1

Adjusted percentage of pupils testing positive for antibodies to COVID-19 in Round 1, Round 2 and Round 3, England, November 2021 to March 2022



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

Notes:

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

2. Antibody tests took place in November to December 2021 for Round 1, January to February 2022 for Round 2, and March 2022 for Round 3.

Antibody estimates by vaccination status

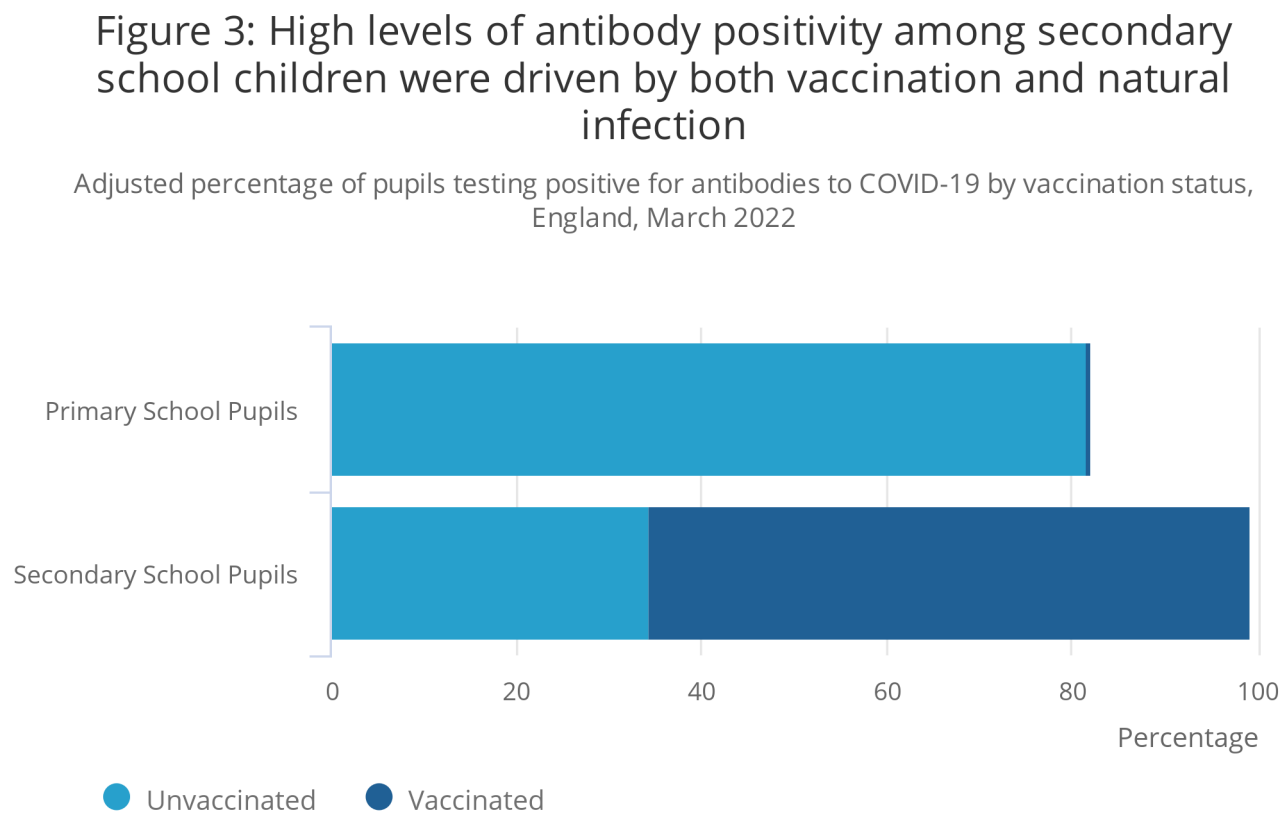
Pupil vaccination data were obtained by linking to the National Immunisation Management System (NIMS). Pupils were defined as vaccinated if they had their first dose at least 14 days before their antibody test. Of pupils tested for SARS-CoV-2 antibodies in Round 3, 67.8% of secondary school and 0.6% of primary school pupils had received at least one SARS-CoV-2 vaccination dose at least 14 days before their antibody test.

Based on adjusted figures, more than 99.0% of secondary school pupils had SARS-CoV-2 antibodies. This is comprised of 64.9% (95% CI: 62.5% to 67.2%) who were vaccinated and 34.4% (95% CI: 31.1% to 37.9%) who were unvaccinated. For primary school pupils, 82.0% had SARS-CoV-2 antibodies, based on adjusted figures. This is comprised of 0.4% (95% CI: 0.0% to 22.2%) who were vaccinated and 81.6% (95% CI: 79.9% to 83.1%) who were unvaccinated. 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. Vaccinated pupils could develop antibodies through 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 3: High levels of antibody positivity among secondary school children were driven by both vaccination and natural infection

Adjusted percentage of pupils testing positive for antibodies to COVID-19 by vaccination status, England, March 2022



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

Notes:

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

2. “Vaccinated” refers to pupils who have received at least one COVID-19 vaccine dose at least 14 days before being sampled.

Regional antibody estimates

Figure 4 shows the adjusted percentage of pupils in primary and secondary schools testing positive for SARS-CoV-2 antibodies by region. The lowest level of SARS-CoV-2 antibodies in secondary school pupils was 92.8% in the South West (95% CI: 90.3% to 94.9%).

As in Rounds 1 and 2, the highest levels of SARS-CoV-2 antibodies for primary school pupils were identified in the West Midlands (90.8%; 95% CI: 86.4% to 94.1%). 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.

Figure 4: The lowest proportion of primary and secondary pupils testing positive for antibodies to COVID-19 was in the South West

Adjusted percentage of pupils testing positive for antibodies to COVID-19 by region, England, March 2022

Notes:

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

Download this chart

.xlsx

Antibody estimates by age

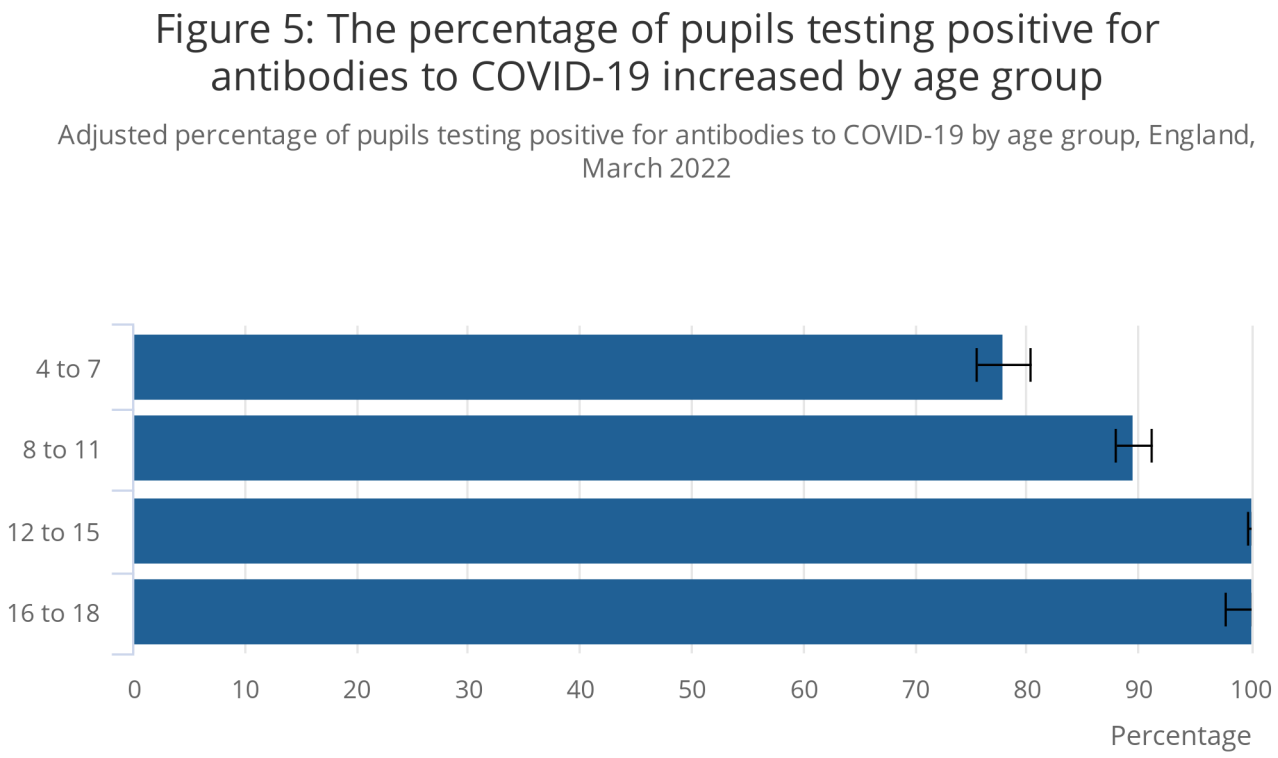
The adjusted proportion of pupils testing positive for SARS-CoV-2 antibodies steadily increases by age (Figure 5). More information on breakdowns by age for pupils aged 4 to 16 years, including unadjusted figures, is available in our accompanying dataset.

Over three-quarters of pupils aged four to seven years (78.0%; 95% CI: 75.5% to 80.3%) tested positive for SARS-CoV-2 antibodies, a statistically significant increase from Round 2 (54.9%; 95% CI: 51.4% to 58.4%). 89.5% of pupils aged eight to eleven years (95% CI: 87.9% to 91.0%) tested positive for SARS-CoV-2 antibodies; this is a statistically significant increase from Round 2 (74.0%; 95% CI: 71.4% to 76.5%).

The Coronavirus (COVID-19) Infection Survey also produces antibody estimates for pupils aged 8 to 15 years. Further information can be found in the Measuring the data section.

Figure 5: The percentage of pupils testing positive for antibodies to COVID-19 increased by age group

Adjusted percentage of pupils testing positive for antibodies to COVID-19 by age group, England, March 2022



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

Notes:

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

2. Age is calculated using the pupil's date of birth as of 31 August 2021.

3 . Vaccine sentiment

In Round 3 of the Schools Infection Survey (SIS), pupils and parents were asked a series of questions about their behaviour and attitudes towards a coronavirus (COVID-19) vaccination for children. Note that this cohort of pupils and their parents will be slightly different from the cohort in the previous section on antibodies, as participants could choose whether to take part in antibody testing and completing questionnaires and may not have participated in both. Please see the Response rates subsection within Measuring the data for more detail.

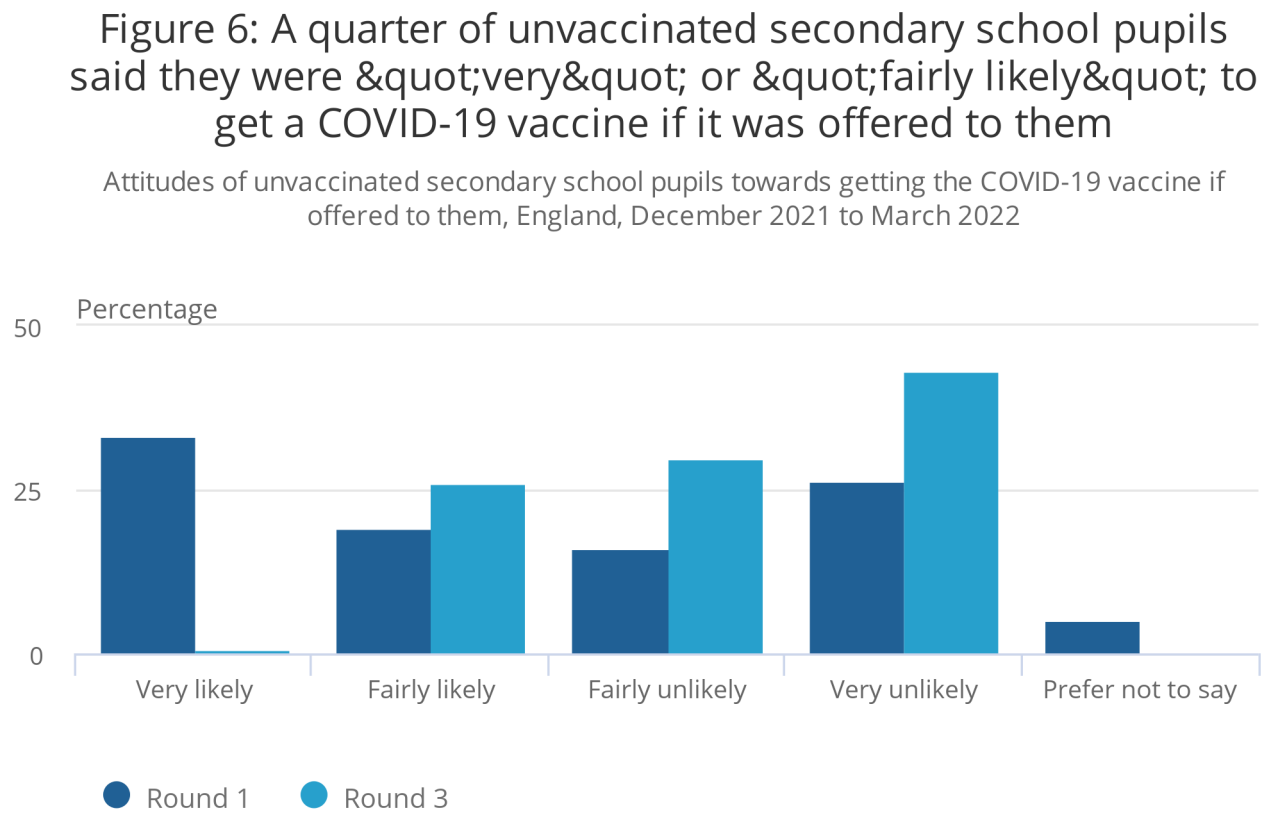
Secondary school-aged pupils' attitudes to vaccination

In the Round 3 questionnaire, 82.2% of secondary school pupils said they had been vaccinated; this was similar between genders (83.4% of boys and 80.9% of girls) and a significant increase from Round 1 (70.1%). National published figures suggest that on 1 April 2022 when the study closed, 51.0% of those aged 12 to 15 years and 65.0% of those aged 16 to 17 years had received a COVID-19 vaccine. The higher prevalence of self-reported vaccination in our study is likely because of the response bias of participating students choosing to opt-in.

Of those who had not received a COVID-19 vaccine, a quarter (26.6%) of pupils said they were "very" or "fairly likely" to get a COVID-19 vaccine if it was offered to them, lower than the 52.2% found in Round 1 questionnaire. This is likely because of the majority of those unvaccinated but willing in Round 1 had been vaccinated by Round 3.

Figure 6: A quarter of unvaccinated secondary school pupils said they were "very" or "fairly likely" to get a COVID-19 vaccine if it was offered to them

Attitudes of unvaccinated secondary school pupils towards getting the COVID-19 vaccine if offered to them, England, December 2021 to March 2022



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

Notes:

1. Questions of those who have not had the COVID-19 vaccination or jab: “How likely are you to get the coronavirus (COVID-19) vaccination if it is offered to you?”

We found that the proportion of pupils who said they were unvaccinated and unlikely to have the vaccine remained similar between Round 1 and Round 3 (15.4% in Round 1 and 12.8% in Round 3).

Of those who had not received a vaccine and would be “very” or “fairly unlikely” to have the vaccine if offered (72.9%), 40.4% said “I don’t think I need a COVID-19 vaccine”. Other reasons include being worried about the side effects (39.2%) and wanting to wait and see how the vaccine works (34.2%).

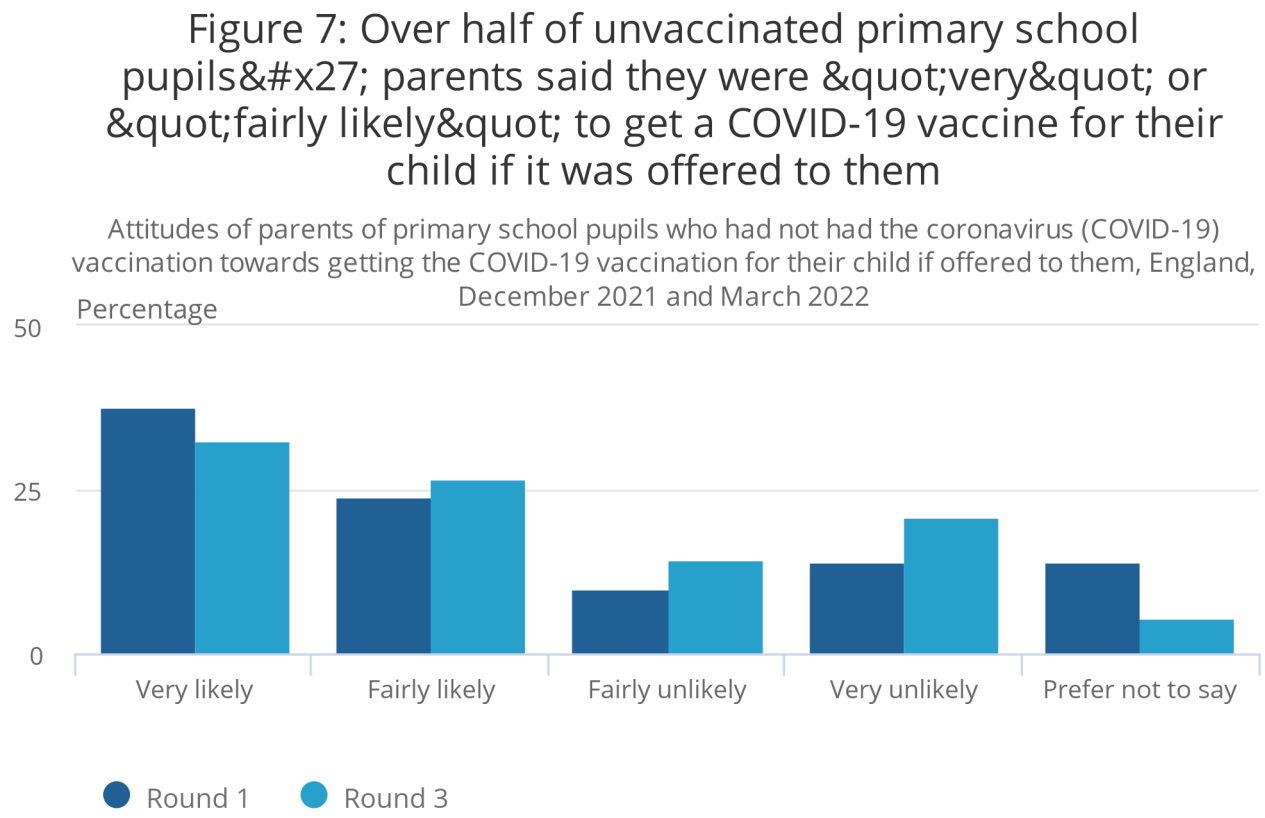
Parent attitudes to vaccinating their primary school-aged children

We found that 6.1% of primary school pupils' parents said their child had been vaccinated. COVID-19 vaccine take-up was similar between genders (5.4% of boys and 6.8% of girls). National published figures suggest that on 1 April 2022 when the study closed, 1.0% of those aged 5 to 11 years had received a COVID-19 vaccine.

We asked parents of primary school pupils who had not had the COVID-19 vaccine how likely they were to agree to their child having a COVID-19 vaccine if it was offered to them. Over half of pupils' parents (59.1%) said they were "very" or "fairly likely" to agree to their child having a COVID-19 vaccine. There was a significant increase in pupils' parents who said they were "very likely" to get a COVID-19 vaccine between Round 1 and Round 3 (13.9% and 20.9%, respectively). For 35.4% of pupils, parents said they were "very" or "fairly unlikely" to agree to their child having a COVID-19 vaccine.

Figure 7: Over half of unvaccinated primary school pupils' parents said they were "very" or "fairly likely" to get a COVID-19 vaccine for their child if it was offered to them

Attitudes of parents of primary school pupils who had not had the coronavirus (COVID-19) vaccination towards getting the COVID-19 vaccination for their child if offered to them, England, December 2021 and March 2022



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

Notes:

1. Questions of those who have not had the coronavirus vaccination or jab: "How likely are you to agree to your child having the coronavirus (COVID-19) vaccination if it is offered to them?"

We found that the proportion of primary school pupils who were unvaccinated and whose parents said they were "unlikely" to agree to them having a vaccine significantly increased from 23.7% in Round 1 to 35.6% in Round 3.

Of those who said they were unlikely to vaccinate their child if offered in Round 3, the main reasons for not agreeing to get a COVID-19 vaccine were that they do not think their child needs a vaccine (51.0%) and they were waiting to see how well the COVID-19 vaccine works for children aged 5 to 11 years (51.2%).

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.

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

COVID-19 Schools Infection Survey, England: pupil antibodies and vaccine sentiment
Dataset | Released 27 June 2022
Estimates of pupils testing positive for SARS-CoV-2 antibodies and analysis of vaccine sentiment from the COVID-19 Schools Infection Survey (SIS).

5 . Collaboration

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. Of note are:

- Shamez Ladhani – UK Health Security Agency: Consultant Epidemiologist and Study Chief Investigator
- Georgina Ireland – UK Health Security Agency: Senior Scientist
- Patrick Nguipdop-Djomo – London School of Hygiene and Tropical Medicine: Associate Professor of Infectious Disease Epidemiology and Study Co-Principal Investigator
- Punam Mangtani – London School of Hygiene and Tropical Medicine: Professor of Infectious Disease Epidemiology and Study Co-Principal Investigator

6 . Glossary

Adjustment method

To account for the sensitivity and specificity of the oral fluid antibody test used, we apply an adjustment to results from unvaccinated pupils. 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. Adjustment for test accuracy is not necessary for vaccinated pupils. More information is available in our COVID-19 Schools Infection Survey, 2021 to 2022: methods and further information article.

Antibody positivity

Antibody positivity is defined by having a fixed concentration of antibodies. A negative test result occurs if there are no antibodies, or if antibody levels are too low to reach a threshold at the time of testing. It does not mean that their antibody level is at zero or that a person has no protection against COVID-19. Additionally, there are other parts of the immune system that will offer protection, for example, a person's T-cell response. This will not be detected by saliva tests for antibodies. A person's immune response is affected by a number of factors, including health conditions and age.

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 (CI) 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. We assess statistical significance using confidence intervals.

Primary school

In this publication, primary school refers to school Years Reception to 6. This covers the those aged 5 to 11 years.

Secondary school

In this publication, secondary school refers to school Years 7 to 13, and so includes sixth form pupils. This covers those aged 11 to 18 years. Sixth form pupils were included only in schools with an attached sixth form, and these schools were given equal weighting when sampling as schools without an attached sixth form. Sixth form colleges were not included in sampling. For more information, see our methodology article.

Vaccination programme

The vaccination programme was made available to those:

- aged 18 years and over on 2 July 2021
- aged 16 to 17 years on 15 August 2021
- aged 12 to 15 years on 22 October 2021
- aged 5 to 11 years on 4 April 2022

These dates may differ for those classified as “extremely critically” or “critically” vulnerable.

7 . Measuring the data

Data presented in this bulletin are from Round 3 of the COVID-19 Schools Infection Survey (SIS) carried out during March of the 2021 to 2022 academic year. These findings are for SARS-CoV-2 antibodies for pupils only.

Estimates have been weighted and are representative of the ethnicity, gender, and age.

Age in this bulletin is calculated using the pupil's date of birth as of 31 August 2021.

See our COVID-19 Schools Infection Survey, 2021 to 2022: methods and further information article for further information.

Reference period

The results presented in this bulletin are from antibody tests conducted in schools in England between 3 March and 25 March 2022. This is referred to as Round 3.

The coverage date for the pupil and parent questionnaire was 15 March to 1 April 2022.

Response rates

In Round 3, 168 schools took part in testing (116 primary and 52 secondary). Within these schools, 10,109 pupils (5,007 primary and 5,102 secondary) took part in the COVID-19 antibody test. The total estimated response rate for participation in Round 3 antibody testing was 11.0%. The estimated response rate for primary school pupils was 16.0% and secondary school pupils was 9.0%.

In Round 3, 2,966 pupils responded to the questionnaire. The estimated response rate for the pupil survey was 46.0% (6,511 eligible participants registered). Parents responded to the SIS on behalf of 7,448 children. The estimated response rate of the parent survey was 62.0% (11,995 eligible children registered). Response rates are dependent on people voluntarily completing the questionnaire, which may introduce respondent bias.

Quality

Quality and methodology information on strengths, limitations, appropriate uses, and how the data were created is available in our COVID-19 Schools Infection Survey, 2021 to 2022: methods and further information 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.

Comparisons with the Coronavirus (COVID-19) Infection Survey

The Coronavirus (COVID-19) Infection Survey (CIS) also produce antibody estimates for pupils aged 8 to 11 years and aged 12 to 15 years. The CIS estimates that during 21 March to 27 March 2022, 97.4% of children aged 8 to 11 years (95% CI: 94.8% to 98.7%, sample size: 119) and 97.3% of children aged 12 to 15 years (95% CI: 95.0% to 98.6%, sample size: 221) had antibodies to COVID-19 at the standard antibody threshold.

Compared with the SIS, the CIS uses a different antibody test (finger prick blood test) to determine antibody levels. It also has important differences in methodologies, including:

- a slightly different sample population with a significantly lower sample size in this age group
- testing methods
- data collection periods

While we estimate different levels of antibody positivity, both studies record a similar level of antibodies across the populations they cover. More information is available in our Using the COVID-19 School Infection Survey to measure the impact of the pandemic on children blog.

8 . Strengths and limitations

Please refer to the Strengths and limitations section of our February 2022 bulletin.

9 . Related links

COVID-19 Schools Infection Survey, England: long COVID and mental health, March 2022
Bulletin | Released 15 June 2022
Analysis of COVID-19 findings on mental health and long COVID 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) Infection Survey, antibody data, UK: 1 June 2022
Bulletin | Released 1 June 2022
Headline results of antibody data by UK country and regions in England from the Coronavirus (COVID-19) Infection Survey.