Public Health Scotland Education Surveillance Programme: Key findings to date

Summary report

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Main points

This report collates findings from a number of projects and information sources, to provide intelligence on COVID-19 in educational settings and populations in Scotland. It is focused on results following the return of pupils to education in August 2020, but includes data from earlier periods where this is relevant.

Key findings

During the ‘second wave’ of COVID-19 in Scotland, there have been a greater number of cases of COVID-19 confirmed in children of educational age (2–17 years) than in the ‘first wave’, as testing has been widely available. The earliest and most substantial rises were seen in those aged 16–17 years, with later and smaller rises in younger age groups. All age groups have seen reductions in rates of COVID-19 following an apparent peak in the first week of November.

There have been a total of 186 hospitalisations, and no deaths among children with COVID-19, up to 6 December 2020.

For the first five weeks following the return to school in August there were only small numbers of schools with pupils who tested positive for COVID-19. Through October, the number of schools with affected pupils increased substantially, and in the first part of Term 2 (19 October to 15 November) around 10% of schools had at least one pupil test positive each week. There are large differences between geographical areas in the extent to which pupils and schools have been affected. Schools have been most affected in those areas with higher case rates in the general community.

Scotland-wide data were used to determine whether teachers were at increased risk of COVID-19, compared to other working-age adults. This analysis found that there was no difference in the risk of hospitalisation between teachers and the general population in the period following return to school, and teachers were at lower risk of severe COVID-19 (admission to intensive care or death within 28 days of testing positive).

Over the same time period, there were differences in the likelihood of testing positive, which meant that teachers were more likely to test positive than the general population in the period
after schools returned. However, in the context of variable patterns of testing over time and between different population groups this does not necessarily imply an increased risk of infection. Over the course of the entire pandemic, it was only among men and women aged less than 50 years old that the likelihood of testing positive was any higher than in the general population.

Between mid-October and mid-November, education staff were invited to participate in the COVID-19 Antibody Survey of education Staff (CASS). The proportion of participants who had antibodies detected to the COVID-19 coronavirus was 7.3% (6.9–7.7%). This is similar to the estimated antibody positivity of the general population estimated in this period, based on the ONS infection survey, which estimated antibody positivity to be 7.1% and 7.3% in October and November, respectively, for those aged over 16 years in Scotland.

**Interpretation**

Following the re-opening of schools, in comparison to the general population, there is no evidence for an increased risk of hospitalisation or severe COVID-19 among teachers. Over the course of the pandemic there is evidence that severe, direct health impacts of infection have been very limited among children.

Given the known health, wellbeing and educational benefits of children being in education, and in the context of the control measures within schools, the surveillance data provided here support the view that children should be in school. It is important that schools continue to follow the schools guidance to minimise the risk of transmission within schools.

The community transmission observed in ‘wave 2’ has had an impact on pupils and schools, and this reinforces the importance of controlling community transmission for protecting and maintaining education. It is reassuring that overall case numbers and cases among educational age groups have fallen since early November, while children have continued to attend in-person education.
Introduction

Worldwide, the coronavirus (COVID-19) pandemic has had an unprecedented impact on educational settings. As in all other UK nations, schools in Scotland were temporarily closed in March 2020 in order to control the spread of COVID-19. Since then, schools in Scotland have re-opened full time with enhanced public health measures in place. Below are the key dates and milestones relevant to education settings since 2020.

- 1 March 2020 – first person in Scotland tests positive for COVID-19
- 17 March 2020 – Cabinet Secretary places Scotland on emergency footing
- 20 March 2020 – Schools close (provision maintained for vulnerable children and children of key workers, throughout lockdown)
- 23 March 2020 – Lockdown begins
- 29 May 2020 – Phase One entered
- 19 June 2020 – Phase Two entered
- 10 July 2020 – Phase Three entered
- 11–18 August 2020 – Schools reopen¹
- 5–18 October 2020 – October break (1–2 weeks; dates vary by local authority). The period August to October break is ‘Term 1’, and from October break to winter holiday is ‘Term 2’.

Education, recognised as a basic human right, is vitally important to child development and wellbeing, and early learning and childcare (ELC), and schools play a vital role in providing equal access to education. There is a need to carefully balance the risks and potential harms of school closures against the potential direct health risks to children and staff from COVID-19 and potential impact schools may have on wider community transmission.

¹ School reopening dates differed by regional councils.
Therefore, it is essential to monitor and understand how COVID-19 affects children and staff in educational settings.

In this series of reports, we publish several outputs from the Public Health Scotland (PHS) Education Surveillance Programme. In addition to this summary report, this publication package includes the following three reports:

- COVID-19 Antibody Survey of education Staff (CASS): Report 1

Information is also drawn from a number of other existing published sources of information provided by Public Health Scotland, including the Weekly Statistical Report, and an earlier report into Cases of COVID-19 among school pupils.

Components of PHS COVID-19 Education Surveillance Programme

PHS is gathering and using information from a range of sources to monitor and understand how COVID-19 is affecting people in educational settings. This programme covers children and young people in education, the educational workforce, and education settings, from early learning up to and including secondary school.

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The information used comes from a range of sources, including routine data on COVID-19 tests and hospital admissions, linked data on occupation, and survey testing, where people are specifically asked to participate. More information is available at: https://publichealthscotland.scot/our-areas-of-work/covid-19/covid-19-data-and-intelligence/enhanced-surveillance-of-covid-19-in-education-settings/

Results and commentary

Weekly monitoring of COVID-19 in the child population

Public Health Scotland monitors and publishes weekly data on cases of COVID-19 among children of school-age and of hospital admissions among children, and key findings relevant to this report are summarised below.4

COVID-19 among children of educational age (2–17 years)

The rate of children and young people, per 100,000 population, who have tested positive for COVID-19 over time, is shown in Figure 1. These data are based on age alone, and therefore not all children and young people will be in education, particularly in the 2–4 year and 16–17 year age groups. There were few cases of COVID-19 confirmed in children during the first period of activity in the pandemic, in March to May 2020, as testing was limited at this time. Infections occurring in the ‘second wave’ are apparent in the period September to December. There are notable differences by age group, with cases increasing earlier and more substantially in the 16–17 year age group, and reaching the highest levels in older age groups. Across all age groups there has been a reduction in the rate of cases in the most recent weeks, from around 9 November.

Figure 1: Weekly rate of individuals who test positive (PCR) for COVID-19, by age group, Scotland, 1 March 2020 to 6 December 2020

Data source: PHS COVID-19 statistical report,\(^4\) data extracted 10/12/2020

Hospital admissions and deaths with COVID-19 among children

Between 1 March and 4 December 2020 there were a total of 186 admissions to hospital of children and young people aged 0–19 years with a positive test for COVID-19.\(^5\) The rate of admissions per 100,000 across this period was 32 per 100,000 in those aged 0–4 years, 8 per 100,000 in those aged 5–14 years, and 18 per 100,000 in those aged 15–19 years. For comparison the rate of admissions with COVID-19 across the whole population was 224 per 100,000.

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\(^5\) A patient may have tested positive for COVID-19 14 days prior to admission to hospital, on the day of their admission or during their stay in hospital.
Data from National Records of Scotland show that there have been no deaths of children aged under 15 years registered in Scotland, where COVID-19 was mentioned on the death certificate, in data available up to 6 December 2020.6

Risk of COVID-19 in teachers

These results provide information on the risk of COVID-19 infection and hospitalisation in teachers, compared to the general population, and compared to healthcare workers. Existing COVID-19 and health data held by PHS were linked to information, such as teacher name and sector, provided by the General Teaching Council of Scotland (GTCS). This provided a means to assess risk in teachers as an occupational group. The case-control method used in this analysis provides a robust way of comparing risk between groups and time periods. It also takes into account differences in age, sex, ethnicity, deprivation and pre-existing health conditions, that might otherwise contribute to the differences in risk.

Three outcomes were measured: the risk of testing positive for COVID-19; the risk of being admitted to hospital with a positive test; and the risk of severe COVID-19 (admission to intensive care or death in someone with a positive test). Hospitalisation and severe COVID-19 are the most reliable measures with which to make comparisons, as they are not influenced by testing policy or behaviour, which can affect the proportion of more mild positive cases that are identified.

The results are shown as hazard ratios (HR). A result of 1 indicates that there is no difference in the risk of the event between teachers and the general population; a result below 1 indicates a lower risk, and a result above 1 indicates a higher risk. The figures in brackets show the 95% confidence interval (CI) for the risk estimate; these reflect the range within which the true value for the population is likely to lie.

Across the whole period (March to November 2020) teachers were at lower risk of hospitalisation with COVID-19 than the general population (HR 0.70; 95% confidence interval 0.52–0.95), and at lower risk of severe COVID-19 (HR 0.50 95% CI 0.30–0.82). In the period since school reopened in August 2020, up to November 2020, there was no difference in the

6 www.nrscotland.gov.uk/covid19stats
risk of hospitalisation between teachers and the general population (HR 0.98; 95% CI 0.67–1.45), and the risk of severe COVID-19 was lower (HR 0.46 95% CI 0.23–0.92).

Following the re-opening of schools, teachers’ risk of testing positive was higher than the general population (HR1.47 (95% CI 1.37–1.57). More detailed assessment of these data, by age and sex, shows that, over the whole period, the difference in risk of testing positive was smaller for female teachers, and for both sexes no increased risk was seen in older age groups. Among teachers aged 31–40 years, the hazard ratio of being a case was 2.03 for men (95% CI 1.60–2.58), and 1.20 for women (95% CI 1.05–1.38). Among female teachers aged 41–50 years and 51–65 years, and male teachers aged 51–65 years, there was no difference in the risk of testing positive compared to the general population.

The likelihood of testing positive is influenced both by the likelihood of infection, and by the likelihood of having this infection confirmed with a test. Access to testing has changed over the course of the pandemic, and use of testing may also be influenced by behavioural factors. This is likely to influence the results seen here, as there were relatively high rates of testing among teachers in the period following school return. It is reassuring that the higher risk of testing positive is not seen in the 51–65 year age groups, who are more likely to experience more severe illness, and that among all age groups the risk of testing positive is not associated with a higher risk of hospitalisation or severe COVID-19.

**COVID-19 Antibody Survey of education Staff (CASS)**

COVID-19 is caused by the new coronavirus known as SARS-CoV-2. When the body is infected with coronavirus, it produces antibodies to help fight the virus, and these may be detected by blood tests. The detection of antibodies provides an indication that someone has had COVID-19, and provides a way of monitoring what proportion of people have had the virus in the past. It is not yet known how long antibodies remain detectable following coronavirus infection; therefore surveillance based on antibody tests may underestimate the total proportion of people who have had coronavirus.

This survey commenced in October 2020, and is planned to continue through the 2020/21 school year, in order to provide monitoring of the proportion of the education workforce who have had COVID-19. CASS is open to any adult member of staff working in an early learning and childcare, or school setting in Scotland. Participants complete an online survey, and
undertake a home fingerprick blood test, which is analysed by the UK Government antibody testing service.

This first round of results are based on information from nearly 20,000 participants that completed the survey and had a blood sample taken between 17 October and 16 November. There were participants from every local authority area in Scotland, and from a wide range of job roles within education. The results are reported as adjusted figures, which takes into account the performance of the test, and 95% confidence intervals are provided in brackets.

Summary findings are presented below. It should be noted that where a difference between groups is identified, this does not necessarily mean that the specified characteristic is the cause of the difference. A range of social, demographic and occupational factors may interact to influence the proportion of participants who have antibodies detected.

- The overall proportion of participants who had antibodies detected is estimated to be 7.3% (95% confidence interval 6.9%–7.7%).
- There were no significant differences between men and women, or by age group, in the proportion of participants that had antibodies detected. Participants of non-White ethnicities had a higher estimated seroprevalence (11.2% (7.2%–17.1%)), than those of White ethnicities (7.3% (6.9%–7.7%)), however these results are based on a small sample of non-White participants.
- Among staff groups a higher proportion of non-teaching staff had antibodies detected (8.8% (7.6–10.1%)) than teaching and teaching support staff (7.1% (6.6–7.6%)). There was no difference between teaching and teaching support staff, and early learning and childcare staff.
- The proportion of staff working in secondary-school settings that had antibodies detected (6.3% (5.7–6.9%)) was lower than staff in early learning and childcare (8.2% (7.2–9.4%)) and primary settings (7.7% (7.1–8.3%)).
- In four local authority areas (based on location of workplace) the proportion of participants that had antibodies detected was higher than the overall national estimate. These were Inverclyde, Glasgow City, Renfrewshire, and North Lanarkshire. In seven local authority areas the proportion of participants that had antibodies detected was
lower than the national estimate. These were Highland, Dumfries and Galloway, Angus, Perth and Kinross, Moray, Aberdeenshire and Argyll and Bute.

No direct comparison with other occupational groups is currently possible, based on the same survey method, as currently this approach has only been taken for education staff in Scotland. The ONS Coronavirus (COVID-19) Infection Survey provides the best comparison for seroprevalence in the general adult population. Using samples taken from adults in a random sample of households in Scotland, it provides estimates of the proportion of the population that would test positive for antibodies. These results show that in October 2020 an estimated 7.1% of the population in Scotland aged over 16 years would have tested positive (4.6–10.4%), and in November an estimated 7.3% (5.0–10.3%).7 From the same survey in England data is also provided by occupational sector, and this shows that in October an estimated 8.1% of those working in the education sector would have tested positive for antibodies (5.9–10.8%).

Overall these data show that the proportion of education staff who have antibodies detected within the CASS survey is comparable to the general population in Scotland, and to those working in the education sector in England, based on estimates from other sources. Differences within education staff in Scotland were detected by job role and work setting, although these differences were small. The most substantial differences observed were based on geography, according to location of workplace, which is likely to reflect the marked geographical differences in the occurrence of COVID-19 that has been observed in Scotland.

Further rounds of data from CASS will permit monitoring over time, and will allow more detailed analysis of the factors associated with having antibodies detected.

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COVID-19 infections in school pupils

Monitoring of COVID-19 infections by age group provides the most rapid means of assessing cases in children of educational age, however additional data are needed to monitor how these cases are distributed in the pupil population and across schools. PHS holds information on the schools that pupils attend for the purposes of child health surveillance and administration of immunisations. By linking this information to COVID-19 test data, it is possible to track the numbers of pupils and schools that have been affected.

These data provide information on cases of COVID-19 among the pupil populations of schools, but that does not necessarily mean that a pupil was present in the school at the time of their illness or infectious period. In addition, the occurrence of multiple cases within the pupil population of a given school does not necessarily imply that these cases are linked or attributable to transmission within the school. These data overestimate cases in the S5–S6 year groups, as records do not yet fully document all those that have left school this academic year.

Across the full 13-week period reported since schools returned in August, 63% of schools have had no positive cases of COVID-19 among their pupil population. Over two-thirds of primary schools (69%) have not had any cases among pupils. In contrast, two-thirds of secondary schools (66%) have had a case among their pupils.

In the most recent report data are provided for the first four weeks of Term 2, as an update to the previously published Term 1 report. In this period, from 19 October to 15 November, the number of cases among school pupils, and the number of schools with pupil cases, have remained at high levels. There were 780 schools who had at least one pupil test positive in this period, and around 10% of schools each week with at least one pupil affected. However, increases in these measures have slowed, compared to the end of Term 1.

The impact of COVID-19 on pupil populations continues to be concentrated in those areas most affected by the highest rates of infection. For example, in Glasgow City and North Lanarkshire around 60% of schools had at least one pupil test positive in the 4 weeks.

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reported, whereas in 10 local authority areas, fewer than 10% of schools were affected in this way.

These findings show that school pupils and schools have been impacted by the ‘second wave’ of COVID-19 in Scotland, particularly in those areas where there have been higher levels of community transmission. Both the rates of cases among pupils, and the proportion of schools with affected pupils, are substantially higher in secondary than primary age groups.

Summary

This report brings together key findings from a range of sources that provide surveillance information on COVID-19 in educational settings and populations in Scotland, from the start of the pandemic to November 2020.

Following the re-opening of schools, in comparison to the general population, there is no evidence for an increased risk of hospitalisation or severe COVID-19 among teachers. Over the course of the pandemic there is evidence that severe, direct health impacts of infection have been very limited among children.

The community transmission observed in ‘wave 2’ has had an impact on pupils and schools, and this reinforces the importance of controlling community transmission for protecting and maintaining education. It is reassuring that overall case numbers and cases among educational age groups have fallen since early November, while children have continued to attend in-person education.

The information provided here must be considered alongside the known health, wellbeing and educational benefits of children being in education, and in the context of the control measures within schools.
Glossary

**Antibodies**: Specific proteins produced by the body when fighting infections.

**CHI**: Community Health Index, a unique patient identifier used in NHS in Scotland.

**CHSP**: Child Health Systems Programme.

**COVID-19**: Disease caused by the new strain of coronavirus known as SARS-COV-2.

**ECOSS**: Electronic Communication of Surveillance in Scotland. The ECOSS system captures lab results from diagnostic and reference laboratories for analysis by Health Protection surveillance teams. It is a national tool for monitoring organisms, infections and microbial intoxications that are of clinical or public health importance.

**SARS-COV-2**: Severe acute respiratory syndrome coronavirus 2, the strain of coronavirus that causes COVID-19.
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Further information

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Appendix 1 – Early access details

Pre-Release Access

Under terms of the ‘Pre-Release Access to Official Statistics (Scotland) Order 2008’, PHS is obliged to publish information on those receiving Pre-Release Access (‘Pre-Release Access’ refers to statistics in their final form prior to publication). The standard maximum Pre-Release Access is five working days. Shown below are details of those receiving standard Pre-Release Access.

Standard Pre-Release Access

- Scottish Government Health Department
- NHS Board Chief Executives
- NHS Board Communication leads
Appendix 2 – PHS and Official Statistics

About Public Health Scotland (PHS)

PHS is a knowledge-based and intelligence driven organisation with a critical reliance on data and information to enable it to be an independent voice for the public’s health, leading collaboratively and effectively across the Scottish public health system, accountable at local and national levels, and providing leadership and focus for achieving better health and wellbeing outcomes for the population. Our statistics comply with the Code of Practice for Statistics in terms of trustworthiness, high quality and public value. This also means that we keep data secure at all stages, through collection, processing, analysis and output production, and adhere to the ‘five safes’.