COVID-19 in schools and early childhood education and care services – the Term 1 experience in NSW

Prepared by the National Centre for Immunisation Research and Surveillance (NCIRS)
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Overview

- This report provides an overview of investigation into all COVID-19 cases in schools and early childhood education and care (ECEC) services in the state of New South Wales (NSW), Australia between 25 January 2020 and 9 April 2020 (school term 1 of the academic year) during the first pandemic wave.
- This is an update to our earlier report dated 26 April 2020 and can also be read in conjunction with a published peer-reviewed journal article on this study in The Lancet Child and Adolescent Health.
- 27 individuals (12 students and 15 staff members) from 25 educational settings (15 schools and 10 ECEC services) were confirmed as primary COVID-19 cases who had an opportunity to transmit the SARS-CoV-2 virus to others in their school or ECEC service.
- 1,448 individuals (1,185 students and 263 staff members) were identified as close contacts of these primary 27 cases.
- In schools, only one primary school child, two secondary school children and two staff members were considered likely to have contracted COVID-19 from exposure to cases at their schools.
- Nine ECEC services reported no secondary cases. However, one ECEC service experienced a large outbreak, with six staff members and seven children infected and additional community-based transmission.
- The attack rate (transmission rates) in this investigation ranged from 1.2% (all settings) to 0.5% (schools only).

Background

Globally, the control of COVID-19 (caused by the virus, SARS-CoV-2) has been focused on public health measures, including decreasing population movements, improving hygiene and ensuring social distancing. Some countries have closed schools as part of their response. The strategy of closing schools has previously been recommended to assist in the control of influenza pandemics because we know children with influenza are likely to spread the infection and become ill from influenza. However, COVID-19 appears to be a less common infection in children than influenza, and infected children generally show mild symptoms compared with adults. It has been suggested that children are also less likely to spread the virus. It has been unclear how commonly SARS-CoV-2 is transmitted within schools and early childhood education and care (ECEC) services among children or staff, and if school or ECEC service closures are an effective measure to control COVID-19. Prolonged closures of educational settings can have negative consequences for the community and for children.

The emergence of COVID-19 and early spread globally coincided with the start of school term 1 in Australia. The first NSW school with a COVID-19 case was identified on 5 March 2020. The National Centre for Immunisation Research and Surveillance (NCIRS), with the support of the NSW Ministry of Health and NSW Department of Education, started a schools investigation in early March. Through this investigation, we aimed to understand the transmission of SARS-CoV-2 in schools and ECEC services in the NSW context. There are approximately 1.8 million young people (aged ≤18 years) living in NSW, around 3,200 schools and 4,000 ECEC services.

This report summarises the findings of this work in NSW schools and ECEC services to 1 May 2020. This report updates preliminary data in our report dated 26 April 2020, and can also be read in conjunction with a published peer-reviewed journal article on this study in The Lancet Child and Adolescent Health.

Methods

COVID-19 is a notifiable disease in Australia. When a person is diagnosed with COVID-19 a public health response is initiated that includes follow up of each case to identify their close contacts and dates of exposure to the person (case) while infectious. A 'close contact' is defined as a person who has been in face to face contact for at least 15 minutes or in the same room for two hours with a case while infectious. In schools, close contacts of cases were usually found either to be students and teachers who shared the same class/classes or extracurricular activities as the case or in their close circle of friends.

Once close contacts are identified, they are required to enter home quarantine for 14 days from the date of last exposure to the infectious case, watch for any symptoms and if they become unwell, have a nose/throat swab to test for COVID-19. NSW Health and NCIRS followed up, via the Notifiable Conditions Information System (NCIMS) database, all close contacts of COVID-19 cases in the 15 schools and 10 ECEC services that an adult or a child with COVID-19 attended while infectious. For each educational setting, the NCIMS database was reviewed at 30 days from the date of exposure to establish the total number of tests performed and their results.

In addition, for schools and ECEC services, close contact staff members and students who agreed to participate in enhanced surveillance: a) filled out a symptom questionnaire; b) were swabbed to test for COVID-19 between 5 and10 days after the last contact with the case, irrespective of whether they had symptoms; and c) had a blood sample taken to detect antibodies to the SARS-CoV-2 virus (which is evidence of an immune response to infection) at 4 to 6 weeks after the exposure.

Results

In the 25 educational settings (10 high schools, 5 primary schools and 10 ECEC services) a total of 27 COVID-19 primary cases (12 students and 15 staff members) were identified between 5 March 2020 and 3 April 2020 (refer to Figure 1). In total, 1,448 close contacts (914 in schools, 534 in ECEC services) were identified in these 25 educational settings.

Within schools, three students and two staff members were detected as secondary cases. Two were diagnosed by nose/throat swab detection of the virus and three were diagnosed by a positive antibody test 4–6 weeks after the exposure. In the ECEC services, no close contacts were identified in nine services but one service had a COVID-19 outbreak, with six staff members and seven children testing positive. Twelve of these cases were diagnosed by nose/throat swab detection of the virus and one case was diagnosed by a positive antibody test.

A review showed that it was most likely, but not certain, that all these cases were infected by transmission in the school or ECEC environment. The overall proportion of contacts found to be infected was 1.2% across all schools and ECEC services, or 0.4% if the ECEC service with the large outbreak was excluded.

Primary schools

A total of five primary cases (one student and four staff members) were identified in five primary schools. The total number of close contacts in these five primary schools was 179 students and 39 staff (total = 218). Nose/throat swabs were taken from 28% (n=62) of symptomatic and asymptomatic contacts. Only one secondary case in a teacher (nose/throat swab virus positive) was identified in the 218 close contacts. The same school had a tertiary case in a student (nose/throat swab virus positive) who was a close contact of the secondary case.
Overall, as shown in Figure 2, only 2 of 218 individuals were identified to have been infected following close contact with a school case among these five primary schools.

High schools

A total of 12 COVID-19 primary cases (eight students and four staff members) were identified who had attended 10 high schools while infectious. The total number of close contacts in these 10 high schools was 600 students and 96 staff (total = 696). Nose/throat swabs were taken from one third (n=235) of symptomatic and asymptomatic contacts, all of whom tested negative.

Two high schools had secondary cases. In one high school, this was 1 student out of the 76 close contacts who underwent blood testing (from 211 total close contacts) at approximately 1 month after contact with the primary cases. In another high school, of 49 close contacts who underwent blood testing (from 74 total close contacts), 1 student and 1 teacher had antibodies detected.

Thus, as shown in Figure 3, only 3 of 696 individuals were identified to have been infected following close contact with a school case in these 10 high schools.

ECEC services

A total of 10 primary cases (three children and seven staff) were identified in 10 ECEC services. The total number of close contacts in these 10 ECEC services was 406 children and 128 staff (total of 534 contacts). Nose/throat swabs were taken from 46% (n=245) of symptomatic and asymptomatic contacts. No secondary cases were diagnosed in 497 close contacts in nine ECEC services. One ECEC service had a large outbreak with 13 secondary cases (seven children and six staff) in 37 close contacts (refer to Figure 4). Delayed case detection due to narrow testing criteria at the time may have contributed to this outbreak, as several generations of transmission would have occurred before outbreak was detected.

Figure 1: NSW schools and ECEC services with a COVID-19 primary case(s) from March to mid-April 2020

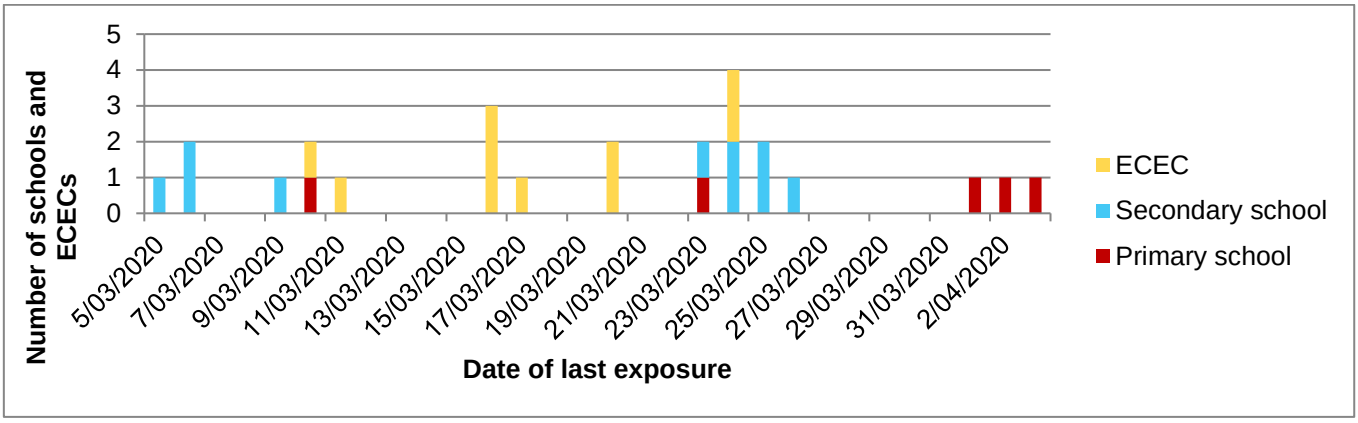


Figure 2: Cases and close contacts among teachers and students in 5 NSW primary schools showing 2 secondary cases in 1 student and 1 teacher

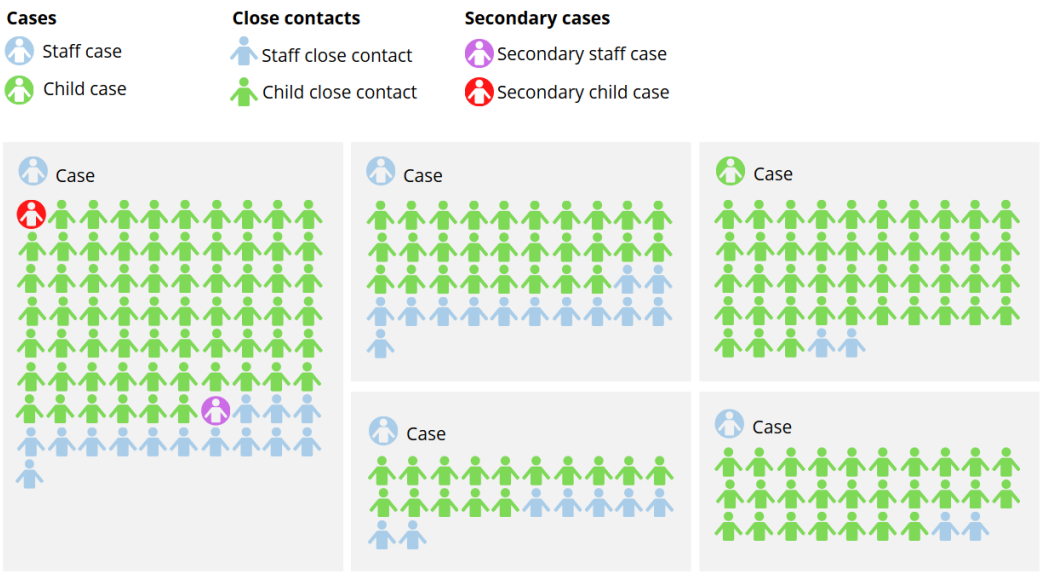


Figure 3: Cases and close contacts among teachers and students in 10 NSW high schools showing 3 secondary cases in 2 students and 1 teacher

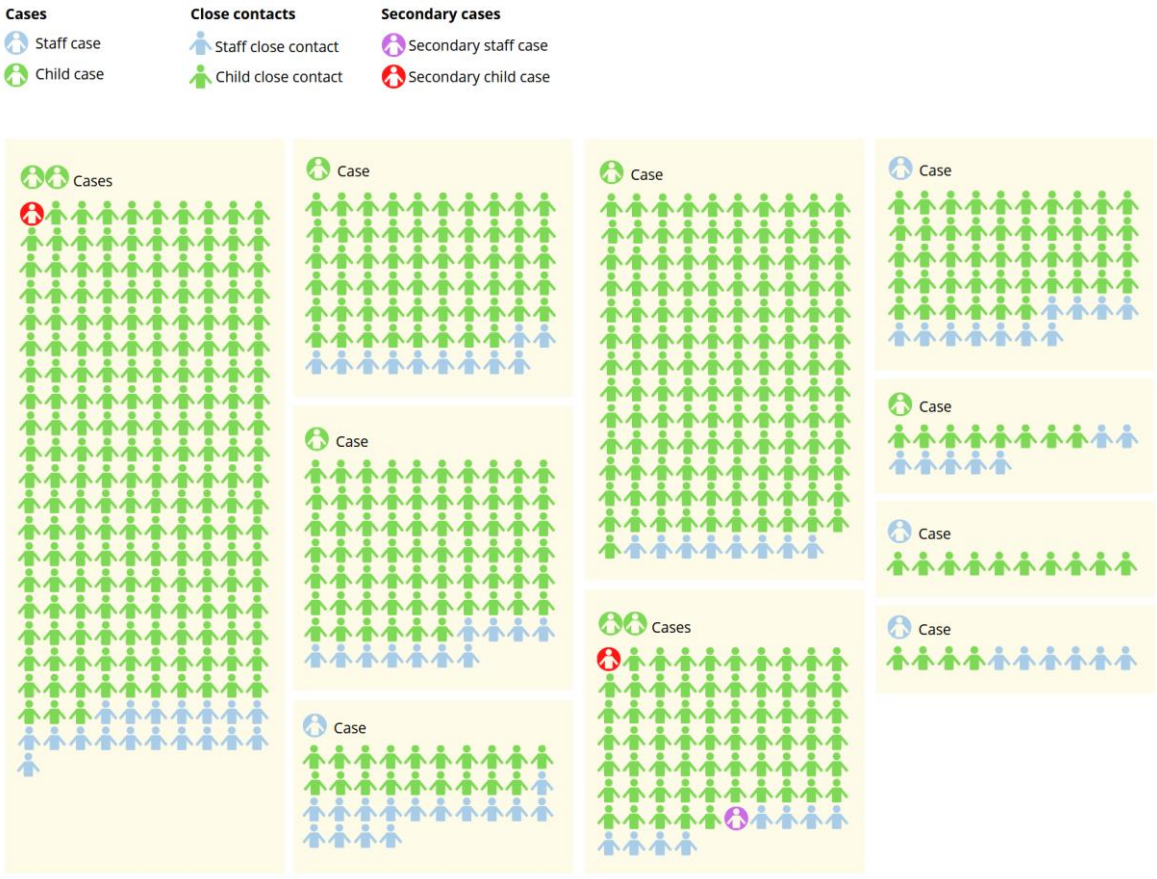
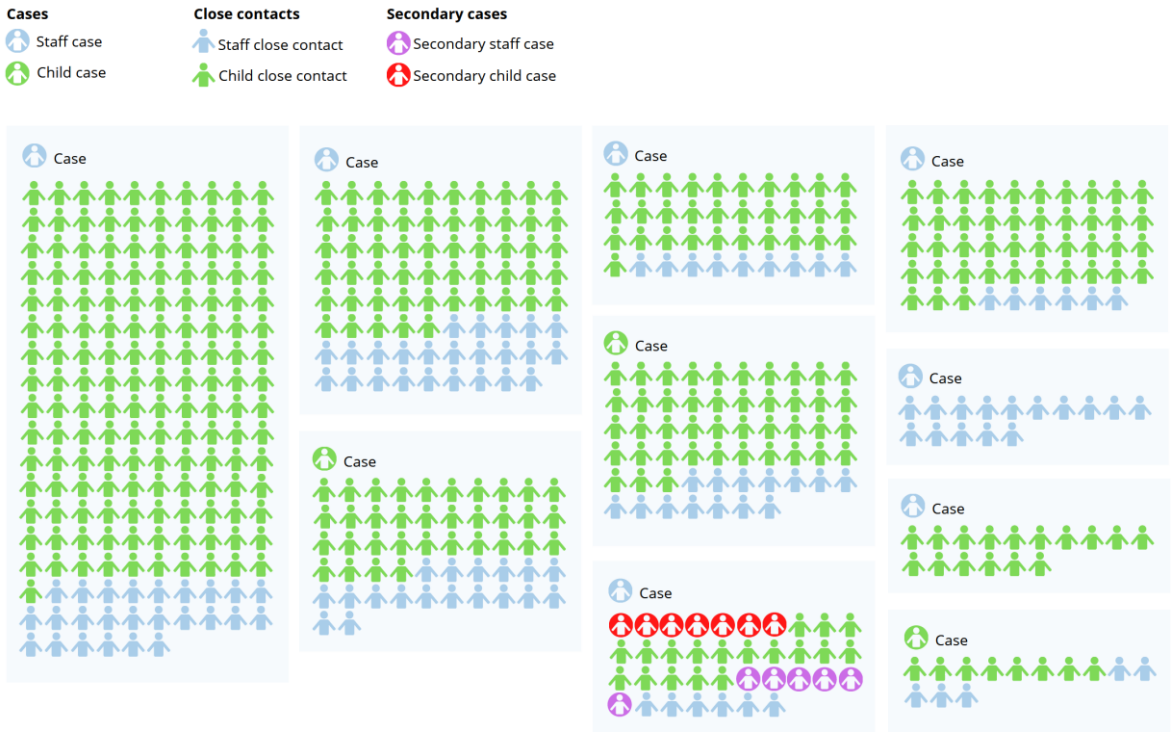


Figure 4: Cases and close contacts among teachers and students in 10 NSW ECEC services showing an outbreak in 1 ECEC service



Conclusion

Our detailed investigation of COVID-19 cases in 15 NSW primary and high schools found only five secondary cases: three in students and two in staff members. This was despite primary cases occurring in 12 children (including two schools which had two concurrent primary cases) and 15 staff members. In 10 ECEC services, 13 secondary cases were identified (seven children and six staff members), albeit all in one ECEC service. Very detailed follow-up occurred, including additional testing for the presence of the virus and for antibodies to the virus, in two thirds of contacts in selected enhanced surveillance sites and one third of the total 1,448 close contacts.

Of all 25 settings, only one ECEC service had an outbreak with a total of 13 secondary cases identified. This outbreak occurred early in the first wave of the epidemic and was potentially related to delayed case detection due to the narrow testing criteria at the time, resulting in several generations of transmission occurring before outbreak detection, as well as other factors. Overall, the secondary transmission rate was 1.2% (18/1,448) for all settings, or 0.4% (5/1,411) excluding the single ECEC service outbreak. The secondary attack rate within schools was 0.5% (5/914).

It is notable that more than half of the primary cases that occurred in schools and ECEC services were in staff members. This is consistent with the higher rate of COVID-19 seen in adults than in children. This reinforces the need for adults, and children, to ensure they do not attend school when ill and if they become ill to promptly isolate themselves and seek medical attention. It is also important for all adults, including teachers and other school staff members, and where possible older children, to follow recommended social distancing practices while at school and in the community. Guidance has been issued at both national and state and territory levels to ensure schools and ECEC services can reduce the risk of the spread of COVID-19.

SARS-CoV-2 transmission in children in schools appears considerably less than the transmission seen for other respiratory viruses, such as influenza. These data suggest that children are not the primary drivers of COVID-19 spread in schools or in the community. This observation is consistent with data from international studies showing

low rates of disease in children and suggesting limited spread among children and from children to adults. Data from the whole of NSW during the same period also demonstrated that children (aged ≤18 years) represented only 4% of all cases of COVID-19 despite being approximately 23% of the population.

It is very important that the results of this investigation are taken in the context of the overall first epidemic wave in NSW during the observational period. The majority of cases that were occurring in NSW each day were related to overseas travel, and community transmission was not occurring at a high rate; the epidemic in NSW was considerably less intense than that seen in multiple other countries. As such these data should not be taken to imply that transmission rates would be the same in other settings with unchecked community transmission. The low case numbers and transmission rates across all NSW schools and ECEC services reflect the strong public health and community responses, which resulted in the COVID-19 epidemic in NSW being rapidly and effectively controlled. Tracking the rate of virus transmission was possible because multiple simultaneous case introductions to schools and ECEC services were not occurring and because these educational facilities remained opened throughout the epidemic peak. Greater spread of the virus may have occurred in schools and ECEC services if the epidemic had escalated or in the absence of rapid and effective case detection and quarantine of exposed close contacts.

In addition, attendance at schools and ECEC services over the observational period declined, although most schools remained open. More detail on this is available in the study published in The Lancet Child and Adolescent Health. From 23 March 2020 the NSW Premier advised that although schools remained open, parents were encouraged to keep their children at home for online learning and school holidays commenced in NSW on Friday 10 April for two weeks.

As the pandemic evolves it will be important to monitor its impact in educational settings. The NSW Department of Health and Department of Education and NCIRS have committed to continue enhanced investigations to monitor the transmission of COVID-19 in schools and ECEC services and report the findings.

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