

COVID-19 in schools and early childhood education and care services – the experience in NSW: 16 June to 31 July 2021

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

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Overview

- This report provides an overview of surveillance of SARS-CoV-2 transmission in all schools and early childhood education and care (ECEC) services and associated households in New South Wales (NSW), Australia between **16 June 2021 and 31 July 2021**, with contact tracing and test follow-up data until **19 August 2021**.
- Since 16 June 2021, NSW has been experiencing local transmission of SARS-CoV-2 with the Delta (B.1.617.2) variant. The start of the outbreak coincided with the last 2 weeks of school term 2.
- From 25 June 2021, the Greater Sydney region has been in lockdown (stay-at-home orders). Schools resumed for Term 3 on 12 July 2021 via online teaching, but remained open for students who required onsite attendance. A range of COVID-19 mitigation measures, including mandatory mask use for adults and high school students, were implemented from 12 July 2021. Vaccination rates were low in working age adults at outbreak onset.
- Between **16 June 2021 and 19 August 2021**, there were 10,782 COVID-19 notifications in NSW (population 8.1 million). Of these, 2,864 (27%) were among those aged 0 to ≤18 years. The majority of children (98%) had asymptomatic or mild infection.
- There were 59 individuals (34 students [57.6%] and 25 staff members [42.3%]) from 51 educational settings (19 schools and 32 ECEC services) confirmed as primary COVID-19 cases who had an opportunity to transmit SARS-CoV-2 to others in their school or ECEC service.
- 2,347 individuals (1,830 students [77.9%] and 517 staff members [22.0%]) were identified as close contacts of these 59 primary cases. Almost all close contacts (96%) underwent SARS-CoV-2 nucleic acid testing.
- 106 secondary cases (69 students and 37 staff members) occurred in 19 of the 51 educational settings (37%; 3 primary schools and 16 ECEC services), resulting in a secondary attack rate of 4.7%. The highest transmission rate occurred in ECEC services between staff members (16.9%).
- 181 household tertiary cases occurred following exposure to the secondary case from the school or ECEC service, resulting in a household tertiary attack rate of 70.7%.
- In follow-up data from **31 July 2021 to 19 August 2021**, there have been cases occurring in 91 educational settings (10 high schools, 33 primary schools, 45 ECEC services and 3 K-12 schools), taking the total number of educational settings involved in the outbreak to 142. Detailed information on secondary transmission arising in these additional schools and ECEC services will be updated in a future report. .
- Transmission rates in schools, ECEC services and households seen during the current SARS-CoV-2 Delta variant outbreak in NSW are 5.2 times higher than those seen throughout 2020. This is because of the higher transmissibility of the Delta variant. For more information, refer to previous NCIRS reports [here](#) and publication in *The Lancet Child and Adolescent Health* [here](#).
- Numerous social and public health measures, including COVID-19 vaccination, are being implemented to reduce transmission in educational settings and the community. For more information, refer to [NSW Health website](#).

Background

The National Centre for Immunisation Research and Surveillance (NCIRS), with the support of the NSW Ministry of Health and NSW Department of Education, has been conducting surveillance of SARS-CoV-2 transmission in educational settings (schools and early childhood and care [ECEC] services) throughout 2020 and 2021 in New South Wales (NSW), Australia. NSW has a population of 8.1 million, with about 1.8 million residents aged ≤ 18 years. The state has approximately 3,100 schools and 5,800 ECEC services.

On 16 June 2021, an outbreak of Delta (B.1.617.2) variant began in Sydney's eastern suburbs, following a period of no community transmission. The first cases in a school were identified on 18 June 2021. The virus has since spread to other local government areas (LGAs), resulting in the implementation of stay-at-home orders (lockdown) in Greater Sydney (36 LGAs) from 25 June 2021 and a state-wide lockdown from 15 August 2021.

The start of the Greater Sydney lockdown coincided with the commencement of the 2-week school winter holiday period. During that time, ECEC, vacation care and out-of-school-care (care before and after school) services were kept open. NSW schools commenced Term 3 on 12 July 2021 via online teaching in the Greater Sydney area, but remained open for any child or adolescent who required onsite attendance (e.g. children of essential workers, vulnerable children and students who require onsite equipment for projects). Mitigation measures were implemented in schools using [NSW tiered COVID-19 safe schools operation plan](#). All adults and high-school students were required to wear masks. Adults (including staff) were required to sign in and out (using QR system), and non-essential adults were provided limited entry in educational settings. Primary school and ECEC children were not required to wear masks.

For more information on the outbreak response, visit [NSW Health website](#). Refer also to [NSW public health orders and restrictions](#).

Because of limited vaccine supply, vaccination rates among adults of working age, including teachers and ECEC staff, were very low at the start of the outbreak, and few adolescents aged ≥ 16 years were vaccinated. As at 16 June 2021, 20% of adults in NSW had been vaccinated with dose 1 and only 5% with dose 2 in NSW. This increased to 38% (dose 1) and 18% (dose 2) by 31 July 2021¹ and has risen further since then. For more information on vaccination rates, including by age, refer to the [Australian Government Department of Health website](#).

SARS-CoV-2 variants of concern (VoC) that spread more easily between people have emerged overseas, resulting in rapidly expanding outbreaks. The Delta (B.1.167.2) VoC, first detected in India, is now present in 148 countries (as of 17 August 2021) and is fast becoming the predominant global strain. The Delta variant is estimated to be 97% (76–117%) more transmissible than the Alpha VoC.² COVID-19 notifications among children and young adults have increased globally, raising concern about transmission potential within educational settings.³

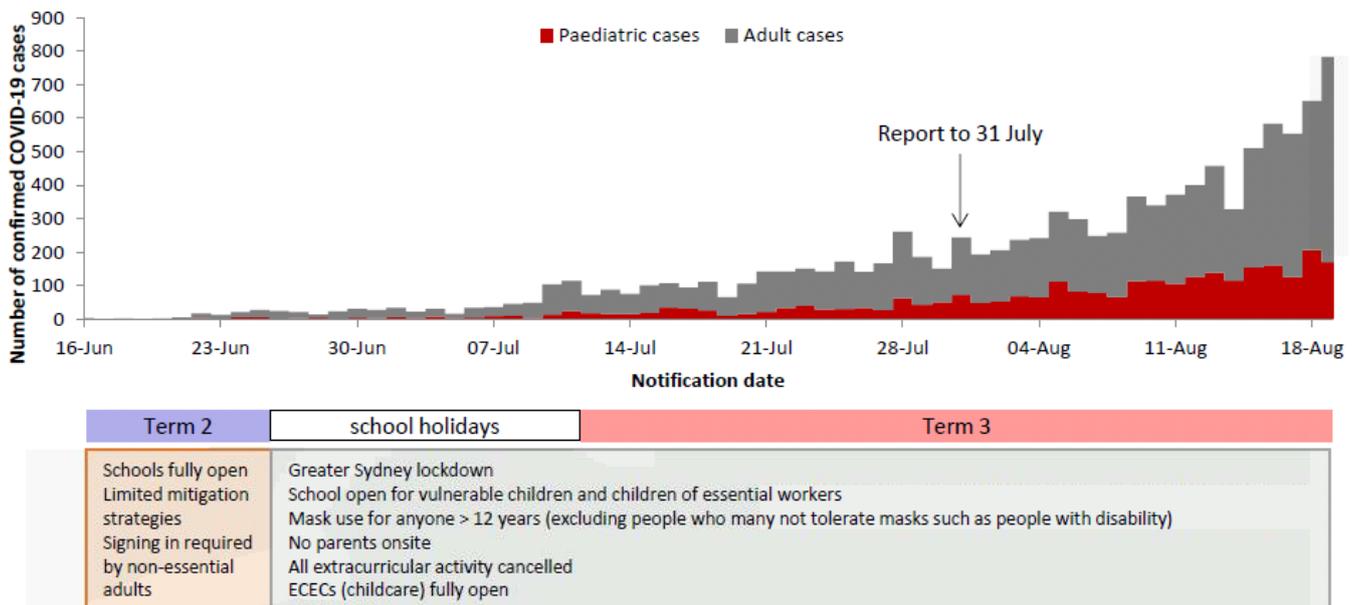
Brief overview of the epidemiology of the COVID-19 Delta variant outbreak in NSW

Between 16 June 2021 and 31 July 2021, there were 3,443 locally acquired COVID-19 cases in NSW, with 753 cases (22%) in children and young people (aged 0 to ≤ 18 years). From 1 August 2021 to 19 August 2021, an additional 7,339 cases were identified, 2,111 (29%) of whom were in children and young people.

Among the total 2,864 (27%) cases in children and young people (between 16 June and 19 August; refer to [Figure 1](#)), 810 (28%) were aged 0–5 years, 945 (33%) were aged 6–12 years and 1,109 (39%) were aged 13–18 years. The majority of cases had asymptomatic or mild infection. 70 out of 2,864 cases (2%) were reported to have been admitted to hospital. Of those admitted, 2 were born in hospital and 68 were admitted from the community. 25 cases were admitted for social and vulnerable reasons, and 43 were hospitalised for medical reasons. Of these 43, 5 young unvaccinated people (aged 15–18 years) required intensive care, some of whom had medical conditions other than COVID-19 that influenced their ICU admission.

Of the COVID-19 cases in children and young people, where the investigation of the source of infection has been completed, 1,680 (88%) had acquired infection from household contacts. All sequenced RNA samples have been of the Delta (B.1.617.2) variant.

Figure 1: COVID-19 cases in NSW, by age and notification date, 16 June 2021 to 19 August 2021



Methods

Any NSW school or ECEC service that had a child or adolescent aged ≤ 18 years and/or adult with laboratory-confirmed COVID-19 attend while infectious (defined as 48 hours before symptom onset, based on national guidelines) was investigated to determine onward transmission in close contacts in the educational setting. In this report, all primary (first) cases in an educational setting were included until 31 July 2021, with data from follow-up for transmission to school/ECEC and the household contacts of any secondary cases included until 19 August 2021.

A 'close contact' is defined as a person who was in face-to-face contact for at least 15 minutes or in the same room for 1 hour with a case while infectious (i.e. during their symptomatic period and 48 hours before symptom onset). All close contacts are required to quarantine for 14 days from their last exposure date. A 'casual contact' is defined as a person who was onsite at the school or ECEC service at the same time as the case but does not meet the definition of a close contact. Casual contacts are required to quarantine for 5 days. Both close and casual contacts are required to undergo SARS-CoV-2 nucleic acid testing before de-isolation. If a casual contact of a school or ECEC case tests positive, all contacts at the educational setting are upgraded to 'close contacts'. An 'outbreak' is defined as 2 or more secondary cases in a school or ECEC service.

Full details of our methods can be found in our previous [reports](#) and [publication](#).⁴

Results

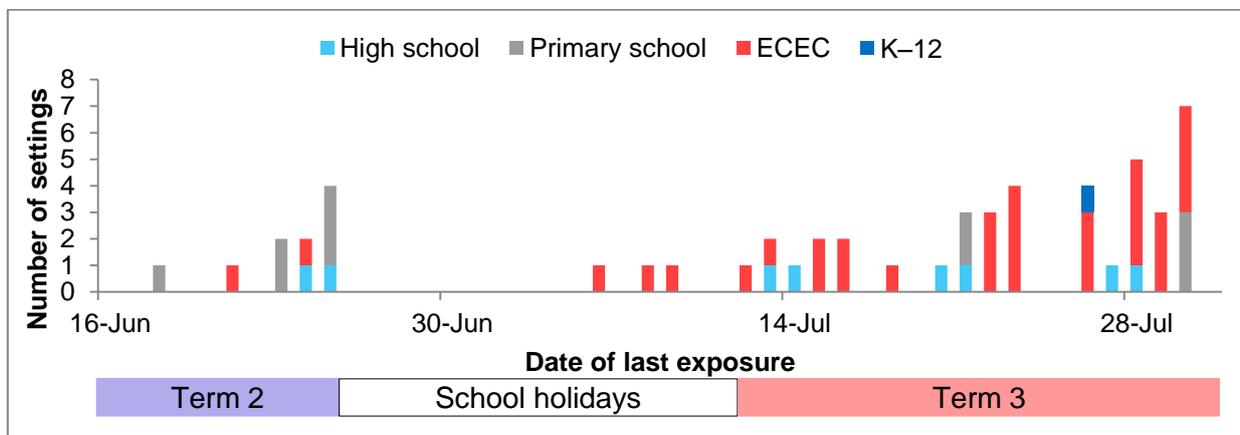
Between 16 June 2021 and 31 July 2021, the reporting rate of COVID-19 cases in NSW was 42 per 100,000 population (within Greater Sydney: 61 per 100,000 population).

During this period, there were 59 primary (first) cases of COVID-19 (34 students and 25 staff members) in 51 educational settings; refer to [Figure 2](#). Most of the primary cases acquired COVID-19 through household contacts (24 students and 8 staff members; 54%), followed by an unknown source (6 students and 12 staff members; 31%) and community non-household contacts (4 students and 5 staff members; 15%).

Public health staff identified 2,347 close contacts (1,830 students and 517 staff members) of the 59 primary cases from the school or ECEC service, of whom 2,253 (96%) contacts underwent nucleic acid testing on at least one occasion.

Of the 2,253 close contacts tested across all settings, 106 cases (69 students and 37 staff members) were positive for SARS-CoV-2. The overall secondary attack rate was 4.7% (106/2,253) (refer to [Table 1](#)). Higher secondary attack rates occurred when the primary case in a school or ECEC service was an adult staff member as compared with a child or an adolescent. The highest transmission rate occurred in ECEC settings between staff members (16.9%). Secondary transmission occurred in 19 of the 51 educational settings (3 primary schools and 16 ECEC services; 37%). All 34 primary and 69 secondary student cases (0-≤18 years) had asymptomatic or mild infection. None required hospitalisation.

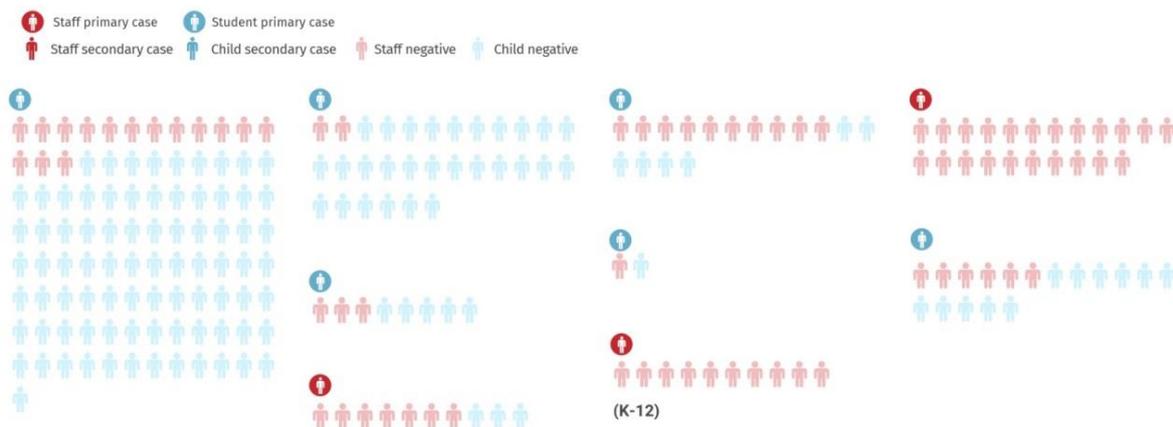
Figure 2: NSW schools and ECEC services with a COVID-19 primary case(s), 16 June to 31 July 2021



High schools

A total of 8 COVID-19 primary cases (6 students and 2 staff members) who attended 7 high schools while infectious were identified. One school had co-primary cases (student and teacher). The total number of contacts in these 7 high schools was 203 (137 students and 66 staff members). 202 (>99%) of the contacts underwent nucleic acid testing. There were no positive secondary cases identified. Refer to [Figure 3](#).

Figure 3: Primary cases, close contacts and secondary cases in staff members and students in 7 NSW high schools and 1 K-12 school between 16 June and 31 July 2021

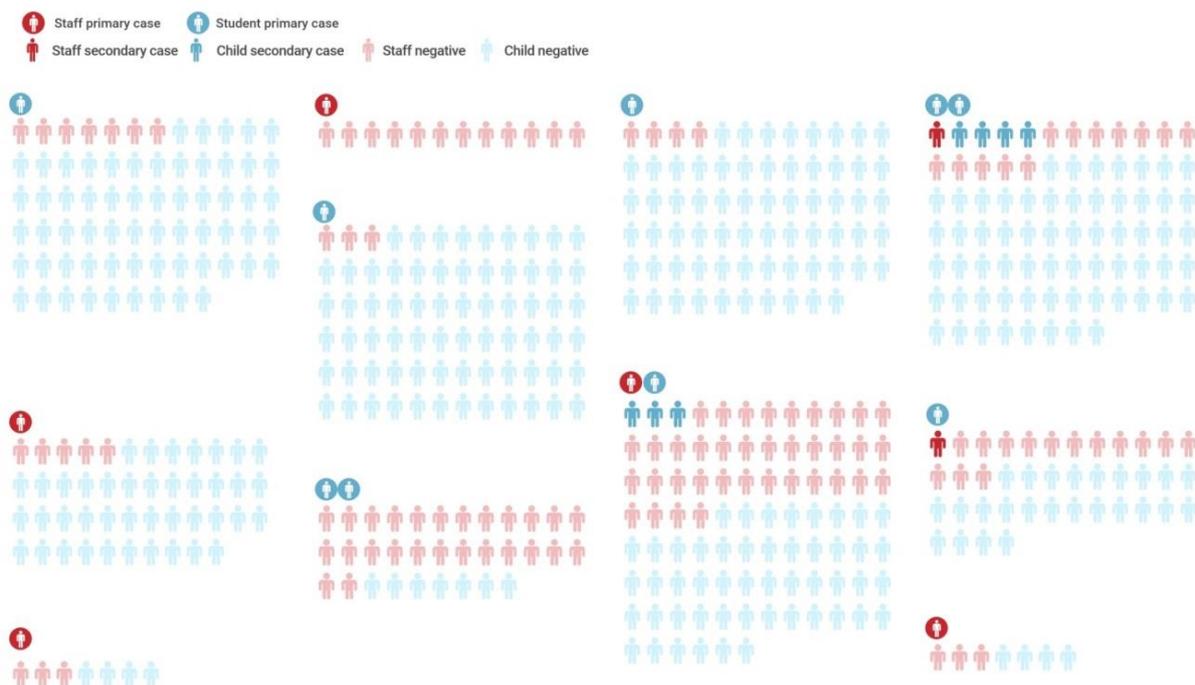


Note: In one high school, there were 2 unrelated exposures that were managed as individual events.

Primary schools

A total of 14 COVID-19 primary cases (9 students and 5 staff members) who attended 11 primary schools while infectious were identified. Three schools had co-primary cases. In two schools the co-primary cases were siblings, and in another school the co-primary cases were an unrelated student and a staff member. The total number of contacts in these 11 primary schools was 546 (434 students and 112 staff members). Of these 546 contacts, 526 (96%) underwent nucleic acid testing, of whom 9 (7 students and 2 staff members) tested positive across 3 settings. The overall secondary attack rate was 1.7% (9/526). Refer to [Figure 4](#).

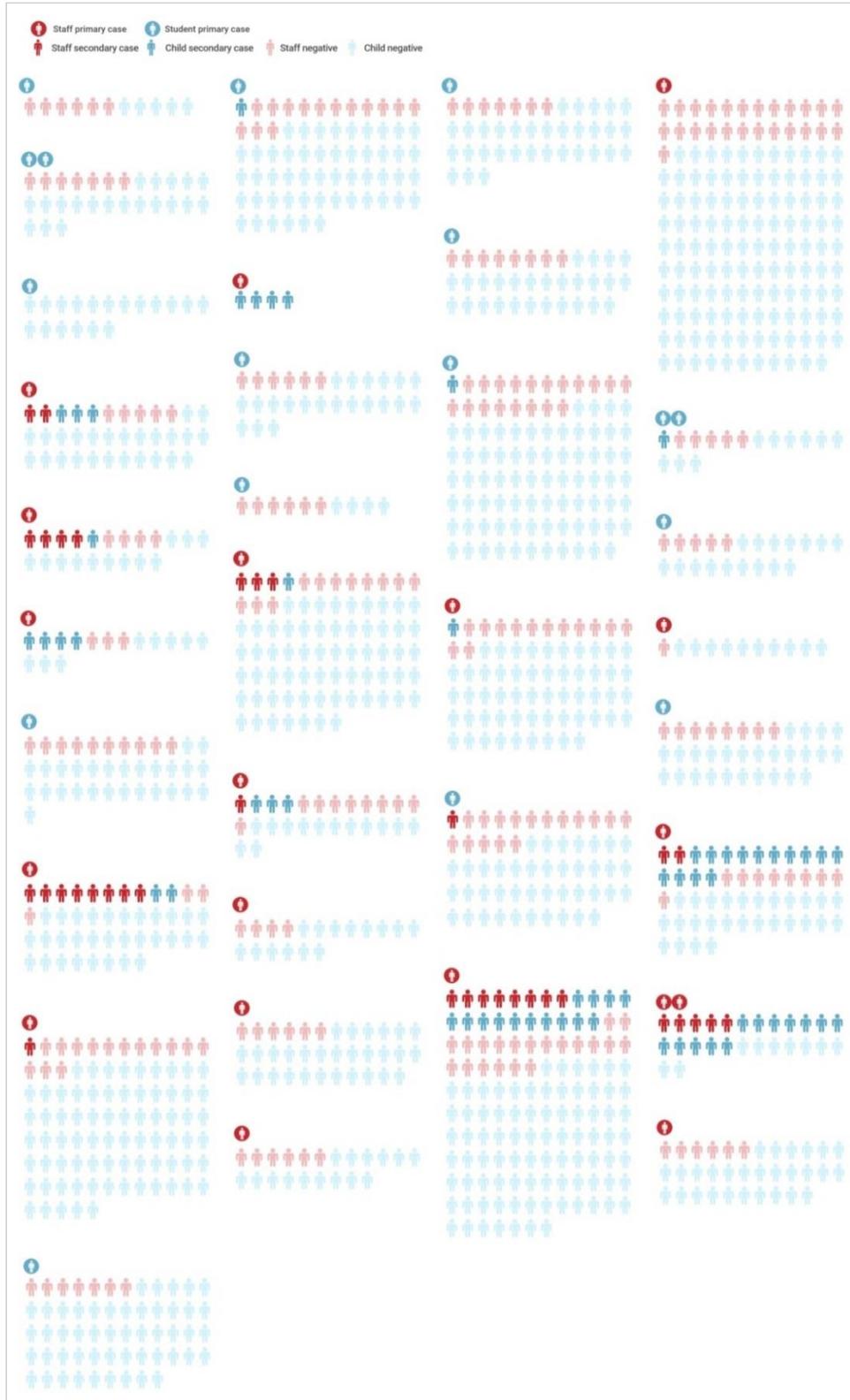
Figure 4: Primary cases, close contacts and secondary cases in staff members and students in 11 NSW primary schools between 16 June and 31 July 2021



ECEC services

ECEC services remained fully open during this report period. A total of 36 primary cases (19 children and 17 staff members) who attended 32 ECEC services while infectious were identified. Three ECEC services had co-primary cases. One ECEC service also had two separate exposures. In two ECEC services, the co-primary cases were siblings, and in another ECEC service they were unrelated staff members. The total number of contacts in the 32 ECEC services was 1,586 (1,259 students and 327 staff members), of whom 1,515 (96%) underwent nucleic acid testing. There was secondary transmission in 16 of 32 ECEC services, where 97 contacts (62 students and 35 staff members) tested positive. The overall secondary attack rate was 6.4% (97/1,515). Refer to [Figure 5](#).

Figure 5: Primary cases, close contacts and secondary cases in staff members and children in 32 NSW ECEC settings between 16 June and 31 July 2021



Note: In one ECEC service, there were 2 unrelated exposures that were managed as individual events.

Kindergarten to Year 12 (K–12) school

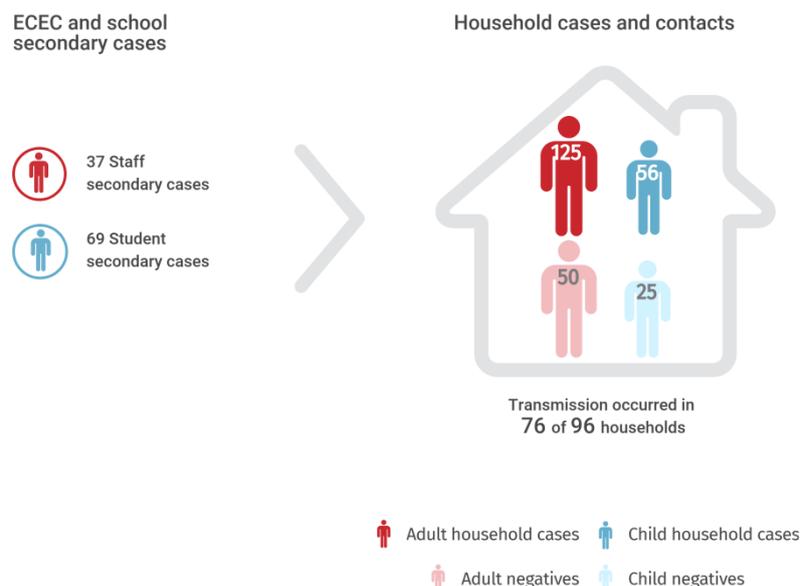
One staff member attended a K–12 school while infectious. There were 12 contacts (all staff members) of the primary case and 10 (83%) underwent nucleic acid testing. No secondary cases were identified. Refer to [Figure 3](#).

Transmission in household contacts from cases who acquired COVID-19 at school or ECEC service

For the 106 secondary cases where infection was acquired within the school or ECEC service (refer to [Table 1](#)), a total of 181 of their 256 household contacts (across 96 households) were subsequently infected with SARS-CoV-2 (attack rate 70.7%). Refer to [Figure 6](#).

The median number of uninfected household contacts was 3 people (range 0–8 people). Transmission from a school/ECEC secondary case occurred in 76 of 96 households. In 55 households (57%) all household members acquired SARS-CoV-2 infection. All 59 paediatric tertiary cases had asymptomatic or mild infection and did not require hospitalisation.

Figure 6: Tertiary (household) cases resulting from a secondary case infected at a school or ECEC between 16 June and 31 July 2021



Settings identified after 31 July 2021

Between **1 August 2021 and 19 August 2021**, an additional 91 educational settings (10 high schools, 33 primary schools, 45 ECEC services and 3 K-12 schools) were identified where 99 individuals (52 students and 47 staff members) attended the setting while infectious. This takes the total number of educational settings involved in the current NSW outbreak to 142. In some of these settings, secondary transmission has occurred. Data on transmission in these schools and ECEC services during this period will be included in the next report.

Table 1: Secondary attack rates in educational settings, by primary and secondary case type and educational setting type, between 16 June and 31 July 2021

Primary case type	Close contact type	n positive NAT/N tested	Attack rate (%)
Overall			
Any	All	106/2253	4.7%
Adult	All	88/1027	8.6%
Adult	Adult	33/294	11.2%
Adult	Child	51/733	7.0%
Child	All	21/1316	1.6%
Child	Adult	4/274	1.5%
Child	Child	17/1042	1.6%
High schools			
Any	All	0/202	0.0%
Primary schools			
Any	All	9/526	1.7%
Adult	All	3/162	1.9%
Adult	Adult	0/60	0.0%
Adult	Child	3/102	2.9%
Child	All	9/454	2.0%
Child	Adult	2/86	2.3%
Child	Child	7/368	1.9%
ECEC services			
Any	All	97/1515	6.4%
Adult	All	85/823	10.3%
Adult	Adult	33/195	16.9%
Adult	Child	51/628	8.1%
Child	All	12/692	1.7%
Child	Adult	2/151	1.3%
Child	Child	10/541	1.8%

Note: For one primary school where both a staff member and student were co-primary cases, the close contacts have been counted in attack rate calculations for both categories of primary cases.

Discussion

NSW is experiencing a large COVID-19 outbreak due to the SARS-CoV-2 Delta (B.1.617.2) variant that commenced on 16 June 2021, with most cases occurring in Greater Sydney (population of 5.7 million people).⁵ The Delta variant infects more people at a faster rate than early forms of SARS-CoV-2. Despite stay-at-home orders in place in Sydney since 25 June 2021, there is ongoing local transmission.

During this outbreak (to end July 2021) there has been a 5-fold higher rate of transmission (secondary attack rate 4.7%) than in 2020 (secondary attack rate 0.9%) in educational settings. ECEC services have experienced the highest rate of transmission (6.4%; 97/1,515), as they were fully open with high attendance rates. The majority of affected ECEC services (88%; 28/32) were in the LGAs with the highest community incidence rates of COVID-19 in Sydney (data not shown). Transmission was highest between ECEC staff members (16.9%) and from ECEC staff member to a child (8.1%). The majority of ECEC staff members are young (64% aged <40 years in the 2016 ECEC

National Workforce Census⁶) and thus were not yet eligible for vaccination under the Australian COVID-19 vaccine national rollout strategy before this outbreak. Transmission was low in schools (1.2%; 9/728) as a likely result of the school holiday period and subsequent limited attendance in Term 3, when the majority of Greater Sydney school students engaged in remote learning.

This report also provides insights into transmission in household contacts from a case who acquired their infection in a school or ECEC service. From the 106 secondary school/ECEC cases, there were 181 household tertiary cases, giving a tertiary attack rate among household members of 70.7% (73.4% from a student and 66.3% from a staff member). This attack rate is higher than the 16.5% attack rate seen in all household contacts of cases from educational settings in our surveillance in Terms 3 and 4, 2020 (data not shown). A household study in England also reported a 64% increase in the odds of household transmission associated with infection with SARS-CoV-2 Delta variant than with Alpha.⁷

Full participation in education services is vital for children to learn and develop socially and for family and societal functioning. Although many children are being infected with SARS-CoV-2, they are rarely hospitalised. There are however long-term consequences of lack of access to education;⁸ for example, the loss of one third of a school year of learning has been estimated to reduce future earned income of the affected students by about 3%.⁹

Higher population-level rates of COVID-19 vaccination, including vaccination of school/ECEC staff, are critical to reduce the risk of transmission of SARS-CoV-2 in the community and in educational settings. In addition, COVID-19 vaccination of adolescents, including Year 12 students (aged 16–18 years) in higher risk LGAs which is currently occurring as part of the outbreak response, is an important step towards returning students into the classroom.

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NCIRS core clinical and epidemiological team

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Clinical and epidemiological team: Nick Wood, Lucy Deng, Evangeline Gardiner, Zoe Joo, Zoe Croker, Twingle Daniel

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Glossary

Community non-household contact	a person in close contact of a COVID-19 case who does not live in their household
ECEC	Early childhood education and care: all forms of education for children under school-age, including childcare and preschool
High school	a secondary school (Year 7 to 12) that caters for children aged 12 to ≤18 years
Household tertiary case	a person who lives within the same household as a secondary case and gets infected with SARS-CoV-2 from exposure to that secondary case
K-12 school	a school (Kindergarten to Year 12) that caters for children aged 4 to ≤18 years in which contacts were not restricted to the primary or secondary school
NSW	New South Wales
Primary case	a person who has SARS-CoV-2 infection and brings it into a school or ECEC
Primary school	an elementary school (Kindergarten to Year 6) that caters for students aged 4 to ≤12 years
SARS-CoV-2	Severe Acute Respiratory Syndrome-Coronavirus-2: the name of the coronavirus that causes COVID-19 disease
SARS-CoV-2 nucleic acid test	a test that detects the SARS-CoV-2 genome
Secondary attack rate	a measure of the frequency of new cases of COVID-19 among the contacts of primary cases
Secondary case	a person who gets infected with SARS-CoV-2 in a school or ECEC setting from exposure to a person with COVID-19
Secondary transmission	transmission of SARS-CoV-2 from a primary case to exposed contacts

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