

SARS-CoV-2: Are schools a driver for epidemic spread?

WSPID

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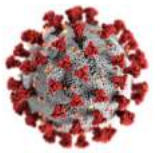
Funded by NSW Government, Department of Health





I would like to begin by acknowledging the Traditional Custodians of the land on which we all meet on today, and pay my respects to their Elders past and present.

COVID-19

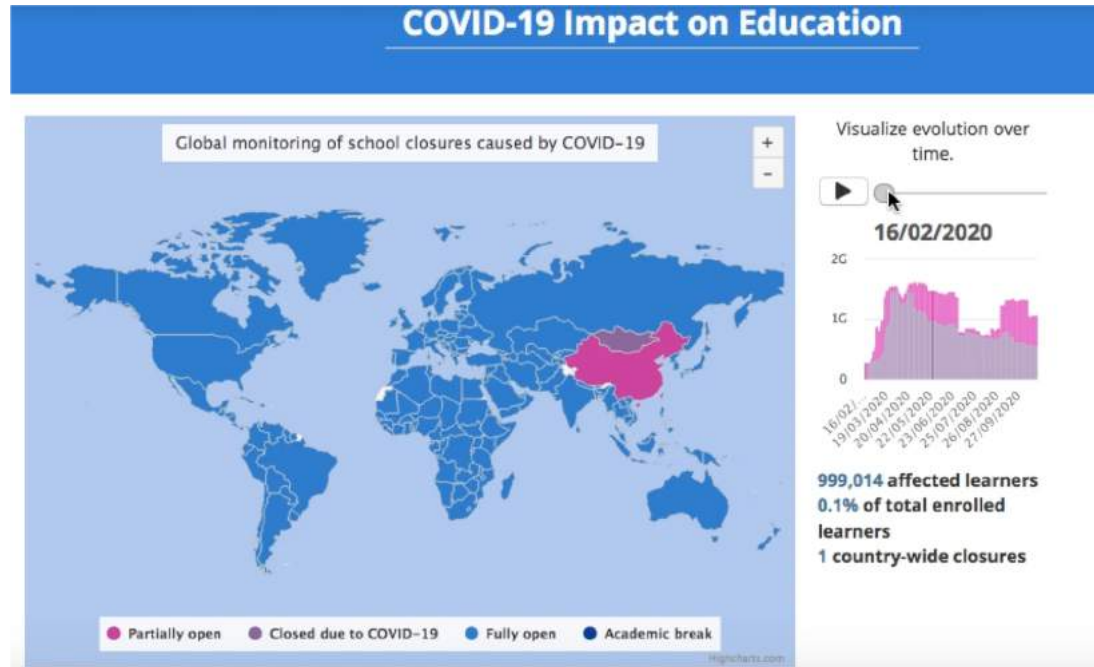


- SARS-CoV-2
- Coronavirus
- Emerged in November/December; noted initially in Wuhan, China
- Global pandemic:
 - 42 million cases; ~ 1,200,000 deaths



COVID-19 Data Repository by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University" or "JHU CSSE COVID-19 Data" for short, and the url: <https://github.com/CSSEGISandData/COVID-19>, Accessed 21 September 2020

COVID-19 impact on education



COVID-19 Impact on Education, UNESCO, <https://en.unesco.org/covid19/educationresponse> Accessed 13 September 2020

Closure of Schools



Possible benefits

- **Aim to reduce viral transmission**
- Reduces travel/movement of people
- Children have mild symptoms – would they bring it home to the family and infect the elders?
- Limiting introduction of this virus to a setting where kids are unable to physically distance
- Protecting teachers

Adverse consequences

- Interrupted learning
- Confusion and stress for teachers
- Parents unable to work
- Increases education disparity
- Rise in drop out rates
- Social isolation
- Increased exposure to vulnerabilities at home

<https://en.unesco.org/covid19/educationresponse/consequences>

Coronavirus in Kenya: How it turned classrooms into chicken coops

25 August

Coronavirus pandemic

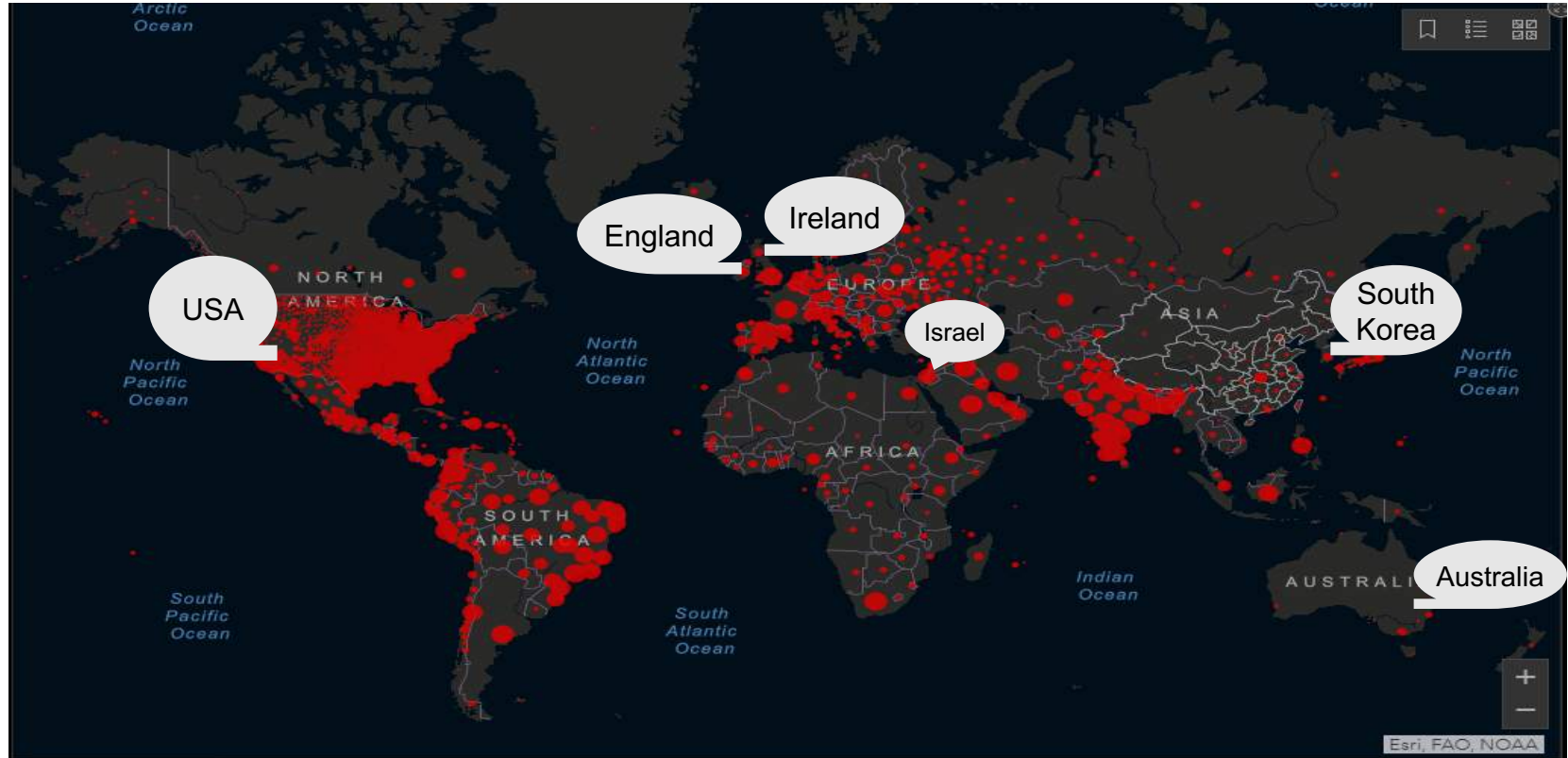


Joseph Maina has transformed the classrooms in his school

<https://www.bbc.com/news/world-africa-53846442>

Does closing schools reduce viral transmission?

Does keeping school open/reopening schools increase viral transmission?





- First Irish case of COVID-19 in a school aged child: March 2020

 Index cases: 3 paediatric cases and 3 adult cases attended school

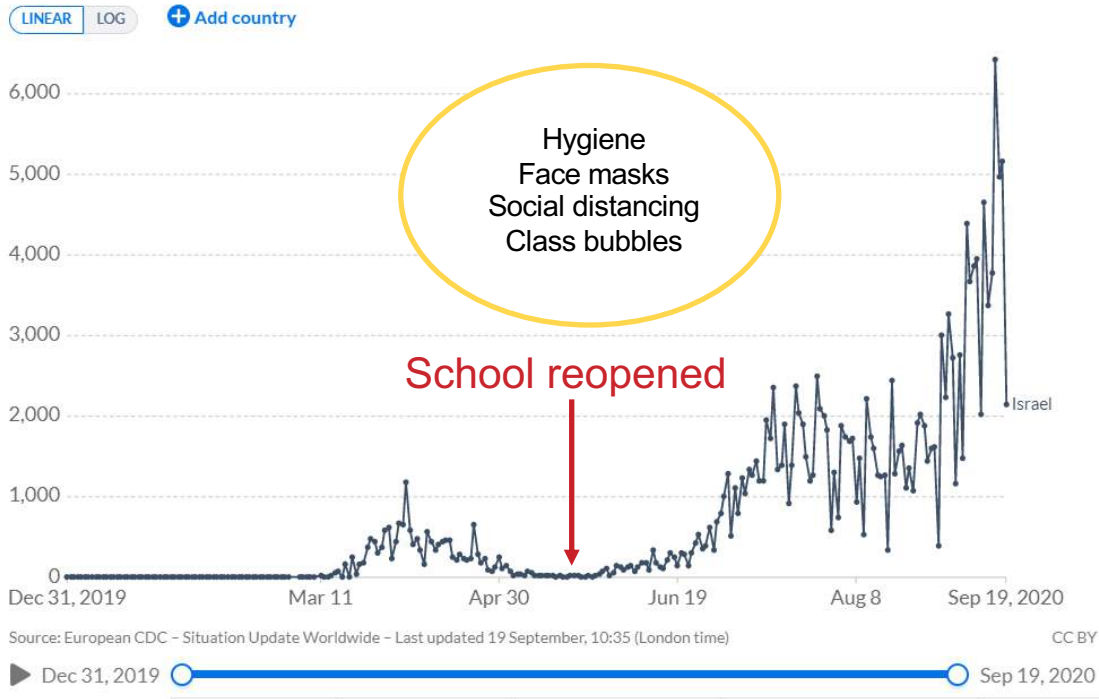
- Contacts: 1,155 – classroom, sports, music, choir
- All symptomatic cases were tested: 0 secondary cases



Daily new confirmed COVID-19 cases

The number of confirmed cases is lower than the number of actual cases; the main reason for that is limited testing.

Our World
in Data



<https://ourworldindata.org/coronavirus/country/israel?country=-ISR>

- 2 index cases – high school (1,164 students and 152 staff)
- Testing of entire school:
 - 153 students; 25 staff members positive
- Crowded classes (up to 38 students), extreme heatwave; continuous air conditioning

Stein-Zamir C. Eurosurveillance. 25(19) 23 Jul 2020



B. Percent Increase in Child Cases, 9/17/20-10/1/20

From 9/17-10/1, there were 73,276 new child cases reported (573,381 to 646,656; 13% increase)^



- Increase in new child cases with school year starting
- Children make up 10.5% of all cases
- 874/100,000
- Children make up 1.8% of all hospitalisation



- Survey of **57,335 childcare workers**
- No difference between COVID-19 whether you continued to work in a childcare
- Being a home-based child care provider was associated with COVID-19 outcome

Gilliam, WS et al. Pediatrics. DOI: <https://doi.org/10.1542/peds.2020-031971> ; Oct 2020

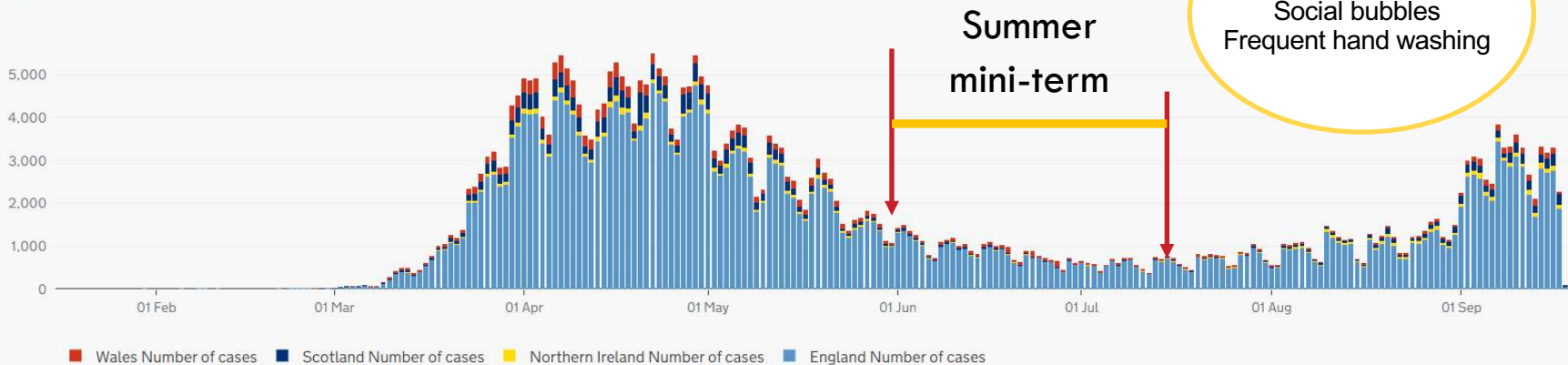


Cases by specimen date, by nation

By nation UK total

Number of people with at least one lab-confirmed positive COVID-19 test result, by specimen date, by nation. Individuals tested positive more than once are only counted once, on the date of their first positive test.

Daily Cumulative Data About



475,000 → 1,646,000 *childcare/primary school

Cases in United Kingdom, GOVI.UK Coronavirus (COVID-19) in the UK, <https://coronavirus.data.gov.uk> Accessed 20 September 2020

England: Educational settings outbreaks “Summer mini-term”



- **Index cases: 101 index cases**

 70 students  28 staff

  4 co-primary cases (household)

- **Secondary cases:**

- 67 settings: no secondary cases
- 30 settings with secondary cases
 - 53% only 1 secondary case

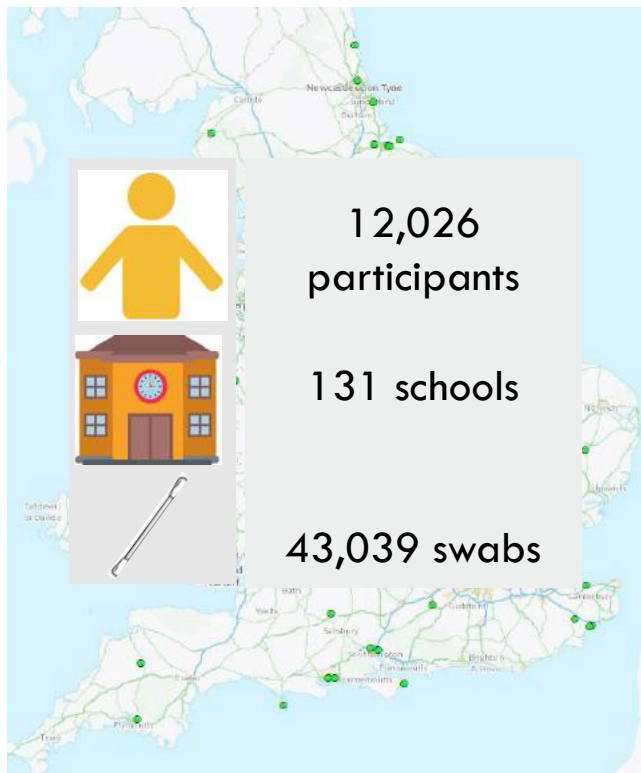
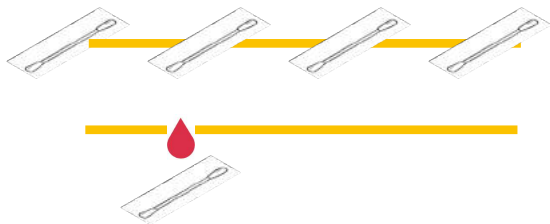
➤ Strong correlation between outbreaks in educational settings and regional COVID-19 incidence

➤ Risk of outbreaks low

England: sKIDS : “COVID-19 Surveillance in School KIDs”



Summer half-term
01 Jun (4-6w)



3 cases
1 student; 2 teachers

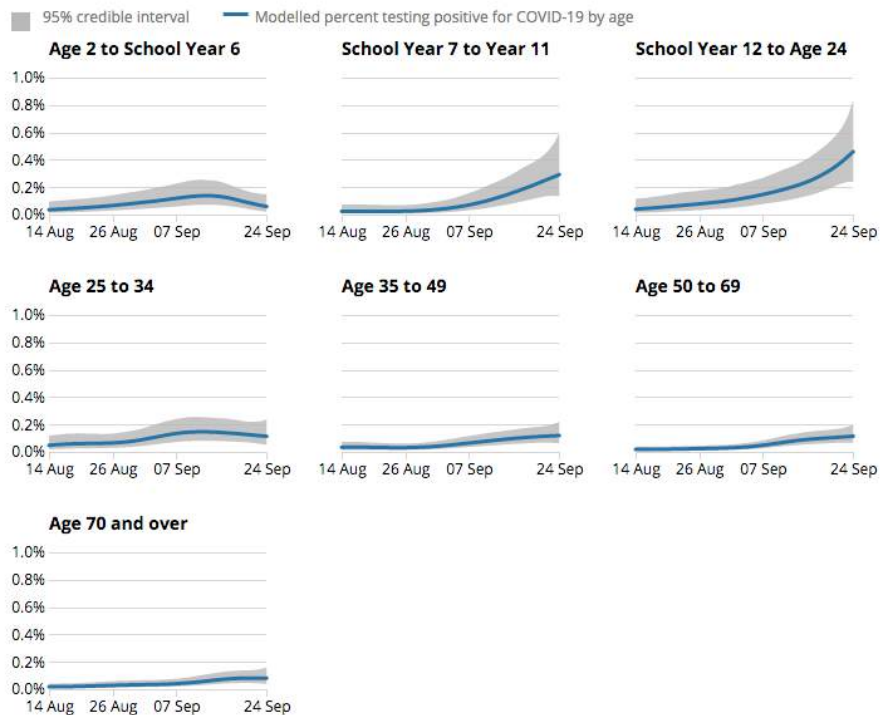


NO additional cases:

- household
- class bubble
- wider educational setting



10.6% students
12.7% staff



Coronavirus: 400,000 children in England off school in one week

Lost learning could create unfairness in 2021 exam grades, schools minister says

- [Coronavirus - latest updates](#)
- [See all our coronavirus coverage](#)

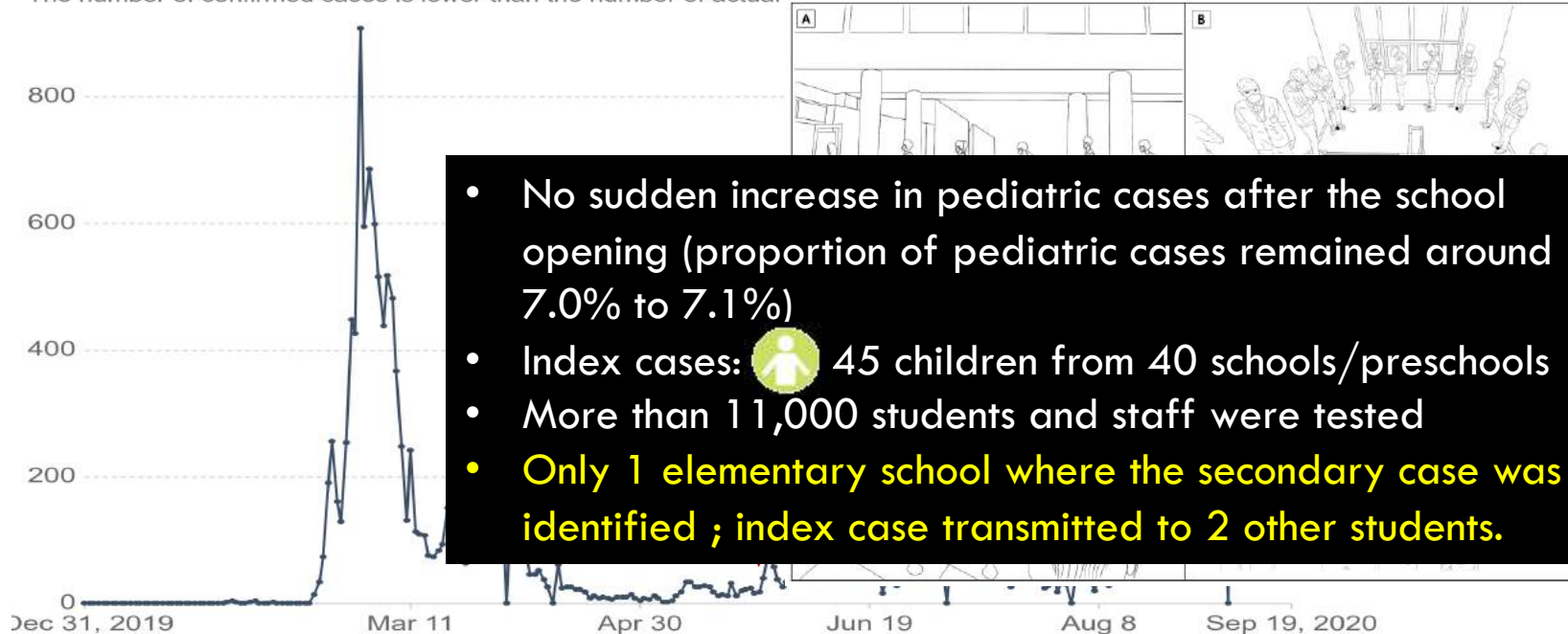





Daily new confirmed COVID-19 cases

The number of confirmed cases is lower than the number of actual cases: the main reason for that is limited testing.

Our World
in Data

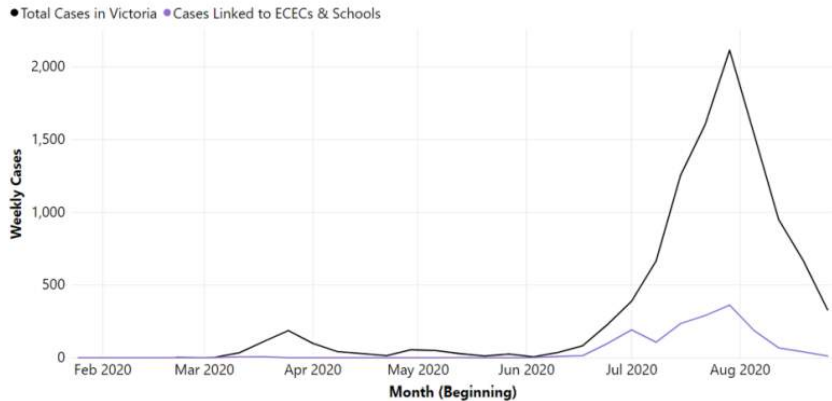


- No sudden increase in pediatric cases after the school opening (proportion of pediatric cases remained around 7.0% to 7.1%)
- Index cases:  45 children from 40 schools/preschools
- More than 11,000 students and staff were tested
- **Only 1 elementary school where the secondary case was identified ; index case transmitted to 2 other students.**

Source: European CDC – Situation Update Worldwide – Last updated 19 September, 10:35 (London time)

CC BY

Australia: Victoria



Epidemiological curve of known SARS-CoV-2 infections in children and adults associated with ECECs and schools, in comparison to total cases diagnosed in Victoria.

Russell, F et al. MCRI 25 September, 2020

https://www.mcri.edu.au/sites/default/files/media/covid_in_schools_report_final_25sept_execsum_1.pdf

- **1,635 infections** linked with ECECs and schools, out of a total of 19,901 cases in Victoria
- **66 percent** involved a single infection in a staff member or student
- 91 percent involved fewer than 10 cases (total)
- Of 1 million students enrolled, only 337 may have acquired COVID via outbreaks at schools
- Of 139 staff & 373 students who may have acquired infection via outbreaks at ECEC or schools, 8 (4 staff and 4 students) were admitted to hospital and all recovered
- Infections in ECEC and schools were rarely linked to infections in the most vulnerable population, the elderly

Australia NSW

- NSW population: 8.1 million
- 1.8 m \leq 18 yrs

- NSW Schools: 3103
- *Staff: 143 084*
- *Student: 1 232 367*

- NSW ECEC: 4600



THE LANCET
Child & Adolescent Health

Log

ARTICLES | [VOLUME 4, ISSUE 11, P807-816, NOVEMBER 01, 2020](#)

PDF
PDF [78]

Transmission of SARS-CoV-2 in Australian educational settings: a prospective cohort study








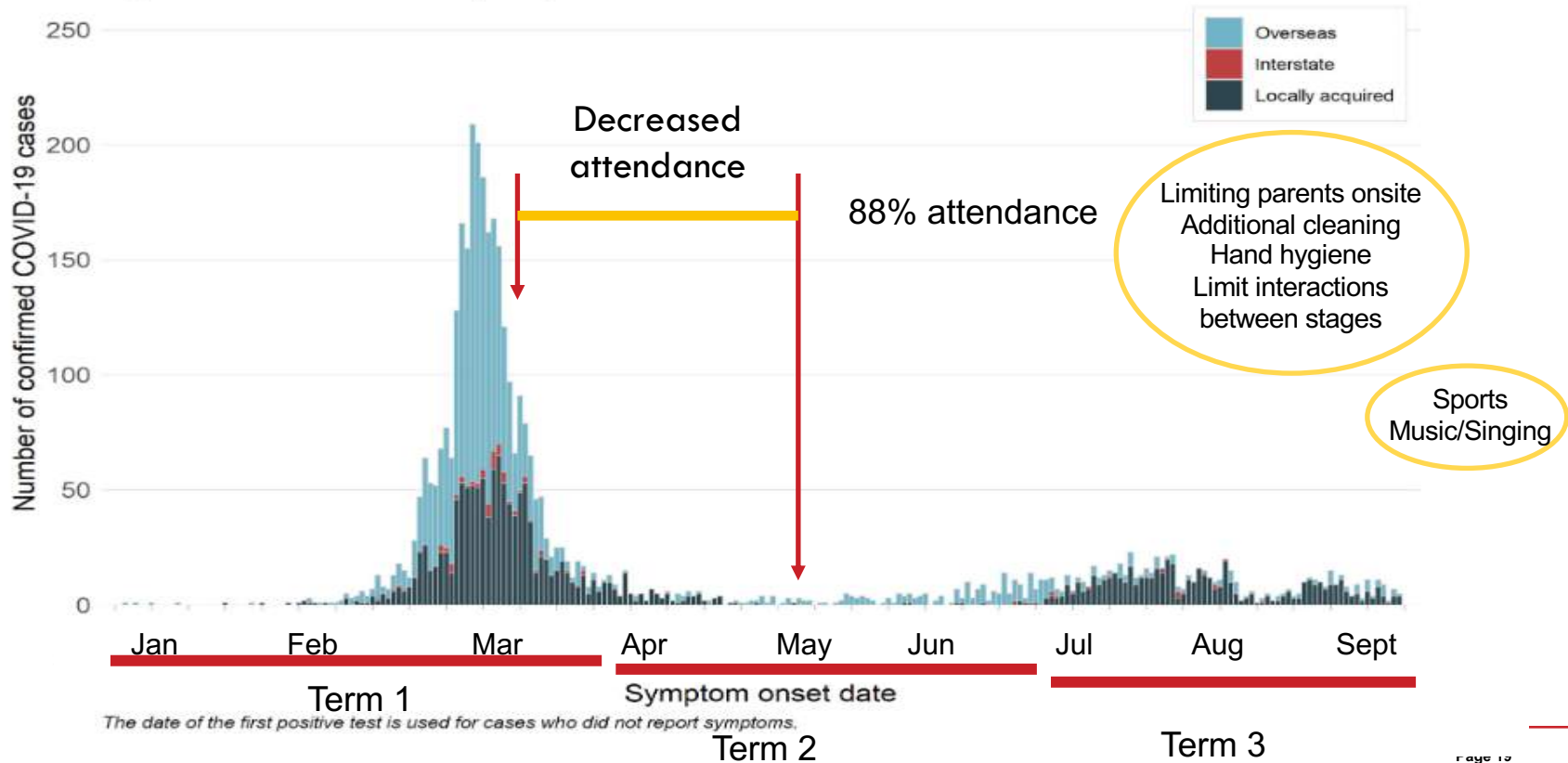
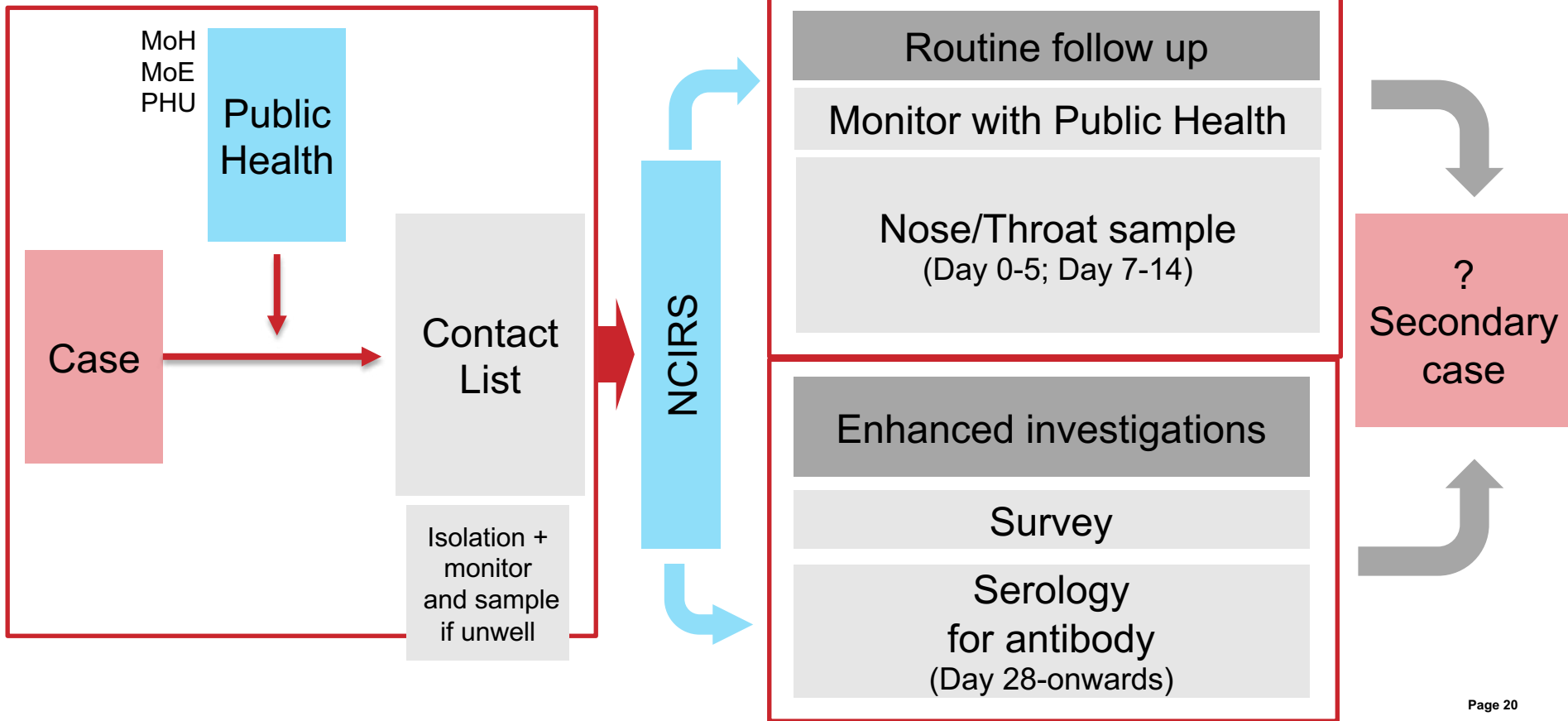
Prof Kristine Macartney, MD   [Helen E Quinn, PhD](#)  [Alexis J Pillsbury, MPhil App Epi](#)  [Archana Koirala, MBChB](#)
[Lucy Deng, MBBS](#)  [Noni Winkler, MPHMT](#)  [et al.](#) [Show all authors](#)  [Show footnotes](#)





Figure 1. COVID-19 cases by likely infection source and illness onset, NSW, 2020







Schools (and childcare) COVID-19 investigation



Transmission by school term in NSW?

Term 1: Total cases: 2982 ; Locally acquired 1253
 27 primary cases in 15 schools; 10 ECEC
 12 students,  15 staff

Term 2: Total cases: 414 ; Locally acquired 147
 6 primary cases in 5 school; 1 ECEC
 4 students;  2 staff

Term 3: Total cases: 615; Locally acquired 439
 39 cases in 28 schools; 6 ECEC
 28 students  5 staff members

	High school	Primary School	ECEC
testing rate** ~40%	696 CONTACTS 292 TESTED 3 positive	218 CONTACTS 78 TESTED 2 positive	534 CONTACTS 257 TESTED 13 positive*
	188 CONTACTS 103 TESTED 0 positive	231 CONTACTS 132 TESTED 0 positive	102 CONTACTS 84 TESTED 0 positive
testing rate** ~95%	2290 CONTACTS 2460 TESTED 20 positive*	860 CONTACTS 748 TESTED 3 positive	439 CONTACTS 421 TESTED 3 positive
	3174 CONTACTS 27 positive Transmission rate: 0.9%	1309 CONTACTS 5 positive Transmission rate: 0.4%	1075 CONTACTS 15 positive Transmission rate: 1.4%*
	ALL CONTACTS (5558) ALL positive (47) Transmission rate: 0.9%		

*outbreaks in 1-3 centres
 **testing = PCR and serology
<http://ncirs.org.au/reports>



- **Preschool/Childcare setting**

- **Term 1:** 13 secondary cases in 1 setting; No transmission in any other setting
- **Contributing factors:**
 - delayed primary case diagnosis
 - combining classrooms
 - close mixing of staff and children
 - shared physical amenities

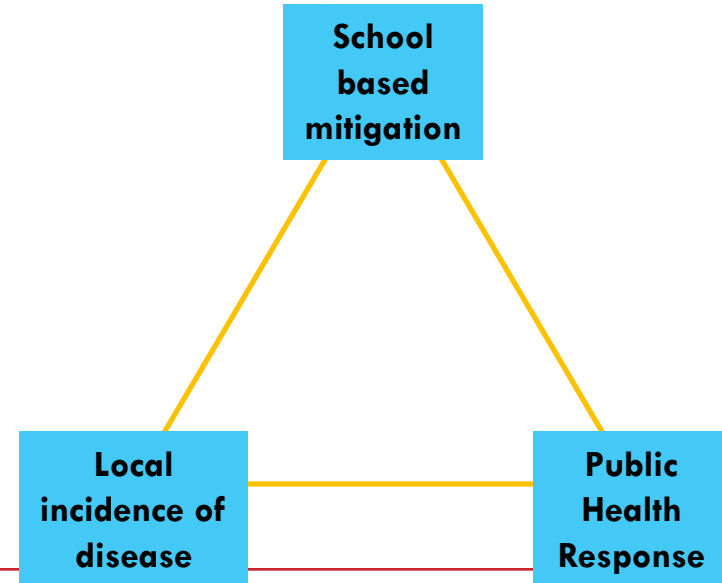
- **High school setting**

- **Term 3** – 3 high schools accounted for 88% (23/26) of secondary cases
- **Contributing factors:**
 - Sentinel seeding events
 - Attendance while symptomatic
 - Increased contact hours

Importance of striking a balance



- How many cases have attended school while infectious?
- What have schools put in place to prevent transmission of COVID-19?
- How do schools respond to an infectious case?
- What is the rate of secondary transmission?

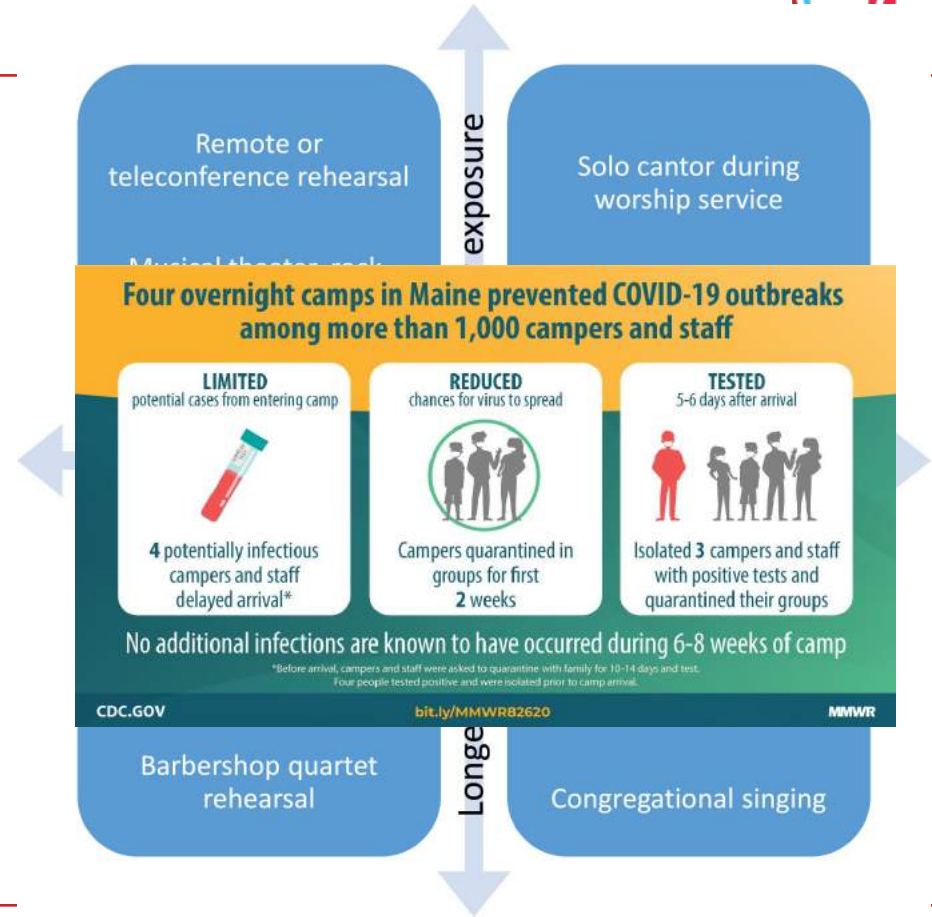


Activities and their risk:



- Singing/Choir practices
 - Outbreak reports in adult choirs
 - Church congregations noted to be outbreak sources
- Sports
 - Close contact; outdoor vs indoor, level of contact
- Overnight camps
 - Outbreak reports in US summer camps

Naunheim M. J Voice. 2020 Jul 2 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7330568/>
Charlotte N. <https://www.medrxiv.org/content/10.1101/2020.07.19.20145326v2>
Hamner L. MMWR 69(19):606–610 <https://www.cdc.gov/mmwr/volumes/69/wr/mm6919e6.htm>
Szablewski C. MMWR 69(31):1023–1025 <https://www.cdc.gov/mmwr/volumes/69/wr/mm6931e1.htm>



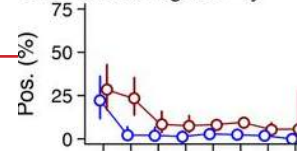
Intergenerational families?



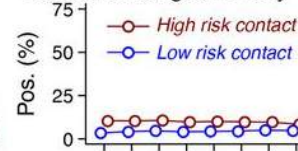
- India
 - Tamil Nadu
 - Andhra Pradesh

C. Case and contact age

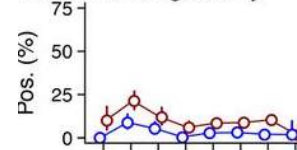
C1. Contacts ages 0–4y



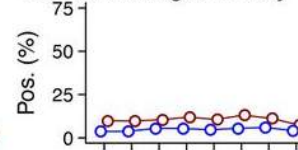
C5. Contacts ages 20–39y



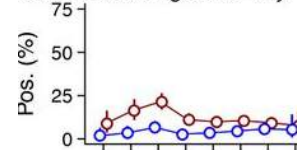
C2. Contacts ages 5–9y



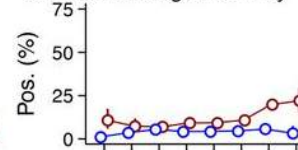
C6. Contacts ages 40–64y



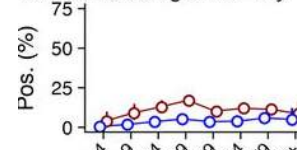
C3. Contacts ages 10–14y



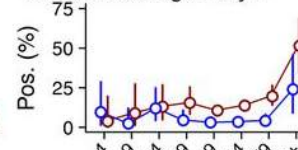
C7. Contacts ages 65–79y



C4. Contacts ages 15–19y



C8. Contacts ages 80y+



Index case age (y)

Index case age (y)



- Highest COVID-19 rate (18.6% [95% CI 14.0%–24.0%]) for household contacts of 10-19 yo
- Lowest (5.3% [95% CI 1.3%–13.7%]) for household contacts of children 0–9 years in the middle of school closure.

Conclusions



- **Likelihood of seeing a case attend school is proportionate to extent of community transmission**
- Transmission within school setting is LOW in context of strong public health and education response
- Schools OVERALL do not seem to be **drivers** of infection
 - Transmission can occur however and is more likely to be amongst staff or high school students.
- School based activities need to be aligned with community incidence of disease
- Early identification of case, = lower risk for transmission
- Coordinated health and education response vital
- Closer of schools; uncertainty of pandemic = stress, mental health toll

