

A photograph of a school hallway. The hallway is brightly lit with recessed ceiling lights. On the left side, there are rows of wooden lockers. On the right side, there are also rows of orange lockers. In the center of the hallway, there is a whiteboard on a stand with the word "INFORMATION" written above it. There are several doors along the walls, some with blue signs above them. A clock is mounted on the wall on the left. The floor is made of light-colored tiles.

# COVID-19 and schools

---

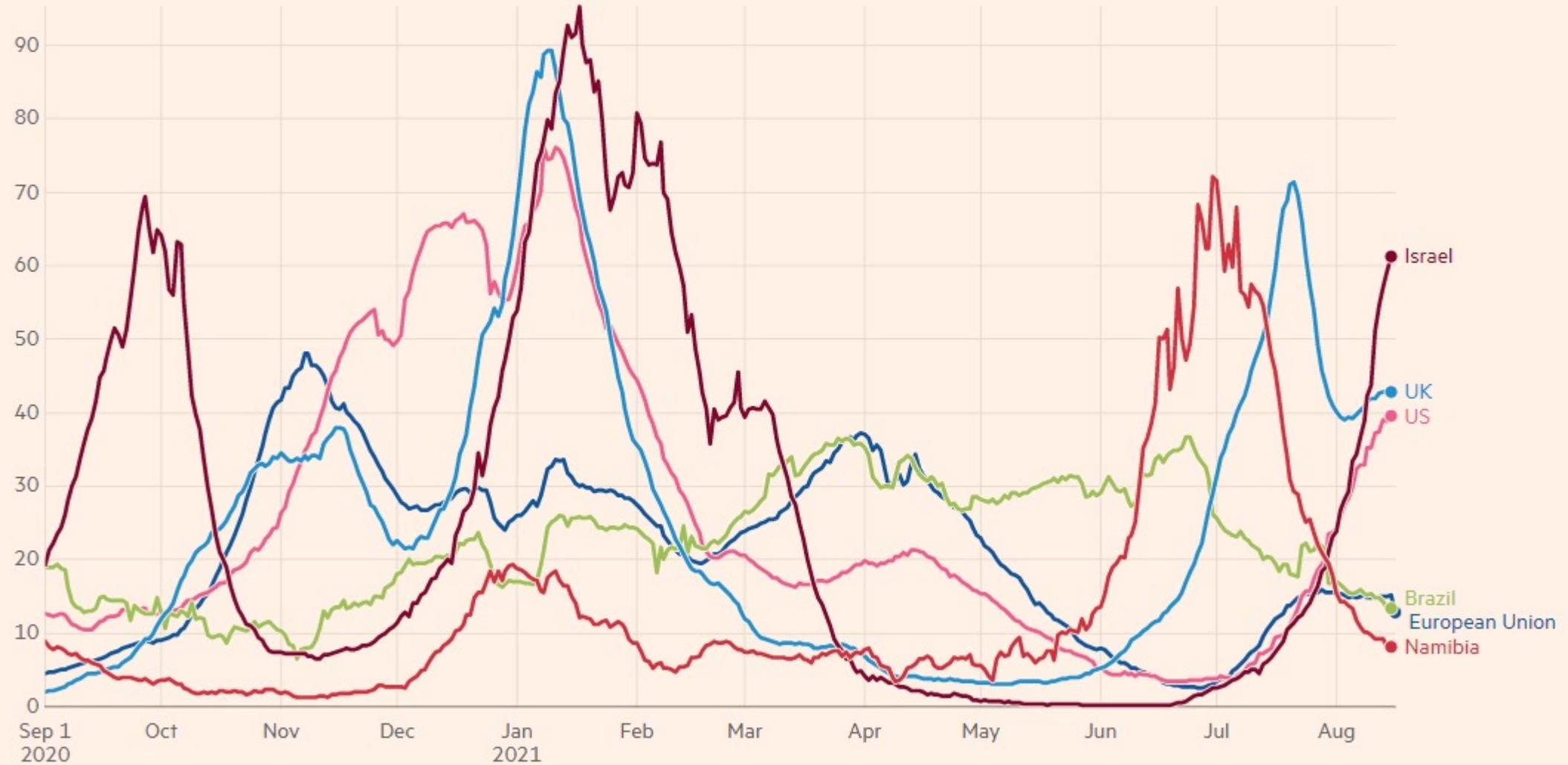
Christelle Ilboudo, MD, FAAP

Assistant Professor of Child Health

University of Missouri Health Care

# New confirmed cases of Covid-19 in European Union, US, Brazil, UK, Israel and Namibia

Seven-day rolling average of new cases (per 100k)



Source: Financial Times analysis of data from Johns Hopkins CSSE, World Health Organization, UK Government coronavirus dashboard, Government of Peru, Public Health France and the Swedish Public Health Agency.  
Data updated August 16 2021 2.00pm BST. Interactive version: [ft.com/covid19](https://www.ft.com/covid19)

FINANCIAL TIMES

# New confirmed cases of Covid-19 in New York, Louisiana, Nevada, Arkansas, Kansas and Missouri

Seven-day rolling average of new cases (per 100k)



Source: Financial Times analysis of data from the Johns Hopkins CSSE.  
Data updated August 16 2021 2.00pm BST. Interactive version: [ft.com/covid19](https://ft.com/covid19)

# Cases and vaccination rates in Missouri

COUNTY POPULATION ^ v	DAILY NEW CASES PER 100K ^ v	INFECTION RATE ^ v	POSITIVE TEST RATE ^ v	VACCINATED (1+ DOSE) ^ v	VULNERABILITY LEVEL ^ v
1 ● St. Louis Co. 990,000	● 31.5	● 1.01	● 11.0%	59% 	● Medium
2 ● Jackson Co. 700,000	● 69.4	● 1.11	● 17.5%	51% 	● Very High
3 ● St. Charles Co. 400,000	● 40.3	● 1.08	● 12.5%	56% 	● Low
4 ● St. Louis city 300,000	● 24.1	● 1.04	● 10.2%	53% 	● Very High
5 ● Greene Co. 290,000	● 41.8	● 0.89	● 11.3%	46% 	● Medium
8 ● Boone Co. 180,000	● 40.1	● 0.91	● 11.0%	58% 	● Medium

# Children and COVID-19: 8/12/21

## Summary of State-Level Data Provided in this Report

Detail and links to state/local data sources provided in Appendix

### Cumulative Number of Child COVID-19 Cases\*

- 4,413,547 total child COVID-19 cases reported, and children represented 14.4% (4,413,547/30,700,985) of all cases
- Overall rate: 5,864 cases per 100,000 children in the population

### Change in Child COVID-19 Cases\*

- 121,427 child COVID-19 cases were reported the past week from 8/5/21-8/12/21 (4,292,120 to 4,413,547) and children represented 18.0% (121,427/674,990) of the weekly reported cases
- Over two weeks, 7/29/21-8/12/21, there was a 5% increase in the cumulated number of child COVID-19 cases (215,251 cases added (4,198,296 to 4,413,547))

### Testing (11 states reported)\*\*

- Among states reporting, children made up between 10.9%-20.6% of total cumulated state tests, and between 4.7%-17.7% of children tested were tested positive

### Hospitalizations (23 states and NYC reported)\*

- Among states reporting, children ranged from 1.6%-3.5% of their total cumulated hospitalizations, and 0.2%-1.9% of all their child COVID-19 cases resulted in hospitalization

### Mortality (43 states, NYC, PR and GU reported)\*

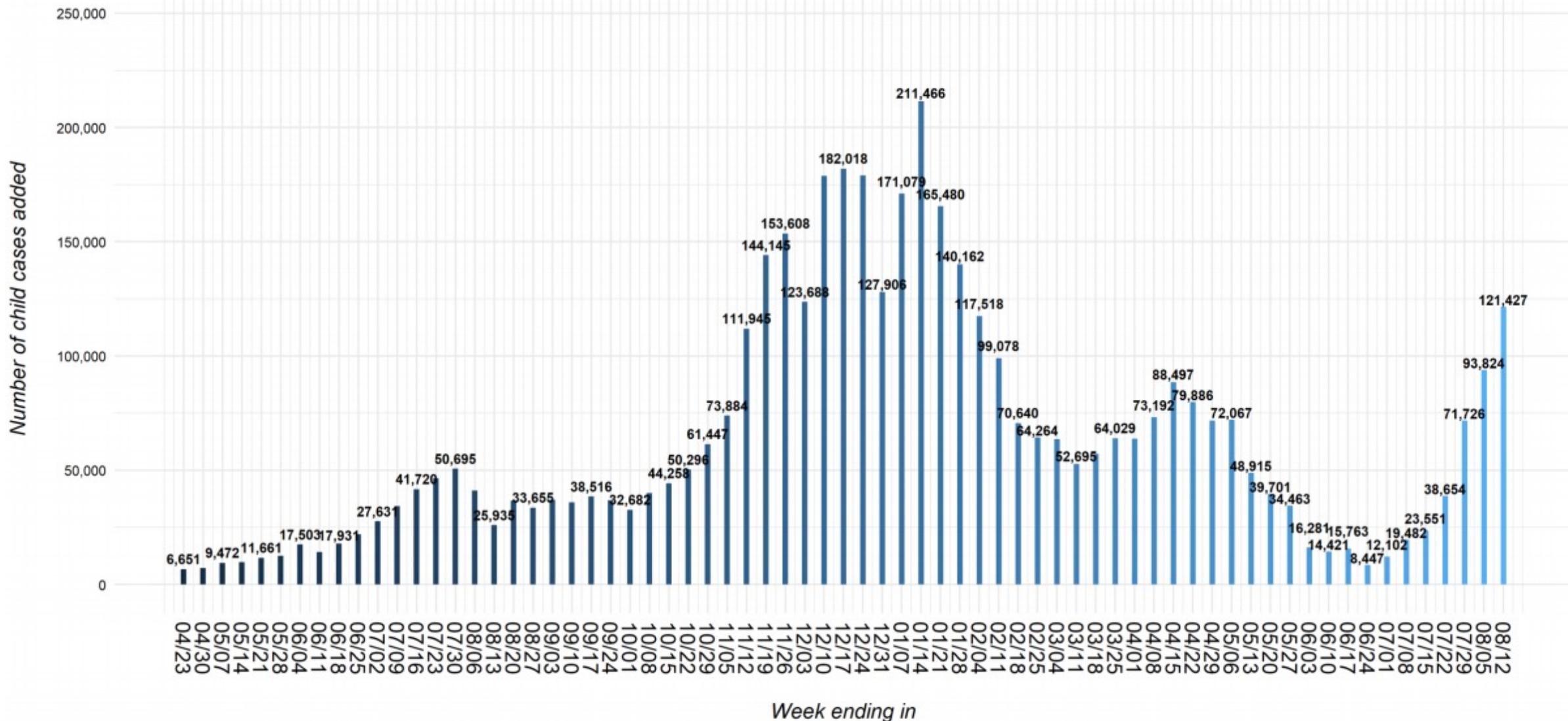
- Among states reporting, children were 0.00%-0.25% of all COVID-19 deaths, and 7 states reported zero child deaths
- In states reporting, 0.00%-0.03% of all child COVID-19 cases resulted in death

See detail in Appendix: Data from 49 states, NYC, DC, PR, and GU; Analysis by American Academy of Pediatrics and Children's Hospital Association

\* Note: The numbers in this summary represent cumulative counts since states began reporting. In this summary and full report, the data are based on how public agencies collect, categorize and post information. All data reported by state/local health departments are preliminary and subject to change and reporting may change over time. Notably, in the summer of 2021, some states have revised cases counts previously reported, begun reporting less frequently, or dropped metrics previously reported. For example, due to several changes on their dashboard and the data currently available, cumulative cases and deaths for Alabama are through 7/29/21. Readers should consider these factors. States may have additional information on their web sites.

^ On 7/15/21, IA stopped updating child testing data; IA cumulative tests through 7/8/21

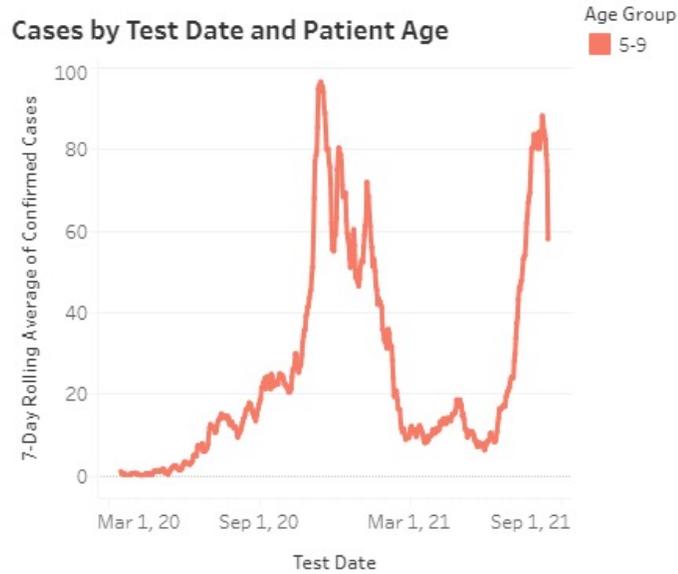
# Fig 6. United States: Number of Child COVID-19 Cases Added in Past Week\*



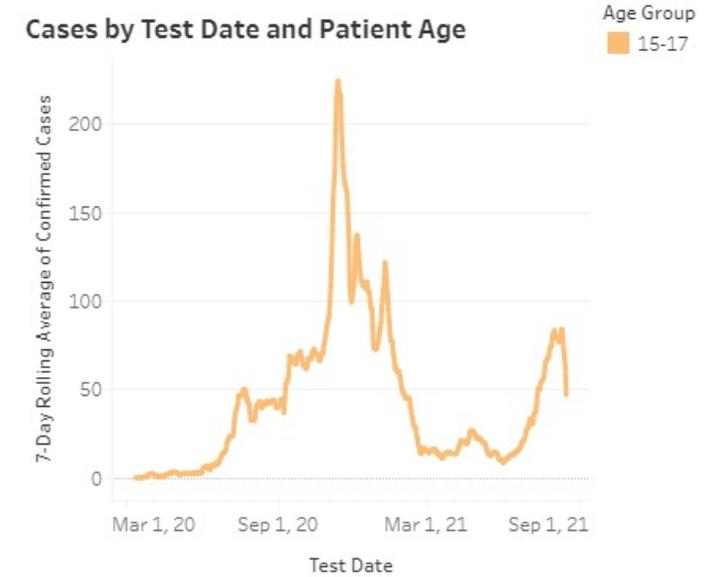
\* Note: 4 states changed their definition of child cases: AL as of 8/13/20, HI as of 8/27/20, RI as of 9/10/20, MO as of 10/1/20; TX reported age for only a small proportion of total cases each week (eg, 3-20%)  
 As of 6/30/21, NE COVID-19 dashboard is no longer available; NE cumulative cases through 6/24/21  
 Due to available data and changes made to dashboard, AL cumulative cases through 7/29/21  
 Due to available data and calculations required to obtain MA child cases, weekly estimates fluctuate (eg, on 8/5/21, there were 1,463 fewer cases)  
 Due to available data and changes made to dashboard, WV cumulative cases through 8/5/21  
 See detail in Appendix: Data from 49 states, NYC, DC, PR and GU  
 All data reported by state/local health departments are preliminary and subject to change; Analysis by American Academy of Pediatrics and Children's Hospital Association

# Cases by test date and age in Missouri

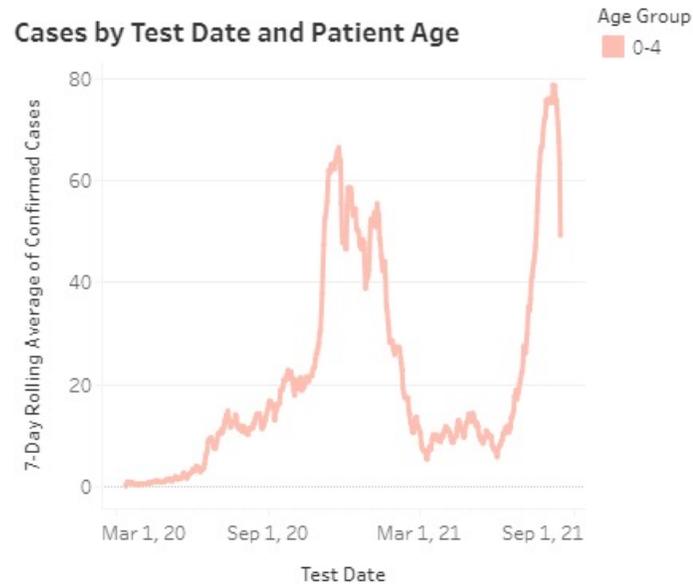
Cases by Test Date and Patient Age



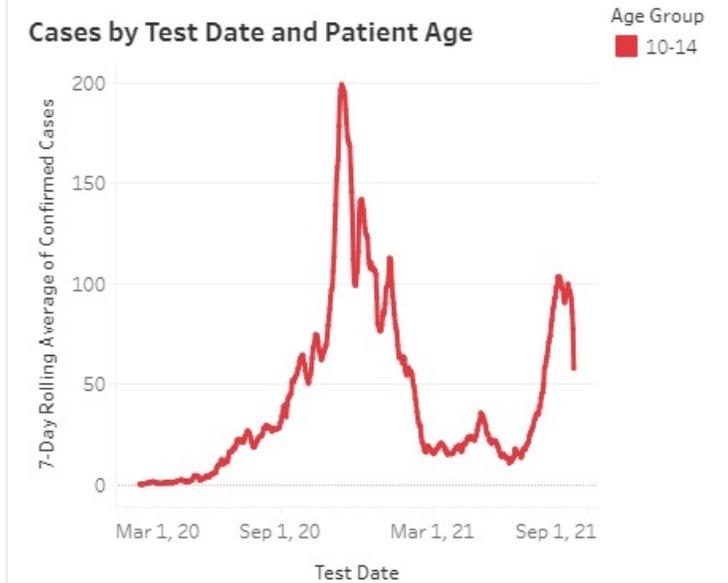
Cases by Test Date and Patient Age



Cases by Test Date and Patient Age



Cases by Test Date and Patient Age



2,000

Total Admissions  
Aug 01, 2020 - Aug 14, 2021

9

Current 7-Day Average  
Aug 08, 2021 - Aug 14, 2021

7

Prior 7-Day Average  
Aug 01, 2021 - Aug 07, 2021

14

Peak 7-Day Average  
Nov 13, 2020 - Nov 19, 2020

+19.2%

Percent change from prior 7-day  
avg. of Aug 01, 2021 - Aug 07, 2021

-38.0%

Percent change from peak 7-day  
avg. of Nov 13, 2020 - Nov 19, 2020

# New Admissions of Patients with Confirmed COVID-19 per 100,000 Population by Age Group, HHS Region 7 Aug 01, 2020 - Aug 14, 2021



By Jurisdiction and Age Group

By Jurisdiction

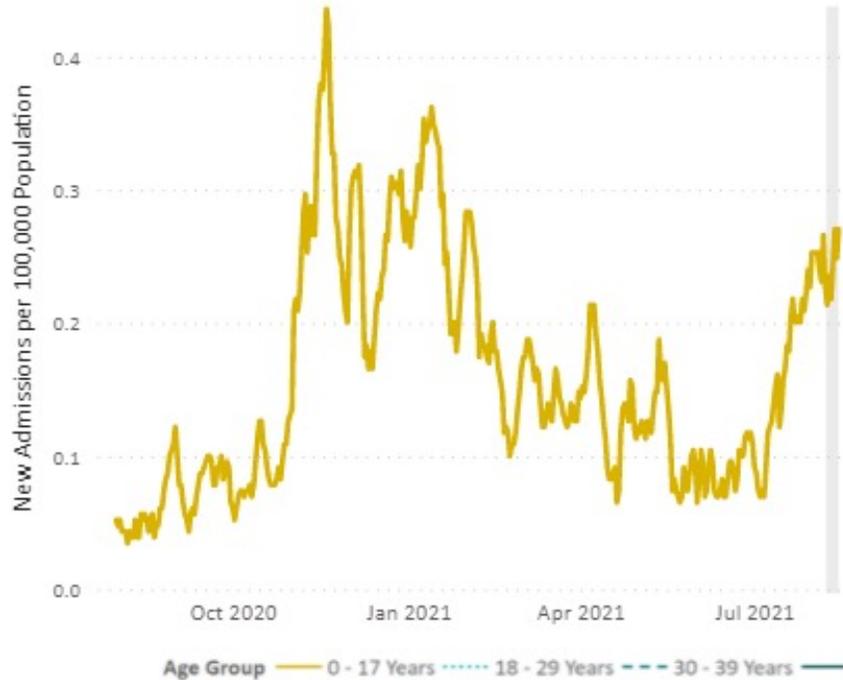
Select a Jurisdiction

Select an Age Group

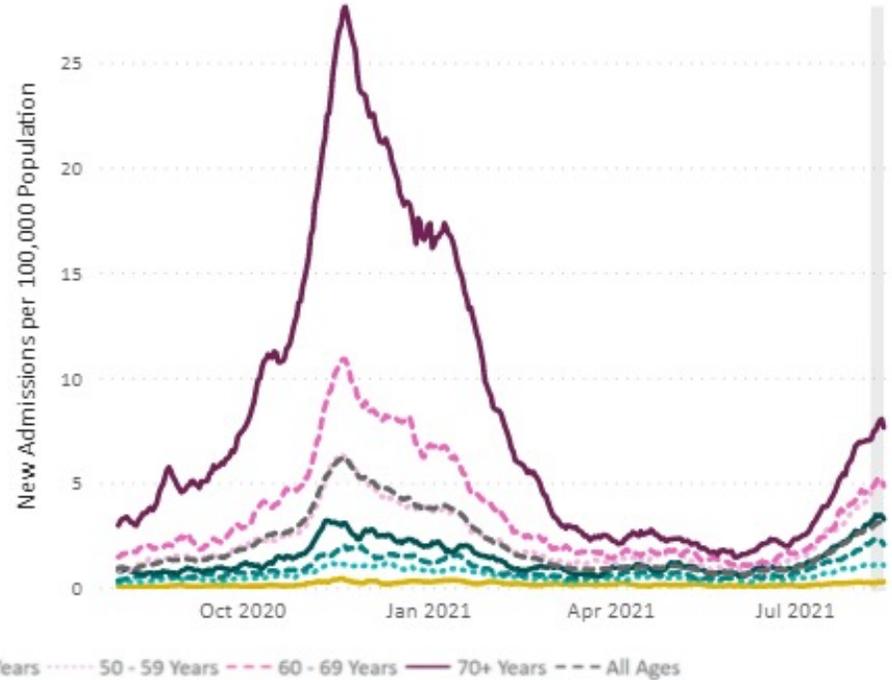
HHS Region 7

0 - 17 Years

HHS Region 7 | 0 - 17 Years

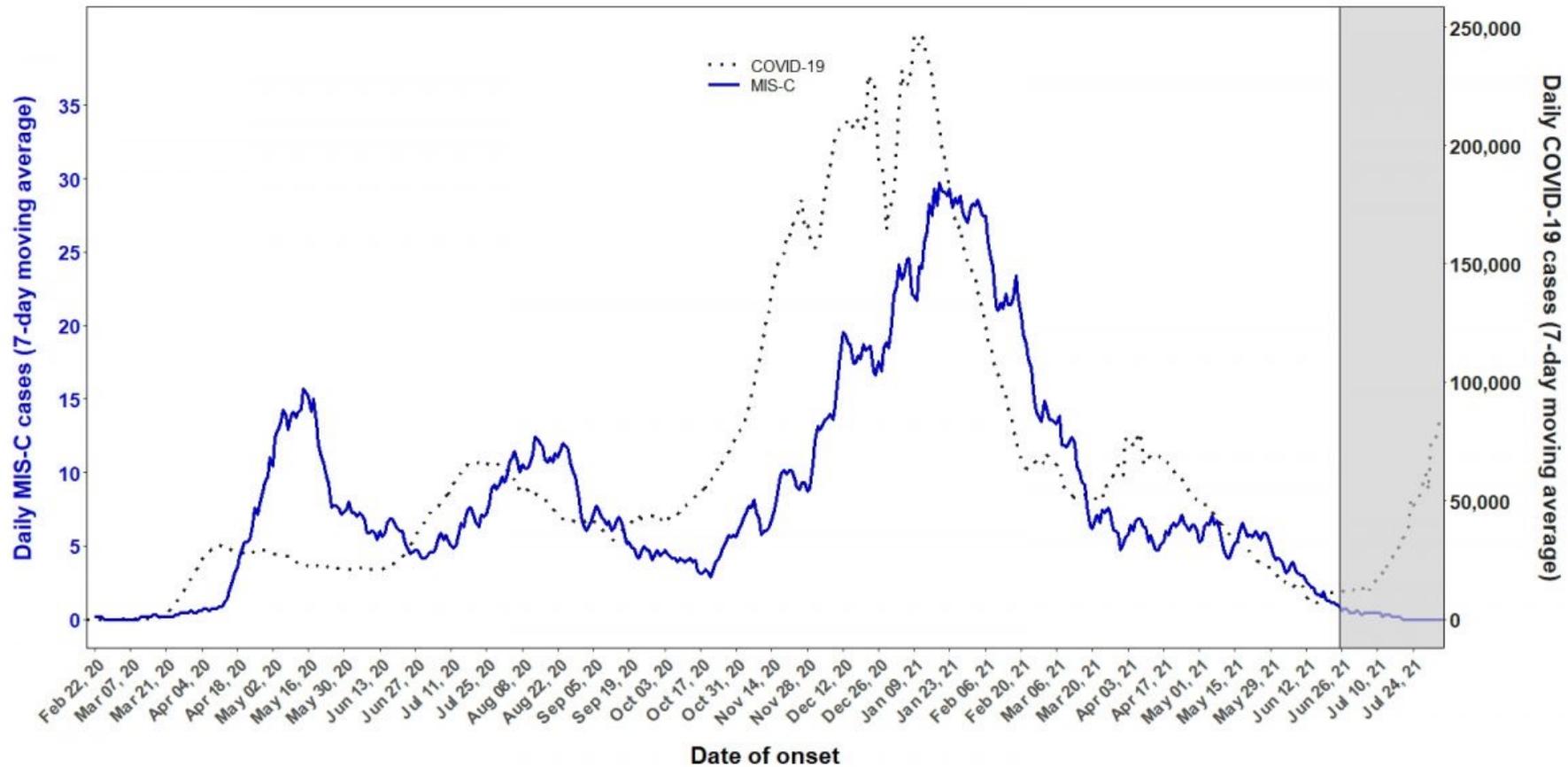


HHS Region 7 | All Age Groups



Based on reporting from all hospitals (N=5,251). Due to potential reporting delays, data reported in the most recent 7 days (as represented by the shaded bar) should be interpreted with caution. Small shifts in historic data may occur due to changes in the CMS Provider of Services file, which is used to identify the cohort of included hospitals. Data since December 1, 2020 have had error correction methodology applied. Data prior to this date may have anomalies that are still being resolved. Note that the above graphs are often shown on different scales. Data prior to August 1, 2020 are unavailable.

# Daily MIS-C Cases and COVID-19 Cases Reported to CDC (7-Day Moving Average)



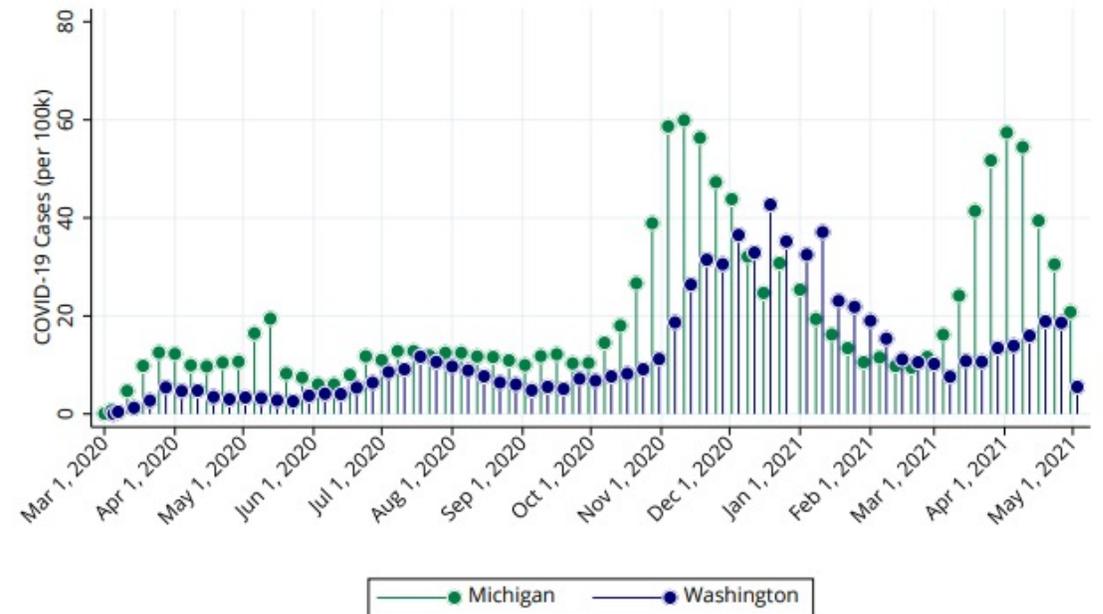
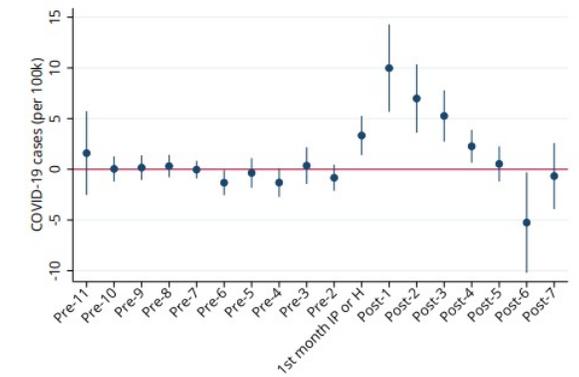
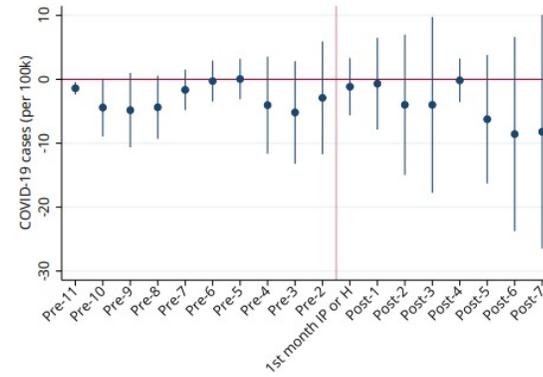
# Layered mitigation strategies

- 09/2020-10/2020: 11/56 school districts
- In person for the first 9 weeks with over 90,000 students+ staff
- 773 community-acquired infections
- 32 acquired in schools
- No child to adult transmission
- Multiple prevention strategies including distancing and universal mask use
  - Breaches in mask use likely explains the few in school transmission cases

- 1 Be Transparent**  
Report all primary COVID-19 cases by week, by school.
- 2 Make a Road Map for Contact Tracing and Testing**  
The school district and local health department(s) should make available publicly who will do what in successful contact tracing.
- 3 Develop a Dashboard**  
A pandemic management dashboard should include primary cases, secondary cases, testing rates, and comparisons to countywide data.
- 4 Implement Lessons Learned**  
School leadership should work with staff to understand secondary transmissions and to implement lessons learned.
- 5 Work With a Trusted Third Party to Analyze Data**  
For example, partner with ABCs.
- 6 Leverage School-Based Metrics**  
Secondary transmission per 10000 students and number of clusters per 10000 students are metrics that are preferable to county data because the crucial element of managing schools is to prevent spread within schools.
- 7 Fight Pandemic Fatigue**  
Target >99% adherence to masking by all mainstream curriculum students, teachers, and staff on school property at all times (except for eating and drinking). Use an anonymous hotline or Web portal to report noncompliance, or use a simple daily walk-through to check that all masks are over the nose, mouth, and chin.
- 8 Make a Detailed Schedule**  
Customize the schedule for each school. Examples for elementary, middle, and high schools are available from ABCs. **The tool kit is especially important here.**
- 9 Consider Extracurriculars**  
In addition to a detailed plan for the general school day, develop a detailed plan for all extracurricular and school-sponsored activities, such as sports and the arts.
- 10 Consider Special Needs**  
This group of teachers and students need additional precautions. Plans should be developed locally, and these groups should receive allocation of extra resources because masking is not always possible.
- 11 Develop a Communication Plan**  
How will districts communicate, with whom, and when? Develop a communication plan that is detailed but that can be revised as new data and insights come to light.
- 12 Walk, Then Run**  
A defined return to in-person learning (for eg, in a hybrid model) can give everyone a chance to adapt to new procedures and policies.

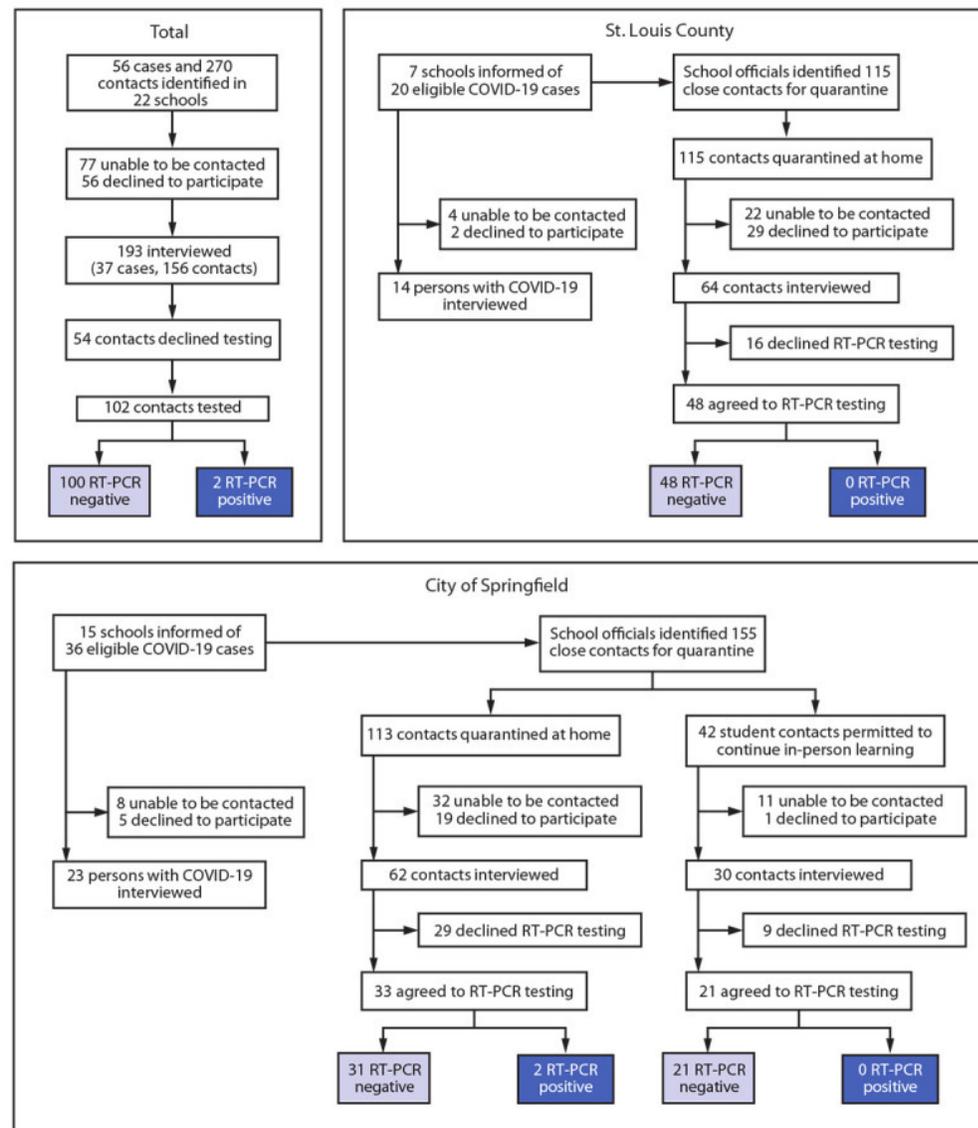
# Transmission in schools- Effect on community rates

- Michigan and Washington states
- In-person instruction not associated with increased spread of SARS-CoV2 with low community transmission
- Increased cases with moderate-to-high community transmission



# Physical distancing and quarantine

- 22 schools in St. Louis and Springfield, MO
  - December 2020
- 70% of students in-person
- 100% mask mandate
- The majority spaced desks 3 feet apart (27% were 6 ft)
- Springfield used modified quarantine
  - If both individuals mask, exposed student continues in-person learning for duration of quarantine
- 37 cases and 156 school-based contacts
- 2% of 102 contacts had positive results



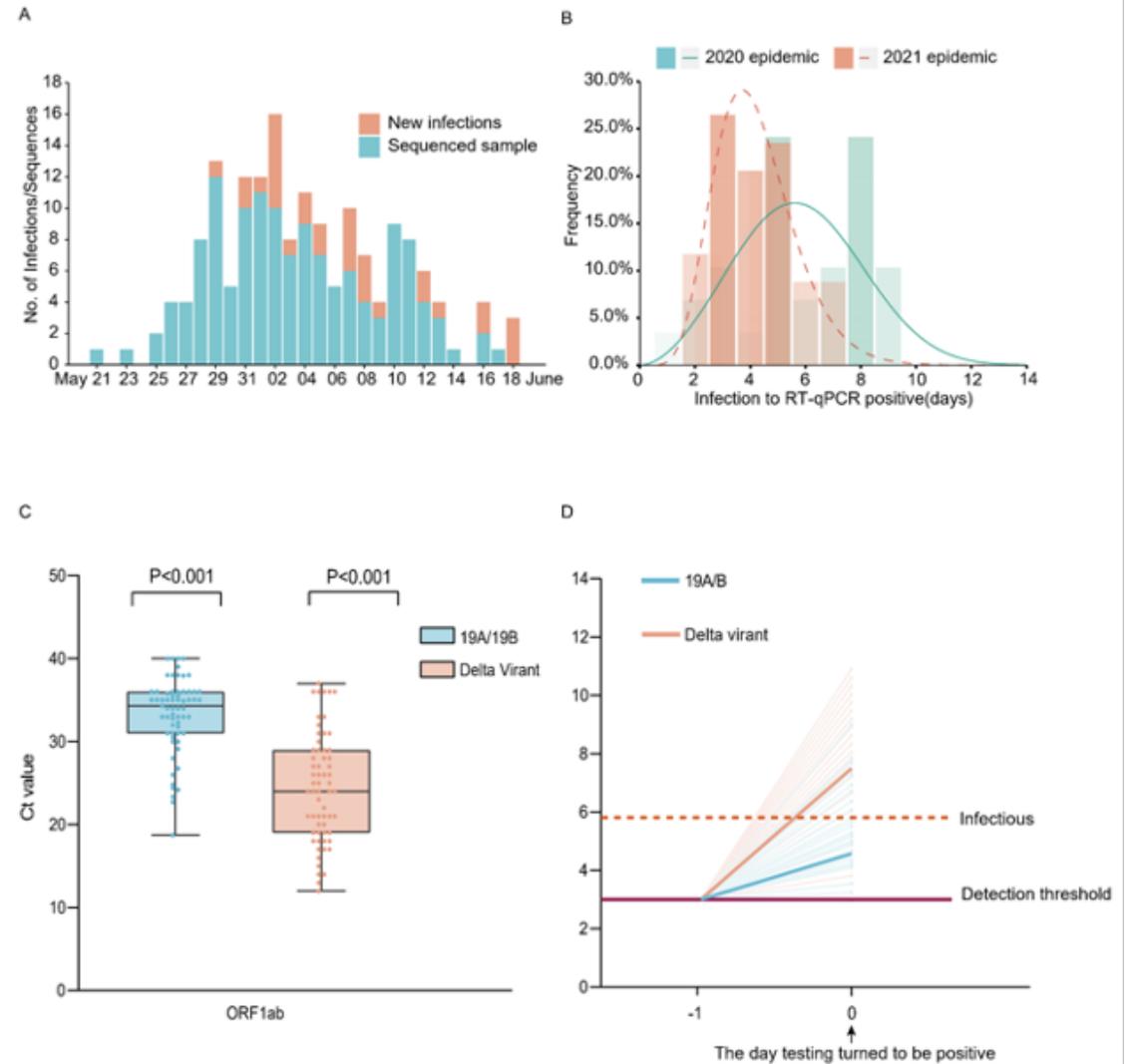
# COVID-19 in school settings

- December 2019- April 2021
- 24 studies including cross-sectional and contact-tracing or cohort studies
- Children and adolescents have a lower risk of secondary attack in school settings when compared to adults (OR=0.84, 95% CI=0.62-1.14)- although statistically insignificant
- Subgroup analysis shows
  - Significantly lower odds of infection in daycare centers/preschools children vs. adults (OR=0.53, 95% CI=0.38-0.72)
  - Insignificant effect in primary schools (OR=0.85, 95% CI=0.55-1.31)
  - Comparable risk of infections in high-school students to adults (OR=1.30, 95% CI=0.71-2.38)
- Conclusion: Children (<10 years) showed lower susceptibility to COVID-19 compared to adults, whereas adolescents in communities and high-schoolers had comparable risk. Risks of infection among children in educational-settings was lower than in communities. Evidence from school-based studies demonstrate it is largely safe for children (<10 years) to be at schools, however older children (10-19 years) might facilitate transmission. Despite this evidence, studies focusing on the effectiveness of mitigation measures in educational settings are urgently needed to support both public health and educational policy-making for school reopening.

# Delta variant

- 167 lab confirmed infections, first case May 21
- Daily sequencing of quarantined subjects
- Time from exposure to positive PCR 4 days vs. 6 days with original strain
- Viral load 1000 times higher for delta when first detected
- Detailed contact tracing and genetic sequencing of each infection
  - Direct contact and some indirect transmission (same restaurant and transportation)
  - No evidence of increased long-distance aerosol compared to previous variants

Figure 1

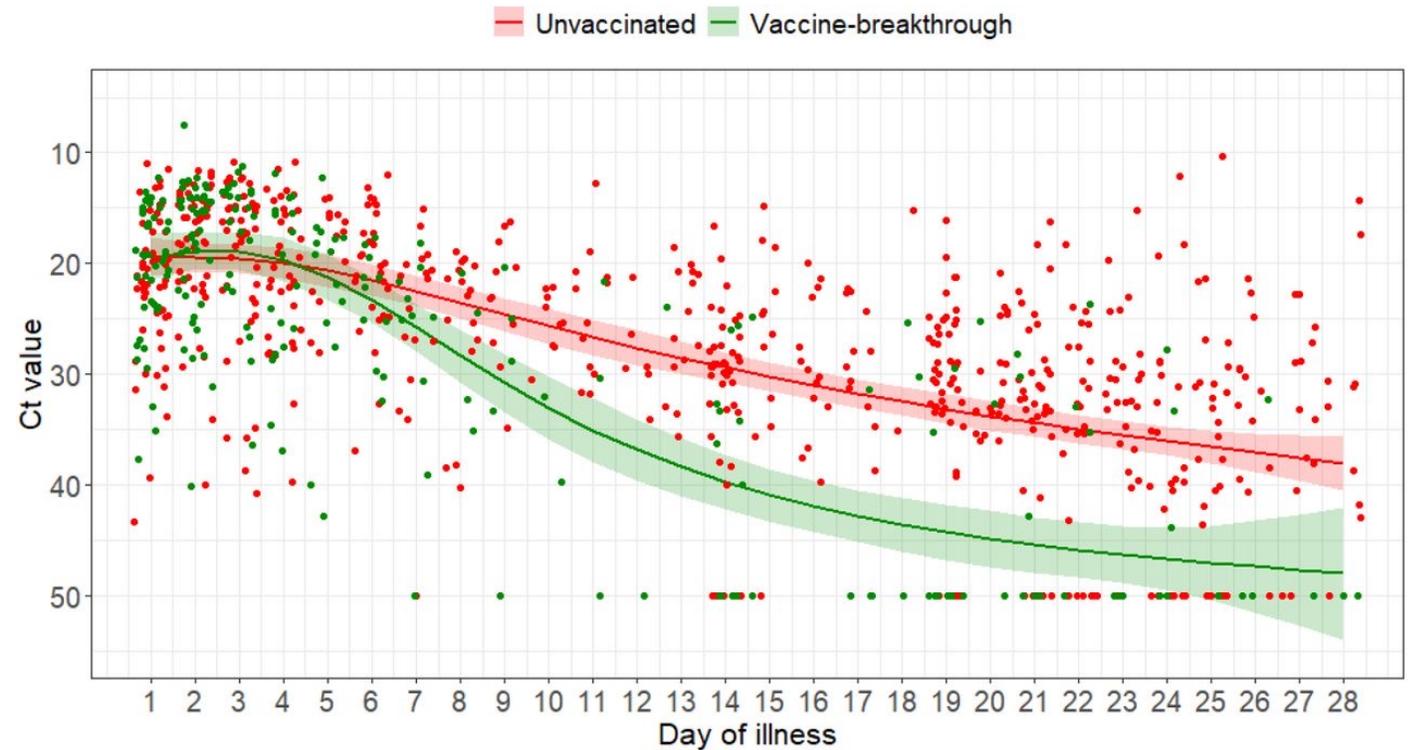


# Delta variant

- England
  - Increase in prevalence from 0.15% to 0.63%, with avg doubling time of 25 days
  - Vaccine effectiveness of 49% in adult infections and 59% for symptomatic disease
  - Previously reported effectiveness of 88% with delta variant, period of 10/2021-05/2021
- Israel
  - Vaccine effectiveness of 39% for infection, 40% symptomatic disease, 88% hospitalization and 91% severe disease time period of 06/20-07/17

# Delta variant

- Vaccinated have the same viral load as unvaccinated
- Only the case in the first 6 days
- Singapore study
  - 218 hospitalized individuals
    - 84 mRNA vaccine, 71 fully vaccinated
    - 4 non mRNA vaccine
    - 130 unvaccinated
  - Older age in vaccine group, decreased odds of oxygen requirement
  - Viral load decreased faster

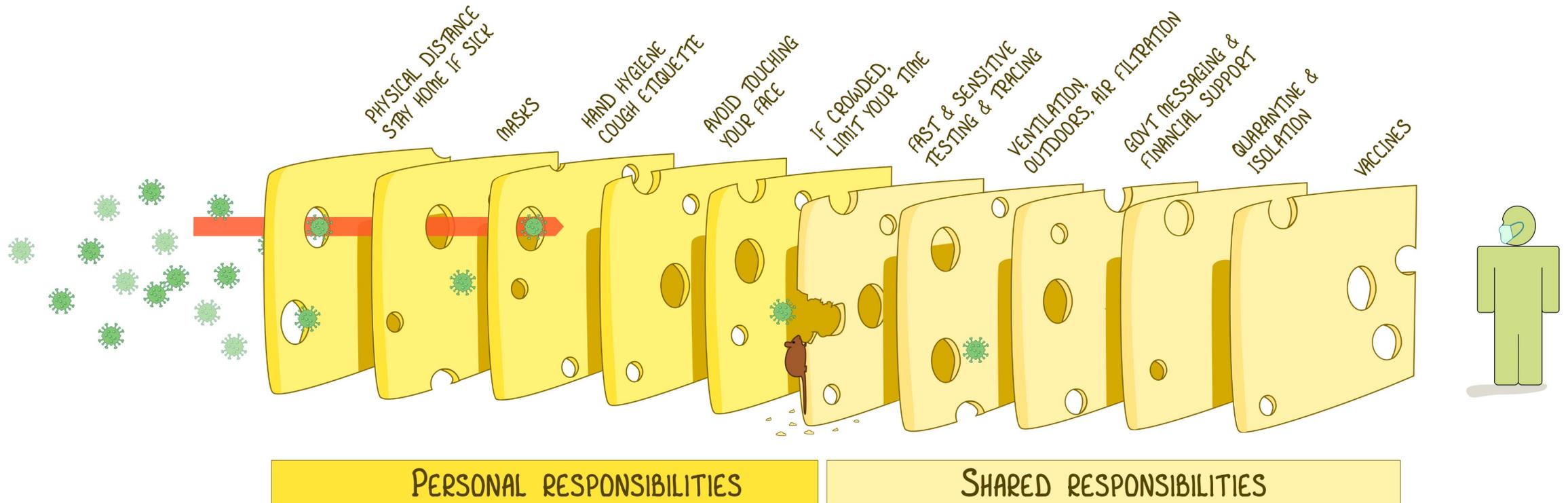


# Considerations for layered mitigation strategies in schools

- Level of community transmission
- COVID-19 vaccination coverage in the community and among students, teachers, and staff
- Strain on health system capacity for the community
- Use of a frequent SARS-CoV-2 screening testing program for students, teachers, and staff who are not fully vaccinated. Testing provides an important layer of prevention, particularly in areas with substantial to high community transmission levels
- COVID-19 outbreaks or increasing trends in the school or surrounding community
- Ages of children served by K-12 schools and the associated social and behavioral factors that may affect risk of transmission and the feasibility of different prevention strategies

# THE SWISS CHEESE RESPIRATORY VIRUS PANDEMIC DEFENCE

RECOGNISING THAT NO SINGLE INTERVENTION IS PERFECT AT PREVENTING SPREAD



EACH INTERVENTION (LAYER) HAS IMPERFECTIONS (HOLES).  
MULTIPLE LAYERS IMPROVE SUCCESS.

IAN M MACKAY  
VIROLOGYDOWNUNDER.COM  
WITH THANKS TO JODY LANARD, KATHERINE ARDEN & THE UNI OF QLD  
BASED ON THE SWISS CHEESE MODEL OF ACCIDENT CAUSATION BY JAMES T DEASON 1997