



# Living Rapid Review Update 16: What is the specific role of daycares and schools in COVID-19 transmission?



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**Please Note:** An update of this review may be available. Access the most current version of this review by visiting the National Collaborating Centre for Methods and Tools COVID-19 Rapid Evidence Service at the above link.

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# Executive Summary

## Background

As jurisdictions continue to implement and lift restrictions to slow the spread of coronavirus disease 2019 (COVID-19), they face major decisions about how and when to re-open and operate schools and daycares. While children are known to be effective vectors for other viruses, such as influenza, their role in the transmission of COVID-19 is much less clear.

This living rapid review was produced to support public health decision makers' response to the COVID-19 pandemic. This review seeks to identify, appraise, and summarize emerging research evidence to support evidence-informed decision making.

This review is based on the most recent research evidence available at the time of release. A previous version was completed on May 6, 2021. This updated version includes evidence available up to May 31, 2021.

In this living rapid review, we answer the question: **What is the specific role of daycares and schools in COVID-19 transmission?**

## What Has Changed in This Version?

- In this update, eight new studies were identified from Germany (n = 3), the United States (n = 3), Canada (n=1) and the United Kingdom (n=1), that explored COVID-19 transmission within schools; findings from these studies are consistent with previously included studies. Secondary Attack Rates (SAR) ranged from 0 to 13.1% and varied depending on the number of infection prevention and control (IPAC) measures in place, and participation in activities such as close-contact sports. Of note, one study from the United Kingdom was conducted during a time in which Variants of Concern (VOC) were most prevalent; SAR increased over time, suggesting that the VOC was more transmissible, however this was also during a time of increased community transmission.
- Three new studies (all from the United States) explored the relationship between IPAC measures implemented, and the number of school cases. Consistent with previous findings, masking of teachers was strongly associated with decreased risk of transmission, and hybrid models of learning appears to increase risk of student cases. Class size and cohort size were not related to risk of cases in schools. One study found a relationship between improved ventilation and lower student cases.
- Two new studies from the United States and Israel explored the effect of school reopening on community rates. Similar to findings from previously included studies, there is little evidence to suggest that increases in community incidence occur when proper IPAC measures are in place and adhered to in school settings. In Israel, a 10% increase in students attending in-person school was associated with an increase in all-age cases of COVID-19 of 0.336 cases/100,000 population (95% CI=0.191,0.481) 28-days following school reopening, independent of other changes to public health measures.
- One new study explored the risk of transmission in camp settings in the United States by IPAC measures in place. Physical distancing, cohorting, and modifications to programming all lower the risk of transmission within the camp setting; modifications to dining and bathroom facilities in overnight camps were also associated with reduced transmission.

## Key Points

- Although the data is consistent that children can both contract and transmit COVID-19, based on published reports to date following re-opening, the risk of transmission from children to children and children to adults in primary school and daycare settings is low, when IPAC measures are in place and adhered to. The certainty of the evidence is moderate (GRADE), and findings may change as new data become available. The risk of transmission within secondary schools is more variable, with findings suggesting that adherence to IPAC measures in place in the school setting and reducing activities outside of the school settings is critical in this age group.
- Implementation of infection control measures is critically important to reducing transmission, especially when community transmission rates are high. Across jurisdictions reviewed, there is wide variability in policies in place limiting the ability to evaluate the impact of specific IPAC measures or make best practice recommendations for daycare or school settings due to variability in the combination of measures implemented. There is emerging evidence that wearing masks, maintaining at least 3ft of distance (especially amongst staff), restricting entry to the school to others, cancelling extracurriculars, outdoor instruction, and daily symptom screening reduce the number of cases within schools; inconsistent findings have been found for associations between ventilation, and class size. Hybrid or part-time in-person learning appears to be associated with higher incidence compared to full-time in-person. The certainty of the evidence is low (GRADE) and findings may change as new data become available.
- Across studies, the number of cases amongst students and teachers mirror trends in the community. There is little high-quality evidence to suggest that re-opening schools contributes meaningfully to community transmission, particularly when community rates are low-moderate and effective IPAC measures are in place. The role of schools on the surrounding community in areas of high community transmission is less clear and not well studied. The certainty of the evidence is low (GRADE) and findings may change as new data become available.
- Data from overnight camps (summer 2020) emphasize the importance of IPAC measures. In settings where IPAC measures are not in place or adhered (particularly in overnight camps) to show that widespread transmission from children is possible, and again highlights the importance of infection control measures. The certainty of the evidence is low (GRADE) and findings may change as new data become available.
- To date there are limited data on the impact of variants of concern (VOC) related to prevalence, SAR, and associations with IPAC measure implementation in school and daycare settings. It is possible that findings may change as more information becomes available about the impact of VOC on transmission in school and daycare settings.
- The studies included in this review do not provide evidence for the experiences of populations who live with social and structural inequities, such as Indigenous or racialized communities. Further research is required to ensure representation of these populations for decision making.

## Overview of Evidence and Knowledge Gaps

- Building upon earlier case reports, contact tracing and prevalence studies, there is a growing body of reports using national or regional surveillance data and comprehensive contact tracing and testing strategies to minimize the likelihood of underestimation of cases. While surveillance reports are identifying cases among staff and students and

children in schools and daycares, these commonly include single cases or a small number of cases typically less than five.

- Within clusters and outbreaks, adult to adult transmission seems to be more common than child to adult or adult to child. Not all included studies separate out cases between staff and students in this way.
- A growing number of studies have randomly selected schools/classes/individuals to undergo testing for active infection (via RT-PCR) or antibodies; consistent across studies, few additional cases are detected suggesting that widespread asymptomatic transmission is not commonly occurring in these settings, particularly when strong IPAC measures are in place.
- Studies that explore the impact of school re-opening or closing on rates of community-transmission are generally limited by reliance on simple correlations, and lack of adequate control for potential confounding factors, such as coinciding timing of implementation or relaxing of other public health measures such as limits on gatherings, opening/closing of stores and restaurants, and community mask mandates.
- The use of more rigorous data collection (e.g., random testing, comprehensive contact tracing/testing) and enhanced reporting of surveillance data (e.g., index cases, secondary transmission, overall prevalence) in future studies can provide more robust data for interpretation and improve certainty of findings.
- Infection control measures were highly variable across jurisdictions scanned. It is important to note that there may be regional variations in policies in place above what are reported in national guidelines.

## Methods

### Research Question

What is the specific role of daycares and schools in COVID-19 transmission?

### Search

The following databases and sources were searched for evidence pertaining to the role of daycares and schools in the transmission of COVID-19 up to May 31, 2021. This search builds upon the previous search conducted in the fifteenth version of this rapid review.

- Pubmed's curated COVID-19 literature hub: [LitCovid](#)
- [TripDatabase](#)
- World Health Organization's [Global literature on coronavirus disease](#)
- [COVID-19 Evidence Alerts](#) from McMaster PLUS™
- [COVID-19 Living Overview of the Evidence \(L-OVE\)](#)
- [PROSPERO International prospective registry of systematic reviews](#)
- NCCMT [COVID-19 Rapid Evidence Reviews](#)
- [medRxiv preprint server](#)
- NCCDH [Equity-informed responses to COVID-19](#)
- NCCEH [Environmental Health Resources for the COVID-19 Pandemic](#)
- NCCHPP [Public Health Ethics and COVID-19](#)
- NCCID [Disease Debrief](#)
- NCCIH [Updates on COVID-19](#)
- [Public Health Ontario](#)
- [Uncover \(USHER Network for COVID-19 Evidence Reviews\)](#)
- Centers for Disease Control and Prevention's [Morbidity and Mortality Weekly Report](#)
- [Government of Ontario](#)
- Ontario [COVID-19 cases in schools and child care centres](#)
- Alberta [COVID-19 school status map](#)
- Québec [Situation in schools](#)
- [COVID-19 School Response Dashboard](#)
- Newfoundland and Labrador Centre for Applied Health Research ([NLCHAR](#))
- National Institute for Public Health and the Environment ([RIVM](#))
- Health Information and Quality Authority ([HIQA](#))
- National Centre for Immunisation Research and Surveillance ([NCIRS](#))
- Institut national de santé du Québec ([INSPQ](#))
- [Don't Forget the Bubbles](#)

A copy of the full search strategy is available in [Appendix 1](#).

Information on policies for daycares and educational settings were retrieved from the scientific publications and governmental public health webpages for the jurisdictions included in research articles in this review.

## Study Selection Criteria

The search first included recent, high-quality syntheses. If no syntheses were found, single studies were included. English-language, peer-reviewed sources and sources published ahead of print before peer review were included. Grey literature were excluded.

Additional exclusion criteria were established (April 2021) to refine the focus of this review given the substantial body of evidence. Studies were excluded if:

- Data was collected prior to July 2020 (during or following first wave lockdown) when understanding of the disease, access to testing and availability of personal protective equipment was limited
- Only absolute number of cases or overall prevalence were reported within a school/district without calculation of secondary attack rates (SAR) or discussion of likelihood of transmission within the schools
- Studies which described the risk of COVID-19 or COVID-19 mortality between teachers, students or parents of children attending school vs. those not attending school, or with no description of exposure within the school

	Inclusion Criteria	Exclusion Criteria
Population	Children and adolescents aged 1–18	Infants
Intervention	Exposure to or diagnosis of COVID-19	
Comparisons	-	
Outcomes	Confirmed or suspected case of COVID-19	
Setting	Schools, daycares, camps	Extra-curricular activities such as sports teams

## Data Extraction and Synthesis

Data on study design, setting, location, population characteristics, interventions or exposure and outcomes were extracted when reported. We synthesized the results narratively due to the variation in methodology and outcomes for the included studies.

The identified syntheses relevant to this report had considerable overlap in the primary literature but varied in the data reported across reviews for the same primary studies. We chose to conduct a new synthesis rather than reporting the overlapping results of the identified syntheses to present the data most succinctly and clearly. The primary studies were used to extract study characteristics and key findings, and to appraise study quality.

Due to the large number of studies, studies are grouped into tables so similar studies can be reviewed together. These tables include 1) studies of transmission within schools and daycares; 2) case reports or case series of transmission within schools or daycares; 3) studies exploring the relationship between IPAC measures and transmission in schools and daycares; 4) studies of the impact of school in-person learning and community transmission; 5) studies on camps; 6) in-progress single studies; 7) syntheses; 8) in-progress syntheses; and 9) Canadian surveillance data.

## Appraisal of Evidence Quality

We evaluated the quality of included evidence using critical appraisal tools as indicated by the study design below. Quality assessment was completed by one reviewer and verified by a second reviewer. Conflicts were resolved through discussion.

<b>Study Design</b>	<b>Critical Appraisal Tool</b>
Synthesis	Assessing the Methodological Quality of Systematic Reviews (AMSTAR) <a href="#">AMSTAR 1 Tool</a>
Cohort	Joanna Briggs Institute (JBI) <a href="#">Checklist for Cohort Studies</a>
Case Control	Joanna Briggs Institute (JBI) <a href="#">Checklist for Case Control Studies</a>
Case Series	Joanna Briggs Institute (JBI) <a href="#">Checklist for Case Series</a>
Case Report	Joanna Briggs Institute (JBI) <a href="#">Checklist for Case Reports</a>
Prevalence	Joanna Briggs Institute (JBI) <a href="#">Checklist for Prevalence Studies</a>
Cross-sectional	Joanna Briggs Institute (JBI) <a href="#">Checklist for Analytical Cross Sectional Studies</a>
Quasi-experimental	Joanna Briggs Institute (JBI) <a href="#">Checklist for Quasi-Experimental Studies</a>

Completed quality assessments for each included study are available on request.

The Grading of Recommendations, Assessment, Development and Evaluations ([GRADE](#)) approach was used to assess the certainty in the findings based on eight key domains.

In the GRADE approach to quality of evidence, **observational studies**, as included in this review, provide **low quality** evidence, and this assessment can be further reduced based on other domains:

- High risk of bias
- Inconsistency in effects
- Indirectness of interventions/outcomes
- Imprecision in effect estimate
- Publication bias

and can be upgraded based on:

- Large effect
- Dose-response relationship
- Accounting for confounding.

The overall certainty of the evidence for each outcome was determined taking in to account the characteristics of the available evidence (observational studies, some not peer-reviewed, unaccounted-for potential confounding factors, different tests and testing protocols, lack of valid comparison groups). A judgement of 'overall certainty is very low', means that the findings are very likely to change as more evidence accumulates.

## Findings

### Summary of the Certainty of Evidence

In this update, 14 new single studies, two new syntheses, four new in-progress studies, one new in-progress synthesis, and six updates to single studies were identified. One in-progress synthesis was removed as it will not be completed, for a total of 101 publications addressing the research question.

A full list of studies that were previously included that are now excluded is available in [Appendix 2](#).

What is the role of schools and daycares on COVID-19 transmission?

Outcome	Studies included		Overall certainty in evidence (GRADE)
	Study design	n	
COVID-19 transmission within schools/daycares (including number of cases, cases per population, and secondary attack rates)	Syntheses	4	⊕⊕⊕○ Moderate <sup>1</sup>
	Observational	42	
Impact of IPAC measures on COVID-19 transmission within schools/daycares (including number of cases, cases per population, and secondary attack rates)	Syntheses	3	⊕⊕○○ Low <sup>2</sup>
	Observational	7	
COVID-19 transmission in the community (change in number of cases, and cases per 100,000 before) after school re-opening)	Syntheses	3	⊕⊕○○ Low <sup>3</sup>
	Quasi-experimental	18	
COVID-19 transmission within camps (including number of cases, cases per population, and secondary attack rates)	Observational	6	⊕⊕○○ Low <sup>4</sup>

<sup>1</sup>In the GRADE approach to quality of evidence, **observational studies**, as included in this review, provide **low quality** evidence, and this assessment was upgraded to **moderate** based on the large effect observed.

<sup>2</sup>In the GRADE approach to quality of evidence, **observational studies**, as included in this review, provide **low quality** evidence. No additional up or downgrades were made.

<sup>3</sup>In the GRADE approach to quality of evidence, this assessment was downgraded due to high risk of bias, and imprecision of effect estimates.

<sup>4</sup>In the GRADE approach to quality of evidence, **observational studies**, as included in this review, provide **low quality** evidence. No other upgrades or downgrades were made.

### Warning

Given the need to make emerging COVID-19 evidence quickly available, many emerging studies have not been peer reviewed. As such, we advise caution when using and interpreting the evidence included in this rapid review. We have provided a summary of overall certainty of the evidence to support the process of decision making. Where possible, make decisions using the highest quality evidence available.



**Table 1: Single Studies, Within School Transmission**

Reference	Date Released	Study Design	Setting, Location	IPAC measures	Summary of Findings	Quality Rating:
<b>New evidence reported on June 14, 2021</b>						
Kim, C., McGee, S., Khuntia, S., Elnour, A., Johnson-Clarke, F., Mangla, A. ... Nesbitt, L. (2021). <a href="#">Characteristics of COVID-19 cases and outbreaks at childcare facilities – District of Columbia, July–December 2020.</a> <i>Morbidity and Mortality Weekly Report</i> , 70(20), 744-748.	May 21, 2021	Prevalence	Home-based and facility-based daycares Centers  District of Columbia, USA	<ul style="list-style-type: none"> <li>• Cohorting (<math>\leq 10</math> children per group)</li> <li>• Enhanced cleaning</li> <li>• Enhanced ventilation (fresh air)</li> <li>• Hand hygiene</li> <li>• Masks (teachers and staff)</li> <li>• Physical distancing (<math>\geq 6</math> ft during meals and naps)</li> <li>• Plastic barrier partitions between groups</li> <li>• Screening</li> <li>• Staggered start/end times</li> </ul>	<p>From Jul 1 – Dec 31, 2020, 112/469 (23.9%) daycares reported a total of 319 cases:</p> <ul style="list-style-type: none"> <li>• 55/112 (49%) reported a single case</li> <li>• 30/112 (27%) reported two or more non-linked cases</li> <li>• 27/112 (26%) reported an outbreak                             <ul style="list-style-type: none"> <li>○ 127 secondary cases (total number of staff/children not reported)</li> <li>○ 69/156 (44.2%) outbreak cases were from 5 facilities with <math>\geq 10</math>/outbreak</li> </ul> </li> </ul> <p>Of 319 confirmed cases:</p> <ul style="list-style-type: none"> <li>• 148 (46%) teachers,</li> <li>• 139 (43%) children</li> <li>• 32 (10%) staff:</li> <li>• 68 (21.3%) were asymptomatic</li> </ul> <p>Factors associated with risk for outbreak:</p> <ul style="list-style-type: none"> <li>• Facility operating time, <math>\leq 3</math> years vs. <math>\geq 10</math> years: <b>Risk Ratio (RR)=3.29 (95% CI=1.38, 7.80)</b></li> <li>• Testing window, <math>\geq 3</math> days after onset vs. 1-2 days onset: <b>RR=2.03 (95% CI=1.04, 3.95)</b></li> <li>• Asymptomatic vs. symptomatic cases: <b>RR=2.10 (95% CI=1.10,4.01)</b></li> </ul> <p>231/319 (72.4%) of all cases were reported after community positivity rates increased.</p>	High
Aiano, F, Mensah, A., McOwat, K., Obi, C., Vusirikala, A., Powell, A. ... Saliba, V. (2021). <a href="#">COVID-19 outbreaks</a>	May 18, 2021	Cross-sectional	Primary and secondary schools, England	<ul style="list-style-type: none"> <li>• Enhanced cleaning</li> <li>• Enhanced ventilation</li> <li>• Hand hygiene</li> <li>• Masks (primary schools had discretion to</li> </ul>	<p>From Aug 31 – Oct 18, 2020, 969 outbreaks were reported; 450 in primary (3% of all), 519 in secondary schools (15% of all).</p> <p>Among 179 schools reporting an outbreak with completed survey data, 2425 cases were reported.</p>	Moderate

<p><a href="#">following full reopening of primary and secondary schools in England: retrospective, cross-sectional national surveillance.</a> <i>The Lancet Regional Health- Europe, 6, 100120.</i></p>				<p>recommend them to students and staff; secondary schools advised to wear in communal areas outside of classroom but not mandatory in classroom)</p> <ul style="list-style-type: none"> <li>Physical distancing</li> </ul>	<p>Attack rates varied by group:</p> <ul style="list-style-type: none"> <li>Secondary students: 1.20%, 95% CI=1.13,1.28%)</li> <li>Primary students 0.84%; 95% CI=0.75,0.94%)</li> <li>Primary staff: 9.81%, 95% CI=8.90,10.82%</li> <li>Secondary staff: 3.97%, 95% CI=3.79,5.69%)</li> </ul> <p>Teaching staff were more likely to be the index case in primary (48%) versus secondary (32%) schools (<b>p=0.027</b>).</p> <p>Larger outbreaks were found among secondary schools:</p> <ul style="list-style-type: none"> <li>Primary schools: 2-35 cases</li> <li>Combined schools: 2-26 cases</li> <li>Secondary schools: 2-100 cases</li> </ul>	
<p>Bark, D., Dhillon, N., St-Jean, M., Kinniburgh, B., McKee, G., &amp; Choi, A. (2021). <a href="#">SARS-CoV-2 transmission in K-12 schools in the Vancouver Coastal Health Region: a descriptive epidemiologic study.</a> <i>Preprint.</i></p>	<p>May 18, 2021</p>	<p>Prevalence</p>	<p>K-12 Vancouver, British Columbia, Canada</p>	<ul style="list-style-type: none"> <li>Cohorting</li> <li>Enhanced cleaning and disinfection</li> <li>Hand hygiene</li> <li>Masks (recommended)</li> <li>Physical distancing</li> <li>Quarantine</li> </ul>	<p>From Sep 1 – Dec 18, 2020, 699 cases among 123,646 staff or students (0.56%).</p> <p>Within 71 school clusters (251 cases):</p> <ul style="list-style-type: none"> <li>45 clusters (142 cases) were acquired outside of school</li> <li>26 clusters (55 cases) contained at least one school-acquired case <ul style="list-style-type: none"> <li>Index cases were more often staff (54%) than students (46%)</li> <li>58% of clusters were found in K-7, 31% in 8-12, and 11% in K-12 schools (58%)</li> <li>31% of clusters included students only, and 15% included staff only</li> <li>Median cluster size was 3 (range 2-8) when index case was staff vs. 2 (range 2-3) when index was a student</li> </ul> </li> </ul> <p>At peak, and throughout reporting, weekly incidence was lower in schools than the community (9.4 vs. 6.6/10,000 and 55 vs. 73/10,000)</p>	<p>High</p> <p><b>PREPRINT</b></p>

<p>Haag, L., Blankenburg, J., Unrath, M., Grabietz, J., Kahre, E., Galow, L., ... Armann, J. P. (2021). <a href="#">Prevalence and Transmission of SARS-CoV-2 in childcare facilities: A longitudinal study</a>. <i>Preprint</i>.</p>	<p>Apr 18, 2021</p>	<p>Cohort</p>	<p>14 Daycare facilities Dresden, Saxony, Germany</p>	<ul style="list-style-type: none"> <li>• Masks (parents)</li> </ul>	<p>From Jul 15, 2020 – Jan 31, 2021, COVID-19 seropositivity of children, parents and staff from 14 daycares was monitored during periods of low and high community prevalence. No participants were seropositive at baseline.</p> <p>Period of low prevalence; 4 confirmed cases:</p> <ul style="list-style-type: none"> <li>• 1/154 (0.7%) staff</li> <li>• 1/196 (0.5%) parent</li> <li>• 2/232 (0.9%) children</li> </ul> <p>Period of high prevalence; 63 confirmed cases in 8 facilities:</p> <ul style="list-style-type: none"> <li>• 23/87 (12.3%) staff <ul style="list-style-type: none"> <li>○ More administrative staff (20.8%) vs. childcare staff (8.1%), <b>p=0.034</b></li> </ul> </li> <li>• 25/236 (10.6%) parents</li> <li>• 15/222 (6.8%) children <ul style="list-style-type: none"> <li>○ 4 clusters, range 2-3 children</li> <li>○ 5/12 cases had no facility link</li> </ul> </li> </ul>	<p>Moderate <b><i>PREPRINT</i></b></p>
<p>Gettings, J.R., Gold, J.A.W., Kimball, A., Forsberg, K., Scott, C., Uehara, A. ... Vallabhaneni, S. (2021). <a href="#">SARS-CoV-2 transmission in a Georgia school district – United States, December 2020–January 2021</a>. <i>Clinical Infectious Diseases</i>, ciab332.</p>	<p>Apr 17, 2021</p>	<p>Prevalence</p>	<p>School district in metropolitan Atlanta, Georgia, USA</p>	<ul style="list-style-type: none"> <li>• Enhanced cleaning</li> <li>• Enhanced ventilation</li> <li>• Hand hygiene</li> <li>• Masks (except during sports)</li> <li>• Physical distancing (&lt;3 ft. in elementary schools due to higher class sizes)</li> <li>• Plastic barriers around desks</li> </ul>	<p>From Dec 1, 2020 – Jan 22, 2021, 98 school cases were identified; 86 included in this analysis :</p> <ul style="list-style-type: none"> <li>• 33 (38.4%) staff; 53 (61.6%) students <ul style="list-style-type: none"> <li>○ Of 1,119 close contacts, 68 of 688 who were tested were positive</li> </ul> </li> </ul> <p>Secondary Attack Rate (SAR) among:</p> <ul style="list-style-type: none"> <li>• Students: 5.8% (95% CI=3.6-8.0)</li> <li>• Staff: 13.1% (95% CI=9.0-17.2)</li> </ul> <p>Higher SAR occurred in:</p> <ul style="list-style-type: none"> <li>• Indoor high impact sports: 23.8% (95% CI=12.7,33.3)</li> <li>• Staff interactions: 18.2% (95% CI=4.5,31.8)</li> <li>• Elementary classrooms: 9.5% (95% CI=6.5,12.5) <ul style="list-style-type: none"> <li>○ Elementary teachers: 15.0 (95% CI=10.2,19.8)</li> </ul> </li> </ul>	<p>Moderate</p>

					<ul style="list-style-type: none"> <li>○ Symptomatic staff; 13.7% (95% CI=9.1,17.8)</li> </ul> <p>Lower SAR occurred in:</p> <ul style="list-style-type: none"> <li>• Asymptomatic students: 2.3% (95% CI=0.6,4.6)</li> <li>• Elementary students: 2.7% (95% CI=0.7,5.3)</li> </ul> <p>69 samples were sequenced. No variants of concern were detected.</p>	
<p>Aiano, F., McOwat, K., Obi, C., Powell, A.A., Flood, J.S., Bhardwaj, S. ... Saliba, S. (2021). <a href="#">COVID-19 Outbreaks in Nurseries During Rapid Spread of the B.1.1.7 Variant of SARS-CoV-2 in England: Cross-Sectional National Surveillance, November 2020 – January 2021.</a> <i>Preprint.</i></p>	Apr 15, 2021	Prevalence	Daycares England, The United Kingdom (B.1.1.7)	<ul style="list-style-type: none"> <li>• Cohorts</li> <li>• Physical distancing</li> </ul>	<p>From Nov 2, 2020 – Jan 31, 2021, 324/32,852 daycares reported an outbreak (0.98%). This study includes data from 173 daycares, reporting 1657 cases: 510 children (31%), 1147 staff (69%) (median 8 cases/outbreak, mode 2 cases/outbreak)</p> <p>Overall SAR was 9.1% (95% CI: 8.65, 9.48)</p> <ul style="list-style-type: none"> <li>• Child index case in 26% of outbreaks: SAR=7.97% (95% CI=7.24, 8.77) (Highest in those &lt;1 and decreased with age)</li> <li>• Staff index case in 72% of outbreaks: SAR=9.48% (95% CI=8.98, 10.0)</li> </ul> <p>Staff to staff transmission was highest (SAR=32.98, 95% CI: 31.19,34.82), followed by child to staff (SAR=26.28, 95% CI= 23.54, 29.21) and lowest in child-to-child transmission (SAR=3.55, 95% CI=3.01,4 .19).</p> <p>SAR were higher in January 2021 when B.1.1.7 variants increased (compared to Nov 2020), suggesting variants may be more transmissible, although community rates also rose at the same time:</p> <ul style="list-style-type: none"> <li>• Children: SAR= 4.21% (95% CI=3.72, 4.77) vs. 2.34% (95% CI=1.94,2.81)</li> <li>• Staff: SAR= 33.96% (95% CI=32.23, 38.30) vs. 24.26% (95% CI=21.97, 26.72).</li> </ul>	<p>Low</p> <p><b><i>PREPRINT</i></b></p>

<p>Armann, J.P., Kirsten, C., Galow, L., Kahre, E., Haag, L., Dalpke, A. (2021). <a href="#">SARS-CoV-2 transmissions in students and teachers: seroprevalence follow-up study in a German secondary school in November and December 2020</a>. <i>BMJ Paediatrics Open</i>, 5, e001036.</p>	<p>Mar 24, 2021</p>	<p>Cohort</p>	<p>Secondary school 8-12 Dresden, Saxony, Germany</p>	<ul style="list-style-type: none"> <li>• Masks in common areas (recommended)</li> <li>• Physical distancing (1.5 m)</li> <li>• Quarantine for close contacts</li> <li>• Reduced extracurriculars</li> </ul>	<p>Seroprevalence testing was conducted amongst students and staff in Nov (8 weeks after a positive student case, low community transmission) and Dec 2021 (high community transmission) to identify undetected cases:</p> <p>Nov: 246/464 (53%) of eligible students and 55/70(79%) of eligible staff:</p> <ul style="list-style-type: none"> <li>• Seroprevalence=1.7% (95% CI=0.3,3.3)</li> <li>• Ratio undetected to detected: 0.25(1/4)</li> </ul> <p>Dec: 197/464 (42%) of eligible students and 40/70 (51%) of eligible staff</p> <ul style="list-style-type: none"> <li>• Seroprevalence=6.8% (95% CI=3.8, 10.2)</li> <li>• Ratio undetected:detected, 0.33 (4/12).</li> </ul>	<p>Moderate</p>
<p>van Loon, W., Hommes, F., Theuring, S., von der Haar, A., Körner, J., Schmidt, M. ... Mockenhaupt, F. P. (2021). <a href="#">Renewed absence of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infections in the day care context in Berlin, January 2021</a>. <i>Clinical Infectious Diseases</i>, ciab199.</p>	<p>Mar 2, 2021</p>	<p>Cohort</p>	<p>Kindergarten, Metropolitan Berlin, Germany</p>	<p>Not reported</p>	<p>From Jan 17 – 23, 2021, children, families, and staff from 12 kindergarten programs were sampled:</p> <ul style="list-style-type: none"> <li>• 149 kindergarten children</li> <li>• 74 staff</li> <li>• 472 household members</li> </ul> <p>All tested negative for COVID-19. Community weekly incidence in the same time period was 110/100,000.</p> <p>Small sample size (n=12 centres) may not be representative of the &gt;2600 kindergartens in Berlin.</p>	<p>Low</p>

<p>Nelson, E.J., McKune, S.L., Ryan, K.A., Lednicky, J.A., Crowe, S.R., Myers, P.D., &amp; Morris Junior, J.G. (2021). <a href="#">SARS-CoV-2 Positivity on or After 9 Days Among Quarantined Student Contacts of Confirmed Cases</a>. <i>JAMA</i>, 325(15), 1561-1562.</p>	<p>Feb 19, 2021</p>	<p>Prevalence</p>	<p>Elementary, middle and high school, Alachua County, Florida, USA</p>	<ul style="list-style-type: none"> <li>Quarantine</li> </ul>	<p>From Aug 1 – Nov 30, 2020, 257/495 (51.9%) suspected school cases tested positive. Total number of students not reported.</p> <p>2189 student close contacts were quarantined for 14 days:</p> <ul style="list-style-type: none"> <li>14/134 (10.4%) tested positive on day 3</li> <li>40/839 (4.8%) tested positive on days 9-14</li> </ul> <p>Of those students testing positive on days 9-14, 8.2% were high school students compared to 1.8% in elementary and middle school (<b>p &lt;0.001</b>).</p>	<p>Moderate</p>
<p><b>Previously reported evidence</b></p>						
<p>Thielecke, M., Theuring, S., van Loon, W., Hommes, F., Mall, M.A., Rosen, A., ... Mockenhaupt, F.P. (2020). <a href="#">SARS-CoV-2 infections in kindergartens and associated households at the start of the second wave in Berlin, Germany – a cross sectional study</a>. <i>European Journal of Public Health</i>, ckab079.</p>	<p>May 6, 2021</p>	<p>Cross-sectional</p>	<p>Kindergarten, Germany</p>	<ul style="list-style-type: none"> <li>Cohorting</li> <li>Enhanced ventilation</li> <li>Masks (staff; 41.7% of settings)</li> <li>Physical distancing (staff, parents)</li> <li>(Attendance with common cold symptoms was allowed in 75% of settings.)</li> </ul>	<p>From Sep 28 – Oct 2, 2020, 720 individuals in 12 kindergarten programs in Berlin were tested for COVID-19 infections and antibodies to assess prevalence of infection among this population.</p> <p>Among those tested, 155 were children, 78 were staff and 487 were household members.</p> <p>701 samples were collected for 98.1% of children, 100% of educators and 96.7% of household members. Of these none were positive. One educator was positive for COVID-19 antibodies.</p>	<p>Moderate</p>

<p>White, P., O'Sullivan, M.B., Murphy, N., Stapleton, J., Dillon, A., Brennan, A., ... Sheahan, A. (2021). <a href="#">An investigation into the rates of transmission of SARS-CoV-2 during the first 6 weeks of the 2020–2021 academic year in primary and post-primary schools in Cork and Kerry, Ireland.</a> <i>Irish Journal of Medical Science</i>. Epub ahead of print.</p>	<p>Apr 1, 2021</p>	<p>Cohort</p>	<p>Primary, post-primary and special educational need schools, Cork and Kerry, Ireland</p>	<ul style="list-style-type: none"> <li>Enhanced cleaning</li> <li>Hand hygiene</li> <li>Masks (staff, students aged &gt;13)</li> <li>Physical distancing (1 m between students in classrooms)</li> </ul> <p>*Dept of PH rapidly identifies school cases and close contacts; advises isolation, as necessary.</p>	<p>From Aug 27 – Oct 11, 2020:</p> <ul style="list-style-type: none"> <li>62 school index cases identified: <ul style="list-style-type: none"> <li>27 (43.5%) aged 4-12</li> <li>23 (37.1%) aged 13-18</li> <li>12 (19.4%) aged ≥19</li> </ul> </li> <li>20/485 close contacts tested positive, Secondary Attack Rate (SAR): 4.1% <ul style="list-style-type: none"> <li>11 (3.1%) among student close contacts</li> <li>9 (6.9%) among staff close contacts</li> <li>These 20 led to 16 additional positive cases outside of school</li> </ul> </li> </ul>	<p>High</p>
<p>Cooper, D.M., Messaoudi, I., Aizik, S., Camplain, R.L., Lopez, N.V., Ardo, J. ... &amp; Boden-Albala, B. (2021). <a href="#">SARS-CoV-2 acquisition and immune pathogenesis among school-aged learners in four K-12 schools.</a> <i>Preprint</i>.</p>	<p>Mar 26, 2021</p>	<p>Cohort</p>	<p>4 schools (2 K-6 and 1 K-8 public, 1 K-12 private), Orange County, USA</p>	<ul style="list-style-type: none"> <li>Masks</li> <li>Physical distancing (≥ 6 ft)</li> </ul> <p>Predominately remote learning (3 public schools)</p>	<p>Two asymptomatic testing cycles were conducted in fall 2020 when community spread was low (3-4 cases/100,000) and during a surge (40 cases/100,000).</p> <p>No positive cases identified in the first cycle; 17/320 students (5.31%) and 6/99 staff (6.1%) tested positive in the second.</p> <p>School A (public, 97% remote) had highest infection rate (<b>9/70, 12.9%, p&lt;0.01</b>), the highest ratio of learner-to-local positivity, and highest number of students reporting COVID-19 symptoms (<b>30%, p=0.04</b>); school D (private, 80% in-person) had lowest infection rate (1/86, 1.2%).</p> <p>No significant difference in positivity rate between remote vs. in-person learning.</p>	<p>High</p> <p><b><i>PREPRINT</i></b></p>

<p>Dawson, P., Worrell, M.C., Malone, S., Tinker, S.C., Fritz, S., Maricque, B. ... CDC COVID-19 Surge Laboratory Group. (2021). <a href="#">Pilot investigation of SARS-CoV-2 secondary transmission in kindergarten through grade 12 schools implementing mitigation strategies – St. Louis County and City of Springfield, Missouri, December 2020.</a> <i>Morbidity and Mortality Weekly Report, 70(12), 449-455.</i></p>	<p>Mar 26, 2021</p>	<p>Quasi-experimental</p>	<p>K-12 schools, Springfield and St. Louis County, Missouri, USA</p>	<p>Both counties:</p> <ul style="list-style-type: none"> <li>• Contact tracing</li> <li>• Enhanced ventilation</li> <li>• Hand hygiene</li> <li>• Masks</li> <li>• Physical distancing (desk spacing, physical barriers)</li> <li>• Quarantine / isolation*</li> </ul> <p>Springfield:</p> <ul style="list-style-type: none"> <li>• Modified quarantine policy (e.g., close contacts who were masked during exposure could continue in-person learning)</li> </ul>	<p>From Dec 7-18, 2020, transmission in two counties with different quarantine policies for close contacts were compared.</p> <p>37 participants (65% students, 35% staff) with COVID-19 and 156 school-based close contacts (88% students, 12% staff) from 22 schools were interviewed.</p> <ul style="list-style-type: none"> <li>• 42 student contacts continued in-person learning under modified quarantine: 30 interviewed, 21 tested, none were positive.</li> <li>• 52 contacts did not meet criteria for modified quarantine due to unmasked exposure (60%), athletic activity contact (21%), or lunch/recess contact (13%). 2 tested positive.</li> <li>• SAR= 2/102, 2%</li> </ul> <p>In schools which implemented mitigation measures, COVID-19 incidence was lower than respective community rates (8/100,000 vs. 711/100,000 in St. Louis and 996/100,000 in Springfield).</p>	<p>Moderate</p>
<p>Doyle, T., Kendrick, K., Troelstrup, T., Gumke, M., Edwards, J., Chapman, S., Propper, R., ... Blackmore, C. (2021). <a href="#">COVID-19 in primary and secondary school settings during the first semester of school reopening – Florida, August –</a></p>	<p>Mar 26, 2021</p>	<p>Cohort</p>	<p>Primary and secondary schools, Florida, USA</p>	<ul style="list-style-type: none"> <li>• Masks (some districts)</li> <li>• Remote learning options</li> </ul>	<p>From Aug 10 – Dec 21, 2020, 63,654 cases reported in school-aged children (aged 5-17). Of 2,809,553 registered students (2.3%). 45% attended in-person learning.</p> <p>34,959 cases were school-related cases (index case had attended school):</p> <ul style="list-style-type: none"> <li>• 72% students, 28% staff</li> <li>• 0.9% of registered students contracted COVID-19 (25,094/2,809,553 students&lt;</li> <li>• 9,630 cases were identified amongst staff, no denominator given</li> </ul> <p>86,832 close school setting contacts were identified; 37,548 (43%) were tested, 10,092 (27%) were positive; SAR=11.6%</p>	<p>Moderate</p>



<p><a href="#">December 2020. Morbidity and Mortality Weekly Report, 70(12), 437-441.</a></p>					<p>695 / 6800 (10.2%) of schools reported outbreaks, average of 6.3 cases/outbreak.</p> <ul style="list-style-type: none"> <li>• 562 outbreaks had additional data: <ul style="list-style-type: none"> <li>○ 110 (20%) associated with activities outside of the classroom: <ul style="list-style-type: none"> <li>▪ Sports: (91)</li> <li>▪ Social gatherings (12)</li> <li>▪ Transportation to school (4)</li> </ul> </li> <li>○ Sports-related were larger than non-sports-related outbreaks (<b>mean 6.0 vs. 4.1 cases, p&lt;0.01</b>)</li> </ul> </li> </ul> <p>Median incidence was 1280 per 100,000 students (range 394 – 3200 by county):</p> <ul style="list-style-type: none"> <li>• Student incidence correlated with county incidences (<b>p&lt;0.001</b>).</li> <li>• Higher rates among students in: <ul style="list-style-type: none"> <li>○ Smaller districts (<b>p&lt;0.0001</b>)</li> <li>○ Districts without mandatory mask policies (<b>p&lt;0.01</b>)</li> <li>○ Districts with more full-time in-person students (<b>p&lt;0.0001</b>)</li> </ul> </li> </ul>	
<p>Gandini, S., Rainisio, M., Iannuzzo, M.L., Bellerba, F., Cecconi, F., &amp; Scorrano, L. (2021). <a href="#">A cross-sectional and prospective cohort study of the role of schools in the SARS-CoV-2 second wave in Italy</a>, <i>The Lancet Regional Health – Europe</i>, 5, 100092.</p>	<p>Mar 26, 2021</p>	<p>Prevalence</p>	<p>Kindergarten, elementary, middle and high schools, Italy</p>	<ul style="list-style-type: none"> <li>• Ban on sports and music</li> <li>• Frequent ventilation</li> <li>• Hand hygiene</li> <li>• Masks (staff, high school students)</li> <li>• Negative test following exposure (some schools)</li> <li>• Physical distancing (1m between seats)</li> <li>• Reduced school hours</li> <li>• Temperature check</li> <li>• Unidirectional flow of students</li> </ul>	<p>From Sept 30, 2020 – Feb 28, 2021, incidence and positivity were lower amongst elementary and middle school students compared to general population; incidence was higher in high school students in 3 of 19 regions. Incidence in teachers was no different from other occupations after adjusting for age.</p> <p>Active contact tracing occurred following case identification from Nov 23 – Dec 5, 2020; mean number of tests per case ranged from 9-17. Clusters (2+ cases in 1 week) were found in 5-7% of schools with a case.</p> <p>Teacher to teacher transmission (37%) was more common than student to teacher (10%) (<b>p=0.007</b>).</p>	<p>High</p>

					<p>Incidence by school level (Nov 23-28):</p> <ul style="list-style-type: none"> <li>Kindergarten: 0.21% of children and 2.35% of teachers</li> <li>Elementary: 0.35% of children and 1.83% of teachers</li> <li>Middle: 0.45% of students and 1.60% of teachers</li> </ul> <p>Increase in <math>R_0</math> was not associated with staggered school reopening date but were linked to a national election. School closures in two regions did not lower <math>R_0</math>.</p>	
Hershow, R.B., Wu, K., Lewis, N.M., Milne, A.T., Currie, D., Smith, A.R., ... Chu, V.T. (2021). <a href="#">Low SARS-CoV-2 transmission in elementary schools – Salt Lake County, Utah, December 3, 2020–January 31, 2021</a> . <i>Morbidity and Mortality Weekly Report</i> , 70(12), 442-448.	Mar 26, 2021	Cross-sectional	K-6 schools, Salt Lake County, Utah, USA	<ul style="list-style-type: none"> <li>6ft distance</li> <li>High mask use (86%)</li> <li>81% in-person learning</li> <li>Plexiglass barriers for teachers</li> <li>Staggered mealtimes</li> </ul>	<p>From Dec 3-Jan 21, 2021, susceptible school contacts of 51 index cases (40 students, 11 staff) were contacted:</p> <ul style="list-style-type: none"> <li>Of 1041 close contacts, 735 (70.6%) were tested, 12 were positive (SAR: 1.6%)</li> <li>5 of 12 positive cases were classified as school-associated</li> <li>Four of five events were deemed to be due to lapses in IPAC measures (&lt;6ft distance during class (2) or lunch (2), and poor mask compliance (2).</li> <li>Tertiary transmission was detected in 3 households</li> </ul>	Moderate
Gillespie, D.L., Meyers, L.A., Lachmann, M., Redd, S.C., & Zenilman, J.M. (2021). <a href="#">The experience of two independent schools with in-person learning during the COVID-19 pandemic</a> . <i>Journal of School</i>	Mar 25, 2021	Prevalence	2 independent K-12 schools, Southeast and Mid-Atlantic, USA	<ul style="list-style-type: none"> <li>Cancelled extracurriculars and congregating activities</li> <li>Enhanced cleaning (classroom disinfecting)</li> <li>Enhanced ventilation</li> <li>Masks</li> <li>Periodic universal testing (following</li> </ul>	<p>From Aug – Dec 2020, 2 schools were monitored for COVID-19 as they returned to in-person learning.</p> <p>School A:</p> <ul style="list-style-type: none"> <li>109 confirmed cases (in 2320 students and staff, 4.9%)</li> <li>60 (54%) detected by universal test, 22 (20%) by contact tracing, 30 (27.8%) self-reported</li> <li>59 (54%) cases during 3-week period following school break</li> </ul>	High

<p><i>Health, 91(5), 347-355.</i></p>				<p>CDC's guidelines, similar to colleges/universities)</p> <ul style="list-style-type: none"> <li>• Physical distancing</li> <li>• Quarantine policies</li> <li>• Temperature checking</li> </ul>	<ul style="list-style-type: none"> <li>• Largest outbreak (28 cases) traced to off-campus party</li> </ul> <p>School B:</p> <ul style="list-style-type: none"> <li>• 25 confirmed cases (in 1200 students and staff, 2.0%)</li> <li>• 21 (84%) detected by universal testing, 1 (4%) by contact tracing, 3 (12%) self-reported</li> </ul> <p>Community incidence rates correlated with school infections:</p> <ul style="list-style-type: none"> <li>• School A: <b>r=0.9, p&lt;0.01</b></li> <li>• School B: <b>r=0.8, p&lt;0.05.</b></li> </ul> <p>There was no correlation between positivity rates and in-school introduction. In-school rates were consistently below community rates.</p> <p>9% of 69 introduced cases, in both schools, resulted in in-school transmission:</p> <ul style="list-style-type: none"> <li>• 5 secondary infections from 45 introduced cases in school A</li> <li>• 1 secondary infection from 24 introduced cases in school B</li> <li>• Reproduction number consistently low (0.47 in school A, 0.05 in school B).</li> <li>• 72% of in-school transmission (school A) associated with mask-wearing noncompliance</li> </ul> <p>No evidence of staff-student transmission.</p> <p>Testing protocol within schools changed over the study period based on resource availability; early cases may have gone undetected.</p>	
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<p>Liu, D., Lin, G., Sun, X., Du, Y., Liu, H., &amp; Qu, M. (2021). <a href="#">Different school reopening plans on coronavirus disease 2019 case growth rates in the school setting in the United States</a>. <i>Journal of School Health, 91</i>, 370-375.</p>	<p>Mar 25, 2021</p>	<p>Cohort</p>	<p>Public K-12 schools, USA</p>	<ul style="list-style-type: none"> <li>Remote and hybrid learning options</li> </ul>	<p>From Aug 10 – Oct 14, 2020, data from 617 school districts in 48 states was crowdsourced:</p> <ul style="list-style-type: none"> <li>13% remote</li> <li>47% hybrid</li> <li>40% in-person</li> </ul> <p>1977 confirmed cases occurred:</p> <ul style="list-style-type: none"> <li>277 remote; mean 3.4±6.7/district</li> <li>748 hybrid; mean 2.6±5.5/district</li> <li>952 in-person; mean 3.8±10.7/district</li> </ul> <p>Daily growth rates were calculated, adjusting for region, poverty level, state-level risk and metropolitan status:</p> <ul style="list-style-type: none"> <li>Remote, 1.1%: <b>OR (vs. hybrid)=0.96 (95% CI=0.96,0.97)</b></li> <li>Hybrid, 4.9%</li> <li>In-person, 3.5%: <b>OR (vs. hybrid)=0.99 (95% CI=0.98,0.99).</b></li> </ul> <p>Hybrid learning resulted in the highest growth rate over time.</p>	<p>Moderate</p>
<p>Willeit, P. Krause, R., Lamprecht, B., Berghold, A., Hanson, B., Stelzl, E., ... &amp; Wagner, M. (2021). <a href="#">Prevalence of RT-qPCR-detected SARS-CoV-2 infection at schools: First results from the Austrian School-SARS-CoV-2 prospective cohort study</a>. <i>The Lancet Regional Health – Europe, 5</i>, 100086.</p>	<p>Mar 23, 2021</p>	<p>Cohort</p>	<p>Primary schools, Austria</p>	<ul style="list-style-type: none"> <li>Varied by region</li> </ul>	<p>From Sept 28 – Nov 16, 2020, a random sample of students (n=9465) and teachers (n=1269) in 245 schools took part in repeat RT-PCR testing every 3-5 weeks.</p> <p>First testing Sep 28 – Oct 22, 2020, 7-day community incidence was 75 per 100,000. School prevalence was 0.39%.</p> <ul style="list-style-type: none"> <li>209 (86%) schools had 0 cases</li> <li>28 (11.5%) schools had 1 case</li> <li>6 (2.5%) schools had 2 cases</li> </ul> <p>Second testing Nov 10 – Nov 16, 2020, 7-day community incidence 419 per 100,000. School prevalence 1.39%. Fewer schools were tested due to new school closure</p> <ul style="list-style-type: none"> <li>52 (59.1%) schools had 0 cases</li> <li>23 (26.1%) schools had 1 case</li> <li>10 (11.4%) schools had 2 cases</li> <li>4 (3.4%) schools had 3 cases.</li> </ul>	<p>High</p>

					<p>In adjusted models, odds of a single case were associated with:</p> <ul style="list-style-type: none"> <li>Regional incidence: 2-fold higher incidence, <b>OR=1.64 (95% CI=1.38,1.96)</b></li> <li>Social deprivation: high/very high vs. low/moderate, <b>OR=2.14 (95% CI=1.30,3.53)</b></li> </ul> <p>There was no association between grade (1-4, 5-8), population density, students per class, teacher vs. students, sex, or age of teachers or students (unadjusted model).</p>	
<p>Ulyte, A., Radtke, T., Abela, I.A., Haile, S.R., Berger, C., Huber, M., ... Kriemler, S. (2021). <a href="#">Clustering and longitudinal change in SARS-CoV-2 seroprevalence in schoolchildren: prospective cohort study of 55 schools in Switzerland</a>. <i>BMJ</i>, 372, n616.</p>	<p>Mar 17, 2021</p>	<p>Cohort</p>	<p>Primary and secondary schools, Switzerland</p>	<ul style="list-style-type: none"> <li>Hand hygiene</li> <li>Masks (students aged 12+)</li> <li>Physical distancing</li> <li>Regular surface cleaning<sup>1</sup></li> </ul>	<p>In Jun/Jul and Oct/Nov 2020, classes and schools were randomly selected to take part in seroprevalence testing. 2831 children from 275 classes in 55 schools enrolled. Median participation within each class was 47%.</p> <p>Overall seroprevalence was 2.4% (95% CI=1.4,3.6%) in summer and 4.5% (95% CI=3.2,6.0%) in late autumn. The proportion ever seropositive was 7.8% (95% CI=6.2,9.5%).</p> <p>There were no differences by age or sex but did differ by district.</p> <p>At least 1 seropositive child was detected in 52 of 55 schools and in 125 of 275 classes (75 of 129 classes with ≥5 children and ≥50% of children tested).</p> <p>7 classes (2.5%) in 5 schools had 3+ cases. Further investigation found probable teacher to student transmission in 1 cluster, and potential school transmission in 3 clusters. Household transmission was probable in the remaining 3 clusters.</p>	<p>Moderate</p>

<sup>1</sup> Federal Office of Public Health of the Swiss Confederation (2020, December 11). [Coronavirus: Precautionary measures](#).

<p>Ladhani, S.N., Baawuah, F., Beckmann, J., Okike, I.O., Ahmad, S., Garstang, J. ... Ramsay, M.E. (2021). <a href="#">SARS-CoV-2 infection and transmission in primary schools in England in June-December, 2020 (sKIDs): an active, prospective surveillance study</a>. <i>Lancet Child &amp; Adolescent Health</i>. Epub ahead of print.</p>	<p>Mar 16, 2021</p>	<p>Cohort</p>	<p>Primary schools, England</p>	<ul style="list-style-type: none"> <li>Physical distancing</li> <li>Reduced class sizes</li> <li>Cohorting (staff, students)</li> </ul> <p>*Schools partially reopened Jun 1, after first national lockdown; summer half term from Jun to mid-Jul. Schools fully reopened Sep; fall term from Sep to mid-Dec.</p>	<p>In Jun – Jul 2020 (i.e. summer half-term), 11,966 participants (6727 students, 4628 staff, 611 unknown) from 131 schools were tested weekly.</p> <p>Estimated infection rates per week:</p> <ul style="list-style-type: none"> <li>4.1/100,000 students (95% CI=0.1,22.8)</li> <li>12.5/100,000 staff (95% CI=1.5,45.0)</li> <li>All household contacts tested negative</li> </ul> <p>From Jun – Nov 2020, seroprevalence testing occurred three times: following partial reopening, at end of summer term, and following full reopening.</p> <p>Round 1 (Jun 2020) seropositivity:</p> <ul style="list-style-type: none"> <li>Students: 11.2% (95% CI=7.9,15.1; 91/816)</li> <li>Staff: 15.1% (95% CI=11.9,18.9; 209/1381)</li> <li>Rates did not differ from community</li> </ul> <p>Round 2 (Jul 2020):</p> <ul style="list-style-type: none"> <li>73.7% participation</li> <li>None tested positive for COVID-19</li> <li>Seropositivity was 10.4% (95% CI=6.8,15.0); 56/540 students and 13.1% (95% CI=9.9,17.0); 117/890 staff</li> </ul> <p>Round 3 (Nov 2020):</p> <ul style="list-style-type: none"> <li>61.9% participation</li> <li>1 staff tested positive (0.1%, 95% CI=0.0,0.6)</li> <li>Seropositivity was 8.6% (95% CI=5.8, 12.2) 33/384 students and 11.2% (95% CI=9.2,14.3); 103/90 staff</li> </ul> <p>Seroconversion was associated with region, ethnicity; no differences were reported by sex, staff/students.</p>	<p>High</p>
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<p>Kriemler, S., Ulyte, A., Ammann, P., Peralta, G.P., Berger, C., Puhan, M.A., Radtke, T. (2020).  <a href="#">Surveillance of acute SARS-CoV-2 infections in school children and point-prevalence during a time of high community transmission in Switzerland.</a>  <i>Frontiers in Pediatrics, 9, 645577.</i></p>	<p>Mar 16, 2021</p>	<p>Prevalence</p>	<p>Primary and secondary schools, Switzerland</p>	<ul style="list-style-type: none"> <li>• Hand hygiene</li> <li>• Masks (students aged 12+)</li> <li>• Physical distancing</li> <li>• Regular surface cleaning<sup>2</sup></li> </ul>	<p>From Dec 1 – 11, 2020 point-prevalence of asymptomatic COVID-19 infections in children aged 6-16 and teachers was assessed in 14 randomly selected schools in areas of high community transmission. Serial testing was completed 1 week via both RT-PCR and a rapid Ag test. National incidence rates were ~4000-5000 per 100,000 per day.</p> <p>Among the 641 children, 1 case was identified (0.2%) via RT-PCR. Among 66 teachers no cases were identified.</p> <p>7 children (1.1%) and 2 teachers (3.0%) tested positive using the rapid test; these results were negative when repeated, thus deemed false positives.</p>	<p>High</p>
<p>Cordery, R., Reeves, L., Zhou, J., Rowan, A., Watber, P., Rosadas, C., ... &amp; Sriskandan, S. (2021).  <a href="#">Transmission of SARS-CoV-2 by children attending school. Interim report on an observational, longitudinal sampling study of infected children, contacts, and the environment.</a>  <i>Preprint.</i></p>	<p>Mar 9, 2021</p>	<p>Cohort</p>	<p>Schools, United Kingdom</p>	<ul style="list-style-type: none"> <li>• 14-day whole class isolation (with single case detected)</li> <li>• Enhanced cleaning</li> <li>• Hand hygiene</li> <li>• Masks (students, secondary schools)</li> <li>• Physical distancing</li> </ul>	<p>From Oct – Dec 2020, longitudinal sampling was conducted for close contacts of 5 school-attending children with COVID-19 (aged 2–18).</p> <p>No transmission to class or school contacts was identified and limited transmission in households (5/23 contacts (21.7%) positive; 1 child and 3 adults).</p> <p>In one secondary school, 3 likely unrelated asymptomatic cases were identified. One student was infected with variant of concern B1.1.7; 7 other class members tested negative.</p> <p>This is an interim report of a larger study; time frame, school participation rate, and sample size are limited.</p>	<p>Moderate</p> <p><b><i>PREPRINT</i></b></p>

<sup>2</sup> Federal Office of Public Health of the Swiss Confederation (2020, December 11). [Coronavirus: Precautionary measures.](#)

<p>National Centre for Immunisation Research and Surveillance. (2021, March 9). <a href="#">COVID-19 in schools and early childhood education and care services – the Term 4 experience in NSW.</a></p>	<p>Mar 9, 2021</p>	<p>Cohort</p>	<p>Schools, daycares services, Australia</p>	<p>All schools:</p> <ul style="list-style-type: none"> <li>• Cohorting</li> <li>• Enhanced cleaning</li> <li>• Hand hygiene</li> <li>• Screening</li> </ul> <p>Primary and secondary schools (in addition):</p> <ul style="list-style-type: none"> <li>• Parents / carers not allowed on site, except for select purposes</li> <li>• Physical distancing (staff)</li> </ul> <p>Students must stay home if unwell, negative tests are required to return to school after showing symptoms<sup>3</sup></p>	<p>From Sep 26 – Dec 18, 2020, 9 student and 1 staff index cases were identified from 3 secondary schools, 3 primary schools, and 4 daycares; infections were acquired via household and community non-household contacts).</p> <p>Of 1113 close contacts (953 students, 160 staff), 1098 were tested; 13 secondary cases (12 students, 1 staff) occurred in 4 settings (2 primary schools, 2 daycares) for an overall SAR of 1.2%, with no transmission in secondary schools, 2.3% in primary schools, and 0.8% in daycares.</p>	<p>Moderate</p> <p><b>NOT PEER REVIEWED</b></p>
<p>Heudorf, U., Steul, K., Walczok, A., Gottschalk, R. (2021). <a href="#">Children and COVID-19- Data from mandatory reporting and results of contact person testing in daycare centers and schools in Frankfurt am Main, Germany, August-December 2020.</a> <i>Monatsschr Kinderheilkd.</i> Epub ahead of print.</p>	<p>Mar 2, 2021</p>	<p>Prevalence</p>	<p>Schools, daycares, Germany</p>	<p>Not reported</p>	<p>From Mar – Dec 31, 2020, 22,715 cases were reported (1717 in children <math>\leq 14</math>).</p> <p>274 index cases were identified in 143 daycares and 75 schools:</p> <ul style="list-style-type: none"> <li>• Daycares: <ul style="list-style-type: none"> <li>○ 34% (56/164) child index cases</li> <li>○ SAR from children: 1.5% (22/1437)</li> <li>○ SAR from adults: 11.2% (104/928)</li> <li>○ 4.5% of adult (48/1062) and 2.5% of child (78/3065) contacts positive</li> </ul> </li> <li>• Schools: <ul style="list-style-type: none"> <li>○ 73.6% (81/110) child index cases</li> <li>○ SAR from children: 2% (61/3006)</li> <li>○ SAR from adults: 2.9% (16/549)</li> <li>○ 0.9% of adult (8/897), 2.5% of child (71/2891) contacts tested positive</li> </ul> </li> </ul> <p>Age-related incidence and SAR increased with incidence in the general population.</p>	<p>Moderate</p>

<sup>3</sup> New South Wales Government. (2020, December 8). [Advice for families.](#)



<p>Schoeps, A., Hoffmann, D., Tamm, C., Vollmer, B., Haag, S., Kaffenberger, T., ... Zanger, P. (2021). <a href="#">COVID-19 transmission in educational institutions August to December 2020 in Germany: a study of index cases and close contact cohorts</a>. <i>Preprint</i>.</p>	<p>Feb 20, 2021</p>	<p>Cohort</p>	<p>Schools and daycares, Rhineland-Palatinate, Germany</p>	<p>Secondary schools:</p> <ul style="list-style-type: none"> <li>Enhanced cleaning</li> <li>Enhanced ventilation</li> <li>masks (in school buildings including classrooms after Nov 22)</li> <li>Personal hygiene</li> <li>Physical distancing (&gt;1.5m)</li> </ul> <p>Primary schools and daycares implemented the same measures as secondary schools, except for physical distancing and wearing face masks.</p>	<p>From Aug – Dec 2020, 591 student, 157 teacher, 36 other school cases followed via local public health.</p> <p>Of 14,591 close contacts, 441 index cases identified: SAR 1.34%, 95% CI=1.16,1.54%.</p> <p>Risk of transmission was more likely:</p> <ul style="list-style-type: none"> <li>Teach index case vs. student (<b>RR=2.38, 95% CI=1.73,3.26</b>)</li> <li>Daycare vs. secondary school (<b>RR=2.75, 95% CI=1.88,4.10</b>)</li> <li>Older age (range of RRs reported)</li> </ul> <p>SARs varied by:</p> <ul style="list-style-type: none"> <li>Teacher vs. student (<b>Incidence Rate Ratio (IRR)=3.17, 95% CI=1.79,5.59</b>)</li> <li>Asymptomatic vs. symptomatic cases (<b>IRR=0.47, 95% CI=0.25,0.89</b>)</li> <li>Daycare vs. secondary schools (<b>IRR=3.23, 95% CI=1.76, 5.91</b>)</li> </ul> <p>Findings limited by incomplete case identification and contact tracing. Transmission attributed to schools but not known how much possible transmission outside these settings</p>	<p>High <b><i>PREPRINT</i></b></p>
<p>Smith-Norowitz, T.A., Hammerschlag, M.R., &amp; Kohlhoff, S. (2021). <a href="#">Coronavirus disease 2019 (COVID-19) infection rates in a private school in Brooklyn, New York</a>. <i>Acta Paediatrica</i>, 110(5), 1569-1570.</p>	<p>Feb 1, 2021</p>	<p>Cohort</p>	<p>All girl's private school, New York City (NYC), USA</p>	<ul style="list-style-type: none"> <li>Hand hygiene</li> <li>Masks</li> <li>Physical distancing</li> <li>Plastic barriers erected around students' and teachers' desks</li> </ul>	<p>From Oct – Dec 2020, 2439 COVID-19 tests were performed in a reopened all girl's private school (aged 6–18).</p> <p>There were 3 positive cases (2 students, 1 staff), for an overall infection rate of 0.13% (vs. NYC public school rates of 0.28 – 0.30% during the same time).</p> <p>No asymptomatic infections were detected.</p>	<p>Moderate</p>

<p>Falk, A., Benda, A., Falk, P., Steffen, S., Wallace, Z., &amp; Høeg, T.B. (2021). <a href="#">COVID-19 cases and transmission in 17 K–12 schools – Wood County, Wisconsin, August 31–November 29, 2020.</a> <i>Morbidity and Mortality Weekly Report</i>, 70, 136-140.</p>	<p>Jan 29, 2021</p>	<p>Prevalence</p>	<p>K-12 schools, rural Wisconsin, USA</p>	<ul style="list-style-type: none"> <li>• Cohorting (11-20 students per group)</li> <li>• Masks (students, provided by a Foundation grant)</li> <li>• Physical distancing (indoor classes, lunch periods)</li> <li>• Quarantine policies (after exposures)</li> </ul>	<p>From Aug 31 – Nov 29, 2020, 191 positive cases were detected among 4876 students and 654 staff engaged in in-person learning from 17 rural schools.</p> <ul style="list-style-type: none"> <li>• 7 students (3.7% of cases) were linked to in-school spread: <ul style="list-style-type: none"> <li>○ 5 elementary, 2 secondary</li> <li>○ 3 in one class, 4 at separate schools</li> </ul> </li> <li>• No in-school transmission reported between classroom cohorts</li> <li>• No known staff-to-staff or student-to-staff spread</li> </ul> <p>COVID-19 incidence in schools was lower than in the county, overall (3453 vs. 5466 per 100,000). (Weekly incidence of 34 – 1189 per 100,000 in the community; 7 – 40% positivity rate).</p> <p>Staff-reported rate of student mask wearing was high (&gt;92%).</p> <p>A limitation of this study was the lack of infection screening to determine prevalence of asymptomatic spread.</p>	<p>High</p>
<p>Theuring, S., Thielecke, M., van Loon, W., Hommes, F., Hülso, C., von der Haar, A. ... BECOSS Study Group. (2021). <a href="#">SARS-CoV-2 infection and transmission in school settings during the second wave in Berlin, Germany: a cross-</a></p>	<p>Jan 29, 2021</p>	<p>Cross-sectional</p>	<p>Primary and secondary schools, Berlin, Germany</p>	<ul style="list-style-type: none"> <li>• Cohorting</li> <li>• Enhanced ventilation (fresh air at least 3x day)</li> <li>• Hygiene commissioner (some schools)</li> <li>• Masks (outside and in classroom, some schools)</li> <li>• Signs about hand hygiene</li> <li>• Soap and water in restrooms</li> </ul>	<p>In Nov 2020, 1199 participants tested (177 primary, 175 secondary school students from 24 classrooms, 142 staff, 625 household members). 7-day incidence in Berlin was 185-210/100,000.</p> <p>9 students and 1 staff tested positive in 8 classrooms; 7 were asymptomatic.</p> <p>No school-related secondary infections in classes at re-testing one week later.</p> <p>Infection prevalence:</p> <ul style="list-style-type: none"> <li>• Students: 2.7% (95% CI=1.2,5.0; 9/338)</li> <li>• Staff: 0.7% (95% CI=0.0,3.9; 1/140)</li> <li>• Household members: 2.3% (95% CI=1.3,3.8; 16/611)</li> </ul>	<p>High</p> <p><b><i>PREPRINT</i></b></p>

<a href="#">sectional study.</a> <i>Preprint.</i>					More positive cases in higher socioeconomic community (high vs. low. <b>OR=4.71, 95% CI=0.82, 48.18</b> ).  Prevalence increased with inconsistent mask-wearing in school, walking to school, and case-contacts outside school.	
Hoch, M., Vogel, S., Kolberg, L., Dick, E., Fingerle, V., Eberle, U., ... von Both, U. (2021). <a href="#">Weekly SARS-CoV-2 sentinel in primary schools, kindergartens and nurseries, June to November 2020, Germany.</a> <i>Preprint.</i>	Jan 26, 2021	Prevalence	Primary schools, kindergarten and nurseries, Germany	<p>All schools:</p> <ul style="list-style-type: none"> <li>Cancelled common activities</li> <li>Hand hygiene</li> <li>Masks (staff, parents)</li> <li>Physical distancing</li> <li>Separate bathrooms and playground</li> </ul> <p>Primary schools:</p> <ul style="list-style-type: none"> <li>Masks (students, except when seated)</li> <li>Reduced class sizes</li> </ul>	<p>From Jun – Nov 2020, 2 of 3169 oropharyngeal swabs (weekly samples from randomly selected children (n=2149) and staff (n=1020)) tested positive (1 student, 1 staff in the same class). 36 close contacts were tested; 1 additional case (student) was identified.</p> <p>Incidence rate was 50/100,000 aged 1-11 and 150/100,000 general population at the time.</p>	High  <b><i>PREPRINT</i></b>
Brandal, L.T., Ofitserova, T.S., Meijerink, H., Rykkvin, R., Lund, H.M., Hungnes, O., ... Winje, B.A. (2021). <a href="#">Minimal transmission of SARS-CoV-2 from paediatric COVID-19 cases in primary schools, Norway, August to November 2020.</a> <i>Eurosurveillance, 26(1), 1-6.</i>	Jan 7, 2021	Prevalence	Primary schools in 2 counties, Norway	<ul style="list-style-type: none"> <li>Hand hygiene</li> <li>Physical distancing</li> <li>Symptomatic children asked to stay home</li> </ul> <p>(Masks <i>not</i> recommended.)</p>	<p>From Aug 28 – Nov 11, 2020, all close contacts of child cases identified in schools were asked to participate. 2 RT-PCR tests were administered, before and after a 10-day quarantine period.</p> <p>13 index cases and 319 child and 74 adult close contacts were identified, 292 (74%) agreed to participate.</p> <ul style="list-style-type: none"> <li>Of 234 child contacts tested, 2 cases (0.9%) were identified.</li> <li>Of 58 adult contacts, 1 case (1.7%) was identified</li> </ul>	High

<p>Hoehl, S., Kreutzer, E., Schenk, B., Westhaus, S., Foppa, I., Herrmann, I., ... Ciesek, S. (2021). <a href="#">Longitudinal testing for respiratory and gastrointestinal shedding of SARS-CoV-2 in day care centres in Hesse, Germany</a>. <i>Clinical Infectious Diseases</i>. Epub ahead of print.</p>	<p>Jan 3, 2021</p>	<p>Cohort</p>	<p>Daycare centres, Germany</p>	<ul style="list-style-type: none"> <li>• Masks (staff)</li> <li>• Screening (staff, students; runny nose permitted)</li> </ul>	<p>From Jun 18 – Sep 10, 2020, 859 children (aged 3 months to 8 years) and 376 staff members from 50 randomly selected daycare centres participated in weekly screening for COVID-19 using buccal mucosa swab, anal swab, and RT-PCR.</p> <p>7366 buccal mucosa swabs and 5907 anal swabs were analyzed.</p> <p>No children tested positive for COVID-19; 2 staff (1 symptomatic, 1 asymptomatic) tested positive from 2 different day care centres.</p>	<p>Moderate</p>
<p>Fricchione, M.J., Seo, J.Y., &amp; Arwady, M.A. (2020). <a href="#">Data-driven reopening of urban public education through Chicago’s tracking of COVID-19 school transmission</a>. <i>Public Health Management &amp; Practice</i>, 27(3), 229-232.</p>	<p>Dec 30, 2020</p>	<p>Cohort</p>	<p>Private schools, Chicago, USA</p>	<ul style="list-style-type: none"> <li>• Hand hygiene</li> <li>• Masks</li> <li>• On site visits and leadership team to follow-up with implementation</li> <li>• Physical distancing</li> <li>• Quarantining of cohort with identification of a positive case</li> <li>• Temperature and symptom checks</li> </ul> <p>(No student or teacher test-based screening required.)</p>	<p>From Aug 17 – Oct 4, 2020, 31 schools reported 59 COVID-19 cases (20 staff, 39 students); the median number of cases per school was 1 (range 1-8). 47 cases were school associated (case had been in the school during the infectious period). Mean community 7-day rolling average was 316 per 100,000, and average test positivity of 4.8%.</p> <p>The majority of multiple cases at a single school were siblings. Contact tracing identified 3 clusters; 2 involved only staff and 1 involved a student and a staff. 2 of 3 clusters were associated with nonadherence to physical distancing outside of school. 1 cluster was potentially transmitted in the classroom.</p>	<p>Moderate</p>

Children's Task and Finish Group. (2020, December 17). <a href="#">Update to 4<sup>th</sup> Nov 2020 paper on children, schools and transmission.</a>	Dec 17, 2020	Cross-sectional	Primary and secondary schools, England	<p>Primary schools:</p> <ul style="list-style-type: none"> <li>Enhanced cleaning</li> <li>Excluded students/staff with symptoms or recent contact</li> <li>Hand hygiene</li> <li>Physical distancing (staff, parents)</li> <li>Staggered start/end times</li> </ul> <p>(&lt;10% of schools implemented masks or distancing for students.)</p> <p>Secondary schools:</p> <ul style="list-style-type: none"> <li>Cohorting</li> <li>Enhanced cleaning</li> <li>Masks (staff, students, common areas only)</li> </ul> <p>(&lt;10% of schools implemented student masks in classrooms or teachers cohorted with a single class)</p>	<p>6253 students and 4841 staff from 42 primary and 63 secondary schools took part in point-prevalence testing. Enrollment rates were 17% for students and 55% for staff.</p> <p>In high-risk areas, % positivity was:</p> <ul style="list-style-type: none"> <li>Primary students: 1.18%, 95% CI=0.71,1.83</li> <li>Primary staff: 1.13%, 95% CI=0.49,2.22</li> <li>Secondary students: 1.73%, 95% CI=1.17,2.43</li> <li>Secondary staff: 1.62%, 95% CI=1.12,2.27</li> </ul> <p>In low-risk areas, % positivity was:</p> <ul style="list-style-type: none"> <li>Primary students: 0%</li> <li>Primary staff: 0%</li> <li>Secondary students: 1.12%, 95% CI=0.62,1.90</li> <li>Secondary staff: 1.18%, 95% CI=0.61, 2.05</li> </ul> <p>This study did not include students who were self-isolating due to symptoms or recent contact. Noted differences between primary and secondary and between low and high-risk areas should be interpreted with caution due to overlapping confidence intervals.</p>	Moderate <b>NOT PEER REVIEWED</b>
Larosa, E., Djuric, O., Cassinadri, M., Cilloni, S., Bisaccia, E., Vicentini, M., ... Reggio Emilia Covid-19 Working Group. (2020).	Dec 10, 2020	Cohort	Preschools, primary schools, middle schools, high schools, Italy	<ul style="list-style-type: none"> <li>Masks (staff, students aged 6+)<sup>4</sup></li> <li>Physical distancing</li> </ul>	From Sep 1 – Oct 15, 2020 after reopening of schools, across 41 classes in 36 schools [8 preschools (aged 0-5), 10 elementary (aged 6-10), 5 middle (aged 11-13), 13 high schools (aged 14-19)], 994 students and 204 teachers were tested following exposure to 48 primary cases (43 students, 5 staff).	Moderate

<sup>4</sup> Ministero dell'Istruzione. (2020, August 6). [Documento di indirizzo e orientamento per la ripresa delle attività in presenza dei servizi educative e delle scuole dell'infanzia.](#)

<p><a href="#">Secondary transmission of COVID-19 in preschool and school settings in northern Italy after their reopening in September 2020: a population-based study.</a> <i>Eurosurveillance</i>, 25(49): pii=2001911.</p>					<p>38 secondary cases (3.82%) were identified among students in 1 elementary school, 2 middle schools, and 6 high schools. The attack rate was higher in high and middle schools (6.6%) vs. elementary schools (0.38%). There were no secondary cases in preschools or among teachers.</p> <p>Most transmission appear to have been from infected family member or close contact. Only one middle school appears to have had transmission within the school, (index cases possibly teacher).</p>	
<p>Russell, F.M., Ryan, K., Snow, K., Danchin, M., Mulholland, K., &amp; Goldfeld, S. (2020). Methods to analyze DHHS data. In, <a href="#">COVID-19 in Victorian Schools: An analysis of child-care and school outbreak data and evidence-based recommendations for opening schools and keeping them open</a> (pp. 31-52). Murdoch Children’s Research Institute and The University of Melbourne.</p>	<p>Nov 9, 2020</p>	<p>Prevalence</p>	<p>Schools, daycares, Victoria, Australia</p>	<ul style="list-style-type: none"> <li>• Enhanced cleaning</li> <li>• Enhanced ventilation</li> <li>• Hand hygiene</li> <li>• Masks</li> <li>• No singing / wind instruments</li> <li>• No indoor sports</li> <li>• Physical distancing</li> <li>• *Strategies implemented according to areas’ colour-coded risk scheme.</li> </ul>	<p>From Jan 25 – Aug 31, 2020, of 19,109 COVID-19 cases confirmed, 2673 (8.5%) were among children aged 0-18.</p> <p>343 events (1635 cases) were associated with daycares and schools:</p> <ul style="list-style-type: none"> <li>• 229 (67%) involved a single case</li> <li>• 114* were outbreaks (≥2 cases from different households) <ul style="list-style-type: none"> <li>○ 90: ≤5 cases</li> <li>○ 12: 6-10 cases</li> <li>○ 26: &gt;10 cases</li> <li>○ 2: &gt;50 cases</li> </ul> </li> </ul> <p>(*Of note, children may be associated with multiple outbreaks)</p> <p>In schools (230 events), there were 337 secondary cases (incidence risk=33 cases per 100,000 students).</p> <p>In daycares (113 events), there were 234 secondary cases (162 staff, 72 children).</p> <p>Cases in schools and daycares were low when community transmission was low; cases peaked when community transmission was highest.</p>	<p>Moderate</p> <p><b><i>NOT PEER REVIEWED</i></b></p>

<p>National Centre for Immunisation Research and Surveillance. (2020, October 21). <a href="#">COVID-19 in schools and early childhood education and care services – the Term 3 experience in NSW.</a></p>	<p>Oct 21, 2020</p>	<p>Cohort</p>	<p>Daycare and schools, Australia</p>	<p>All schools:</p> <ul style="list-style-type: none"> <li>• Cohorting</li> <li>• Enhanced cleaning</li> <li>• Hand hygiene</li> <li>• Screening</li> </ul> <p>Primary and secondary schools (in addition):</p> <ul style="list-style-type: none"> <li>• Parents / carers not allowed on site, except for select purposes</li> <li>• Physical distancing (staff)</li> <li>• Students must stay home if unwell, negative tests are required to return to school after showing symptoms<sup>5</sup></li> </ul>	<p>From Jul 4 – Sep 25, 2020, 39 individuals (32 students and 7 staff members) from 34 educational settings (28 schools and 6 daycare services) were confirmed as primary COVID-19 cases (community acquired) who had an opportunity to transmit the virus to others in their school or daycare setting.</p> <p>3824 individuals (3439 students and 385 staff members) were identified as close contacts of the primary cases.</p> <p>33 secondary cases (28 students and 5 staff members) occurred in 10 educational settings (5 high schools, 3 primary schools, 2 daycare centres).</p> <ul style="list-style-type: none"> <li>• Outbreaks were identified in four high schools. SAR=1.1%.</li> <li>• There were no outbreaks within primary schools setting.</li> <li>• There was one outbreak in a daycare.</li> </ul> <p>The overall SAR was 0.9% (33/3641) for all settings: 1.1% in high schools, 0.4% in primary schools and 0.7% in ECEC services. The highest rate of transmission in primary schools and ECEC services was among adults, at 6.6%.</p>	<p>Moderate</p> <p><b><i>NOT PEER REVIEWED</i></b></p>
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<sup>5</sup> New South Wales Government. (2020, December 8). [Advice for families.](#)

**Table 2: Case Reports and Case Series Following School Reopening**

Reference	Date Released	Location, Setting	IPAC Measures	Summary of Findings	Quality Rating:
<b>Previously reported evidence</b>					
Berke, E.M., Newman, L.M., Jemsby, S., Bhalla, N., Sheils, N.E., Oomman, N. ... Cangelosi, G.A. (2021). <a href="#">Pooling-in-a-pod: A strategy for COVID-19 testing to facilitate safe return to school.</a> <i>Preprint.</i>	Mar 26, 2021	Independent K-12 school, Washington DC	<ul style="list-style-type: none"> <li>• Daily symptom screening</li> <li>• Masking</li> <li>• Physical distancing</li> <li>• Modified extracurriculars</li> <li>• “Facility optimization”</li> <li>• Hybrid learning (1-12 only, K all in person)</li> </ul>	<p>This project aimed to test the feasibility of ‘pool in a pod’ cohort-specific testing for early case detection and management.</p> <p>From Nov 30, 2020-Mar 3, 2021, 815 students and 276 staff took part in twice a week testing (participation varied by week).</p> <p>Over 15 testing sessions, there were 967 negative and 2 positive pools. Outside confirmatory testing identified a single positive case, the second was deemed to be a false positive.</p> <p>Cost-per-program was \$24.77. A number of students returned to in-person learning after initiating testing procedures with no increase in positive cases.</p>	Moderate <b><i>PREPRINT</i></b>
Volpp, K.G., Kraut, B.H., Ghosh, S., & Neatherlin, J. (2021). <a href="#">Minimal SARS-CoV-2 transmission after implementation of a comprehensive mitigation strategy at a school – New Jersey, August 20 – November 27, 2020.</a> <i>Morbidity and Mortality Weekly Report, 70(11), 377-381.</i>	Mar 19, 2021	Secondary school with residential and commuter students, New Jersey, USA	<ul style="list-style-type: none"> <li>• Pre-arrival and arrival quarantine</li> <li>• Negative RT-PCR before arrival</li> <li>• 2x/w RT-PCR</li> <li>• Symptomatic rapid testing</li> <li>• Isolation rooms</li> <li>• Contact tracing/ case management</li> <li>• Signed agreement</li> <li>• 6-ft distance</li> <li>• Masking</li> <li>• Hygiene</li> <li>• Personal tracking</li> <li>• Take-out cafeteria</li> <li>• No visitors to dormitories</li> <li>• HEPA-filters</li> <li>• Inter-scholastic sports cancelled</li> </ul>	<p>From Aug 20-Nov 27, 2020, testing was conducted at a private boarding school.</p> <p>8955 tests were collected from 405 staff, and 12,494 tests from 775 students.</p> <ul style="list-style-type: none"> <li>• 17 staff (0.18%) and 8 student (0.06%) specimens tested positive representing 4% of staff and 1% of students</li> <li>• 31 close contacts were quarantined and tested; none tested positive</li> </ul> <p>25 of 27 infections (93%) were likely due to off-campus contacts; source of infection could not be determined from 2 cases.</p>	Moderate



<p>Gold, J.A.W., Gettings, J.R., Kimball, A., Franklin, R., Rivera, G., Morris, E., ... Georgia K-12 School COVID-19 Investigation Team. (2021). <a href="#">Clusters of SARS-CoV-2 infection among elementary school educators and students in one school district- Georgia. December 2020-January 2021. Morbidity and Mortality Weekly Report, 70(8), 289-292.</a></p>	<p>Feb 26, 2021</p>	<p>Elementary schools, Georgia, USA</p>	<ul style="list-style-type: none"> <li>• Masks (except while eating)</li> <li>• Plastic dividers on desks (but students sat &lt;3 ft apart)</li> </ul>	<p>From Dec 1, 2020 – Jan 22, 2021, 9 clusters (of <math>\geq 3</math> linked COVID-19 cases) involving 13 staff and 32 students at 6 schools were identified. 2600 students and 700 staff attended school during this time.</p> <p>18/69 (26%) household members of persons with school-associated cases tested positive.</p> <p>Median cluster size (including household members) was 6 (range 3-16).</p> <p>Index patients were:</p> <ul style="list-style-type: none"> <li>• Staff (4 clusters)</li> <li>• Student (1 cluster)</li> <li>• Unknown (5 clusters)</li> </ul> <p>Probable transmission included:</p> <ul style="list-style-type: none"> <li>• Staff-to-student (8 clusters)</li> <li>• Student-to-student (4 clusters)</li> <li>• Student-to-staff (3 clusters)</li> <li>• Staff-to-staff (2 clusters; which was followed by staff-to-student transmission and resulted in 15/31 school-associated cases)</li> </ul> <p>9 clusters involved lack of physical distancing, 5 inadequate student mask use.</p>	<p>Moderate</p>
<p>Buonsenso, D. &amp; Graglia, B. (2021). <a href="#">High rates of SARS-CoV-2 transmission in a high-school class. Journal of Paediatrics and Child Health, 57(2), 299-300.</a></p>	<p>Jan 15, 2021</p>	<p>Secondary school, Italy</p>	<ul style="list-style-type: none"> <li>• Lunch at desk</li> <li>• Masks (in class)</li> <li>• Open windows (but no other ventilation system)</li> </ul> <p>(Insufficient space to distance desks, no cohorting, no hand sanitizer.)</p>	<p>On Sep 24, 2020, a 16-year-old secondary school student tested positive for COVID-19; one week before, 2 (of 26) classmates presented with flu-like symptoms and tested positive. From Sep 17 – 28, 2020, 9 children (36.6%) tested positive.</p> <p>Limitations of this report include lack of epidemiological assessment of the broader school and household members.</p>	<p>Moderate</p>

<p>Link-Gelles, R., DellaGrotta, A.L., Molina, C., Clyne, A., Campagna, K., Lanzieri, T.M., ... Bandy, U. (2020). <a href="#">Limited secondary transmission of SARS-CoV-2 in child care programs -Rhode Island, June 1-July 31, 2020</a>. <i>Morbidity and Mortality Weekly Report</i> 69(34), 1170-1172.</p>	<p>Aug 28, 2020</p>	<p>Daycare, Rhode Island, USA</p>	<ul style="list-style-type: none"> <li>• Cohorting</li> <li>• Enhanced cleaning</li> <li>• Hand hygiene</li> <li>• masks (staff all times; students in common areas)</li> <li>• Reduced class sizes</li> <li>• Screening</li> </ul>	<p>Daycare programs re-opened on Jun 1, 2020; data presented on all possible daycare-associated COVID-19 cases to Jul 31, 2020.</p> <p>52 positive/probable of 101 possible cases reported:</p> <ul style="list-style-type: none"> <li>• 30 (58%) children (median age = 5 years)</li> <li>• 22 (42%) adults (20 teachers, 2 parents)</li> </ul> <p>Cases occurred in 29 (4.4%) of 666 re-opened daycare programs:</p> <ul style="list-style-type: none"> <li>• 20 programs (69%) had a single case with no secondary transmission</li> <li>• 5 programs (15%) had 2-5 cases with no secondary transmission</li> <li>• 4 programs (0.6%) had possible secondary transmission</li> </ul> <p>Among 4 programs with possible secondary transmission:</p> <ul style="list-style-type: none"> <li>• Program #1: 5 children, 4 staff, 1 parent; 60 children and 21 staff quarantined</li> <li>• Program #2: 3 confirmed cases; 26 students and 17 staff quarantined</li> <li>• Program #3: 2 cases; appear un-linked, cannot confirm</li> <li>• Program #4: 1 staff, 1 child; 37 students, 16 staff quarantined</li> </ul> <p>In programs where secondary transmission likely took place, epidemiologic investigations identified lack of adherence to Department of Health guidelines (e.g., movement between groups/classrooms).</p>	<p>Moderate</p>
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**Table 3: Single Studies, Associations Between Mitigation Measures and Outcomes**

Reference	Date Released	Study Design	Setting, Location	IPAC measures	Summary of Findings	Quality Rating:
<b>New evidence reported on June 14, 2021</b>						
Gettings, J., Czarnik, M., Morris, E., Haller, E., Thompson-Paul, A.M., Rasberry, C. ... MacKellar, D. (2021). <a href="#">Mask use and ventilation improvements to reduce COVID-19 incidence in elementary schools — Georgia, November 16–December 11, 2020</a> . <i>Morbidity and Mortality Weekly Report</i> , 70(21), 779-784.	May 28, 2021	Quasi-experimental	K-5 schools, Georgia, USA	<ul style="list-style-type: none"> <li>Enhanced ventilation</li> <li>Flexible medical leave for teachers</li> <li>Hand hygiene</li> <li>Masks (teachers and staff, some schools for students)</li> <li>Physical distancing (<math>\geq 6</math> ft between desks/tables, plastic barriers around desks/tables)</li> </ul>	<p>From Nov 6 – Dec 11, 2020, self-reported data from 91,893 students in 169/1461 schools in 51/159 counties were collected; 17.8% in-person and 82.2% hybrid.</p> <p>566 confirmed cases were reported (3.08 cases/500 students, 95% CI=2.84,3.34):</p> <ul style="list-style-type: none"> <li>In person: 106 cases; 3.65 cases/500 students (95% CI=3.02,4.41)</li> <li>Hybrid: 460 cases; 2.97 cases/500 students (95% CI=2.71,3.26)</li> </ul> <p>Risk of COVID between schools implementing various IPAC measures were compared, adjusting for county-level incidence:</p> <ul style="list-style-type: none"> <li>Hybrid (vs. 100% in person): RR=0.91 (95% CI=0.60,1.36)</li> <li>Mask requirement for teachers and staff: <b>RR=0.63 (95% CI=0.47,0.85)</b></li> <li>Mask requirements for students: RR=0.79 (95% CI=0.50,1.08)</li> <li>Flexible medical leave for teachers: RR=0.81 (95% CI= 0.56,1.17)</li> <li>Improved ventilation (vs. no): <b>RR=0.61 (95% CI=0.43,0.87)</b>; Uncertain ventilation changes (vs. no): <b>RR=0.63 (95% CI=0.42, 0.95)</b></li> <li>Desk/table barriers: RR=0.98 (95% CI=0.69,1.41)</li> <li>Students per classroom: RR=1.02 (95% CI=0.98,1.06)</li> <li>Cohort size, per student: RR=1.00 (95% CI=1.00,1.00)</li> <li>Handwashing: RR=0.88 (95% CI=0.76,1.01)</li> </ul> <p>Incidence was higher in areas of higher community transmission.</p>	High

<p>Oster, E., Jack, R., Halloran, C., Schoof, J., &amp; McLeod, D. (2021). <a href="#">COVID-19 Mitigation Practices and COVID-19 Rates in Schools: Report on Data from Florida, New York and Massachusetts.</a> <i>Preprint.</i></p>	<p>May 21, 2021</p>	<p>Quasi-experimental</p>	<p>Florida, New York and Massachusetts, USA</p>	<ul style="list-style-type: none"> <li>• Cohorts</li> <li>• Enhanced ventilation</li> <li>• Masks</li> <li>• Reduced student density</li> <li>• Physical distancing (6 ft.)</li> <li>• Symptom screening</li> <li>• Temperature checks</li> </ul> <p>Varied by state</p>	<p>Student IRRs for mitigation practices were calculated by State over the 2020-2021 school year:</p> <ul style="list-style-type: none"> <li>• Florida: <ul style="list-style-type: none"> <li>○ Student density <math>\geq 80</math> vs. 10-49%: <b>IRR=0.576, <math>p &lt; 0.001</math></b></li> <li>○ Student density 50-79 vs. 10-49%: <b>IRR=0.773, <math>p &lt; 0.001</math></b></li> <li>○ Staff mask mandate vs. none: IRR=0.990, <math>p &gt; 0.05</math></li> <li>○ No mask mandate vs. any: IRR=1.116, <math>p &gt; 0.05</math></li> <li>○ Ventilation improvements: IRR=0.858, <math>p &gt; 0.05</math></li> </ul> </li> <li>• Massachusetts: <ul style="list-style-type: none"> <li>○ Student density <math>\geq 80</math> vs. 10-49%: <b>IRR=0.627, <math>p &lt; 0.001</math></b></li> <li>○ Student density 50-79 vs. 10-49%: <b>IRR=0.655, <math>p &lt; 0.01</math></b></li> </ul> </li> <li>• New York <ul style="list-style-type: none"> <li>○ Student density <math>\geq 80\%</math> vs. 10-49%: <b>IRR=0.628, <math>p &lt; 0.001</math></b></li> <li>○ Student density 50-79 vs. 10-49%: <b>IRR=0.708, <math>p &lt; 0.001</math></b></li> <li>○ Ventilation improvements vs. none: IRR=0.938, <math>p &gt; 0.05</math></li> </ul> </li> </ul> <p>Higher in-person learning density is consistently associated with lower student cases.</p>	<p>Moderate <b><i>PREPRINT</i></b></p>
<p>Oster, E. (2021, April 25). <a href="#">National COVID-19 school response dashboard.</a></p>	<p>Apr 25, 2021</p>	<p>Prevalence</p>	<p>Schools, USA</p>	<ul style="list-style-type: none"> <li>• Varied by county</li> </ul>	<p>From Aug 31, 2020 – Apr 25, 2021, 7,605,281 students learning in-person and 1,633,082 in-person staff included in the dashboard.</p> <p>From Apr 12 – 25, 2012</p> <ul style="list-style-type: none"> <li>• Daily case rate = 20 per 100,000 students (0.28%).</li> <li>• Daily case rate = 14 per 100,000 staff (0.20%)</li> </ul>	<p>Low <b><i>NOT PEER REVIEWED</i></b></p>

					<ul style="list-style-type: none"> <li>The community case rate in school-matched population was 20 per 100,000, positivity rate of 5.43%.</li> </ul> <p>Case rates (per 100,000) by mitigation strategies include:</p> <p><u>Student masking vs. no mask</u>  Low/moderate community transmission (&lt;50 total new cases per 100,000 persons in the past 7 days, or approx. &lt;7 cases per day)</p> <ul style="list-style-type: none"> <li>Students: 4/10,171 (0.04%) vs. 1/1255 (0.40%)</li> <li>Staff: 5/10,170 (0.05%) vs. 5/1255 (0.40%)</li> </ul> <p>Substantial community transmission (50-99 total new cases per 100,000 persons in the past 7 days, or ~7-14 cases per day)</p> <ul style="list-style-type: none"> <li>Students: 8/24,571(0.03%) vs. 5/4142 (0.12%)</li> <li>Staff: 8/24,567 (0.03%) vs. 6/4132 (0.15%)</li> </ul> <p>High community transmission <math>\geq 100</math> total new cases or more per 100,000 persons in the past 7 days, or approx. &gt;14 cases per day</p> <ul style="list-style-type: none"> <li>Students: 24/99,201 (0.02%) vs. 17/19,946 (0.09%)</li> <li>Staff: 32/99,032 (0.03%) vs 17/19,652 (0.09%)</li> </ul> <p><u>6-foot student distancing vs. 3-foot vs. no distancing</u>  Low/moderate community transmission</p> <ul style="list-style-type: none"> <li>Students: 5/6170 (0.08%) vs. 3/660 (0.45%) vs. 1/3036 (0.03%)</li> <li>Staff: 5/6168 (0.08%) vs. 3/661 (0.45%) vs. 5/3037(0.16%)</li> </ul> <p>Substantial community transmission</p> <ul style="list-style-type: none"> <li>Students: 9/16,010 (0.06%) vs. 7/1287 (0.54%) vs. 4/7904 (0.05%)</li> </ul>	
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					<ul style="list-style-type: none"> <li>• Staff: 8/15,997 (0.05%) vs. 7/1287 (0.54%) vs. 6/7903 (0.08%)</li> </ul> <p>High community transmission</p> <ul style="list-style-type: none"> <li>• Students: 25/78,239 (0.03%) vs. 19/3261(0.58%) vs. 15/19,656 (0.08%)</li> <li>• Staff: 30/77,791 (0.04%) vs. 32/3261 (0.98%) vs. 26/19,638 (0.13%)</li> </ul> <p><u>Increased ventilation vs. no ventilation</u></p> <p>Low/moderate community transmission</p> <ul style="list-style-type: none"> <li>• Students: 5/6019 (0.08%) vs. 2/3766 (0.05%)</li> <li>• Staff: 5/6019 (0.08%) vs. 5/3766 (0.13%)</li> </ul> <p>Substantial community transmission</p> <ul style="list-style-type: none"> <li>• Students: 8/15,991 (0.05%) vs. 5/9136 (0.05%)</li> <li>• Staff: 8/15,979 (0.05%) vs. 7/9134 (0.08%)</li> </ul> <p>High community transmission</p> <ul style="list-style-type: none"> <li>• Students: 24/70120 (0.03%) vs. 21/30,807 (0.07%)</li> <li>• Staff: 30/70,057 (0.04%) vs. 27/30398 (0.09%)</li> </ul> <p><u>In-person student density</u></p> <p>Low/moderate community transmission</p> <ul style="list-style-type: none"> <li>• Students: <ul style="list-style-type: none"> <li>○ Density &lt;60%: 6/5616 (0.11%)</li> <li>○ Density 60-90%: 4/7950 (0.05%)</li> <li>○ Density &gt;90%: 2/8339 (0.02%)</li> </ul> </li> <li>• Staff: <ul style="list-style-type: none"> <li>○ Remote: 4/185(2.16%)</li> <li>○ Density &lt;60%: 8/4979 (0.16%)</li> <li>○ Density 60-90%: 8/7947 (0.10%)</li> <li>○ Density &gt;90%: 5/8338 (0.06%)</li> </ul> </li> </ul> <p>Substantial community transmission</p> <ul style="list-style-type: none"> <li>• Students: <ul style="list-style-type: none"> <li>○ Density &lt;60%: 8/18303 (0.04%)</li> <li>○ Density 60-90%: 7/20,036 (0.03%)</li> </ul> </li> </ul>	
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					<ul style="list-style-type: none"> <li>○ Density &gt;90%: 4/11,705 (0.03%)</li> <li>● Staff: <ul style="list-style-type: none"> <li>○ Remote: 11/401 (2.73%)</li> <li>○ Density &lt;60%: 10/16732 (0.06%)</li> <li>○ Density 60-90%: 12/20,025 (0.06%)</li> <li>○ Density &gt;90%: 10/11,595 (0.09%)</li> </ul> </li> </ul> <p>High community transmission</p> <ul style="list-style-type: none"> <li>● Students: <ul style="list-style-type: none"> <li>○ Density &lt;60%: 24/64,283 (0.04%)</li> <li>○ Density 60-90%: 22/65,123 (0.03%)</li> <li>○ Density &gt;90%: 14/33,527 (0.04%)</li> </ul> </li> <li>● Staff: <ul style="list-style-type: none"> <li>○ Remote: 43/1598 (2.69%)</li> <li>○ Density &lt;60%: 31/57,144 (0.05%)</li> <li>○ Density 60-90%: 36/64,841 (0.06%)</li> <li>○ Density &gt;90%: 28/33,420 (0.08%)</li> </ul> </li> </ul>	
<p>Crowe, J., Schnaubelt, A. T., Schmidt-Bonne, S., Angell, K., Bai, J., Eske, T. ... Broadhurst, M. J. (2021). <a href="#">Pilot program for test-based SARS-CoV-2 screening and environmental monitoring in an urban public school district.</a> <i>Preprint.</i></p>	Apr 17, 2021	Quasi-experimental	2 middle schools and 1 high school, Omaha, Nebraska, USA	<ul style="list-style-type: none"> <li>● Cohorts (alternating)</li> <li>● Enhanced cleaning</li> <li>● Hand hygiene</li> <li>● Masks</li> <li>● Physical distancing (6 ft.)</li> </ul>	<p>From Nov 9 – Dec 11, 2020, 3 urban public schools performed weekly asymptomatic RT-PCR testing (students and staff). School wastewater, air and surface samples in choir classrooms were collected weekly.</p> <p>2885 samples from 773 participants identified 46 cases: 24 staff, 22 students. Participation was 96% in staff and 12% in students</p> <p>Cumulative case rates from asymptomatic testing exceeded conventional testing rates:</p> <ul style="list-style-type: none"> <li>● Students: 70/1000 vs. 12/1000</li> <li>● Staff: 53/1000 vs. 21/1000</li> </ul> <p>High school students were at greater risk for a confirmed case than middle school students (<b>OR=3.3, p=0.009 vs. OR=2.2, p=0.03</b>). No differences were found between those who took part in band or choir, or between teacher roles.</p>	Moderate <b><i>PREPRINT</i></b>

Previously reported evidence						
Lessler, J., Grabowski, K., Grantz, K.H., Badillo-Goicoechea, E., Metcalf, J.E., Lupton-Smith, C. ... & Stuart, E.A. (2021). <a href="#">Household COVID-19 risk and in-person schooling</a> . <i>Science</i> . Epub ahead of print.	Apr 29, 2021	Cross-sectional	Schools, USA	<ul style="list-style-type: none"> <li>Cancelled extracurriculars</li> <li>Closed common spaces (playgrounds, cafeterias)</li> <li>Cohorting</li> <li>Masks</li> <li>Physical distancing (extra space, separators between desks)</li> <li>Reduced class size</li> <li>Restricted entry</li> <li>Symptom screening</li> </ul> <p>*Substantial heterogeneity in number and type of IPAC measures mandated across states.</p>	<p>From Nov 24 – Dec 23, 2020 and Jan 11 – Feb 10, 2021, data on schooling behaviours and COVID-19 outcomes from 50 states were collected via an online survey (2,142,887 respondents, 284,789 reported living with at least one child in in-person schooling).</p> <p>Compared to full-time in-person, part-time in-person was not associated with risk of COVID-19 outcomes once mitigation measures are accounted for.</p> <p>For every additional IPAC measure implemented there was a decrease in odds of a positive test (<b>adjusted OR=0.93, 95% CI=0.92,0.94</b>); symptoms screening was associated with the greatest risk reduction. When 7 or more IPAC measures were implemented, risk largely disappeared (with a complete absence of risk with 10 or more IPAC measures). Among those reporting 7 or more mitigation measures, 80% reported student/teacher mask mandates, restricted entry, desk spacing and no supply sharing.</p> <p>Associations between IPAC measures and positive tests varied; outdoor instruction, restricted entry, no extracurriculars, and daily symptom screening were associated with significant risk reductions:</p> <ul style="list-style-type: none"> <li>Student mask mandate: adjusted OR=0.91 (95% CI=0.83,1.00)</li> <li>Teacher mask mandate: adjusted OR=0.91 (95% CI=0.83,1.00)</li> <li>Same teacher all day: adjusted OR=1.00 (95% CI=0.93,1.08)</li> <li>Same students all day: adjusted OR=0.93 (95% CI=0.86,1.00)</li> <li>Outdoor instruction: <b>adjusted OR=0.88 (95% CI=0.80,0.98)</b></li> </ul>	Moderate



					<ul style="list-style-type: none"> <li>• Restricted entry: <b>adjusted OR=0.88 (95% CI=0.81,0.95)</b></li> <li>• Reduced class size: adjusted OR=1.01 (95% CI=0.94,1.09)</li> <li>• Closed cafeteria: adjusted OR=1.03 (95% CI=0.95,1.11)</li> <li>• Closed playground: adjusted OR=1.01 (95% CI=0.92,1.10)</li> <li>• Desk shields: <b>adjusted OR=1.12 (95% CI=1.04,1.22)</b></li> <li>• Extra desk space: adjusted OR=0.96 (95% CI=0.89,1.04)</li> <li>• No extracurriculars: <b>adjusted OR=0.73 (95% CI=0.68,0.79)</b></li> <li>• No sharing supplies: adjusted OR=0.92 (95% CI=0.85,1.00)</li> <li>• Daily symptom screen: <b>adjusted OR=0.78 (95% CI=0.73,0.84)</b></li> <li>• Part-time in person: adjusted OR=0.97 (95% CI=0.91,1.03)</li> </ul>	
van den Berg, P., Schechter-Perkins, E.M., Jack, R.S., Epshtein, I., Nelson, R., Oster, E., & Branch-Elliman, W. (2021). <a href="#">Effectiveness of three versus six feet of physical distancing for controlling spread of COVID-19 among primary and secondary students and staff: A retrospective, state-wide cohort study.</a> <i>Clinical Infectious Diseases</i> , ciab230.	Mar 10, 2021	Cohort	242 public schools, Massachusetts	<ul style="list-style-type: none"> <li>• Cohorting</li> <li>• Dedicated isolation space for symptomatic students</li> <li>• Enhanced cleaning</li> <li>• Enhanced ventilation</li> <li>• Hand hygiene</li> <li>• Masks (staff, students <math>\geq</math> grade 2)</li> <li>• Physical distancing (&gt;3 vs. &gt;6 feet)</li> <li>• Symptom screening (staff, students)</li> </ul>	<p>From Sep 24, 2020 – Jan 27, 2021, daily incidence in students and staff were compared in school physical distancing requirements of 3 vs. 6 feet. In total, 4226/537,336 (0.79%) students and 2382/99,390 (2.4%) staff tested positive.</p> <p>Cases were similar in all districts:</p> <ul style="list-style-type: none"> <li>• Staff IRR=0.989 (95% CI=0.73,1.33)</li> <li>• Student IRR=0.891 (95% CI=0.59,1.34)</li> </ul> <p>After adjusting for community incidence:</p> <ul style="list-style-type: none"> <li>• Staff IRR=1.02 (95% CI=0.75,1.37)</li> <li>• Student IRR=0.904 (95% CI=0.62,1.33)</li> </ul>	Moderate

<p>Hoehl, S., Schenk, B., Rudych, O., Göttig, S., Foppa, I., Kohmer, N., ... Ciesek, S. (2020). <a href="#">At-home self-testing of teachers with a SARS-CoV-2 rapid antigen test to reduce potential transmissions in schools</a>. <i>Preprint</i>.</p>	<p>Dec 7, 2020</p>	<p>Cohort</p>	<p>Primary and secondary schools, Germany</p>	<ul style="list-style-type: none"> <li>• Not reported</li> </ul>	<p>Of 10,836 rapid antigen tests conducted by 602 teachers (mean 18 tests per participant), 5 true positive (0.19%) and 16 false positive tests were recorded. Four false negative tests occurred in symptomatic cases. Among cases, 4 were symptomatic and 1 was pre-symptomatic. All cases were identified when local 7-day incidence was higher than 100 cases/100,000.</p>	<p>Moderate <b><i>PREPRINT</i></b></p>
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**Table 4: Single Studies, Community-level Impact of School Reopening**

Reference	Date Released	Study Design	Setting, Location	IPAC measures	Summary of Findings	Quality Rating:
<b>New evidence reported on June 14, 2021</b>						
Somekh, I., Boker, L. K., Shohat, T., Pettoello-Mantovani, M., Simões, E.A.F., & Somekh, E. (2021). <a href="#">Comparison of COVID-19 incidence rates before and after school reopening in Israel.</a> <i>JAMA Network Open</i> , 4(4), e217105.	Apr 26, 2021	Quasi-experimental	School aged children, pre and post lockdown, Israel	Not reported	<p>From Sep 1 –21 and Nov 1 – Dec 31, 2020, IRRs and positivity rates (RR) were compared to the weeks prior to school reopening across age groups.</p> <p>Sep 1-14 (vs. Aug 24-31):</p> <ul style="list-style-type: none"> <li>• <b>Age 0-9: aIRR=1.1 (95% CI=1.0,1.14)</b> <ul style="list-style-type: none"> <li>○ Positivity RR=0.77 (95% CI=0.7,0.8)</li> </ul> </li> <li>• <b>Age 10-19: aIRR=3.1 (95% CI=2.96,3.3)</b> <ul style="list-style-type: none"> <li>○ Positivity RR=1.5 (95% CI=1.4,1.6)</li> </ul> </li> <li>• <b>Age 20-39: aIRR=3.2 (95% CI=2.96,3.4)</b> <ul style="list-style-type: none"> <li>○ Positivity RR=1.6 (95% CI=1.5,1.66)</li> </ul> </li> <li>• <b>Age 40-59: aIRR=3.1 (95% CI=2.9,3.3)</b> <ul style="list-style-type: none"> <li>○ Positivity RR=1.5 (95% CI=1.45,1.6)</li> </ul> </li> <li>• <b>Age ≥60: aIRR=2.2 (95% CI=2.0,2.3)</b> <ul style="list-style-type: none"> <li>○ Positivity RR=1.1 (95% CI=1.0,1.2)</li> </ul> </li> </ul> <p>Nov 1- Dec 31:</p> <ul style="list-style-type: none"> <li>• <b>Age 0-9: aIRR=1.34 (95% CI=1.23,1.45)</b> <ul style="list-style-type: none"> <li>○ Positivity RR=0.75 (95% CI=0.7,0.8)</li> </ul> </li> <li>• <b>Age 10-19: aIRR=1.9 (95% CI=1.74,2.06)</b> <ul style="list-style-type: none"> <li>○ Positivity RR=0.97 (95% CI=0.95,1.1)</li> </ul> </li> <li>• <b>Age 20-39: aIRR=2.5 (95% CI=2.3,2.7)</b> <ul style="list-style-type: none"> <li>○ Positivity RR=1.3 (95% CI=1.25,1.4)</li> </ul> </li> <li>• <b>Age 40-59: aIRR=2.43 (95% CI=2.3,2.6)</b> <ul style="list-style-type: none"> <li>○ Positivity RR=1.28 (95% CI=1.2,1.4)</li> </ul> </li> <li>• <b>Age ≥60: aIRR=2.95 (95% CI=2.6,3.3)</b> <ul style="list-style-type: none"> <li>○ Positivity RR=1.48 (95% CI=1.35,1.6)</li> </ul> </li> </ul> <p>Children age 0-9 had the lowest slope of adjusted incidence over time in Sept, as community rates increased, suggesting that school was not the key driver of increased incidence during this time period.</p>	Moderate

Bosslet, G. T., Pollak, M., Jang, J.H., Roll, R., Sperling, M., & Khan, B. (2021). <a href="#">The effect of in-person primary and secondary school instruction on county-level SARS-CoV-2 spread in Indiana</a> . <i>Clinical Infectious Disease</i> , ciab306.	Apr 13, 2021	Quasi-experimental	K-12 Indiana, USA	Not reported	<p>From Jul 12 – Oct 6, 2020, proportions of in-person classes from 343/399 (85.7%) schools was compared to county incidence of COVID-19 occurring 28 days later. Median new daily cases in the community during this period was 9.1/100,000.</p> <p>A 10% increase in proportion of all students attending in-person classes was associated with a daily increase of <b>0.336/100,000</b> new all-age county cases 28 days later (<b>95% CI=0.191,0.481</b>).</p> <p>A 10% increase in proportion of students aged 0-19, attending in-person was associated with a daily increase of <b>0.274/100,000</b> cases in that age group 28 days later (<b>95% CI=0.163,0.384</b>).</p>	High
<b>Previously reported evidence</b>						
Casini, L. & Rocchetti, M. (2021). <a href="#">Reopening Italy's schools in September 2020: A Bayesian estimation of the change in the growth rate of new SARS-CoV-2 cases</a> . <i>Preprint</i> .	Apr 9, 2021	Quasi-experimental	Italy	Not reported	<p>In 15/21 regions (71%), an estimated change in the growth rate of daily COVID-19 cases occurred an average of 16.66 days (95% CI=14.47,18.73) after schools reopened (Sep-Oct 2020). Of the other 6/21 regions: 2 presented a change &gt;4 weeks after opening; 4 before or on day schools reopened.</p> <p>Cases doubled an average of 47.50 days (95% CI=37.18,57.61) before this to an average of 7.72 days (95% CI=7.00,8.48) after.</p> <p>While this analysis suggests an association between school reopening and community spread, no other confounding factors were considered; transmission within schools was also not studied.</p>	Moderate <b>PREPRINT</b>
Haapanen, M., Renko, M., Artama, M., & Kuitunen, I. (2021). <a href="#">The impact of the lockdown and the re-opening of</a>	Mar 30, 2021	Cohort	School-aged children, Finland	School closures (as part of regional lockdown restrictions) *Schools were closed from week	This retrospective register study collected nationwide weekly incidences of positive COVID-19 findings in children (aged 0-19) from Jan – Aug, 2020, including 2 weeks following summer vacation	High

<p><a href="#">schools and day cares on the epidemiology of SARS-CoV-2 and other respiratory infections in children – A nationwide register study in Finland.</a> <i>EClinicalMedicine, 34, 100807.</i></p>				<p>12-20; re-opened week 20 (May 14, 2020), closed again for summer vacation (week 23). Students returned to school in week 33.</p> <ul style="list-style-type: none"> <li>• Masks (aged &gt; 15)</li> </ul>	<ul style="list-style-type: none"> <li>• Incidence dropped during summer vacation (0.3/100,000, 95% CI=0.1,0.8) in week 25; slowly increased (up to 2.5 / 100,000, 95% CI=1.7,3.5) by the time school resumed in week 33.</li> <li>• Following school reopening, incidence reached 4.2/100,000 (95% CI=3.1,5.5).</li> </ul> <p>A main limitation is the short reporting period (3 weeks before/after summer vacation).</p>	
<p>Lichand, G., Dória, C.A., Cossi, J., &amp; Leal-Neto, O. (2021). <a href="#">Reopening schools in the pandemic did not increase COVID-19 incidence and mortality in Brazil.</a> <i>Preprint.</i></p>	Mar 30, 2021	Cohort	Primary, middle, and secondary schools, Sao Paulo State, Brazil	<ul style="list-style-type: none"> <li>• Hand hygiene</li> <li>• Limited attendance (35% capacity in severely affected regions)</li> <li>• PPE (staff)</li> </ul> <p>*131/645 municipalities reopened an estimated 1700 schools (~2 million students) for in-person activities from Oct-Dec 2020.</p>	<p>From Oct – Dec 2020, this study compared COVID-19 effective potential growth and deaths, 1) before and after returning to in-person learning in municipalities that reopened schools, and 2) between municipalities that reopened schools and those that did not.</p> <p>Growth rates increased over time, with no difference in municipalities that did and did not reopen.</p> <p>School reopening did not increase COVID-19 incidence or mortality, on average, up to 12 weeks after reopening.</p>	Moderate <b><i>PREPRINT</i></b>
<p>Bignami-van Assche, S., Boujija, Y., Fisman, D., &amp; Sandberg, J. (2021). <a href="#">In-person schooling and COVID-19 transmission in Canada's three largest cities.</a> <i>Preprint.</i></p>	Mar 23, 2021	Case series	School-aged children, Montreal, Toronto, and Calgary, Canada	<ul style="list-style-type: none"> <li>• Masks (varied): <ul style="list-style-type: none"> <li>○ Toronto: mandatory for elementary and secondary schools; encouraged for kindergarten.</li> <li>○ Montreal: mandatory in common areas for elementary,</li> </ul> </li> </ul>	<p>Levels of community transmission were low when schools reopened (Aug 25-31, 2020):</p> <ul style="list-style-type: none"> <li>• 11.3/100,000 Montreal</li> <li>• 10.0/100,000 Toronto</li> <li>• 26.7/100,000 Calgary</li> </ul> <p>Montreal and Toronto implemented IPAC measures (restaurant and recreation closures, gathering restrictions) in Oct 2020; by Dec, all 3 cities had implemented these and additional measures (work from home, business closures).</p> <p>Levels of community transmission had risen by end of study period (Jan 6-12, 2021):</p>	Low <b><i>PREPRINT</i></b>

				<p>and later, in classrooms for secondary schools.</p> <ul style="list-style-type: none"> <li>○ Calgary: mandatory K-12, could be removed when seated in classrooms (cohorts, physically distanced)</li> <li>• Optional remote or hybrid learning</li> </ul>	<ul style="list-style-type: none"> <li>• 356.9/100,000 Montreal</li> <li>• 165.9/100,000 Toronto</li> <li>• 153.5/100,000 Calgary</li> </ul> <p>In Toronto and Calgary, infection trends in 0–19-year-olds paralleled adults; in Montreal, increased rates among adults were preceded by increases among 10-19 year-olds, suggesting Montreal school IPAC measures were insufficient.</p> <p>One week after schools closed for winter holiday break, weekly incidence declined among 0–19-year-olds but continued to rise in other age groups.</p>	
<p>von Bismarck-Osten, C., Borusyak, K., &amp; Schönberg, U. (2021). <a href="#"><i>The role of schools in transmission of the SARS-CoV-2 virus: Quasi-experimental evidence from Germany.</i></a> Centre for Research and Analysis of Migration (CReAM) &amp; Department of Economics, University College London.</p>	<p>Mar 19, 2021</p>	<p>Quasi-experimental</p>	<p>School-aged children, Germany</p>	<ul style="list-style-type: none"> <li>• Cohorting</li> <li>• Enhanced cleaning</li> <li>• Enhanced ventilation</li> <li>• Masks (but not mandatory in classrooms)</li> <li>• Physical distancing</li> <li>• Quarantine (cases, contacts)</li> </ul>	<p>From Jun 1 - Oct 28, 2020, neither staggered summer and fall breaks nor return to school at full capacity following breaks impacted the spread of COVID-19 among children or adults.</p> <ul style="list-style-type: none"> <li>• 0.335 cases per day/100,000 children aged 5-14, and 0.026 cases per day/100,000 older adults 60+ were prevented in the first 3 weeks of the summer break. Community incidence was low (0.7/100,000) in all states.</li> <li>• 1.279 cases per day/100,000 children aged 5-14, and 0.584 cases per day/100,000 older adults 60+ were prevented during the first week of the fall break. Community incidence was 3.141/100,000.</li> </ul> <p>The number of child cases increased during the last 2 weeks of summer break and decreased in the first weeks after school re-opening.</p>	<p>Moderate</p> <p><b><i>NOT PEER REVIEWED</i></b></p>

Chernozhukov, V., Kasahara, H., Schrimpf, P. (2021). <a href="#">The association of opening K-12 schools and colleges with the spread of COVID-19 in the United States: county-level panel data analysis.</a> <i>Preprint.</i>	Mar 16, 2021	Quasi-experimental	Primary and secondary schools, USA	<ul style="list-style-type: none"> <li>Masks (staff; not mandatory in all counties)</li> </ul>	From Apr 1 - Dec 2, 2020, an increase in visits to schools and opening schools to in-person learning was associated with an increase in weekly growth rates of confirmed COVID-19 cases by 5 (SE=2) percentage points, particularly in counties where staff mask wearing was not mandatory.	Moderate <b><i>PREPRINT</i></b>
Buja, A., Paganini, M., Cristofori, V., Baldovin, T., Fusinato, R., Bocucuzzo, G., ... & Parpinel, M. (2021). <a href="#">Opening schools and trends in SARS-CoV-2 transmission in European countries.</a> <i>Preprint.</i>	Mar 1, 2021	Quasi-experimental	Schools, Europe	<ul style="list-style-type: none"> <li>Not reported</li> </ul>	<p>A significant increase in daily infections was found in 21/27 European countries from 20 days before to 45 days after schools reopened in 2020; most change points occurred 21 days (range 10-42 days) after reopening.</p> <p>Importantly, follow-up period was short and other regional restrictions were loosened at the same time, thus causal relationship between school reopening and cases cannot be inferred.</p>	Moderate <b><i>PREPRINT</i></b>
Mensah, A., Sinnathamby, M., Zaidi, A., Coughlan, L., Ismail, S.A., Ramsay, M.E., ... Ladhani, S.N. (2021). <a href="#">SARS-CoV-2 infections in children following the full re-opening of schools and the impact of national lockdown: Prospective, national observational cohort surveillance, July-December</a>	Feb 24, 2021	Cohort	Pre-, primary, and secondary school-aged children, England	<ul style="list-style-type: none"> <li>Not reported</li> </ul>	<p>From Jul – Oct 2020, there was a strong correlation (<b><math>r=0.1174-0.5832</math>; <math>p&lt;0.001</math></b>) in regional COVID-19 rates between adults and children; the strongest correlation was for secondary school-aged children (aged 11-18).</p> <p>Upon school re-opening (Aug 24, 2020), there was an increase in rates for secondary and primary but not preschool-aged children.</p> <p>A week-long half-term break (Oct 26, 2020) was associated with a small and temporary decline in infection rates.</p> <p>A national month-long lockdown (Nov 2020), with schools open, was associated with rapid declines in rates in young adults, followed by children in all age groups one week later.</p>	High

<p><a href="#">2020, England.</a> <i>Journal of Infection</i>, 82, 67-74.</p>					<p>Trends were strongest in regions with high infection rates prior to lockdown.</p> <p>COVID-19 rates in school-aged children influenced by community adult rates.</p> <p>Analysis completed according to child's age, not school attendance; did not distinguish between infection from in or out of schools.</p>	
<p>Ingelbeen, B., Peckeu, L., Laga, M., Hendrix, I., Neven, I., van der Sande, M.A.B., &amp; van Kleef, E. (2021). <a href="#">Reducing contacts to stop SARS-CoV-2 transmission during the second pandemic wave in Brussels, Belgium, August to November 2020.</a> <i>Eurosurveillance</i>, 26(7), 1-7.</p>	<p>Feb 18, 2021</p>	<p>Quasi-experimental</p>	<p>Primary and secondary schools, Brussels, Belgium</p>	<ul style="list-style-type: none"> <li>• Not reported</li> </ul>	<p>Schools re-opened on Sep 1, 2020. Contacts, teleworking, and restaurant restrictions were loosened at this time, then gradually reintroduced on Oct 6.</p> <p>Positive cases among children increased Aug – Sep (schools closed) with increased testing rate (<b>correlation=0.74, p&lt;0.001</b>).</p> <p>From Sep 3 – Oct 7, 8.9% (67/755) of infections were from children (aged 10-19) to other age groups; 17.4% (131/755) from other age groups to children. The proportion of child cases among all cases did not change.</p> <p>Intragenerational transmission was highest (39.4%, 63/160) during fall holidays and the closure of all non-essential services (Nov 2).</p>	<p>Low</p>
<p>Perramon, A., Soriano-Arandes, A., Pino, D., Lazcano, U., Andrés, C., Català, M., ... Soler-Palacin, P. (2021). <a href="#">Epidemiological dynamics of the incidence of COVID-19 in children and the relationship with the opening of schools in Catalonia (Spain).</a> <i>Preprint</i>.</p>	<p>Feb 17, 2021</p>	<p>Quasi-experimental</p>	<p>Primary and secondary schools, Catalonia, Spain</p>	<ul style="list-style-type: none"> <li>• Cohorting</li> <li>• Enhanced ventilation</li> <li>• Hand hygiene</li> <li>• Infographics</li> <li>• Masks (students aged <math>\geq 6</math>)</li> <li>• Mass screening campaigns</li> <li>• Cohort screening/ quarantining with positive case</li> </ul>	<p>From Sep 14, 2020 – Jan 31, 2021, 48,914 (of 942,881) children (aged &lt;18) tested positive for COVID-19 (5.2%). Variant B.1.1.7 was first detected in Catalonia at end of December.</p> <p>Incidence for aged &lt;12 lower than general population; incidence aged 12-17 similar or higher. Age associated with higher incidence.</p> <p>Incidence impacted by changes in active screening/testing. Daily tests and cases among children, compared with the general population, decreased when schools were closed (<b>p&lt;0.001</b>). During first 11 weeks, positivity rate in children (<math>\leq 5\%</math>) was lower</p>	<p>Low</p> <p><b>PREPRINT</b></p>



					<p>than general population; positivity rate increased when schools were closed for holidays (<b>p&lt;0.001</b>) due to a decrease in screening/testing.</p> <p>Rate of cases in children was significantly lower than for adults during whole study period (<b>p&lt;0.001</b>).</p>	
<p>Gras-Le Guen, C., Cohen, R., Rozenberg, J., Launay, E., Levy-Bruhl, D., &amp; Delacourt, C. (2021). <a href="#">Reopening schools in the context of increasing COVID-19 community transmission: The French experience.</a> <i>Archives de Pédiatrie.</i> 28(3), 178-185.</p>	Feb 15, 2021	Quasi-experimental	Primary, middle, and secondary schools, France	<ul style="list-style-type: none"> <li>• Hand hygiene</li> <li>• Masks (students aged ≥11, indoors, outdoors)</li> <li>• Physical distancing</li> </ul>	<p>From Sep – Oct 2020, the relative risk (RR) of a positive test and the IRR were significantly lower in all child age groups, compared with adults.</p> <p>The positive RR was:</p> <ul style="list-style-type: none"> <li>• Ages 0-5: <b>0.46 (95% CI=0.44,0.49)</b></li> <li>• Ages 6-17: 0.69 (95% CI=0.68,0.70)</li> </ul> <p>The IRR was:</p> <ul style="list-style-type: none"> <li>• Ages 0-5: 0.09 (<b>95% CI=0.08,0.09</b>)</li> <li>• Ages 6-10: 0.31 (<b>95% CI=0.30,0.32</b>)</li> <li>• Ages 11-14: 0.64 (<b>95% CI=0.63,0.66</b>)</li> <li>• Ages 15-17: 1.07 (<b>95% CI=1.05,1.10</b>)</li> </ul> <p>&lt;1% of schools were closed during the study period.</p>	Moderate
<p>Goldhaber, D., Imberman, S.A., Hopkins, B., Brown, N., Harbatkin, E., &amp; Kilbride, T. (2021). <a href="#">To what extent does in-person schooling contribute to the spread of COVID-19? Evidence from Michigan and Washington.</a> National Bureau of Economic Research.</p>	Feb 1, 2021	Cohort	School-aged children, Michigan and Washington state, USA	<ul style="list-style-type: none"> <li>• Optional remote or hybrid learning</li> </ul>	<p>Simple correlations show in-person learning is correlated with increased COVID-19 cases; but accounting for pre-existing cases and other covariates brings estimates close to zero, on average.</p> <p>In Ordinary Least Squares (OLS) models, in-person or hybrid learning is not associated with increased spread when there are low or modest levels of pre-existing cases in the community; cases do increase with high levels of community transmission. (definition of high vs. low or modest levels not provided).</p>	Moderate <b>NOT PEER REVIEWED</b>

<p>Isphording, I. E., Lipfert, M., &amp; Pestel, N. (2021). <a href="#"><u>Does re-opening schools contribute to the spread of SARS-CoV-2? Evidence from staggered summer breaks in Germany.</u></a> Collaborative Research Center Transregio 224, University of Bonn &amp; University of Mannheim.</p>	<p>Jan 29, 2021</p>	<p>Quasi-experimental</p>	<p>School-aged children, Germany</p>	<ul style="list-style-type: none"> <li>• Cohorting</li> <li>• Enhanced cleaning</li> <li>• Enhanced ventilation</li> <li>• Masks</li> <li>• Physical distancing</li> <li>• Quarantine (cases, contacts)</li> <li>• Regular rapid testing (staff, students)</li> <li>• Screening</li> <li>• Sports, music cancelled</li> </ul> <p>*Schools allowed to impose stricter measures.</p>	<p>From Jul 1 – Oct 12, 2020, there was no evidence that school re-openings, following staggered summer breaks, increased state community case numbers.</p> <p>Confirmed cases were highest among those aged 15-59 (1.7/100,000), compared to children aged 5-14 (1.1/100,000). Case numbers in all age groups were higher after school re-opening compared with before.</p> <p>Possible limitations of this study include only measuring 4 weeks after schools re-opened and low community spread at the time.</p>	<p>Moderate <b>NOT PEER REVIEWED</b></p>
<p>Harris, D.N., Ziedan, E., &amp; Hassig, S. (2021, January 4). <a href="#"><u>The effects of school reopenings on COVID-19 hospitalizations.</u></a> National Center for Research on Education Access and Choice.</p>	<p>Jan 4, 2021</p>	<p>Cohort</p>	<p>USA</p>	<p>Varied across jurisdictions</p>	<p>Compared to the 10 weeks prior to school reopening (Aug 2020), in the first 6 weeks of opening, there was no increase in hospitalizations per 100,000 in counties with reopening of schools in-person or with hybrid learning. Analyses were adjusted for geographic and period-level factors.</p> <p>When analyses were stratified by baseline level of hospitalization, results were inconclusive at the highest rate of &gt;44 per 100,000 per week. Thus, reopening schools may have an impact at this level due to higher rates of community transmission.</p>	<p>High <b>NOT PEER REVIEWED</b></p>

<p>Peaper, D.R., Murdzek, C., Oliveira, C., &amp; Murray, T. (2020). <a href="#">Severe acute respiratory syndrome coronavirus 2 testing in children in a large regional US health system during the coronavirus disease 2019 pandemic</a>. <i>The Pediatric Infectious Disease Journal</i>, 40(3), 175-181.</p>	<p>Dec 15, 2020</p>	<p>Cohort</p>	<p>All school-age children, Southern Connecticut, New York, Rhode Island, USA</p>	<p>Varied by state</p>	<p>Data for all tests completed from Mar 1 –Sep 26, 2020, in those aged <math>\leq 18</math> in a single health system were analyzed.</p> <p>Test positivity did not increase with school reopening (trend: 0.02% per week; 95% CI=–0.06%,0.09%) overall or by age group. High school (age 15-18) and middle school (age 11-14) consistently had higher rate than children aged &lt;2, 2-5, and 6-10.</p>	<p>Moderate</p>
<p>Miron, O., Yu, K.H., Wilf-Miron, R., Kohane, I., &amp; Davidovitch, N. (2020). <a href="#">COVID-19 infections following physical school reopening</a>. <i>Archives of Disease in Childhood</i>. Epub ahead of print.</p>	<p>Dec 7, 2020</p>	<p>Cohort</p>	<p>Primary and secondary schools, Florida, USA</p>	<p>Varied by country</p>	<p>In counties with in-person learning, incidence increased daily once schools re-opened (August 2020). In elementary schools on day 4, the incidence was 11/100,000 (95% CI=9.9,12) and increased to 12.8 (95% CI=11.7,13.9), 1.2-fold by day 20. No trend was observed in counties that did not re-open.</p> <p>Among secondary schools with in-person learning incidence increased daily once schools re-opened. On day 1, the incidence was 16.1 (95% CI=14.4,17.9), and on day 20, it increased to 20.5 (95% CI=18.5,22.5),1.3 fold.</p> <p>No trend was observed in counties that did not re-open.</p> <p>The authors note that counties that offered remote learning also had public mask mandates, limits on public gatherings, and socioeconomic differences that may confound results.</p>	<p>Moderate</p>

**Table 5: Studies specific to summer camps**

Reference	Date Released	Location, Setting	IPAC Measures	Summary of Findings	Quality Rating:
<b>New evidence reported on June 14, 2021</b>					
Suh, H. H., Meehan, J., Blaisdell, L., & Browne, L. (2021). <a href="#">Effectiveness of Non-Pharmaceutical Interventions on Child and Staff COVID-19 Cases in US Summer Camps</a> . <i>Preprint</i> .	Feb 22, 2021	49 states and the District of Columbia, USA	<ul style="list-style-type: none"> <li>• Cohorting</li> <li>• Enhanced cleaning</li> <li>• Hand hygiene</li> <li>• Infrastructure adjustments</li> <li>• Masks</li> <li>• Pre-camp quarantine</li> </ul>	<p>In summer 2020 data from 486 day and overnight camps and 89,635 campers was collected:</p> <ul style="list-style-type: none"> <li>• 74/486 (15.22%) camps reported <math>\geq 1</math> confirmed case</li> <li>• 127/486 (26.13%) reported <math>\geq 1</math> confirmed or suspected case               <ul style="list-style-type: none"> <li>○ 111 campers</li> <li>○ 191 staff</li> </ul> </li> <li>• 5 camps reported <math>\geq 5</math> total cases; 3 had an outbreak (<math>\geq 3</math>/week).</li> </ul> <p>IPAC measures related to COVID-19 risk include:</p> <ul style="list-style-type: none"> <li>• Pre-camp quarantine at home (vs. no required home quarantine):               <ul style="list-style-type: none"> <li>○ Campers: <b>RR=2.82 (95% CI=1.36,5.86)</b></li> <li>○ Staff: <b>RR=2.81 (95% CI=1.76,4.48)</b></li> </ul> </li> <li>• Pre-camp quarantine at camps (vs. no required camp quarantine)               <ul style="list-style-type: none"> <li>○ Campers: (NR, insufficient data)</li> <li>○ Staff: RR=1.39 (95% CI=0.86,2.26)</li> </ul> </li> <li>• Masks for campers:               <ul style="list-style-type: none"> <li>○ Campers: <b>RR=0.36 (95% CI=0.36,0.95)</b></li> <li>○ Staff: <b>RR=0.17 (95% CI=0.08, 0.40)</b></li> </ul> </li> <li>• Masks for staff               <ul style="list-style-type: none"> <li>○ Campers: <b>RR=0.39 (95% CI=0.19, 0.80)</b></li> <li>○ Staff: <b>RR=0.38 (95% CI=0.24,.0.60)</b></li> </ul> </li> <li>• Decreased capacity:               <ul style="list-style-type: none"> <li>○ Campers: RR=1.44 (95% CI=0.59, 3.52)</li> <li>○ Staff: <b>RR=3.77 (95% CI=1.63,8.72)</b></li> </ul> </li> <li>• Physical distancing               <ul style="list-style-type: none"> <li>○ Campers: <b>RR=0.31 (95% CI=0.15,0.65)</b></li> <li>○ Staff: RR: 0.67 (95% CI=0.42,1.07)</li> </ul> </li> <li>• Cohorts               <ul style="list-style-type: none"> <li>○ Campers: <b>RR=0.39 (95% CI=0.19,0.82)</b></li> <li>○ Staff: RR=0.63 (95% CI=0.37,1.06)</li> </ul> </li> <li>• Modified programming               <ul style="list-style-type: none"> <li>○ Campers: <b>RR=0.30 (95% CI=0.15,0.61)</b></li> </ul> </li> </ul>	Low <b>PREPRINT</b>

				<ul style="list-style-type: none"> <li>○ Staff: <b>RR=0.52 (95% CI=0.32,0.82)</b></li> <li>• Visitor restrictions <ul style="list-style-type: none"> <li>○ Campers: RR=1.39 (95% CI=0.42,4.57)</li> <li>○ Staff: RR=2.62 (95% CI=0.96,7.18)</li> </ul> </li> <li>• Cleaning <ul style="list-style-type: none"> <li>○ Campers: RR=0.71 (95% CI=0.21,2.33)</li> <li>○ Staff: RR=2.71 (95% CI=0.66,11.03)</li> </ul> </li> <li>• Hand hygiene <ul style="list-style-type: none"> <li>○ Campers: RR=0.72 (95% CI: 0.22,2.37)</li> <li>○ Staff: RR=5.68 (95% CI=0.79,40.87)</li> </ul> </li> <li>• Dining alterations <ul style="list-style-type: none"> <li>○ Campers: <b>RR=0.24 (95% CI=0.09,0.63)</b></li> <li>○ Staff: RR=1.57 (95% CI=0.38,6.40)</li> </ul> </li> <li>• Changed/increased bathroom facilities: <ul style="list-style-type: none"> <li>○ Campers: <b>RR=0.34 (95% CI=0.15,0.80)</b></li> <li>○ Staff: RR=0.90 (95% CI=0.56,1.47)</li> </ul> </li> </ul> <p>When multiple IPAC measures were combined, the following combinations significantly reduced risk:</p> <ul style="list-style-type: none"> <li>• Masks combined with physical distancing: <ul style="list-style-type: none"> <li>○ Campers: <b>RR=0.22 (95% CI=0.09,0.63)</b></li> <li>○ Staff: <b>RR=0.18 (95% CI=0.08,0.44)</b></li> </ul> </li> <li>• Masks combined with modified programs: <ul style="list-style-type: none"> <li>○ Campers: <b>RR=0.23 (95% CI=0.09,0.63)</b></li> <li>○ Staff: <b>RR=0.15 (95% CI=0.06,0.37)</b></li> </ul> </li> <li>• Physical distancing and modified programs <ul style="list-style-type: none"> <li>○ Campers: <b>RR=0.25 (95% CI=0.12,0.54)</b></li> <li>○ Staff: <b>RR=0.51 (95% CI=0.31,0.81).</b></li> </ul> </li> </ul>	
<b>Previously reported evidence</b>					
Jordan, I., Fernandez de Sevilla, M., Fumado, V., Bassat, Q., Bonet-Carne, E., Fortuny, C., ... & Gratacós, E. (2021). <a href="#">Transmission of SARS-CoV-2 infection among children in summer schools applying stringent control measures in Barcelona, Spain</a> . <i>Clinical Infectious</i>	Mar 12, 2021	Summer schools, Spain	<ul style="list-style-type: none"> <li>• Cohorting</li> <li>• Hand hygiene</li> <li>• Mainly outdoor activities</li> <li>• Masks (<math>\geq 6</math> years)</li> </ul>	<p>From Jun 29 – Jul 31, 2020, 39 index cases were identified from 41 summer schools (2318 total children, 547 staff).</p> <ul style="list-style-type: none"> <li>• Among 253 contacts identified from 30 child index cases (aged 3-15), 12 tested positive (4.7%).</li> <li>• Among 9 adult index cases, 114 contacts identified, 3 tested positive (2.6%).</li> </ul> <p>Overall SARs were 4.09%:</p> <ul style="list-style-type: none"> <li>• From adult staff to: <ul style="list-style-type: none"> <li>○ Children, 0-12: 1.64% (1/61)</li> </ul> </li> </ul>	Moderate

<p><i>Diseases</i>. Epub ahead of print.</p>				<ul style="list-style-type: none"> <li>○ Children, 13-17: 11.76% (2/17)</li> <li>○ Adult staff: 0% (0/36)</li> <li>● From children aged 0-10 to: <ul style="list-style-type: none"> <li>○ Children, 0-12: 5.26% (8/152)</li> <li>○ Children, 13-17: 0% (0/2)</li> <li>○ Adult staff: 2.7% (1/37)</li> </ul> </li> <li>● From children aged 11-17 to: <ul style="list-style-type: none"> <li>○ Children, 0-12: 4% (1/25)</li> <li>○ Children, 13-17: 6.9% (2/29)</li> <li>○ Adult staff: 0% (0/8)</li> </ul> </li> </ul> <p>Schools with IPAC measures had lower transmission than general population (reproduction number 0.3 vs. 1.9).</p> <p>Frequent hand washing was associated with a lower SAR (<b>p=0.024</b>). No significant associations were found between other IPAC measures and transmission (compulsory mask wearing indoors/outdoors, outdoor activities).</p>	
<p>Pray, I.W., Gibbons-Burgener, S.N., Rosenberg, A.Z., Cole, D., Borenstein, S., Bateman, A., ... Westergaard, R.P. (2020). <a href="#">COVID-19 outbreak at an overnight summer school retreat — Wisconsin, July–August 2020</a>. <i>Morbidity and Mortality Weekly Report</i> 69(43): 1600-1604.</p>	<p>Oct 30, 2020</p>	<p>Community/ Summer Camp Wisconsin, USA</p>	<ul style="list-style-type: none"> <li>● Masks (while travelling)</li> <li>● Negative COVID-19 test (last 7 days or serology in last 3 months)</li> <li>● Quarantine for 7 days, prior to attending</li> </ul>	<p>127 students, 21 counsellors (aged 17-24) and 4 staff members from 21 states and 2 foreign countries attended camp from Jul 2 – Aug 11, 2020.</p> <p>The index case (grade 9 student) developed COVID-19 symptoms on Jul 3 and tested positive on Jul 5.</p> <p>Despite efforts to isolate close contacts, 116/152 (76%) of attendees had confirmed (n=78) or probable (n=38) COVID-19. This included:</p> <ul style="list-style-type: none"> <li>● 100/127 students (79%)</li> <li>● 15/21 counsellors (71%)</li> <li>● 1 staff member (25%)</li> </ul> <p>Excluding the 24 attendees who provided positive serologic results prior to camp, SAR: 91% (116/128). Note that no mitigation measures were in place following initial quarantine and negative test.</p>	<p>High</p>

<p>Cooch, P., Watson, A., Olarte, A., Crawford, E., CLIAhub Consortium, DeRisi, J., ... Bardach, N. (2020). <a href="#">Supervised self-collected SARS-CoV-2 testing in indoor summer camps to inform school reopening</a>. <i>Preprint</i>.</p>	<p>Oct 23, 2020</p>	<p>Day camp, K-8 California, USA</p>	<ul style="list-style-type: none"> <li>• Cohorting</li> <li>• Masks (staff, except when eating)</li> <li>• Temperature check</li> </ul>	<p>163 participants (including 67 campers, 76 household contacts and 20 staff) self-collected nasal and saliva swabs at the beginning and end of 2 summer camps (between 3-5 weeks apart).</p> <ul style="list-style-type: none"> <li>• No positive RT-PCR tests for the virus that causes COVID-19 were found at either timepoint.</li> <li>• 7 participants (4%, 95% CI=1%,7%) had a positive serology test at either timepoint.</li> </ul> <p>It was not possible to determine whether any transmission occurred between participants as no documented cases occurred during camps.</p>	<p>High <b><i>PREPRINT</i></b></p>
<p>Blaisdell, L.L., Cohn, W., Pavell, J.R., Rubin, D.S. &amp; Vergales, J.E. (2020). <a href="#">Preventing and mitigating SARS-CoV-2 transmission – four overnight camps, Maine, June-August 2020</a>. <i>Morbidity and Mortality Weekly Report</i> 69(35), 1216-1220.</p>	<p>Aug 26, 2020</p>	<p>Overnight camps Maine, USA</p>	<ul style="list-style-type: none"> <li>• Cohorting</li> <li>• Enhanced cleaning</li> <li>• Hand hygiene</li> <li>• Masks</li> <li>• Maximal outdoor programming</li> <li>• Physical distancing</li> <li>• Prearrival quarantine</li> <li>• Pre- and post-arrival testing and screening</li> </ul>	<p>642 children and 380 staff members (aged 7-70) attended 4 overnight camps from Jun - Aug 2020.</p> <p>12 attendees (11 children and 1 staff) were identified as having COVID-19 related signs or symptoms during daily screening checks. All tested negative.</p> <p>Three asymptomatic attendees tested positive for the virus that causes COVID-19 after camp arrival (1 child, 2 staff). They were immediately isolated, and respective cohorts quarantined. No secondary transmission was identified.</p>	<p>Moderate</p>
<p>Szablewski, C.M., Chang, K.T., Brown, M.M., Chu, V.T., Yousaf, A.R., Anyalechi, N., ... Stewart, R.J. (2020). <a href="#">SARS-CoV-2 transmission and infection among attendees of an overnight camp</a>. <i>Morbidity and Mortality Weekly Report</i> 69(31): 1023-1025.</p>	<p>Jul 31, 2020</p>	<p>Overnight summer camp Georgia, USA</p>	<ul style="list-style-type: none"> <li>• Masks (staff)</li> <li>• Negative test within 12 days of attending</li> </ul>	<p>158 staff and counsellors took part in training Jun 17-20, 2020. 363 campers and 3 staff joined Jun 21.</p> <p>On Jun 22 a staff member developed symptoms, left camp on Jun 23, tested positive Jun 24. The camp was closed that day.</p> <p>Amongst 344 of 597 attendees:</p> <ul style="list-style-type: none"> <li>• Attack rate highest amongst staff (56%) vs. youth (49%), and those in larger cabins (53%).</li> </ul> <p>The authors note they cannot rule out multiple index cases due to high incidence of COVID-19 in Georgia.</p>	<p>Low</p>

**Table 6: In-progress Single Studies**

Title	Anticipated Release Date	Setting	Description of Document
<b>New evidence reported on June 14, 2021</b>			
<p>Chu, H. (2021). <a href="#">Reopening Schools Safely and Educating Youth (ROSEY) Research Study (ROSEY)</a>. <i>ClinicalTrials.gov</i>, NCT04859699.</p>	<p>Jun 2023</p>	<p>Schools</p>	<p>This pilot study includes a clustered randomized control trial (RCT) assessing the effectiveness of a testing program on student attendance in K-8. Incidence of COVID-19 will be compared between the control; students who receive weekly PCR testing and the intervention; students who receive weekly testing and risk mitigation communication materials to educate them on COVID-19 health and safety measures.</p>
<p>Newland, J. G. (2021). <a href="#">Assessing Testing Strategies for Safe Return to K-12 Schools in an Underserved Population</a>. <i>ClinicalTrials.gov</i>, NCT04875520.</p>	<p>Mar 31, 2023</p>	<p>Schools</p>	<p>This clustered RCT will compare the incidence of school-based COVID-19 transmission between weekly student and staff surveillance testing vs. testing only symptomatic students and staff.</p>
<p>Sweeney-Reed, C.M., Wolff, D., Niggel, J., Kabesch, M., &amp; Apfelbacher, C. (2021). <a href="#">Pool Testing as a Strategy for Prevention of SARS-CoV-2 Outbreaks in Schools: Protocol for a Feasibility Study</a>. <i>JMIR Research Protocols</i>, 10(5), e28673.</p>	<p>Not reported</p>	<p>School</p>	<p>This study will assess the feasibility of an infection monitoring program in schools in an effort to enable targeted quarantining in place of full school closures.</p>
<p>Zinszer, K., McKinnon, B., Bourque, N., Zahreddine, M., Charland, K., Papenburg, J. ... Quach, C. (2021). <a href="#">Seroprevalence of anti-SARS-CoV-2 antibodies among school and daycare children and personnel: Protocol for a cohort study in Montreal, Canada</a>. <i>Preprint</i>.</p>	<p>Not reported</p>	<p>Daycares, schools</p>	<p>This longitudinal cohort study will estimate the seroprevalence and seroconversion of antibodies against the virus that causes COVID-19 among students and staff in primary and secondary school and daycares in Montréal, Canada.</p>
<b>Previously reported evidence</b>			
<p>Zimmerman, K. (2021). <a href="#">Coronavirus-19 (COVID-19) and related outcomes in school aged children (ABC health outcomes in children)</a>. <i>ClinicalTrials.gov</i>, NCT04757831.</p>	<p>Feb 15, 2026</p>	<p>Schools</p>	<p>This study will measure the incidence of non-severe and severe COVID-19 disease including risk factors and outcomes, among children (aged <math>\leq 21</math>).</p>
<p>Zimmerman, K. (2021). <a href="#">COVID-19 surveillance and exposure testing in school communities</a>. <i>ClinicalTrials.gov</i>, NCT04831866.</p>	<p>Apr 15, 2023</p>	<p>Schools</p>	<p>This study will compare incidence of COVID-19 in schools performing weekly surveillance testing on 10-20% of students and 100% with schools performing exposure testing on students and staff after close contact with a confirmed COVID-19 case.</p>
<p>Duysburgh, E. &amp; Vermeulen, M. (2020). <a href="#">Prevalence and incidence of antibodies against SARS-CoV-2 in children measured for one year in Belgium: A sero-epidemiological prospective cohort study</a>. <i>ClinicalTrials.gov</i>, NCT04613817.</p>	<p>Aug 31, 2021</p>	<p>Schools</p>	<p>This study will determine the seroprevalence and seroconversion of antibodies against the virus that causes COVID-19 in primary and secondary school-aged children at different time points.</p>



Kaiser, R. (2021). <a href="#">SARS-CoV-2 surveillance in childcare facilities</a> . <i>German Clinical Trials Register, DRKS00023507</i> .	Not reported	Daycare	This study will assess the feasibility of testing children and staff at daycares for COVID-19 twice per week for two weeks.
Mullane, M.J., Thomas, H.M., Epstein, M., Mandzufas, J., Mullan, N., Whelan, A. ... & Gething, P. (2021). <a href="#">DETECT schools study protocol: A prospective observational cohort surveillance study investigating the impact of COVID-19 in western Australian schools</a> . <i>Frontiers in Public Health, 9</i> , 636921.	Not reported	Schools	This prospective observational cohort surveillance study will measure the incidence, transmission, and impact of COVID-19 in 79 schools across Western Australia.
Universitätsklinikum Rostock. (2020). <a href="#">Prospective Study initiated by University Hospital Rostock concerning COVID-19 in mothers, nursery and school teachers of children in Rostock</a> . <i>German Clinical Trials Register, DRKS00022504</i> .	N/A	Daycare, schools	This study will measure prevalence of COVID-19 and associated antibodies in mothers, daycare nurses and teachers, and school teachers over the period of 12 months.

**Table 7: Syntheses**

Reference	Date Released	Review Conclusions	Quality Rating
<b>New evidence reported on June 14, 2021</b>			
<p>Sulaiman, F., Coomaran, V., Muhajarine, N., Dalidowicz, M., &amp; Miller, L. (2021, March 30). <a href="#"><i>What are the effects of the new COVID variants on transmission and school reopenings in pediatric populations?</i></a> Saskatchewan Health Authority.</p>	<p>Mar 30, 2021 (Search completed Jul 2, 2020)</p>	<p>This review aimed to explore the role the new COVID-19 variants on transmission and school re-openings in pediatric populations.</p> <p>Only one study was included related to transmissibility across age groups that was not related to school opening.</p>	<p>Low</p> <p><b>NOT PEER REVIEWED</b></p>
<p>Fadlallah, R., Jamal, D., Daher, N., Masri, R., &amp; Hemadi, N. (2020 September 18). <a href="#"><i>COVID-19 supplement on school re-opening (2 of 3): K2P evidence summary - Impact of school closure/ reopening and school management practices on COVID-19 pandemic.</i></a> American University of Beirut Faculty of Health Sciences.</p>	<p>Sep 18, 2020 (Search completed Sep 2020)</p>	<p>This review reports on the impact of school closures, school reopening and school management on the transmission of COVID-19, the harms of school closures and an overview of the other countries' experience with school closure/reopening.</p> <p>One systematic review and three single studies found that the results on school closures were mixed and limited. Five modelling studies were included which supported the use of school closures as part of a suite of intervention with authors noting that reduction may have to been related to other concurrent non-pharmaceutical interventions.</p> <p>Findings on the impact of school re-openings is limited. Emerging evidence from school contact tracing suggests that school re-openings have not been associated with significant increases in community transmission. A strong correlation was found between the number of outbreaks in schools and regional incidence; 0.51 outbreaks/COVID-19 infection per 100,000 people in the community (p=0.001).</p> <p>Evidence to support management practices on COVID-19 is limited to 1 systematic review and 3 modelling studies. Findings support reopening primary schools as opposed to high schools; reopening schools without any precautions was predicted to yield substantial risk for students, staff and parents. Modelling studies supported the implementation of a range of alternative school interventions to mitigate viral transmission.</p>	<p>Low</p> <p><b>NOT PEER REVIEWED</b></p>

Previously reported evidence			
Walsh, S., Chowdhury, A., Russell, S., Braithwaite, V., Ward, J., Waddington, ... Mytton, O. (2021). <a href="#">Do school closures reduce community transmission of COVID-19? A systematic review or observational studies.</a> <i>Preprint.</i>	Mar 6, 2021 (Search completed Oct 12, 2020)	<p>This review included 32 studies that explored the effect of school closures on community transmission of COVID-19. 11 studies explored the impact of school reopening. 3 studies explored the effect of school holidays. Most studies had serious to critical risk of bias. 15 were from peer-reviewed journals, 24 were pre-print articles and 1 was a conference abstract.</p> <p>Studies of school closures with the lowest risk of bias found no conclusive evidence that school closures alone resulted in reduced transmission. Studies with serious to critical risk of bias found large protective effects in incidence and mortality rate.</p> <p>Among studies of school reopening with the lowest risk of bias, 3 found no increase in transmission while 1 reported increase in transmission. Studies with serious to critical risk of bias found no association (3), mixed findings (2) or increased transmission (2).</p> <p>Variability in the findings may reflect the methodology used and the importance of contextual factors (not studied) across geographic regions.</p> <p>The inability to properly adjust for other interventions, mostly introduced at the same time as school closures, may result in overestimation of the effects of school closures. Other limitations include an inability to distinguish between school type (primary, secondary) and direct vs. indirect (e.g., parents staying home, too) effects of school closures.</p>	Moderate <b><i>PREPRINT</i></b>
Xu, W., Li, X., Dozier, M., He, Y., Kirolos, A., Lang, Z., ... & Theodoratou, E. (2020). <a href="#">What is the evidence for transmission of COVID-19 by children in schools? A living systematic review.</a> <i>Journal of Global Health, 10(2):</i> 021104.	Dec 19, 2020 (Search completed Sep 14, 2020)	<p>Five cohort studies found 18 secondary cases in 3345 contacts. The SAR were:</p> <ul style="list-style-type: none"> <li>• Students: 0.15% (95% CI=0.00,0.93)</li> <li>• Staff: 0.70% (95% CI=0.00,3.56)</li> <li>• Overall: 0.08% (95% CI=0.00,0.86)</li> </ul> <p>Six cross-sectional studies reported 639 COVID-19 cases from 6682 participants tested. The positivity rates were:</p> <ul style="list-style-type: none"> <li>• Students: 8.74% (95% CI=2.34,18.53)</li> <li>• Staff: 13.68% (95% CI=1.68,33.89)</li> <li>• Overall: 8.00% (95% CI=2.17,16.95)</li> </ul> <p>Quality of evidence (based on 5 cohort studies and 6 cross-sectional studies) was low but suggests that students have lower infection attack rates and positivity rates, compared to staff.</p>	Moderate
Krishnaratne, S., Pfadenhauer, L.M., Coenen, M., Geffert, K., Jung-Sievers, C., Klinger, C., ... Burns, J. (2020). <a href="#">Measures implemented in the school</a>	Dec 17, 2020 (Search completed Oct 8, 2020)	<p>This rapid scoping review identified studies that reports on implementation of measures in schools but did not report on the effectiveness of these. The majority of included studies (n=31) were inferential modelling studies. 11 observational/quasi-experimental studies were included that are included in this rapid review.</p>	Moderate

<p><a href="#">setting to contain the COVID-19 pandemic: a rapid scoping review</a>. <i>Cochrane Database Systematic Reviews</i>, 12.</p>		<p>Identified school-based measures included:</p> <ul style="list-style-type: none"> <li>• Organizational (n=36; e.g., to make contacts safer (mask use, hand hygiene, respiratory etiquette, physical distancing, modified activities) and reduce opportunity for contacts (staggered arrivals, breaks, rotating attendance, cohorts, stay-at-home policies)</li> <li>• Structural/environmental (n=11; e.g., school yard division, furniture removal and distancing, improved ventilation and cleaning protocols)</li> <li>• Surveillance/response (n=19; e.g., testing, tracing, screening, quarantining)</li> </ul>	
<p>Suk, J.E., Vardavas, C., Nikitara, K., Phalkey, R., Leonardi-Bee, J., Pharris, A., ... Semenza, J.C. (2020). <a href="#">The role of children in the transmission chain of SARS-CoV-2: a systematic review and update of current evidence</a>. <i>Preprint</i>.</p>	<p>Nov 9, 2020 (Search completed Aug 31, 2020)</p>	<p>There was limited to no evidence of secondary transmission among school contacts.</p> <p>One outbreak following school re-opening was attributed to crowded classes, no masks, and the use of air conditioning. Conversely, another study showing limited transmission after re-opening attributed success to class distancing, use of masks for adults, daily screening, and disinfection.</p>	<p>Moderate</p> <p><b>PREPRINT</b></p>
<p>Goldstein, E., Lipsitch, M., &amp; Cevik, M. (2020). <a href="#">On the effect of age on the transmission of SARS-CoV-2 in households, schools and the community</a>. <i>The Journal of Infectious Diseases</i>, 223(3), 362-369.</p>	<p>Oct 29, 2020 (Search completed Oct 5, 2020)</p>	<p>Some evidence that no/limited mitigation strategies (e.g., crowded classrooms) are associated with spread of the virus that causes COVID-19 in secondary schools.</p> <p>However, introduction of mitigation strategies may prevent outbreaks.</p>	<p>Low</p>
<p>Health Information and Quality Authority. (2020, August 21). <a href="#">Evidence summary for potential for children to contribute to transmission of SARS-CoV-2</a>.</p>	<p>Aug 21, 2020 (Search completed Aug 10, 2020)</p>	<p>Based on low certainty evidence, transmission from child-to-adult or child-to child does occur in household and education settings, but transmission rates for children are low.</p> <p>Three studies with nine cases and 1036 close contacts confirmed secondary transmission. Three studies with 74 confirmed cases across 66 facilities to over 13,000 close contacts identified 198 confirmed cases.</p>	<p>Low</p> <p><b>NOT PEER REVIEWED</b></p>

**Table 8: In-progress Syntheses**

Title	Anticipated Release Date	Setting	Description of Document
<b>New evidence reported on June 14, 2021</b>			
Little, T., Reinhard, D., & White, S. <a href="#">K-12 non-pharmacological responses to influenza-like and Coronavirus illness outbreaks in US schools – A systematic review</a> . PROSPERO, CRD42021247217.	Aug 31, 2021	Schools	This review will summarize available evidence as to the effectiveness of non-pharmaceutical interventions and/or prevention strategies employed by K-12 school on the transmission of COVID-19.
<b>Previously reported evidence.</b>			
Bhamani, S., Tabani, A., Ahmed, D., & Saleem, A. (2020). <a href="#">A rapid systematic review on COVID transmission trends in children on schools reopening in lower middle income countries</a> . PROSPERO, CRD42020204925.	Jul 31, 2021	Schools	This review will summarize virus transmission among children and outbreaks occurring after schools re-open in lower middle-income countries.
Viner, R. & Waddington, C. <a href="#">Transmission of SARS-CoV-2 by children and young people: a systematic review of population studies</a> . PROSPERO, CRD42021222276.	Apr 30, 2021	Home, school, community	This review will explore population-based surveillance studies to compare rates of COVID-19 transmission from children and young people to others.
Karki, S.J., Lange, B., Heinsohn, T., & Joachim, A. (2021). <a href="#">The risk of infection and contribution to transmission of SARS-CoV-2 in school staff - a systematic review</a> . PROSPERO, CRD42021239225	Apr 15, 2021	Schools	This systematic review will summarize the risk and rate of COVID-19 transmission from staff working in schools, including secondary attack rates among students and the general population.
Lange, B., Ott, J., & Karki, S. J. (2021). <a href="#">Evidence synthesis gaps in understanding disease burden of children, transmission parameters in schools and households and effects of measures implemented in schools during the COVID-19 pandemic – a rapid systematic review of systematic reviews</a> . PROSPERO, CRD42021231866.	Mar 31, 2021	Home, school	This rapid review of systematic reviews will summarize evidence syntheses on the disease burden of COVID-19 in children, their role, and the role of schools in transmission, and the effects of mitigation measures.
Chatterji, M., Kitamura, K., Muenig, P., Willson, G.E., De Leon Jr., R., & Allegrante, J.P. (2020). <a href="#">The relative effectiveness of multilevel interventions in reducing risks of transmission of lethal viruses in Grade K-12 school communities and school linked populations: a systematic review and best-evidence synthesis</a> . PROSPERO, CRD42020201930.	Aug 29, 2020	School and school-linked populations	This review will report on the relative efficacy of multilevel intervention in reducing risks of COVID-19 and other lethal viruses among kindergarten to grade 12 school communities and in school linked populations.

**Table 9: Canadian Surveillance Data**

Reference	Date Released	Study Design	Setting, Location	IPAC measures	Summary of Findings	Quality Rating:
<b>New evidence reported on June 14, 2021.</b>						
Government of Ontario. (2021, June 8). <a href="#">COVID-19 cases in schools and child care centres.</a>	Jun 8, 2021	Prevalence	Primary, secondary schools, and daycares, Ontario, Canada	<p>All schools:</p> <ul style="list-style-type: none"> <li>• Cohorting</li> <li>• Enhanced cleaning</li> <li>• Masks, eye protection (staff)</li> <li>• No non-essential visitors</li> <li>• Record keeping</li> <li>• Screening</li> </ul> <p>Primary and secondary schools (in addition):</p> <ul style="list-style-type: none"> <li>• Hand hygiene</li> <li>• Student masks grades 1-12, in school (hallways, class), on school transportation, outdoors (when cannot distance)</li> <li>• Physical distancing</li> <li>• Scheduled remote learning days (grades 9-12)</li> <li>• Staggered bell times (suggested)</li> <li>• Targeted testing (voluntary, participating schools)<sup>6</sup></li> </ul> <p>Daycare centres (in addition): drop-off, pick-up protocols<sup>7</sup></p>	<p>From Sep 5, 2020 – Apr 9, 2021, a total of 15,002 school-related cases were reported in publicly funded schools in Ontario:</p> <ul style="list-style-type: none"> <li>• 11,315 student cases</li> <li>• 2515 staff cases</li> <li>• 1172 ‘other’ cases (not identified)</li> </ul> <p>As of April 9, 2021, schools moved to remote learning due to increasing COVID-19 cases in communities.</p> <p>From Jun 12, 2020 – June 8 2021 a total of 7302 cases occurred in those connected to daycare settings in Ontario:</p> <ul style="list-style-type: none"> <li>• 4322 child cases</li> <li>• 2980 staff/provider cases</li> </ul> <p>As of June 8, 2021, 129 (2.44%) centres were currently reporting a case; 27 (0.51%) centres were closed.</p> <p>Reported school and daycare centre closures are due to outbreaks or operational considerations (i.e., # of staff in isolation resulting in insufficient # of staff available to keep school or daycare centre open; regional closures in local public health unit areas not considered.</p> <p>Transmission source unknown for cases, therefore unable to report the proportion of cases due to in-school transmission</p>	Moderate <b>NOT PEER REVIEWED</b>

<sup>6</sup> Government of Ontario. (2020, November 27). [Guide to reopening Ontario’s schools.](#)

<sup>7</sup> Government of Ontario. (2020, January 12). [COVID-19: Reopening child care centres.](#)

Government of Alberta. (2021, June 7). <a href="#">COVID-19 school status map</a> .	Jun 7, 2021	Prevalence	Primary and secondary schools, Alberta	<ul style="list-style-type: none"> <li>• Cohorting</li> <li>• Enhanced cleaning</li> <li>• Hand hygiene</li> <li>• Masks (staff, students grade 4+, when physical distancing not possible)</li> <li>• Physical distancing (staff, students)</li> <li>• Screening</li> </ul> Strict symptomatic stay-at-home policy <sup>8</sup>	School (251 total) status classification (no date reported): <ul style="list-style-type: none"> <li>• 75 outbreaks (10+ cases)</li> <li>• 69 outbreaks (5-9 cases)</li> <li>• 92 alerts (2-4 cases)</li> <li>• 57 open (i.e., no status to report)</li> </ul>	Moderate  <b>NOT PEER REVIEWED</b>
Government of Québec. (2021, June 7). <a href="#">Daily numbers for the province – public and private school systems highlights</a> .	Jun 7, 2021	Prevalence	Public and private school system, Québec	<ul style="list-style-type: none"> <li>• Alternating in-person/remote attendance (secondary schools in red and orange zones)</li> <li>• Cohorting</li> <li>• Enhanced cleaning</li> <li>• Masks (staff, students grades 5+; in red and orange zones, all students, except preschoolers)</li> </ul> Physical distancing <sup>9</sup>	Data from 2740 public schools, 254 private schools including over 1,300,000 students and 226,000 staff.  Confirmed positive cases in the school from start of school to Dec 22, 2020: <ul style="list-style-type: none"> <li>• Public: 14,929 students, 3558 staff</li> <li>• Private: 2443 students; 480 staff</li> <li>• Total: 17,372 students (~1.3% of all students), 4038 staff (~1.8% of all staff)</li> </ul> Confirmed active cases in school system on June 7, 2021 <ul style="list-style-type: none"> <li>• Public: 643 students, 58 staff</li> <li>• Private: 167 students, 8 staff</li> <li>• Total: 810 students (~0.06% of all students), 6 staff (~0.003% of all staff)</li> </ul> Confirmed variant cases since March 12 <ul style="list-style-type: none"> <li>• Public: 1097</li> <li>• Private: 288</li> <li>• Total: 1385</li> </ul> Number of schools that have had a positive case Jan 5 – Apr 29, 2021: 2576 (94%)	Low  <b>NOT PEER REVIEWED</b>

<sup>8</sup> Government of Alberta. (2021, January 19). [COVID-19 information: guidance for school re-entry - scenario 1](#).

<sup>9</sup> Government of Québec. (2021, January 11). [Organization of educational activities in 2020-2021 \(COVID-19\)](#).

<p>Government of Ontario. (2021, June 4). <a href="#">COVID-19: asymptomatic targeted testing in schools.</a></p>	<p>June 4, 2020</p>	<p>Prevalence</p>	<p>Primary, secondary schools, Ontario, Canada</p>	<p>All schools:</p> <ul style="list-style-type: none"> <li>• Cohorting</li> <li>• Enhanced cleaning</li> <li>• Masks, eye protection (staff)</li> <li>• No non-essential visitors</li> <li>• Record keeping</li> <li>• Screening</li> </ul> <p>Primary and secondary schools (in addition):</p> <ul style="list-style-type: none"> <li>• Hand hygiene</li> <li>• Student masks grades 1-12, in school (hallways, class), on school transportation, outdoors (when cannot distance)</li> <li>• Physical distancing</li> <li>• Scheduled remote learning days (grades 9-12)</li> <li>• Staggered bell times (suggested)</li> <li>• Targeted testing (voluntary, participating schools)<sup>10</sup></li> </ul>	<p>From Feb 1, 2021, to Apr 30, 2021, 56,183 rapid asymptomatic tests were conducted across 602 schools; a total of 411 additional cases were detected (0.73%).</p> <p>The number of cases identified by school board ranged from 0 to 150, and percent positive tests per school board ranged from 0 to 2.6%.</p>	<p>Low</p> <p><b><i>NOT PEER REVIEWED</i></b></p>
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<sup>10</sup> Government of Ontario. (2020, November 27). [Guide to reopening Ontario's schools.](#)



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