

Evidence Review of Reopening Schools During the COVID-19 Pandemic

Brookline Remote Learning Expert Advisory Panel on Public Health, Safety, and Logistics

Initially Prepared June 29, 2020; Most Recently Updated Sept. 25, 2020

Overview

In considering whether and how to reopen public schools in Brookline in 2020-2021, our expert advisory panel continues to review and analyze emerging evidence from published studies in several areas: 1) The risk of COVID infection and serious illness in children; 2) School-based outbreaks and risks to teachers, staff, and other students; and 3) Effect of school closures on overall community COVID rates.

Risks of COVID Infection in Children:

Multiple peer-reviewed studies and [reviews](#) show that children are significantly less likely to become infected with COVID, including in population-based studies that tested all individuals even those without symptoms, and when schools were still open:

- In a [study](#) of 2766 people in Switzerland that tested for antibodies to the virus causing COVID, children ages 5-9 were 60% less likely to have been infected than adults.
- A population-based screening [study](#) in Iceland (which did not close schools) found infection rates increased with age, with the infection rates in children under 10 half that of adults.
- Another population-based screening [study](#) in a high-incidence town in Italy at the beginning of the town's lockdown found a 3.0% infection prevalence among adults, 1.2% among children 11-20, and 0% (0 out of 217 tests) among children 0-10.
- An [international study](#) of 6 countries estimated that individuals younger than 20 were half as likely to become infected as adults over 20 years old.
- A [study](#) of households with COVID-19 exposure in China showed that children were infected at lower rates than adults – 4% vs. 17% – even though these individuals all lived in the same home with a COVID-positive family member.

There is some evidence to suggest that younger children have lower infection rates than older children:

- A CDC [report](#) showed that confirmed infection rates among U.S. children peaked in July, with rates roughly twice as high for 12-17 year olds than 5-11 year olds.
- Results from the Italian population-screening [study](#) mentioned above similarly showed the lowest infection rates among children under 10 year old.

Among those who do get infected, the risk of serious illness among children due to COVID is very low:

- A [study](#) in China showed that 1.6% of children with confirmed COVID-19 had severe or critical disease, most of whom (7 of 9) had underlying medical conditions. Another [study](#) from China showed that 5.2% of infected children had severe disease and 0.6% had critical disease. Two of the combined 2686 infected children in these two studies died (0.07%).
- Data from the [UK](#) indicate that among hospitalized children, risks of serious complications are highest among infants and those with other pre-existing serious illness.

Some studies have analyzed molecular or biological pathways that may make infection and transmission of COVID-19 higher or lower in different age groups: For instance, [two studies](#) showed *higher* levels of viral RNA in the noses of children with COVID compared to adults, while another study showed *lower* levels of the [key receptor](#) in children (vs. adults) that allows the COVID-19 virus into the body, and another showed *fewer respiratory droplets* in the exhalations of children. The first two studies suggest that children might be higher transmitters of infection, the latter two suggest the opposite. Our panel's assessment, however, is that these laboratory or mechanism-based studies are less useful than direct studies of disease transmission by age group cited here.

Rates of childhood infection have increased as overall national case rates have [risen](#), but complication rates for children remain quite low. The Centers for Disease Control and Prevention (CDC) [reported](#) that from the start of the pandemic through July 2020 the rate of infection requiring hospitalization for 5 to 17

year-olds was roughly 1 out of 22,000 children. These statistics also demonstrate large racial and ethnic [disparities](#), with rates of hospitalization for COVID higher among Black and Latino children than white children, which must be considered alongside evidence that the [harms of school closures](#) have also had disproportionately negative [impacts](#) on children of color and low-income families. Clearly, multiple factors affecting health equity are at play in the epidemic and school reopening policies, which must be monitored closely.

School-Based Outbreaks and Risks:

Studies of schools with known cases of COVID-19 show that infection risk among other teachers and students are low. In most cases, schools did not close but used contact tracing and quarantining instead:

- A [study](#) from Australia tracked 27 individuals (12 students, and 15 teachers/staff) with confirmed COVID-19 infections during times they were present at school or early childhood education centers. Of the 1448 people who came into contact with these individuals, 1.2% contracted COVID-19 (2.4% of early childhood contacts, and 0.5% of K-12 school contacts)
- In a French [case study](#) of a 9-year old child who attended 3 schools while symptomatic with respiratory symptoms later confirmed to be COVID-19, 176 contacts were identified, including 84 who had shared a classroom with the child. There were zero confirmed COVID-19 cases in this group, after close surveillance and testing of symptomatic individuals.
- A [study](#) in Ireland tracked 6 episodes where students (3) or teachers/other adults (3) at schools were confirmed to have COVID. Of the 924 students and 101 adults that came into contact with these individuals at school, there were zero confirmed cases of COVID-19, after close follow-up, contact tracing, and testing of symptomatic individuals.
- A population-based [study](#) from South Korea indicates that children 0-9 years old are only half as likely to transmit the infection to household members as adults are, while older children/teens may have rates of transmission – once infected – at least as high as adults. A subsequent [analysis](#) of the same data found that after removing children who were infected at the same time as the adults in their household, the risk of child-to-adult spread was extremely low – just 0.5%, contradicting the prior study showing high teen transmission rates. A related [study](#) found that risks to close contacts outside the household are substantially lower than within the household.
- Increasing [direct evidence](#) and [modeling studies](#) suggests that consistent mask use in indoor spaces can significantly reduce the risk of viral spread, which is most relevant for adults and older children who may be at higher risk of transmission. [Face shields](#) provide an additional level of protection, with one recent study in India showing that adopting the use of face shields cut the infection rate among community health workers from 19% to 0% over the course of more than 18,000 house visits (including 2600 homes with people who later tested positive for COVID).
- A study of infection risk by occupation in [Sweden](#) – which did not close schools –found that COVID infections were highest for taxi and bus drivers, while teachers’ rates were similar to the population average. The [Netherlands](#) reported in June that the infection rate for teachers and childcare workers who were tested was less than half the rate of the general population.
- Outbreaks of COVID have occurred among students after reopening schools in Israel without classroom size limits or consistent social distancing practices. It is unclear whether all of these infections were transmitted in schools, as Israel reopened [large adult gatherings](#) at the same time. Overall [numbers](#) show nearly 2000 student and teacher cases through early July, out of more than [2 million](#) school children in the country. The largest [outbreak](#) occurred in a middle/high school, with poor ventilation and lack of masks due to a heat wave implicated as key contributors.
- A CDC [analysis](#) of day care centers in Rhode Island found a confirmed or probably COVID infection rate during the summer of 30 children out of approximately 19,000; teachers accounted for another 20 cases and parents 2. Only four cases led to any secondary transmission. This contrasts with a large overnight camp [outbreak](#) in Georgia, which the CDC attributed to lack of mask use and poor ventilation in cabins. Another CDC [study](#) of 3 Utah day care programs with

outbreaks found that 19% of close contacts (24 of 124) developed infections; mask use was required for staff only at 2 sites and for neither staff nor children at the third.

- [Preliminary evidence](#) in the U.S. shows that confirmed or suspected COVID cases in schools were recorded among 0.23% of students and 0.49% of teachers between Aug. 31-Sept 13, which corresponds to 16 per 100,000 daily cases for students and 35 per 100,000 daily for teachers. However, these results have important limitations – they are self-reported from survey responders, many regions with open schools have infection rates far higher than Brookline and Massachusetts, and these figures do not indicate whether these individuals became infected at school or in the community.
- Longer term evidence on school reopening comes from education ministers in [22 European countries](#), who reported that reopening schools has not led to a rise in COVID-19. Reopenings in several Asian nations have had been associated with only small and [infrequent](#) outbreaks. A recent [report](#) from the European Union’s CDC described that the majority of counties had not identified any school-based outbreaks, and only one reported a cluster of more than 10 cases related to schools (13 confirmed infections). They concluded that “schools have not been a major outbreak environment for COVID-19 in the EU.”

Role of School Closures in Community Spread

Re-opening schools has implications for the broader community. Infections from school can be brought home. Having children out of the home can change adults’ behaviors and affect disease spread. Studies on the broader effect of school closures on COVID community spread have found that social distancing steps as a whole are critical to slowing COVID infection, but findings are mixed on whether school closures are effective, and the majority of published papers thus far suggest that school closures are not as effective as other policies such as banning large events. These studies are challenging to conduct, however, since many school closures occur at or near the same time as other social distancing policies, which may account for the mixed findings:

- One [study](#) of county-rates of COVID across the U.S. found “no evidence that school closures influenced the growth rate” in COVID infections, while another [found](#) that school closures were associated with significant reductions in COVID infections and deaths, though this paper did not account for other closure policies like large gathering bans, restaurant closures, or non-essential business closures.
- An [analysis](#) of 11 European nations found large reductions in COVID spread from lock-downs, but no significant effect from school closures on their own. Another [analysis](#) of social distancing policies in Italy, France, and the United States found no significant effect of school closures on COVID growth rates.

Conclusion and State Guidance:

The decision to re-open in-person schools is not simple. We recognize the stress, fear, and confusion all of us have experienced during the pandemic. Community members – parents, teachers/staff, and children themselves – may wonder, “*If we needed to close this spring, what changed to let us to open this fall?*” Our committee’s consensus is that three major factors have changed since March 2020.

- Current rates of COVID in our state have fallen dramatically. Current rates of [new cases](#) of COVID in Massachusetts are have fallen by more than 80% since peak rates in April (as of August 4, 2020). However, ongoing efforts to reduce community spread are critical to keeping risks in schools low, and schools should not be the only target for local officials in trying to reduce the risk of viral spread.
- We now have stronger evidence that children are at lower risk for being infected by the virus and that school-based transmission rates are generally low.
- We have more evidence on tools that can reduce risks of COVID. The combined effects of physical distancing, masks, improved hand hygiene and cleaning, and use of well ventilated

**** DRAFT DOCUMENT – SUBJECT TO REVISION ****

indoor and outdoor space all reduce risks of re-opening. Because COVID can be spread by [asymptomatic carriers](#), these tools are critical for reducing risks of school-based transmission. In addition, having a clear testing strategy and contact tracing is critical to allow public health and school authorities to respond to and reassess the risks as the epidemic evolves.

Overall, the goal is not zero risk – that is not feasible. With or without COVID, schools have always had to consider and manage risks such as influenza and other infections, traffic safety for children getting to school, playground injuries, etc. In all cases, the imperative is to educate our children while appropriately managing and reducing the risks to students, staff and teachers, and the broader community.

[Guidance](#) from the Massachusetts Department of Elementary and Secondary Education reiterates these points: “Based on current data and research – the medical community supports the return of our students to in-person learning, with appropriate health and safety guardrails in place. **With adherence to a comprehensive set of critical health and safety requirements, we can bring our students, staff, and families safely back to school.**”

While the evidence summarized here is our best current guide, new information may change this assessment in the future and we will continue to update this review periodically. Re-opening is not a simple one-time decision. Rather, we look forward to working with school leadership, teachers, parents, students, and community members in an ongoing way to best balance the benefits of in-person schooling for our students and COVID risk management.