

Evidence and Considerations for School Reopenings

With schools in the United States—from preschool, to K-12, to higher education—considering strategies to safely reopen following their closure for the COVID-19 pandemic, we prepared this policy review to support local jurisdictions and school administrators in their planning. It provides emerging evidence that can guide safety protocols, highlights where there is limited research, and features the experiences of school districts and universities across the world.

To inform this document, PolicyLab has been tracking academic literature, scientific pre-prints, global school reopening policies, and guidance from public health and education institutions related to schools, occupational safety, and child health more broadly in the context of COVID-19. We intend for this policy review to serve as a guide from which decision-makers can consider interventions for health protections to reduce transmission risk in a school environment. We caution that data from this pandemic remains sparse; considerations featured in this document are guided by best interpretation of transmission risk, sometimes for SARS-CoV-2, but more often based on experience with other respiratory viruses like influenza. As additional evidence becomes available, our team will update this guidance. For questions or feedback, please reference the contact/author list on page 11.

For those seeking additional sources of information on health and safety considerations for school reopening, the [Centers for Disease Control and Prevention \(CDC\)](#), [UNICEF](#), the [American Academy of Pediatrics](#), and the [American Federation of Teachers](#) provide useful guidance on school-level reopening policies and procedures as well.

All decision-makers should be mindful that as long as there are cases of SARS-CoV-2 in the community, there are no strategies that can eliminate transmission risk in schools entirely. The goal is to keep transmission as low as possible so as to safely continue school activities.

Fundamental concepts that guide the interventions we highlight include:

- **Schools should prepare a range of interventions that they can flex in response to changing transmission rates and circulating cases within a community:** Schools are a critical foundation to communities, not simply for the educational, social, nutritional, and health benefits they provide to children, but also for their critical importance to workforce participation of parents. A school-level tiered approach to reopening that prioritizes in-school learning and activities during periods of low community transmission and includes protocols for adjustments during periods of circulating cases either within the school or the community can promote continuity of education and safety. Models of on-site and virtual instructional and extracurricular activities can be responsive to changes in community transmission risk—for example, a tiered approach may plan for periods of “school dense,” “school dilute,” “mixed school-home” and “home only.” Foundationally, we would expect all schools with any on-site activity to have strong plans for enhanced hygiene and disinfection, illness monitoring

and attendance policies, as well as strategies for physical distancing to reduce transmission between and among students and staff.

- **Early evidence suggests children may be at lower risk from severe disease:** The [evidence to date](#) reveals that, overall, children and adolescents are at lower risk of serious complications from SARS-CoV-2 than adults. The incidence of severe or fatal disease is also less than has been observed during influenza seasons; this past year alone, [174 children died](#) of influenza-related complications. At the same time, the risk is not zero. Although the numbers of children with symptomatic illness are fewer, some who do become sick require hospital-level care, including a small subset of children with [an inflammatory syndrome](#) potentially associated with SARS-CoV-2 that, in rare circumstances, has been fatal. We also do not yet know whether concurrent influenza and SARS-CoV-2 infection confers additional risk, as might be anticipated in late fall and winter of 2020-21. To date, children with comorbid medical conditions, including asthma and immune suppression, have not presented with SARS-CoV-2 in significant numbers; however, consideration of the data with respect to all children with special health care needs remains a high priority, and health departments should communicate with school officials if signals emerge.
- **Children may be at lower risk of transmission, but school environments require special attention as data on school transmission has not yet accrued:** Youth who contract SARS-CoV-2 often have mild or no symptoms. While adults with mild symptoms and those who are presymptomatic and asymptomatic can spread the virus, the evidence on how likely children are to spread the virus is mixed. There is emerging [evidence](#) that some children carry a similar viral load as adults, but it is unclear at this time if this predicts transmission and, if so, the degree to which children in [school settings](#) will be [responsible](#) for transmission, given that respiratory symptoms have not been prominent in most cases. While large outbreaks have not been sourced to schools or day cares to date, we would caution that schools were closed very early prior to community spread events, leaving uncertainty around the contribution of school and child care center reopenings to SARS-CoV-2 transmission within communities. In mid-late April, several countries in Asia and Europe reopened schools, with more countries slated to open in mid-May. Early evidence from Denmark, reported in [news media](#) on May 17, showed a brief increase in the SARS-CoV-2 reproduction number (Ro) following reopening, which has since dropped and no teachers have reported illness to date. As more evidence from these locations becomes available, we will update our guidance.
- **The risk to teachers, staff and caregivers warrants strong safety plans in all school settings:** Data on the [age distribution](#) of educators show that almost 30% of teachers nationally are aged 50 and over, placing them in a risk group for complications from SARS-CoV-2. Teachers unions have begun to accumulate [COVID-19 mortality data](#) on educators and school staff. Over 50 educators in New York City have died to date,

though these deaths have not been sourced to school-related exposures. Enhanced surveillance and testing of teachers and staff is warranted with considerations for flexible attendance policies, supported by paid leave, to encourage staff and teachers to quarantine if they or their household members are sick. Additionally, alternative options for virtual instruction may be considered for teachers whose risk is too high for in-class learning. Virtual instruction opportunities will likely increase in response to periods of quarantine, with staggered scheduling, or for subsets of the student body with medical risks that prohibit them from receiving on-site instruction.

- **Safety guidance should extend beyond schools to clear instructions for families to mitigate transmission risk when children are home:** We would advise school districts to work with health departments and local health care systems to disseminate hygiene and disinfection strategies for transmission prevention at home. This may include reminders for increased hand washing, laundering, and surface disinfection for items traveling between school and home. Additionally, schools should provide clear regulations around early identification of illness and school absence/quarantine procedures for symptomatic children with SARS-CoV-2 infections and their siblings, as well as for children with infected household members. Flexible online learning options are needed on a short-term basis for children during periods of quarantine and, on a longer-term basis, remote options are needed for families with older or chronically ill caregivers who decide to prioritize home instruction during periods of community transmission to lower exposure risk. More stringent school sick policies and increased periods of home-based instruction will likely broaden interest in paid leave and employment protection policies for working families during periods of heightened community transmission.
- **Selective strategies will be important to accommodate for local area differences and unique educational settings:** While many health and safety strategies will be shared across school environments, some considerations will be unique to schools with resident students (dormitories at higher educational institutions or boarding schools) versus schools in which students commute every day. There are significant variations as well in: 1) student body size; 2) teacher-student classroom ratios; 3) the health, social and economic status of students and families; 4) structural environments (e.g., ventilation, classroom infrastructure); 5) settings (e.g., urban, rural, student modes of transportation); and 6) weather-related factors. For that reason, each school must consider a wide range of choices to accommodate their local needs while prioritizing strong practices of hygiene and disinfection, distancing, and robust plans for surveillance and quarantine practice. As much as possible, plans for increased time out of school for the student body should be coordinated in advance with parents, community programs, and children and youth services to ensure the safety and well-being of youth during this time.

A Review of Interventions that May Reduce Transmission Risk Among Children Attending School

This section reviews potential interventions that may assist schools in reducing transmission risk during periods of heightened community transmission. In each section, we highlight the interventions supported by evidence or considered promising by medical and public health experts.

K-12 Interventions

General Considerations:

- **Flexible attendance policies for students, teachers and staff:** Flexible attendance policies should be considered for students, teachers and staff with: (1) signs of symptoms or confirmed illness, (2) household members with a positive test, or (3) households with high-risk caregivers or siblings.
 - Flexible attendance policies for symptomatic individuals have [evidence](#) of effectiveness in reducing influenza transmission.
 - Virtual learning accommodations should be considered to maintain continuity of education for students during periods of quarantine.
- **Adjustment of school calendars:** Schools might consider starting the school year earlier in anticipation of a longer shutdown period in the winter and to reduce student exposure to concurrent community spread of influenza and SARS-CoV-2.
- **Increased capacity of school health services:** Schools might augment staffing of school nurses or other designated personnel to strengthen school health service capacity, even during periods of altered schedules/hybrid learning protocols or student quarantine. Schools might consider continuity of the following services: medication dispensing and adherence monitoring; speech, motor skills and other school-based therapies; and mental health and counseling services. Counseling services are a necessary school support for children and may play an important role for youth who have experienced household stress and trauma during the pandemic. Schools may also wish to support grief counseling for students who have experienced loss.
- **Maintenance of up-to-date immunization schedules and influenza vaccinations:** Schools should promote influenza vaccination education and leverage school communications, [facilities](#), and/or health sector partnerships to deliver immunizations to students upon school re-entry and reduce risk for influenza.
 - In light of decreased access to preventive care during the shelter-in-place period, [more students](#) may be out of vaccination schedule compliance.
 - Schools should work collaboratively with public health departments and health care providers to facilitate access to immunizations in a timely manner to reduce immunization-related school exclusion for children.
- **Increased transportation options:** Altered school schedules and policies to promote student physical distancing have implications for student transportation. It may be

important to increase student distancing in transit to and from school. For example, some European countries are using staggered bus schedules or more vehicles for transportation. School buses will need protocols for increased cleaning and disinfection. Urban areas where student rely on mass transit will need policies to minimize risk of student exposure, which may include masking recommendations or distribution of hand sanitizer.

- **Flexing team sports, music programming and other recreational activities in relationship to community risk:** Schools should consider opportunities for safe exercise for students. Non-contact sports can implement transmission risk-mitigation protocols to address: hygiene, disinfection of equipment, distancing during practice and competition, and numbers of participants. Contact sports will require these measures and in addition, enhanced surveillance and testing should be considered to minimize higher risk of transmission in participating athletes. [CDC guidance](#) has been issued on sports activities. Group-based music programming (e.g., band, orchestra, choir) should similarly consider transmission risk-mitigation protocols to address: hygiene, disinfection of equipment, distancing during practice and competition and numbers of participants. In periods of elevated community spread, schools may need to consider cancelling or postponing competitions and other sports, music and recreational events.
- **A focus on strong school communication strategy:** Family and caregiver communication about protocols and schedules will be critical. Schools should be particularly mindful of frequent communications that are accessible in non-English languages and to all caregivers (this is particularly important for children residing with grandparents or other kin or foster caregivers).

Sanitation & Hygiene:

Sanitation procedures are critically important in school settings as the current evidence (as of May 11) suggests fomite transmission in children is a primary concern. **Schools should disinfect at regular intervals throughout the day and emphasize increased student and staff hand hygiene (in compliance with [CDC guidance](#)).** Teachers and staff will need rigorous and routine refresher training on proper hygiene, distancing and personal protective equipment protocols.

- Shared and frequently touched surface disinfection should be prioritized, particularly door handles, light switches and faucets. Additionally, desktops should be disinfected between classroom rotations.
- Additional considerations may include minimizing sharing of electronic devices (e.g., tablets, calculators) or disinfecting between use; keeping children's belongings separated in labeled cubbies, containers or desks; and limiting outside objects brought into schools.
- Procurement of sanitation supplies such as hand sanitizer, soaps, disinfectant, and masks should begin in advance of school re-opening. Disinfectant supplies should be [OSHA- and CDC](#)-approved. Resource-constrained schools may require assistance in acquiring bulk supplies.

Ventilation:

Schools should consider increased ventilation in learning spaces and hallways (CDC, 2020). Holding classroom activities in outdoor spaces or larger school spaces (e.g., auditoriums, gymnasiums) instead of small classrooms and using windows and open classroom doors for cross-ventilation can be considered.

- Ventilation is an intervention to reduce transmission of respiratory illnesses in community (non-health care) settings ([WHO 2019](#), [Nature 2019](#)). [Emerging data](#) from COVID-19 suggests that spreading events are less likely to occur in outdoor areas.
- Urban school environments may have limitations with outdoor space access, outdoor air quality or safety. If alternative ventilation options cannot be deployed, an enhanced focus on other means of on-site distancing, class size reduction, and/or flexible scheduling may be weighed as alternative strategies to minimize transmission risk.

Physical Distancing:

Schools should prioritize selective distancing measures, given strong evidence of their effectiveness in reducing transmission. Distancing via smaller teacher-student ratios and physical distancing of desks is being widely implemented among countries that have reopened. Schools might consider the following:

- **Reducing class size:** Current policies among reopened schools in Europe and Asia consider the ratio to be 10 or 15 students to 1 teacher with 6-foot spacing between single desks. However, evidence is lacking for exact specifications of ratios and distancing between desks that effectively minimize transmission.
 - Of note, smaller ratios improve feasibility of increased disinfection regimens.
 - [Hybrid virtual/on-site](#) instructional models have been proposed as a strategy to reduce on-site class size. Hybrid models may be facilitated with staggered scheduling (as [endorsed by the American Academy of Pediatrics](#)). Policies for staggered scheduling have been considered at the classroom (rotational blocks of students) and grade (rotational blocks of grades) levels. Staggering can occur on a daily (e.g., morning and afternoon sessions) or weekly (e.g., alternating days of on-site) level.
 - Hybrid models would need to be supported by broad access to technology. Many students do not have WiFi access or computers at home. In some area, community buildings provide an alternative site for WiFi access on students' virtual learning days.
 - Hybrid models may leverage the workforce of medically high-risk teachers for virtual instruction as a strategy to reduce on-site transmission risk.
 - Schools that use any staggered or hybrid models should consider the needs of students with medical, developmental or learning considerations that require in-person instruction.
 - Before and after care programs often have increased student-teacher ratios, so may require special attention in the administration of additional staffing to meet distancing protocols.

- **Addressing space limitations:** Identifying alternative classroom space will likely occur in tandem with efforts to reduce class size. For those schools at capacity with current class sizes, this will require identification of alternative classroom spaces versus staggered/hybrid scheduling.
 - Modular or trailer classrooms might be considered in communities where there is ample space on school campuses (e.g., suburban or rural communities).
 - Community buildings such as libraries, recreational centers, or churches could be considered as flex space in more densely populated areas with little additional space.
- **Minimizing contact between groups of students in hallways and other small spaces:** Staggering transitions and arrivals and dismissals and one-directional hallway designations are options being implemented in Denmark. Limiting classroom rotations by students (instead having teachers rotate rooms while students remain in place) is another strategy that might reduce hallway crowding.
- **Considering alternate approaches to student lunch routines:** Crowding and increased social contact in lunchrooms and dining halls may increase transmission risk. Schools may consider classroom-based meals eaten at student desks or increased staggering of meal times in multiple locations of the school with enforcement of physical distancing. Sharing of food should be discouraged.
- **Regulating use of bathrooms and water fountains:** Along with a focus on increased disinfection protocols, schools might regulate social contact and crowding in bathrooms and at water fountains. Disinfection options might include “virostatic” materials for smooth surface disinfection in bathrooms. The provision of hand sanitizer should be considered for use before entering and leaving the bathroom to minimize fomite transmission of the virus to high-touch surfaces.

Symptom Surveillance:

Surveillance and testing strategies (for students, teachers, staff and families) will need to be adaptable to the school setting: Comprehensive ongoing symptom surveillance could include routine symptom checks through on-site, app- or web-based reporting; selective temperature screening; and absence monitoring. Surveillance activities should include and prioritize teachers and staff, who are at increased risk of morbidity and may present an increased transmission risk to children if infected.

- Surveillance should seek to identify students, teachers, and staff who are likely ill or exposed by family/household members. Those who are identified would be considered for exclusion/absence policies in accordance with [American Academy of Pediatrics](#) and CDC recommendations. Virtual instruction can be provided during periods of quarantine for students who are not symptomatic.
 - At a school level, the [CDC currently recommends](#) a short-term (2-5 day) dismissal of all students and staff for cleaning, disinfection, and coordination with local public health officials following confirmation of an infected person in the building.

- Symptom screening should use a case definition based on current research ([CDC](#), [NZ](#), [China](#), [UK](#)). We propose the following set of symptoms for surveillance:
 - Two of the following: fever (measured or subjective), chills, rigors, myalgia, headache, sore throat, new olfactory and taste disorder(s)
 - OR**
 - At least one of the following: cough, shortness of breath, difficulty breathing
- School systems may seek partnerships with a county or state public health department. While schools will provide surveillance of transmission among students and staff, public health departments may offer assistance in protocol development and reporting procedures and assume control or coordination of testing and contact tracing procedures.
- Child care centers have [demonstrated](#) successful school-level symptom surveillance via web-based reporting that have detected outbreaks early. Participatory surveillance approaches may be considered for adoption in school environments.
- School systems may designate risk thresholds to switch between “school dense,” “school dilute,” “mixed school-home” and “home only” instruction after consideration of overall community spread, and in the presence of increasing evidence of school transmission.
- Schools will need to consider the appropriate staffing of school nurses or other certified health personnel to lead surveillance and quarantine protocol activities or coordinate with state or local public health departments or health care systems to address workforce shortages.
- The following guidance is provided for when a student or staff member screens or tests positive for COVID-19:
 - **Symptomatic individual/child who tests positive:** exclude for 10 days from symptom onset AND only allow to return 3 days after fever resolution (if present) AND improved respiratory symptoms
 - **Symptomatic individual/child not tested:** exclude for 10 days from symptom onset AND only allow to return 3 days after fever resolution (if present) AND improved respiratory symptoms; may return to school if a doctor establishes an alternative diagnosis (e.g., Urinary tract Infection) and presents a doctor’s note to confirm the presence of alternate diagnosis that explains symptoms
 - **Symptomatic individual/child who tests negative:** exclude until afebrile for 24 hours (if fever present) AND improved respiratory symptoms
 - **Exposed and asymptomatic individual/child:** exclude for 14 days from last exposure if remains asymptomatic; if individual becomes symptomatic, exclude until they meet criteria listed above of a symptomatic individual who tests positive or is not tested
 - **There is no role for testing to get a “negative test” to clear a child to return to school.** A COVID-19 positive individual does not need a repeat COVID-19 test or a doctor’s note in order to return to the center.
 - If a child or staff member has a confirmed diagnosis of COVID-19, call the local health department for further instructions.

- All children and staff in the same classroom or who have come in close contact (defined as greater than 10 minutes of interaction less than 6 feet away) with a symptomatic individual should quarantine at home for 14 days. Anyone who develops symptoms during that time should contact their health care provider, and centers should follow guidance the guidance above for symptomatic individuals who tests positive or who are not tested.

Masking:

Schools may consider that adults wear facial protection while in the building.

Masking evidence is hard to interpret in the context of school. The evidence on masking in non-health care settings to date [suggests protective effects](#) of masks against person-to-person spread. In a school setting, those most vulnerable to SARS-CoV-2 morbidity, including teachers and staff, may consider facial and eye protection. There remains no evidence to guide a recommendation for child masking.

- Schools should plan for procurement of masks or face shields, and laundering policies should be developed if cloth masks are to be used. Eyewear protection might also be considered given emerging evidence of benefit in reducing transmission.
- Face shields may be the most well-suited facial protection option as these devices do not obstruct the mouth. Students who are deaf, hard-of-hearing, or have autism spectrum disorder must be able to see the face and mouth of their teacher.
- Developmentally appropriate communication with students from their educators regarding masking should be prioritized when school commences to provide reassurance and reduce anxiety among students.

Special Considerations for Higher Education and Boarding Schools:

Colleges, universities, and boarding schools present unique challenges around high-density shared living spaces, dining areas, recreational spaces and bathrooms. SARS-CoV-2 has been shown to pass most easily indoors, and dorm living is similar to high-transmission facilities like cruise ships and nursing homes. Other respiratory illnesses [have been shown](#) to easily transmit in dorm settings.

For more suggestions for higher education institutions, please consider further information from [Kuali, Inside Higher Ed](#) or the [National Governor's Association](#).

Sanitation & Hygiene:

- Frequency of cleaning and disinfection protocols focused on dorms, shared bathrooms, gyms/locker rooms and lecture halls should be increased. Specific protocols for heightened disinfection of residential dormitory hallways and shared bathrooms in areas with identified cases or exposures should be considered.
- Frequent communications to students with hygiene and sanitation instructions should be provided in residential and instructional facilities.
- Student access to hand sanitizer and masks should be considered for distribution by schools.
- Libraries and classrooms with shared computers or technology devices should be considered for staggered scheduling of access and frequent disinfection. Increased availability of technology to all students can minimize sharing of devices and risk of fomite spread.

Masking:

- College-aged students may more easily participate in masking protocols than K-12 students.
- Public shared spaces may warrant staff and student masking simultaneously.
- Rigorous, routine training on proper use and washing of masks may be necessary.

Physical Distancing:

- **General**
 - Students may be grouped into cohorts that live, use shared facilities, and attend courses together to minimize contact with other groups. These groups could be used to identify new cases and quickly isolate small groups.
- **Classes**
 - [Hybrid on-site/virtual instructional models](#) are already in use at many higher education institutions. Increased reliance on these models is a strategy to reduce transmission risk.

- Large lectures can be moved online and smaller classes or tutorials can be moved to larger spaces, such as gymnasiums and concert halls, with increased distancing.
- **Dorms/Living Arrangements**
 - Single or lower-occupancy dorm rooms can be considered, if on-site or full-time enrollment declines.
 - If reliable serology tests become more available, schools might consider, with family consent, shared room assignments with serology negative and serology positive students to minimize potential transmission within the dorm room.
 - When considering residence policies, higher education institutions should prioritize dorms or housing continuity and supports for students who are [housing insecure](#), low-income, [parents](#) and LGBTQ youth. This will be particularly important during periods of school closure or limited on-campus residence when community transmission is increased.
 - High-density on- or off-campus living such as sorority, fraternity, or cooperative housing may need special regulations to minimize crowding and increase sanitation protocols. As this is likely outside of an institutions' jurisdiction, administrators should work closely with the local health department to enact and enforce regulations.
- **Shared Facilities**
 - Distancing of staff and students in public spaces, especially in classrooms, dining halls and shared facilities may be important.
 - Staggering the use of laundry, gym, and other shared spaces could mitigate potential opportunities for transmission.
 - More regulated dining facility access might be considered alongside delivery of pre-packaged meals during periods of increased community transmission.
- **Large Gatherings**
 - During periods of increasing or high community transmission, schools might restrict gathering size of spectators for large events such as athletic games, socials, parades, homecoming activities or festivals.
 - Enforcement of gathering size limitations might extend beyond college-endorsed events to on- and off-campus parties and regulation of distancing and sanitation protocols of local bars and restaurants frequented by students.

Surveillance & Testing:

The setting of the college or university should drive each school's testing approach. Smaller, remote colleges where most students live on campus will likely have an easier time monitoring and contact tracing. Urban and commuter campuses may need to consider different strategies.

- **Syndromic Surveillance**
 - Schools may be able to implement participatory syndromic surveillance with text- or app-based reporting of symptoms on a regular basis.

- Class attendance monitoring and selective use of temperature screenings are additional options for early outbreak detection.
- **Testing**
 - Testing protocols may include prioritizing high-exposure staff and students and those staff and students commuting/arriving from areas of high community transmission for targeted testing approaches, as well as the use of pooled testing strategies to clear groups of students—for example, sports teams, certain classes or cohorts (e.g., medical or dental trainees with health care facility exposures). Additionally, testing should be used to identify positive cases when surveillance measures identify a possible hotspot.
- **Contact Tracing**
 - Schools may have some advantages for contact tracing via access key cards or phone apps.
 - Coordination with local public health departments may assist with protocol development, reporting and tracing workforce.

Isolation and Quarantine of Students:

- With adequate safety, hygiene and medical monitoring protocols, sequestered dorms may confer advantages for isolation and quarantine of students in residence outside of community settings.
- Student health services will need to message clear procedures for ill students, including what to do if students notice symptoms, and where to go to seek testing and health care.
- Schools should identify sequestered spaces to quarantine sick and/or exposed students for the duration of their illness and assign specific staff to provide health monitoring and food delivery.
- Students will need access to educational materials during quarantine.
- Ensure online or hybrid course offerings during individual quarantine or periods of increased campus distancing will not delay graduation or affect student loan, scholarship or work-study eligibility. Additional use of online learning approaches will require broad availability of computers and WiFi access to all students.

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