

Evidence and Guidance for In-Person Schooling during the COVID-19 Pandemic

Updated November 5, 2020 (from October 21, 2020)

Across the United States, schools—from preschool, to K-12, to higher education—have been safely reopening following their closure for the COVID-19 pandemic by adhering to important recommended mitigation strategies including mask wearing, social distancing, hand hygiene and contact tracing. This policy review updates and expands upon a previous version from August 2020 focused on school reopening to provide the latest evidence and continued support to local jurisdictions and school administrators as they negotiate the dynamic challenges of this pandemic and plan for the future. We highlight where there is limited research and feature the experiences of school districts and universities across the world. We intend for this policy review to serve as a guide for decision-makers considering interventions to reduce transmission risk in schools. We also stress that these are general recommendations that are not intended to be one-size-fits-all, but rather, can be adapted locally.

To inform this document, PolicyLab has been tracking the published literature, scientific pre-prints, global school reopening policies and early anecdotal experiences. We also reviewed guidance from public health and educational institutions related to schools, occupational safety and child health more broadly in the context of COVID-19. Recommendations are guided by data on respiratory virus transmission risk, sometimes specific to SARS-CoV-2, but often extrapolated from experience with other viruses that are similarly transmitted, such as influenza. We caution that data from this pandemic are continuously emerging, requiring periodic updates of this guidance. For questions or feedback, please reference the contact/author list on page 14.

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 entirely eliminate transmission risk in schools. The goal is to keep transmission as low as possible to maximize both safety and in-person learning.

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Review of the Evidence for School Operations during the Pandemic

- **Overall, children and adolescents are at lower risk of serious infection and complications from SARS-CoV-2 than adults.** This includes most children with comorbid medical conditions, such as well-controlled asthma, those receiving immune suppressive therapies (including cancer) and youth with special health care needs. Despite this, the risk of severe illness is not zero. Some infected children have required hospital-level care, including for a [rare inflammatory syndrome](#) associated with SARS-CoV-2 that can be severe. Deaths from SARS-CoV-2 in children are rare, accounting for approximately 100 (0.05%) of the more than 200,000 deaths in the United States (for reference, there are typically between 100-150 pediatric deaths from influenza each year in the U.S.).
- **Although children of all ages can spread COVID-19, young children are relatively inefficient drivers of transmission, while [older teens](#) appear to have transmission risks similar to those of adults.** Youth who contract SARS-CoV-2 often have minimal to no symptoms. Transmission from an asymptomatic child to other members of their household has been reported, but has been only rarely documented to occur in early childhood education or school settings.
- **Schools across the U.S. have successfully reopened for in-person learning, though often in the context of low levels of community transmission.** Although COVID-19 mitigation strategies such as masking, distancing, and ventilation are designed to withstand higher community incidence, the tipping point remains unknown. Even well-resourced schools should be prepared to pivot to remote learning if community transmission overwhelms the capacity for efficient contact tracing and infection monitoring and thus, jeopardizes the safety of in-person schooling.
- **Strong school safety plans can, and have, mitigated risk for transmission, even within communities with moderate incidence.** Though most school reopening occurred in communities with weekly case incidence between 10 to 35 cases per 100,000 individuals (average of 5 new cases/daily) and testing positivity below 5%, some schools have successfully reopened in communities with higher incidence rates. Learning from these real-world experiences, it appears that a higher case incidence might be tolerated for in-person learning in some settings—particularly for younger children—and with continued adherence to strong school safety plans.
- **Most school-associated transmission has occurred outside of school or because of poor adherence to masking protocols.** Limited data are available from investigations of school-associated outbreaks; however, from the data we do have, it's evident that most school-related transmission has involved student gatherings outside of school and shared meals (either in or outside of schools) amongst staff. Although reports of daycare outbreaks have been rare, those that have been reported occurred when there was limited implementation and/or adherence to multi-layered mitigation plans. Staff-to-staff transmission in this setting has been associated with poor masking compliance.

- **Youth sports have been associated with disease transmission in children, but exposures have most often been off the field of play.** Although not comprehensive, reports from contact tracing of sports-related exposures has revealed that, when transmission occurs, it appears to be driven primarily by off-field interactions in locker rooms, on the sideline/bench, and at pre- or post-game events and parties. Assessment of recent outbreaks in professional sports teams have infrequently demonstrated transmission during on-field play, even when athletes are confirmed to be positive soon after competition.
- **Teachers, staff and caregivers are most at risk from the consequences of outbreaks that originate from school buildings.** Almost 30% of teachers nationally are aged 50 and over, elevating their risk for complications from SARS-CoV-2. They are also more likely, once infected, to transmit the virus across school settings to students or to other teachers and staff during the school day. Flexible attendance policies supported by paid sick leave for teachers is critical to reducing transmission. School safety plans should focus on the distancing and masking of staff during the school day, and pay particular attention to breakrooms where teachers may congregate, and where we already see evidence of COVID-19 transmission.

Incremental Strategies for Reopening Schools

The previous version of this policy review offered case incidence thresholds to guide school leaders in decisions about reopening. (The original thresholds and description of evidence used to define those thresholds are provided in Appendix D on page 21.) We have intentionally moved beyond the absolutism of case incidence and test positivity thresholds that—although were helpful benchmarks for starting school in late summer (before school experiences could guide decision-making), are no longer the most pressing questions for school leaders.

Since August, many schools have opted for incremental reopening strategies **beginning with special populations, such as children with special education needs or elementary school-aged children, for in-school learning**, followed by older students.

As many schools are already partially or fully reopened, we would encourage continued reopening of schools **in the absence of evidence of linked transmission occurring in schools within the area, and in the absence of rapidly accelerating community transmission (i.e., quickly approaching or reaching 9% or greater test positivity).** In these scenarios, local health departments may proactively recommend schools revert to online learning to impede widespread community transmission. **November 5 addition:** In the setting of higher community transmission, schools that have already reopened for in-class instruction and avoided in-school transmission might still elect to implement selective strategies for reverting to online learning. These selective strategies might include keeping younger grades in school while temporarily reverting middle and high school-age children to online learning and suspending scholastic team sports competition and/or continuing these extracurricular activities under highly supervised conditions.

The recommendation to continue with reopenings is in part related to the fact that many health departments have greatly expanded their capacity to conduct detailed and rapid contact tracing, an essential community containment strategy. **Schools should focus on strengthening their relationships with their local health departments** and should rely on information from these partners to inform decisions on continued reopening or, if necessary, reverting to in-person learning.

Schools with evidence of linked transmission will likely need to at least temporarily revert to distance learning, depending on the extent of the outbreak. Small isolated events that are clearly contained may inform revisions to safety plans. When there are decisions to close, the extent of the outbreak will determine whether closure is by section (e.g., classrooms, grade levels, sports teams) or for entire schools. Closures of at least 14 days should be prioritized to break transmission cycles when there has been linked transmission. If multiple sections are impacted, the entire school may need to revert to distance learning.

For schools that have not yet begun to offer in-person instruction, or for those who have already initiated an incremental reopening strategy and are returning more cohorts and age groups to the classroom, we would advise that **schools consider reopening based on the following considerations:**

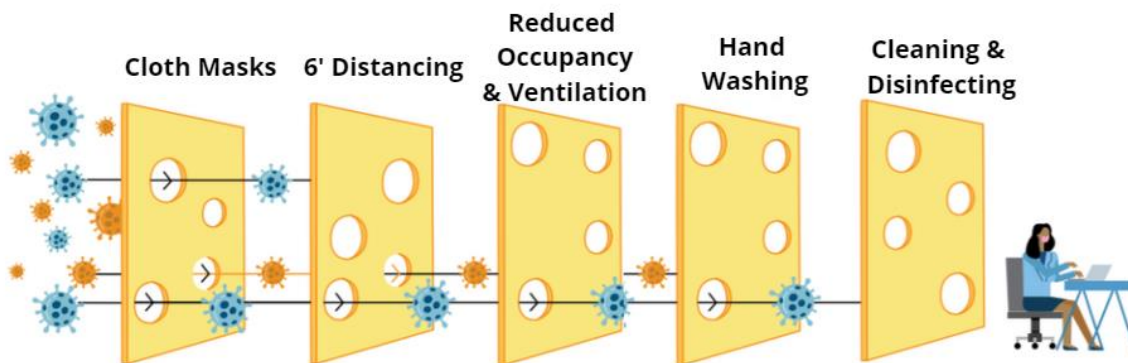
- students and staff are from regions with stable or decreasing test positivity rates over the last two weeks.
- higher rates of community transmission are stemming from residential settings with limited interaction with the larger community (e.g., nursing homes, correctional facilities). If this is the case, school officials might consider an “adjusted” case incidence threshold for reopening as defined by local public health authorities.
- the school campus has ample amounts of indoor and outdoor spaces to physically distance students and facilitate instruction and activities among smaller cohorts.

Foundational Components of In-School Learning Safety Plans

The following components are essential to the specific COVID-19 mitigation strategies we suggest and describe in the next section.

- **Multi-layered prevention strategies to reduce the risk of COVID-19 transmission within the school building.** By layering mitigation strategies like masking, distancing, cohorting and cleaning protocols, schools can greatly reduce the risk of transmission of SARS-CoV-2 even if an infected individual is in the building or in contact with the school community. This is, in essence, the “swiss cheese” model of prevention strategies, adapted for school communities during the COVID-19 pandemic, as shown in the graphic below.

The "Swiss Cheese" Model of COVID-19 Mitigation in Schools



PolicyLab adapted this graphic from the Cleveland Clinic's "Swiss Cheese Approach to COVID Mitigation"

- **Strong partnership between schools and local public health authorities.** These partnerships should focus on symptom surveillance and reporting, followed by guidance on how to build strong, multi-layered in-school protocols. For an outbreak to occur when strong symptom surveillance is in place, there would need to be multiple, simultaneous failures in other elements of the school safety plan. Learning from outbreaks among children and teachers throughout the region can inform potential vulnerabilities in local school plans to prevent potential outbreaks in the future.
- **Contact tracing to avoid unnecessary school closures.** Some students, teachers and school staff will inevitably be infected with SARS-CoV-2. It is critical for schools, leveraging a strong partnership with local public health authorities, to identify the source of outbreaks in the student population in order to understand if transmission occurred within the school building or during out-of-school time. Robust contact tracing has shown that many documented clusters of pediatric cases have occurred during out-of-school group activities and social events. If an outbreak is traced to in-school transmission, this will help school administrators appropriately respond with improvements to school safety plans or brief periods of distance learning.
- **Strong communication with families about mitigating risk at home.** Many of the same protocols developed for school settings have generalizability to homes and social events outside of school. Schools should communicate with their parent communities to emphasize reducing large gatherings, limiting the number of friends their child sees outside of school, prioritizing outdoor activities, and practicing sensible hygiene and disinfection in the home. Additionally, schools should provide clear regulations around early identification of illness and school absence/quarantine procedures for symptomatic children with suspected or confirmed SARS-CoV-2 infections. Guidance must also reinforce the need for siblings to quarantine when one member of the household is infected. 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).

- **Strong communication with families and staff about extracurricular activities like youth sports leagues.** With accumulating evidence of transmission occurring due to lapsed vigilance with masking and distancing in the context of youth sports leagues, particular attention should be paid to the youth sports and activities section of this guidance (see Appendix A on page 15). We would advise school districts to work with health departments and local health care systems to disseminate useful tips for home prevention that mirror many of the elements of school safety plans.
- **Flexible online learning options for short- and long-term learning throughout the pandemic.** While most students will require online learning, at least on a short-term basis during periods of quarantine and isolation, remote options will be needed on a long-term basis for families with older or medically at-risk caregivers who opt not to send their children into school buildings.
- **Local area differences and unique educational settings drive safety plans and considerations.** While many health and safety strategies will be shared across school environments, some will be unique based on student body size, teacher-student classroom ratios, structural environments (e.g., ventilation, classroom infrastructure), settings (e.g., urban, rural, student modes of transportation), and weather-related factors. In addition, schools with resident students (i.e., dormitories at higher educational institutions or boarding schools) will have different considerations than schools in which students commute each day. Each school must consider the range of choices in relation to individual school context and community, while prioritizing mask wearing, social distancing, ventilation, hygiene and disinfection, and robust surveillance and quarantine.
- **November 5 addition: Implementation of point-of-care testing strategies aimed at quick identification of outbreaks should be considered to support school reopenings.** As our country has built capacity for rapid point-of-care testing, the possibility of utilizing testing to assist school districts in quelling outbreaks has become a reality. Until now, most schools have directed their students to established labs or health care facilities for molecular PCR testing (a testing platform that requires performance in a certified laboratory) when they are exposed or have symptoms. Some schools (principally independent schools) have partnered with certified labs (locally or via mail courier) to bring access to PCR tests to students in the school. However, for most schools this is not an option.

New antigen point-of-care testing provides the opportunity to test teachers and students in school nursing offices and get test results in near real time. This may allow more expeditious decision-making on quarantine and isolation to mitigate additional spread within the school. Antigen point-of-care testing is likely best utilized for symptomatic individuals for whom the test performs more optimally. However, despite lower sensitivity and specificity compared to molecular PCR testing, antigen testing might also

be cost effective and practical as a method for regular sentinel surveillance of asymptomatic school staff when community transmission rates are high, particularly during winter months, when asymptomatic transmission may be higher.

Recommended Interventions for K-12 School In-Person Safety Plans

This section reviews potential interventions for reducing transmission risk in schools in communities with reported COVID-19 cases. In each section, we highlight interventions supported by evidence.

Flexible attendance policies for students, teachers and staff: Flexible attendance policies should be in place for students, teachers and staff with: (1) signs of symptoms or confirmed illness; (2) household members with a positive COVID test; (3) households with high-risk caregivers or siblings; or (4) a recent exposure to a suspected or confirmed COVID-19 case.

- 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 or isolation.

Increased capacity of school health services: Schools should increase school health service capacity through additional school nurses and mental health staff, even during periods of altered schedules/hybrid learning protocols or student quarantine. Continuity must be considered for 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, including grief counseling for students who have experienced loss.

Maintenance of up-to-date immunization schedules and influenza vaccinations: Schools should promote influenza vaccination of all staff and students. Schools should leverage existing channels of communications to educate their communities on the importance of influenza vaccination this season and consider partnerships to deliver immunizations to students upon school re-entry.

- In light of decreased access to preventive care during the shelter-in-place period, [more students](#) may be out of adherence with age-appropriate vaccinations.
- 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.

Reduce transmission risk associated with transportation to and from facilities: Altered school schedules and policies to promote student physical distancing have implications for student transportation. It is important to increase student distancing in transit to and from school. School buses will need protocols for increased cleaning and disinfection. Student masking on buses, public transportation, and in carpools is an important safety measure; lack of masking in these settings has been described in school and sports-related outbreaks. Hand hygiene upon entry to school should also be prioritized.

Flexing team sports, music programming and other recreational activities in relationship to community risk: Schools should create opportunities for safe exercise for students. [CDC guidance](#) has been issued on sports activities, and we provide information on sports and related activities in Appendix A on page 15. [Additional information](#) on safely returning to youth sports is available from Children’s Hospital of Philadelphia. Group-based music programming (e.g., band, orchestra, choir) should also implement transmission risk-mitigation protocols to address: hygiene, disinfection of equipment, distancing during practice and competition, and numbers of participants. Due to potential increased risk of droplet transmission, physical distancing should be prioritized for wind instruments and choir/singing. In periods of accelerating community spread, schools should consider canceling or postponing competitions and other sports, music and recreational events. Additional information on music and arts activities is provided in Appendix B on page 17.

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 should include routine daily symptom checks with on-site or in-home screening. Surveillance activities should include teachers and staff, who are at increased risk of morbidity and, if infected, may present an increased transmission risk to children.

- Surveillance should seek to identify students, teachers, and staff who may be ill or exposed by COVID-positive family/household members. Those who are identified would be considered for quarantine policies in accordance with [American Academy of Pediatrics](#) and CDC recommendations.
 - At the onset of an outbreak, a school should consider a short-term (2-5 days) dismissal of all students and staff for cleaning, disinfection and coordination with local public health officials to determine next steps (in accordance with CDC guidelines).
 - Linked transmission that has been identified within a classroom or school may inevitably lead to decisions to revert to online learning, whether for classrooms, schools or entire districts. Schools should prioritize 14-day periods of closure (whether limited or full) when such decisions are made to allow for at least one full transmission cycle of quarantine.
 - Symptom screening should use a case definition based on current research ([CDC](#)). Pennsylvania state guidance suggests the following set of symptoms for surveillance provided by the Council of State and Territorial Epidemiologists (CTSE):
 - Two of the following:
 - fever (measured or subjective) chills, rigors
 - muscle aches (myalgia)
 - headache
 - sore throat
 - nausea or vomiting, diarrhea
 - fatigue
 - congestion or runny nose
- OR**
- At least one of the following symptoms: cough, shortness of breath, difficulty breathing, new loss of smell or taste

- If an individual fails to meet the case definition criteria for COVID-19 but still has symptoms of an illness, they should stay home until symptoms subside to avoid spreading another illness.
- Importantly, temperature checks alone are insufficient for assessing COVID-19 illness in staff or students. Temperature checks, if performed, should be a part of a broader symptom screening effort.
- Child care centers have demonstrated successful school-level symptom surveillance via web-based reporting that have detected outbreaks early. Additionally, participatory surveillance, when individuals actively report symptoms of illness to a central location, can assist in identifying early outbreaks and should be considered as an adjunctive tool in school environments.

Quarantine and School Absence Policies for Symptomatic and Exposed Persons:

This section adds detail to the introductory pages of this document, where quarantine and absence policies are discussed.

1. **Symptomatic individual/child with test positive:** exclude for 10 days from symptom onset AND at least 24 hours after fever resolution (if present) AND improved respiratory symptoms. If a child or staff member has a confirmed diagnosis of COVID-19, call the local or state health department for further instructions.
2. **Symptomatic individual/child not tested:** exclude for 10 days from symptom onset AND at least 24 hours after fever resolution (if present) AND improved respiratory symptoms
3. **Symptomatic individual/child determined to have an alternate cause or illness by their primary medical doctor:** exclude until afebrile for 24 hours (if fever present) and symptoms improving
4. **Symptomatic individual/child with test negative:** exclude until afebrile for 24 hours (if fever present) AND improved respiratory symptoms
5. **Direct exposure but asymptomatic:** exclude for 14 days from last exposure if remains asymptomatic; exclude until meets criteria #1/2 if becomes symptomatic.
 - **Direct exposure** (defined as greater than 15 minutes of interaction less than 6 feet away): Quarantine is required. All children and staff in the same classroom or who have come in close contact with a COVID-positive individual should quarantine at home unless given alternate guidance from health department officials. Anyone who develops symptoms during that time should contact their health care provider and schools should follow guidance #1/2 above.
 - **Indirect exposure:** When an individual (student or staff) is exposed to someone who has had direct exposure to someone who has been diagnosed with COVID-19, no quarantine is needed.
 - **Household travel:** If a household member of a student or staff member has returned from traveling to an area of higher transmission and has a geographic

exposure that the student or staff member does not have, the student or staff member does not need to quarantine. To minimize the risk of in-house transmission, the family may attempt in-home isolation of the traveler until the end of their quarantine period. If the traveler becomes ill and the student or staff has direct exposure to this family member within 24 hours before or during symptoms, the staff or student needs to follow quarantine procedures.

Requiring a “negative test” to clear a child to return to school is not routinely recommended for most children. The COVID-19-positive individual does NOT need a repeat COVID test or a doctor’s note in order to return to school. As testing has become more widely available, there has been increasing discussion of possible modified quarantine protocols in which exposed children or staff who remain asymptomatic during quarantine a week after exposure might be returned to a classroom in the presence of a negative test (assuming the exposure is not within the household).

Masking:

Disposable or reusable cloth or surgical masks covering the mouth and nose are recommended for students and all adults in school buildings, with some limited exceptions for early elementary or pre-school settings. Masks provide increased protection when compared to face shields. Face shields provide some protection and may be considered under certain circumstances. N95 masks are not recommended for non-health care settings.

- **Masks:** In educational settings, surgical masks are preferable to other masks in reducing COVID-19 transmission, although cloth masks are acceptable. Gaiters and bandanas are not recommended for routine use.
 - To be effective, face coverings (surgical or cloth masks) should always cover the nose and mouth.
 - If using a disposable mask, staff should replace when soiled or damaged. Cloth masks should be laundered each day and should properly fit to avoid having to touch or reposition the mask.
- **Face shields:** Clear face shields provide a partial barrier to respiratory droplets and may be considered, especially for those working with children with hearing loss, who depend on lip reading and facial expressions to aid their communication, or by speech/language therapists during therapy sessions.
 - Face shields should be considered an adjunct to masking, particularly when close contact within classrooms is needed.
 - **Clear masks or masks with clear mouth panels** may also serve to support youth in need of visual facial cues. Clear masks provide increased protection as compared to shields, particularly in situations where physical distancing is less than 6 feet.
 - Teachers using face shields in the absence of masks introduce increased risk for transmission that might be offset by increasing the distance between teachers and students.
 - Face shields should be wiped down daily with soapy water or a spray cleaner and allowed to air dry.
- **Goggles:** Teachers and staff may consider additional eye protection through the use of goggles (or eyewear) that can prevent respiratory droplets from entering the tissue

around the eye, and thus provide an additional element of protection against infection. This consideration may feel most useful in the context of aid to students with medical complexities contributing to increased exposure to bodily fluids. For more information, see “[FAQ: Support for Children with Special Educational Needs Amid COVID-19.](#)”

- **When masking children, teachers and school districts should consider the following:**
 - Babies and children younger than 2 years old should NOT wear masks due to risks of suffocation.
 - Children age 2 and older who are mature enough and physically capable of wearing a mask should do so when not napping or eating.
 - Enforcement of masks should be developmentally appropriate, especially in young children and children with disabilities.
 - Any child unable to remove a mask themselves in the event of an emergency should NOT wear a mask.
 - Children should never wear masks during nap times.
 - Not all children will tolerate wearing masks—it may be most difficult for children with a small number of specific health conditions, sensory differences or behavioral challenges. Most schools will need to adopt a clear policy and protocols for medical exemptions. Coordination between medical teams, parents, and educators can help determine who is unable to wear a mask and substitute face shields when possible.
 - Child mask wearing should be emphasized during carpools, drop-off/pick-up times, bathroom breaks and hallway transitions.
 - It may be difficult to require a child to wear a mask throughout the entire day. When there are periods of physical distancing of at least 6 feet, mask breaks may be considered. Mask breaks should occur when prompted by the teacher and while students are seated quietly and appropriately distanced in order to reduce transmission risk. Ideally, mask breaks will be 15 minutes or less.
 - There are many resources available to help children adapt to mask wearing. Some tips that we share with families include:
 - Allow children to select their mask and design.
 - Stuffed animals, dolls or action figures can also practice mask-wearing.
 - Parents can model mask-wearing behavior.
 - Practice wearing a mask in a safe space before a child leaves home.
 - Children can read social stories about mask-wearing.

Sanitation & Hygiene:

Sanitation procedures are important in school settings. **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 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 reopening. Disinfectant supplies should be [OSHA- and CDC-approved](#). Resource-constrained schools will likely require assistance in acquiring bulk supplies.

Ventilation:

Schools should maximize ventilation in learning spaces and hallways (CDC, 2020).

The goals of ventilation are to: 1) improve airflow and air cleanliness to disrupt transmission and 2) reduce the amount of virus particles in the air by depopulating spaces.

- 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.
- Ventilation can reduce risk of indoor COVID-19 transmission but cannot replace the need for masking and distancing.
- Ventilation strategies include increased use of open windows and outdoor spaces for instruction and activities, as well as reducing the density of people within spaces through implementation of cohorting models or use of larger school spaces (e.g., auditoriums, gymnasiums).
- Ventilation improvements should focus on optimizing air exchanges in consultation with local experts on ventilation improvements.
- 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 are the two primary strategies that have been implemented.

- **Classroom considerations:**
 - 6-foot physical distancing is preferable to the 3-foot recommendation from the World Health Organization.
 - Classroom arrangements should plan for teacher and aide distancing from students, in addition to distancing between students.
 - Students should all be facing the same direction, rather than facing one another.
 - Table partitions may provide protection when distancing is not feasible.
 - [Hybrid virtual/on-site](#) instructional models have been proposed as a strategy to reduce on-site class size.
 - Hybrid models would need to be supported by broad access to technology. In some areas, community buildings such as libraries or recreation centers provide an alternative site for WiFi access on students' virtual learning days.
 - Hybrid models should also consider the needs and impact on workforce participation of caregivers.
 - Before care 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.

- **Minimizing contact between groups of students in hallways and other small spaces:** Staggering transitions, arrivals and dismissals, as well as one-directional hallway designations are options. Limiting classroom rotations by students (instead having teachers rotate rooms while students remain in place) is another strategy to reduce hallway crowding.
 - Masking in hallways and during drop-off and pick-up is an important strategy.
- **Considering alternate approaches to student lunch routines:** Crowding and increased social contact in lunchrooms and dining halls increase transmission risk. Schools should 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. Outdoor eating is encouraged when feasible. Sharing of food is 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. Students should wear masks in bathrooms.

Cohorting:

Schools can minimize contact between students and teachers by considering a small cohort model: This model identifies set groups of student cohorts to spend all day with one another in classes, lunch, bathroom breaks, transitions and recess. Many elementary schools already function in such a manner, with a set group of students moving together throughout the day.

- Cohorting is a practice to limit the number of exposures and contain spread.
- Even if students spend time in after-school activities or in the community outside of cohorts, the use of cohorts can still impede transmission within the school day and potentially simplify decisions around quarantine and selective closure if outbreaks are identified.
- There is not yet evidence to guide the ideal cohort size, but schools should aim for the smallest groups feasible given staff and space limitations. Schools in [Denmark](#) are trialing this cohorting model with groups of roughly 12 students.
- Extended day programming and sports or extracurricular activities should be considered when identifying cohorts of students and staff. Isolating groups to different exercise and play equipment or zones may limit viral exposure.
- A cohorting strategy works well with staggered days and arrival/departures, breaks, passing periods and transportation. Schools should be mindful of segregating students by racial or economic backgrounds if linking transportation schedules to cohorts.
- Ongoing symptom surveillance will allow small isolated cohorts to move to virtual learning if a cohort begins to show symptoms or an individual tests positive for COVID-19.

Key Questions to Guide Decision-Making on Reverting to Virtual Learning

With colder weather, case transmission is likely to rise, and school districts will be faced with challenging decisions on when to revert to distance learning vs. continuing in-class instruction. These challenging decisions can be informed by asking a few key questions and reflecting on the ability of the school, alongside public health partners, to remediate any identified issues:

- 1) *Did your school have difficulty implementing and maintaining all aspects of its school safety plan?*
- 2) *How effective has your collaboration with local public health authorities been when there has been a student or teacher who is found to be COVID-positive?*
- 3) *How quickly is disease transmission and test positivity accelerating in your region? (Note that regions that surpass 9% test positivity might consider temporary closures.)*
- 4) *Has there been evidence of in-classroom transmission within your school?*
- 5) *Has there been evidence of increasing linked transmission in your school or other schools in your region despite high levels of compliance with safety measures?*
- 6) *Are there populations to consider for prioritized maintenance of in-school instruction (e.g., children with learning differences or special needs)?*

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Appendix A: Special Considerations for Sports

School and youth sports leagues that have returned to practice and competition provide an opportunity to assess transmission within and between teams. Administrators, coaches, players, and family members should consider enforcing mitigation strategies to limit high-risk, off-field team activities.

Sports leagues should partner with local health departments to guide these recommendations. This includes full disclosure of individuals who may have been exposed, either on the field or outside of game time when athletes or coaches test positive. The thresholds for the operation of youth sports listed below, modified from our previous guidance, reflect the incorporation of these partnerships into decision-making by school districts and youth sports leagues.

The decision to continue recommending thresholds for sports activities is grounded by the perspective that preserving in-school education is the priority, and that outbreaks in sports and extracurriculars can threaten on-site education:

Threshold	Guidance
<i>9% or greater test positivity, or rapidly accelerating community disease transmission</i>	In the absence of frequent, routine SARS-CoV-2 testing of participants, suspend all team/group competition and group sports training, revert to individual or online training and activities
<i>Below 9% testing positivity, and without evidence of rapidly accelerating disease transmission in the community</i>	<ul style="list-style-type: none"> • All sports should do individual-level drills and distanced and/or masked group training. • Decisions to suspend team activities will be made in consultation with health departments when students or coaches test positive. • When team quarantine is initiated, it should be for a period of at least 14 days. • Team competition or extracurricular events may be considered assuming safety plans that include: <ul style="list-style-type: none"> • Compacts within team or groups to reduce exposure risk during season and limit symptomatic participants from exposing teams or groups • Closing locker rooms for the 2020-21 season if possible (limit occupancy and dressing time if not) • Requiring and enforcing masking during indoor team meetings or on sideline, and during transportation to and from games or events • Limiting carpools to and from games when possible; require masking for carpools when necessary • Close dialogue and guidance from health departments evaluating outbreaks from schools within the region • Spectator and crowd plans that emphasize reduced gathering sizes, distancing and masking during events

	<ul style="list-style-type: none"> • Symptom surveillance and testing, when available, particularly for high-contact sports (football, basketball, wrestling, ice hockey, water polo) • Masking of healthy athletes on-field, particularly during periods of increasing community disease transmission <p>To aid masking of athletes, many vendors are now offering silicone mask brackets that provide more comfortable positioning of masks during gameplay.</p> <p>Regional travel should be minimized and should not occur when one team comes from an area with a high burden of disease, rising transmission and/or ongoing outbreaks.</p> <p>Revisions on masking recommendations as community transmission falls will be considered following the winter of 2020-21.</p>
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November 5 addition: There has been accumulating evidence that indoor sports should be differentiated from sports played outdoors. To date, much of the transmission associated with indoor sport activities, principally basketball and hockey, appears to be related to limited commitment to social distancing in locker rooms, during transportation to and from events, and at gatherings outside the context of gameplay (e.g., in stands, in parking lots before the games, during team meals, or at team parties). To preserve on-field activities in the coming months, sports programs should eliminate these high-risk gatherings. This should include closing locker rooms and having participants come dressed to play, limiting entry of spectators to only one family member, and having players wear masks up to and possibly throughout the period of play.

Additionally, sports programs need plans for contact tracing and clear quarantine directives for participants who have been exposed to SARS-CoV-2 or diagnosed with COVID-19. These directives need to be applied consistently across all teams and players. Without a commitment to these efforts, transmission could spread through players, coaches, and family members.

Notably, even with these mitigation strategies in place, sports-related transmission might occur. There is gathering evidence that indoor (on-court, on-ice) transmission is potentially more likely than what has been experienced during outdoor sport competition. Early evidence from the National Basketball Association confirmed on-court transmission, and there have been documented outbreaks among hockey teams, particularly at the youth level, suggesting a higher risk than observed in fall outdoor sports. The risk of transmission during indoor competition has not been fully elucidated for each sport, but it likely will vary by competition type. Some sports, like swimming, offer the possibility of ample distancing during competition, and thus their risk for transmission is likely lower. Sports that require close, prolonged contact (e.g., wrestling) likely confer higher risk.

Sports like basketball and wrestling have the advantage of smaller teams and, when not cost prohibitive, may be able to utilize frequent SARS-CoV-2 testing as an additional mitigation strategy. Teams may use frequent individual PCR testing, and tournaments may use individual or pooled PCR testing among teams to clear groups before competition.

If a sports program is not able to enact these mitigation strategies, or if community transmission rates are too high, we would advise suspending team competition during this winter season and restarting when community transmission has substantially declined. During pauses in competition, players should be given guidance on individual training procedures to maintain fitness.

Appendix B: Special Considerations for Music & Arts Programs

As described in previous PolicyLab blog posts on COVID-19 [modeling trends](#) and [music guidance](#), arts extracurriculars are important for the social and emotional well-being of children. Unfortunately, we do not yet have sufficient empiric data, as we do from youth sports, from which to prioritize different strategies of mitigation. Early outbreaks in choirs have confirmed potential for enhanced transmission from music and band activities, which necessitates a focus on mitigation strategies.

Sanitation & Hygiene

- Discourage the sharing of instruments that cannot be easily wiped down between uses, particularly wind instruments
- Consider use of nylon bell covers lined with MERV 13 filters for wind and brass instruments, though effectiveness studies still pending
- Ensure cleaning and sanitization protocols of shared items/spaces, including instruments, music stands and chairs

Masking

Masks are recommended for all staff and students before, during, and after music or arts rehearsal.

- Masks should be worn while singing, playing non-wind instruments and acting, both indoors and outdoors.
- Specialized masks for singers have been developed and should be considered for routine use if choruses intend to practice or perform in-person.
- Wind instrument players should be provided access to specialized masks with slits.

Ventilation

Increased ventilation is especially important among singers as these types of activities, even more so than talking, result in [aerosolization of virus](#). While data on musical activities, especially among groups of children are still emerging, [chorus practices](#) have been linked to COVID-19 super-spreader events.

- Rehearsals and performances should be held in outdoor venues, if possible.
- If indoors, prioritize large, open spaces with functioning windows. Open any available windows and doors for the duration of, and after, rehearsal.
- Limit rehearsals to less than 30-minute sessions to reduce exposure time.

- For schools doing targeted ventilation strategies, HEPA air filters that turn over indoor air frequently should be prioritized for spaces with high-risk activities.
- Ensure that between rehearsals or following the use of an indoor space, there is enough time to allow for air to turn over at least once (based on HEPA filter).

Physical Distancing

Given the added transmission risk during many arts extracurriculars, physical distancing remains a critical strategy in both indoors and outdoors environments, especially when singing or projecting one's voice for acting. Minimum distances for specific activities are provided below. Transmission risk will be reduced with increasing distance.

- Musicians should maintain a minimum of 6 feet distance at all times from other individuals both front-to-back and side-to-side.
- Brass instrument players should maintain a minimum of 9 feet distance front-to-back at all times from other musicians due to the size and shape of the instruments.
- All musicians should face the same direction rather than facing one another.

Cohorting

Limiting the size of ensembles as compared to typical orchestra or band sizes can reduce exposure risks for cohorts of musicians and singers. Reduced cohort size also allows for quick identification of an outbreak and resulting isolation or quarantine protocols.

Performances

- Performing students should wear masks and distance at a 6-foot radius (with 9 feet front-to-back for brass players) as per practice protocols.
- Unmasked acting performances would be safer with enhanced testing, symptom surveillance, and theater compacts to reduce exposure risk of actors in the week prior to performances.
- Performing ensembles should maintain 20 feet distance from any audience members.
- Audience members should be masked and maintain 6 feet distance from each other both front-to-back and side-to-side at all times.
- Outdoor performances are ideal. If indoor spaces are to be used, refer to the guidance above around ventilation and hygiene.

Appendix C: 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

- Increased frequency of cleaning and disinfection protocols focused on dorms, shared bathrooms, gyms/locker rooms and lecture halls. 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 distributed 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 should participate in masking protocols.
- Many schools have adopted both indoor and outdoor masking requirements on campus given the high rates of transmission experienced during college reopenings.
- Provide comprehensive, routine training on proper use and washing of masks.

Physical Distancing

- **General**
 - Students may be grouped into cohorts that live, use shared facilities, and attend courses together to minimize contact with other groups. Much like the cohorting model suggested for K-12 groups above, 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, or temporary outdoor pavilions, with increased distancing.
- **Dorms/Living Arrangements**
 - Single or lower-occupancy dorm rooms should be prioritized.
 - When considering residence policies, higher education institutions should provide 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 will need special regulations to minimize crowding and increase sanitation protocols. A number of colleges have already pivoted to online instruction given early outbreaks from fraternity, sorority or off-campus gatherings. 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.
 - 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.
- **Enforcement**
 - Given early challenges with adherence to college and university plans by some students that have already led to significant outbreaks, we would advise clear messaging and protocols for students or faculty who would actively undermine mitigation protocols. Students might sign a pledge, such as the [“Protect Purdue Pledge,”](#) to reinforce expected norms and routines on college campuses. Colleges may seek to exclude students who disregard protocols from campus attendance and consider other enforcement mechanisms per school policy.

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. We also advise special caution for large universities situated in rural areas with poor health care capacity. These unique institutions will need to consider the feasibility of resuming residential campus life in areas that have little margin for outbreaks originating from college campuses.

- **Syndromic Surveillance**
 - Schools can 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 and 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.
 - Testing considered for return to school after breaks may consider a stratified sampling approach to assess baseline prevalence of infection. Baseline prevalence data should guide decisions on whether more testing is required or whether prioritizing symptom surveillance is appropriate.

- Many schools are moving toward routine testing (weekly, on average) of college students when testing capacity is available. Molecular PCR testing has been found to be more accurate than antigen testing in reducing false positives during routine surveillance of asymptomatic individuals.
- **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.
- Frequent and extended quarantines of students on campus create competing mental health risks to students that may require more pragmatic approaches to minimize harm to exposed students. With wider availability of testing on college campuses, schools might consider shortening quarantines of exposed asymptomatic students to a week in the presence of a negative test for COVID-19 (either antigen or molecular PCR) at the end of the shortened isolation (i.e., at 7 days post exposure). Students returning from shortened quarantine will need high compliance with masking through the end of the 14-day period.

Appendix D: August 2020 Guidance on Community Transmission Thresholds for School Reopening

The [PolicyLab August 2020 recommendations for safe school reopenings](#) reflected the available data on pediatric COVID-19 transmission. In particular, the recommendations urged for significant and sustained reduction in community transmission rates prior to schools reopening for classroom instruction. At that time, evidence on the effectiveness of school safety plans were available from overseas locations, which reopened in the spring when community transmission rates were low. Data were lacking on the effectiveness of implementing school safety plans across a wider range of community disease burden. As such, the goals of the August 2020 guidance were to: 1) reduce the likelihood that outbreaks will originate in schools; and 2) provide a runway for possible success in transition to classroom learning that can be maintained for a meaningful duration of time. However, as schools have reopened with a wide range of incidence rates, we have increasing confidence that multi-layered mitigation strategies can be

effective even in the face of increased community transmission, and updated our guidance (presented in this document) to reflect that.

August 2020 threshold recommendations

Thresholds released by PolicyLab reflected a combination of both testing positivity rates AND case incidence trends. Testing positivity is based on a 7-day rolling average of testing positivity within a county. Daily case incidence trends are based on daily incidence per 100,000 individuals, calculated as a 7-day rolling average of the past 7 days as compared to the previous 7 days. Schools and communities were advised to inform decisions regarding school openings after Labor Day by considering sequential trends of at least two 7-day periods (14-21 days) across the reopening metrics. These data metrics are available through state or county departments of health.

All decisions to return to in-person instruction should be weighed in the context of the strength of health and safety plans to mitigate within-school transmission.

Threshold	Guidance
<u>Stable or declining weekly</u> case incidence approaching 10 per 100,000 AND less than 5% test positivity	Reopen schools previously online for full in-class or hybrid instruction in compliance with state and district guidance
<u>Stable or declining weekly</u> case incidence between 10-35 per 100,000 AND less than 5% test positivity	Consider incremental reopening strategy, beginning with the return of special needs and/or elementary age children to the classroom
<u>Stable</u> case incidence and test positivity between 5% to 9%	If already resumed in-class instruction, cautiously continue with plan, including incremental reopenings, provided there is no evidence of linked transmission between students or staff during the school day; when linked transmission occurs, consult with health department to guide decisions for classroom or school closure; actively monitor county rates with public health department to inform school closure during periods of accelerating disease transmission
9% or greater test positivity	Revert to online schooling only, as testing positivity would indicate widespread community transmission