

Evidence and Considerations for School Reopenings

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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 16.

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.

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**Please note anything highlighted in blue has been updated on August 19, 2020.*

Principles that guide the interventions we highlight include:

- 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, [185 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. To date, children with most comorbid medical conditions, including asthma and immune suppression, have not presented with COVID-19 in significant numbers, with the exception of obesity. With [increasing child infection rates](#) in recent weeks, consideration of the data with respect to children with special health care needs remains a high priority. Health departments should communicate with school officials if signals emerge.
- There is evidence that symptomatic children of all ages can spread COVID-19. Older teens appear to have transmission risks similar to those of adults. To date, the role of asymptomatic young children in transmission is less clear.** Children and youth who contract SARS-CoV-2 often have minimal to no symptoms. While adults with minimal to no symptoms can spread the virus, the evidence on how likely infected children are to spread it is hard to interpret, but likely varies based on a child’s age, viral load and number of contacts. In adults, viral load is a key determinant of infectivity. Although we have limited data to define how viral load influences infectivity in a child, recent data suggest that symptomatic [children carry a similar viral load](#) as adults, which should be interpreted alongside the knowledge that children in school settings typically have [more daily contacts with adults](#), to suggest that an infected child may pose a risk to transmission to children and adults in their environment.

- As children return to school settings, they may contribute more significantly to community viral transmission than observed this past spring. Much of our evidence of reduced [transmission rates](#) as well as reduced likelihood of symptomatic infection, especially by [younger children](#), was developed while the activities of most children were severely curtailed due to closures of [schools](#) and child care facilities, as well as local “stay-at-home” orders. The American Academy of Pediatrics reported almost 180,000 new pediatric cases between July 9 and August 6, a 90% increase over the total number of reported cases among youth from all the months preceding; incidence rates and severity of illness will bear close watching as schools reopen, many in areas of high case incidence, for the fall.

Altogether, children have experienced a [lower burden of symptomatic and/or identified infection](#), though an increasing number of children are [testing positive](#) for the virus as many places in the U.S. relax social distancing and stay-at-home orders. Recent outbreaks in [summer camps](#) and reopened [schools](#) in the United States are cause for concern, and reveal that this virus can spread quickly and extensively among children who gather for extended periods of time, especially when there is higher disease burden within the community. In contrast, successful school reopenings have occurred in several countries that achieved [very low levels](#) of community transmission before sending kids back into the classroom. In mid-late April, several countries in Asia and Europe reopened schools, with more following in mid-May. [Data](#) from these countries show few outbreaks, mostly occurring in [secondary schools](#) that limited implementation of on-site safety protocols. In sum, at this time, the evidence suggests that symptomatic children will play a role in spreading the virus and that schools in areas of elevated transmission, even with safety protocols in place, are susceptible to transmission among students and teachers.

Our recommendations reflect accumulating data on pediatric COVID-19 transmission and urge for a sustained and significant reduction in community transmission rates prior to schools reopening for classroom instruction, 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. As more evidence 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. Enhanced surveillance 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 symptomatic. Additionally, alternative options for virtual instruction may be considered for teachers with underlying conditions in classroom settings where sufficient physical distancing

cannot be achieved. Virtual instruction opportunities will likely increase in response to periods of quarantine and with any use of staggered/hybrid scheduling.

- **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 medically at-risk caregivers who decide to prioritize home instruction during periods of active community transmission. More stringent school sick policies will likely broaden interest in paid leave 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 children and adolescents commute every day. There are significant variations as well in 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. 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.

Guidance on Community Transmission Thresholds for School Reopening

This section reviews suggested thresholds of community transmission rates for reopening schools. Openings occurring beyond these ceiling thresholds may experience increased risk of transmission.

Active case transmission identified within classrooms or activity cohorts, amongst teachers and staff, or across schools may trigger decisions to close schools at much lower thresholds than the ones suggested below.

Threshold recommendations:

These thresholds reflect a combination of both testing positivity rates AND case incidence levels. Testing positivity is based on a 7-day rolling average of testing positivity within a county. Weekly case incidence trends are based on weekly incidence per 100,000 individuals, calculated as a 7-day rolling average of the past 7 days as compared to the previous 7 days. Decisions regarding school-level closures and openings should consider the sequential trends of at least two 7-day periods (14-21 days). These data metrics are available through state or county departments of health.

Outbreaks within schools must supersede these guidelines. If an outbreak occurs within a school, districts should consult with their local department of health for guidance.

All decisions to return to in-person instruction should be made with corresponding plans for health and safety.

Threshold	Guidance
<i>stable or declining weekly case incidence approaching 10 per 100,000 AND less than 5% test positivity</i>	Reopen schools previously online for full in-class or hybrid instruction in compliance with state and district guidance
<i>stable or declining weekly case incidence between 10-35 per 100,000 AND less than 5% test positivity</i>	Consider incremental reopening strategy, returning special needs and/or elementary age children to the classroom
<i>stable case incidence and test positivity between 5% to 9%</i>	If already resumed in-class instruction, cautiously continue with plan, provided there is no evidence of transmission among students in the classroom, activity groups or teachers/staff; actively monitor county rates with public health department
9% or greater test positivity	Revert to online schooling only

Outbreaks within schools must supersede these guidelines. If an outbreak occurs within a school, schools should consult with their local department of health for guidance.

Safest, most cautious reopening opportunity given summer community spread: Delay resumption of in-school or hybrid learning plans, including incremental reopening for younger or special needs children, until the first week of October, assuming, by mid-September, a stable or declining weekly case incidence rate approaches 10 cases per 100,000 AND a 7-day rolling average of test positivity declines below 5%. This strategy reflects concern for current upward case trends in many

geographies as well as a potential resurgence following holiday travel on Labor Day weekend, given increased case counts seen after Memorial Day and July Fourth.

Incremental Strategies for Populations that May Have Difficulty Learning Virtually

- While some schools may aim for even more significant reductions in test positivity or case incidence rates based on tolerance of risk, other schools may choose to prioritize **special populations for in-school learning who may face challenges with virtual learning**, such as children with special education needs or elementary school aged children, particularly when they are nearing, but not yet at reopening thresholds for their full student body.
- Plans for in-person instruction for special populations should consider thresholds of **declining case incidence that does not exceed 35 cases per 100,000 per week (average of 5 new cases/daily) and testing positivity below 5%**. Additional considerations might include:
 - Whether the school community, apart from the county, is likely or confirmed to have lower rates of community transmission and test positivity. For example, this might include districts in less densely populated sections of the county or some private schools.
 - The size of enrollment and physical building(s) and campus. Smaller school communities present a more favorable opportunity to identify and manage transmission risks. Large buildings and campuses present a more favorable environment for adequate distancing.
 - The strength of the school reopening plan that includes: daily symptom and exposure monitoring, masking, physical distancing, hygiene/disinfection, and communication plans with the health department and families.

Sports & Activities

Even during periods of virtual instruction, schools may consider **small group or individual** sports, activities or student clubs that adhere to the strong prevention practices.

Threshold	Guidance
9% or greater test positivity	Suspend all team/group competition and group sports training, revert to individual or online training and activities
<i>stable weekly</i> case incidence AND 5% to 9% test positivity	<ul style="list-style-type: none"> • All sports may do individual-level drills and distanced and/or masked group training • Lower-contact sports or activities with the ability to distance athletes or participants during competition (e.g., baseball, softball, track, swimming, golf) may continue to scrimmage or

	<p>pursue team competition under local health department guidelines, but would be recommended to keep those events local or isolated with a couple of partner schools or teams in the area</p> <ul style="list-style-type: none"> • Lower-contact sports team competitions should only be permitted with another team whose local area positivity rates and daily case incidence fall within these guidelines • Moderate-contact sports (soccer, field hockey, lacrosse) should only do individual-level drills with distancing protocols in place and not participate in team scrimmages or competitions • Moderate-risk activities (e.g., indoor competitions/clubs including science, engineering and debate clubs) should consider virtual competitions as feasible. Where indoor activity occurs, minimize the size of gatherings, enforce masking and distance all participants. • Higher-contact sports and high-risk activities without the ability to distance athletes or participants (e.g., wrestling, football, basketball, water polo) should only do individual-level drills or rehearsals with distancing protocols in place (6 ft. minimum) and not participate in team scrimmages or competitions
<p><i>stable or declining</i> weekly case incidence AND 1%- 5% testing positivity</p>	<ul style="list-style-type: none"> • Same as above with the exception of moderate-contact sports or activities • Moderate-contact sports (soccer, field hockey, lacrosse) may continue to scrimmage under local health department guidelines, but would be recommended to keep those events local or isolated with a couple of partner schools or teams in the area • Moderate-contact sport team competitions should only be permitted with another team whose local area positivity rates and daily case incidence fall within these guidelines • Moderate-risk activities (e.g., indoor competitions/clubs including science, engineering, debate clubs) may continue indoor activity with masking and distancing protocols for all participants
<p>weekly case incidence less than 10 per 10,000 AND testing positivity below 1%</p>	<ul style="list-style-type: none"> • Higher-contact sports and high-risk activities without the ability to distance athletes or participants may cautiously participate in team competitions • Team competitions should only be permitted with another team whose local area positivity rates and daily case incidence fall within these guidelines
<p><i>Music programs:</i> 20-foot distancing is recommended for music programming that includes choir, brass and/or woodwind instruments and stage productions (actor-audience). Other music activities should maintain 6-foot distancing and masking.</p>	

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 for schools in communities with transmission rates that allow for school reopening. In each section, we highlight the interventions supported by evidence.

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.
- **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. Continuity of the following services: medication dispensing and adherence monitoring; speech, motor skills and other school-based therapies; and mental health and counseling services should be considered. 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 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 protocol. Hand hygiene upon entry to school should be prioritized.
- **Flexing team sports, music programming and other recreational activities in relationship to community risk:** Schools should consider opportunities for safe exercise

for students. [CDC guidance](#) has been issued on sports activities. [Additional information](#) on sports is available from Children’s Hospital of Philadelphia. Group-based music programming (e.g., band, orchestra, choir) should consider 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 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 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 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.

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 may present an increased transmission risk to children if infected.

- 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 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.
- If transmission has been identified within a classroom or school, dismissal should include a 14-day minimum closure for quarantine. Transmission identified in a county with increasing trends of case incidence warrants consideration of a 28-day closure.
- 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, 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 olfactory or taste disorder*
- 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.
- Schools will need to consider the appropriate staffing of school nurses or other certified health personnel to lead symptom surveillance and quarantine protocol activities or coordinate with state or local public health departments or health care systems to address workforce shortages.
 - Partnerships with a public health departments or health systems may be beneficial in protocol development and reporting 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.

Quarantine and School Absence Policies for Symptomatic and Exposed Persons

- The following guidance is provided for when a student or staff member screens or tests positive for COVID-19.
 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
 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. **Exposed and asymptomatic:** exclude for 14 days from last exposure if remains asymptomatic; exclude until meets criteria #1/2 if becomes symptomatic.
 - **Direct exposure:** Quarantine required. Direct exposures occurs when an individual (student or staff) is within 6 feet distance for a period of 15 minutes or longer to an individual diagnosed with COVID-19 and this exposure occurred during or within 48-hours prior to the individual's symptom onset.
 - **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.

There is no role for testing to get a “negative test” to clear a child to return to school. The COVID-19 positive individual does NOT need a repeat COVID test or a doctor's note in order to return to school.

- If a child or staff member has a confirmed diagnosis of COVID-19: Call the local or state health department for further instructions.
- All children and staff in the same classroom or who have come in close contact with (direct exposure defined as greater than 15 minutes of interaction less than 6 feet away) should quarantine at home unless given alternate guidance from health department officials. Anyone who develops symptoms during that time should contact their healthcare provider and schools should follow guidance #1/2 above.
- If a household member of a student or staff member has returned from travelling 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.
- Decisions about classroom or school quarantines should consider overall community and school-level spread. Schools should seek to preserve on-site instruction for as many students as possible. In circumstances of low circulating cases within the community, classroom-contained exposures may not warrant large dismissals. See section on thresholds (page 4) for more information.

Masking

Medical or surgical masks covering the mouth and nose are recommended for staff and all adults in school buildings. 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 at this time. Some states and county public health agencies have made mask use mandatory, but typically do not require this of young children. In a school setting, schools will follow state education and health department guidance on masking, and may choose to adopt local county public health masking mandates if they are present. More specific considerations on masking follow.

- **Medical or Surgical Masks:** In educational settings, medical or surgical masks provide appropriate protection against COVID-19 transmission. Medical or surgical masks provide superior protection to cloth masks and face shields.
 - To be effective, face coverings (surgical or cloth masks) should always cover the nose and mouth.
 - If using a disposable mask, staff should use a new mask each day.
 - While cloth masks (or neck gaiters and bandanas) do not provide as much protection as a medical or surgical mask, they will help to reduce the risk of virus spread. It is important to wash a cloth mask every day with warm soapy water.
- **Face shields:** Clear face shields do 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.
 - Clear face shields may also be helpful with young children or children with autism spectrum disorder.
 - **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.
 - When used alone (without a mask), face shields are preferred for situations where physical distancing can be achieved.
 - Face shields should be wiped down daily with soapy water or a spray cleaner and allowed to air dry.
- **Goggles:** Goggles, particularly when face shields are not being used with/without a mask, can prevent respiratory droplets from entering the tissue around the eye, and thus provide an additional element of protection against infection.
- **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.
 - Masks may be considered for children age 2 and older who are mature enough and physically capable of wearing one.

- 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 and times of increased physical activity.
- Cloth masks must be laundered daily with warm soapy water.
- 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 flexible policy for medical exemptions. Clear protocols for exemptions should be developed. Coordination between medical teams, parents and educators can help determine who is unable to wear a mask.
 - Some children who are unable to wear a medical mask can learn to wear a face shield or cloth face covering.
- Child mask wearing should be emphasized during 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 in order to reduce risk. Ideally, mask breaks will be a duration of 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.
 - Beloved 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.

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 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 student-student distancing.
 - 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 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 and arrivals and dismissals and one-directional hallway designations are options. Limiting classroom rotations by students (instead having teachers rotate rooms while students remain in place) is another strategy that may reduce hallway crowding.
 - Masking in hallways is an important strategy.
- **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. Masking may also be considered in bathrooms.

Cohorting

Schools can minimize contact between students and teachers by using 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.
- 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.
- If cohorting is not feasible (eg, in many high school settings), schools may prioritize the robust implementation of other safety measures. Even in the presence of a cohort model, the principles of masking, distancing, sanitation, and disinfection still apply.

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.
- Comprehensive, 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. 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 may 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 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.
- **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](#) 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 would advise special caution for large universities situated in rural areas with poor healthcare 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 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.
 - 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.

- **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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