



PLANNING FOR ON-CAMPUS K-12 EDUCATION DURING COVID-19

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The complex decision-making regarding reopening of schools compels careful thought, planning, and collaboration, within and across communities. Through this document, the **COVID-19 Healthcare Coalition** provides clarifications, interpretations, and estimates that can be used as a resource by school leaders to develop and implement plans for returning to on-campus learning, in the context of the COVID-19 pandemic. This document summarizes guiding principles and lessons learned, to provide current information (as of publication date) as well as additional resources to facilitate discussions and decisions regarding return to on-campus learning policies.

The reopening of schools—either to virtual or on-campus learning—is approaching quickly. Communities should give particular consideration to the socioeconomic challenges and disparities within their districts; the need for transparency in development and implementation of plans; and the provision of funding and resources to schools, teachers, and other school staff to ensure safety and efficacy of on-campus or virtual-learning environments.

EXECUTIVE SUMMARY

The reopening of schools—either to virtual or on-campus learning—is a critical, global issue. This document, developed by the COVID-19 Healthcare Coalition, provides clarifications, interpretations, and estimates that can be used as a resource by school leaders to develop and implement plans for returning to on-campus learning.

Based on what is known to date about the COVID-19 pandemic, we propose school districts consider the following criteria when making decisions about returning to on-campus learning:

1. Ensure local COVID-19 community spread is controlled, as indicated by less than one new case per day per 100,000 people (10 new cases per day per million people). This threshold is consistent with the levels of community spread in countries where schools have successfully reopened without subsequent surges in COVID-19.¹
2. Require universal cloth facemask use;^{2,3} implement and enforce social distancing (in schools and on buses); reduce or eliminate indoor congregation; enhance hand hygiene; and support Testing, Tracing, and Supported Isolation (TTSI)⁴ in the schools being reopened. Of note, these strategies should be implemented in the community at large to effectively control spread of the virus.
3. When local COVID-19 conditions permit, return to on-campus learning in stages, beginning with grades K-5; measure results and impact at each stage to inform decision making. Using locally selected public health indicators of COVID-19 transmission, stages of on-campus return should be defined in partnership with community stakeholders. Consider further prioritization based on:
 - Socioeconomic factors: e.g., children who rely on schools for meals, healthcare, or mental health services
 - Ease of virtual learning: e.g., children with special needs, children that lack access to tools/connectivity needed for virtual learning, or children who are English-language learners
 - Family situations: e.g., children of essential workers, single-parent households

Conversely, children with preexisting medical conditions may be more likely to develop serious illness and therefore might not be prioritized for on-campus learning. Consideration should also be given to children who live with family members who may have risk factors for serious COVID-19 illness. A staged reopening plan is recommended because it allows 1) students who benefit most from in-person learning to return to campus; 2) parents and guardians to return to work; and 3) physical distancing in schools, without major changes to the built environment. A staged approach is applicable only after a community has controlled local COVID-19 transmission to an acceptable threshold.

These criteria derive from a set of guiding principles, reflect guidance from multiple responsible agencies and expert organizations, and support evidence-based data-driven decision making. Additionally, school districts should leverage current data and guidance from reputable sources to drive decision making regarding returning to on-campus learning. Innovative approaches to TTSI can mitigate COVID-19 risks and should be considered in conjunction with guidance from public health experts. When developing plans, funding for acquiring and replenishing protective and sanitizing equipment is critical. Careful thought and advanced planning from decision makers can support a safer learning environment for both students and staff, under the right local conditions.

1 https://www.nejm.org/doi/full/10.1056/NEJMms2024920?query=featured_home

2 <https://jamanetwork.com/journals/jama/fullarticle/2768532>

3 <https://pubs.acs.org/doi/10.1021/acsnano.0c03252>

4 Testing, Tracing, and Supported Isolation is the end-to-end process of administering diagnostic tests, tracing the close contacts of infected individuals, identifying other infected individuals among those close contacts, and subsequently isolating those infected individuals from the uninfected.

GUIDING PRINCIPLES OF RETURN TO SCHOOL

As states, tribes, local communities, and districts develop and announce their plans, they should consider the following guiding principles:

- **One size does not fit all.** Federal guidance leaves room for local flexibility. Decisions will vary based on state and local conditions and priorities. There is no single prescriptive formula that will work for everyone in all locations. Plans can and should change as local COVID-19 conditions change and as new information is learned about COVID-19 transmission in schools.
- **Thresholds to guide decision making are best established within a community, using evidence and circumstance to drive decisions.** Communities vary in terms of size, demographics, geography, population density, and other characteristics. Working within communities, alongside local health departments and health professionals, is essential to develop thresholds related to COVID-19 transmission that inform decisions to both reopen schools and close schools to on-campus learning if necessary.
- **On-campus learning is inadvisable while community transmission is high.** While there is agreement that in-person learning is preferable to many parents, teachers, and students, the risk within the school environment and the potential for schools to serve as amplifiers of community spread are much greater while community transmission is high.
- **Evidence and circumstances within the community should drive decisions.** Decisions should be based on the circumstances within a local community, both with respect to the status of COVID-19 transmission and the secondary effects on learning, the economy, and non-COVID-19-related health and wellness. Furthermore, practical conditions within local districts may influence approaches to on-campus learning. For example, age of school buildings affects ventilation by HVAC or windows, and availability of sinks can influence ability to institute effective hand hygiene.
- **Age matters.** Current literature reports risk of serious illness in younger children appears to be lower than in older children and adults. Younger children find it more challenging to comply with social distancing, wear masks of any kind, and learn effectively by virtual means. The National Academies of Science, Engineering and Medicine (NASEM) prioritize the return to on-campus learning for students in grades K-5 and students with special needs.⁵
- **Every approach carries risk.** There is risk in reopening school to on-campus learning, as it increases human interaction and thus the potential for disease transmission among students and staff and subsequently to their families. There is risk in keeping school campuses closed to in-person learning, with respect to learning loss, impact of social isolation on adolescents, and other secondary effects. In these unprecedented circumstances, it is important to actively engage communities to assess and acknowledge risk, communicate interpretation of those risks to all stakeholders, and develop plans to mitigate the assumed risks. Of note, 24 percent of all teachers are at greater risk of serious illness due to underlying health conditions or age, according to a Kaiser Family Foundation Analysis.⁶

⁵ <https://www.nap.edu/catalog/25858/reopening-k-12-schools-during-the-covid-19-pandemic-prioritizing>

⁶ <https://www.kff.org/coronavirus-covid-19/issue-brief/how-many-teachers-are-at-risk-of-serious-illness-if-infected-with-coronavirus/>

- **Communities and families will weigh the risk to children differently.** The community, local health department, or school board manages risk for a population, while a family, faced with the same information, may perceive and prioritize the risk to their child. This may result in conflict. Household disparities or circumstances, including poverty, access to internet or computers, family support systems, reliance on schools for meals, preexisting medical conditions, and family responsibilities, among others, will also influence the feasibility of virtual learning, depending on whether services can be provided while students are off campus and whether funding will be sustained for school-provided services.
- **Consider what is best for all stakeholders.** Decisions on how to achieve education goals should consider all critical stakeholders, including but not limited to 1) children; 2) teachers, staff, administrators, bus drivers, unions; 3) families of children and staff; and 4) community members. Consider the level of effort, funding, space, and environment necessary to implement plans that maximize effectiveness of education while minimizing risk. Communicate frequently and transparently with stakeholders while developing plans.
- **Consider the costs and seek additional funding.** Changes to the school environment, including the use of physical barriers between students, will require additional funding. Costs for protective equipment and cleaning and disinfecting supplies should also be considered. Hardware and software for virtual learning may also require additional investment. Supplemental costs may be associated with safe transportation of students when occupancy or distancing restrictions are applied to school buses. In many states, funding is tied to school attendance, which is likely to be substantially affected by COVID-19. Maintaining and supplementing budgets will be required to minimize risk for on-campus learning.

IDENTIFYING RELIABLE GUIDANCE FOR REOPENING STRATEGIES, PRACTICES, AND CONSIDERATIONS

KEY MESSAGES

- Use the specific and actionable [guidance](#) from the U.S. Centers for Disease Control and Prevention (CDC) as your primary resource for planning and decision making for return to on-campus learning; this federal guidance is intended to be adapted to state and local jurisdictional reality.
- Consult guidance from the Occupational Safety and Health Administration (OSHA) and state departments of health and education, to ensure compliance with applicable regulations, laws, and policies.
- Use supplementary guidance from professional organizations and teachers' unions to further inform and contextualize decisions made after reviewing federal and state guidance.

WHERE TO START

Federal, state, local, tribal, and territorial leaders' guidance intends to capture the many factors of a safe return to campus. It can be challenging to know which guidance documents are applicable to local decision making, particularly if they are incongruent.

As state governments and local school boards maintain most of the regulatory authority and oversight of school districts, leaders should ensure their reopening plans align with current policies and regulations of local school boards, state guidance, and health agencies. These plans should also take into consideration guidance from federal departments and agencies, such as CDC, the U.S. Department of Education, and OSHA in the U.S. Department of Labor. Guidance documents from professional organizations, nonprofit organizations, or academic institutions should be referenced after review of federal and state guidance and should be considered supplementary guidance. Local health departments are a key partner for any school district developing and implementing plans for on-campus learning.

CDC GUIDANCE

CDC is the federal agency charged with protecting the health and safety of the U.S. population. While CDC provides guidance to control and prevent the spread of infectious diseases like COVID-19, states, tribal, territorial, and local jurisdictions retain statutory and regulatory authority over public health. These local and regional jurisdictions apply federal guidance when developing plans that reflect local realities.

CDC published "Interim Guidance for Administrators of US K-12 Schools and Child Care Programs."⁷ CDC recently supplemented this interim guidance with "Preparing K-12 School Administrators for a Safe Return to School in Fall 2020."⁸ Together, these guidance documents offer specific and actionable resources to answer key questions:

- What is the role of schools in responding to COVID-19?
- What have schools elsewhere in the world done to successfully open?
- How should schools prepare for, and respond to, COVID-19?
- What should be done when a case of COVID-19 is confirmed in a school?

⁷ <https://www.cdc.gov/coronavirus/2019-ncov/community/schools-childcare/guidance-for-schools.html>

⁸ <https://www.cdc.gov/coronavirus/2019-ncov/community/schools-childcare/prepare-safe-return.html>

In this guidance, CDC presents strategies for response in situations where community transmission is substantial, minimal to moderate, or absent. CDC stresses the need to engage the wider community in practicing safe behaviors and to include social distancing and transmission-prevention communications and reinforcing behaviors. The recommendations include using multiple concurrent strategies to prevent the spread of COVID-19 in schools and using cohorting⁹ (or podding) to limit contact between students and staff. Creating cohorts of students as a strategy to limit unnecessary exposure of students has an additional benefit of allowing districts to trace close contacts easily if an individual tests positive. CDC also recommends working closely with local health officials on COVID-19-related decisions, including how to manage positive cases in the community and support contact tracing efforts.

Additionally, CDC's "[Considerations for K-12 Schools: Readiness and Planning Tool](#)" provides school administrators with a checklist of mitigation measures, policies, and practices categorized into those that 1) improve general readiness, 2) should be conducted on a daily or weekly basis, and 3) should be used to prepare for illness in the school population.¹⁰

CDC offers additional guidance documents intended for administrators, teachers, parents, and community members that include:¹¹

- Guidance for Schools & Child Care
- Supplemental Guidance for Child Care
- Preparing for a Safe Return to School
- Operating School
- Families Deciding How to Go Back to School
- Family Checklists for Going Back to School
- Cloth Face Masks in Schools
- Screening Students for Symptoms
- Testing in K-12 Schools
- FAQs About Reopening
- FAQs for Administrators
- Importance of Reopening Schools

As school campuses begin to open around the country, administrators should refer to CDC guidance for current resources and tools that ensure the safety of staff, students, and their respective families. Appendix A: Additional Centers for Disease Control and Prevention Guidance provides additional detail regarding the contents of CDC guidance for K-12 schools and other relevant COVID-19 guidance documents.

⁹ Cohorts or pods are "closed" groups of individuals who maintain social interaction only within their groups throughout the school day. This approach potentially limits the spread of COVID-19 from an infected individual, as ideally only members of their cohort or pod would be exposed.

¹⁰ <https://www.cdc.gov/coronavirus/2019-ncov/downloads/community/School-Admin-K12-readiness-and-planning-tool.pdf>

¹¹ <https://www.cdc.gov/coronavirus/2019-ncov/community/schools-childcare/index.html>

GUIDANCE FROM OTHER ORGANIZATIONS

Other organizations provide thought leadership and scientific evidence to inform return- to-campus decision making, including:

- **NASEM.** NASEM is a Congressionally chartered organization relied upon to provide unbiased, authoritative, and scientifically based answers to questions of national importance. NASEM released a report weighing the benefits and risks of reopening schools for on-campus learning, recommending that grades K-5 and students with special needs be prioritized in reopening plans. Within this report, NASEM provides nine recommendations that address the following topics: 1) the decision to reopen, 2) precautions for reopening, 3) partnerships between school districts and public health officials, 4) access to public health expertise, 5) decision-making coalitions, 6) equity in reopening, 7) addressing financial burdens for schools and districts, 8) high-priority mitigation strategies, and 9) urgent research needed to make informed decisions.¹²
- **The American Academy of Pediatrics, American Federation of Teachers, National Education Association, and School Superintendents Association** released a joint statement emphasizing the need for science-based public health guidance on reopening schools. They stated that reopening schools safely requires appropriate investments and financial support to ensure safe environments for education. Like the NASEM report, this joint statement highlighted the racial and social inequities exposed by the COVID-19 pandemic and the consequences of these inequities on children.¹³
- **Harvard University Edmond J. Safra Center of Ethics and the Harvard Global Health Institute** released a guidance document to help schools and school districts use local COVID risk levels to determine their approach for learning. This guidance document also offers a proposal for a staged return to on-campus learning.¹⁴
- **The University of Nebraska Medical Center COVID-19 Back to School PlayBook** provides best practices and recommendations for schools to minimize risk to students, teachers, parents/guardians, staff, and the community. This playbook discusses logistical benchmarks, practical considerations, engineering controls, administrative controls, personal protective equipment (PPE), and other special considerations.¹⁵
- **The National Governor's Association (NGA)** maintains a robust resource library of information pertaining to education issues during COVID-19.¹⁶
- **Johns Hopkins University eSchool+ Initiative** features an overview and links to 13 national reopening guidance plans for K-12 schools.¹⁷
- **The National School Boards Association** offers a webinar series to discuss issues pertinent to districts, including funding shortfalls, supply chain issues, school transportation, sports and performance programs, and others.¹⁸

12 <https://www.nap.edu/catalog/25858/reopening-k-12-schools-during-the-covid-19-pandemic-prioritizing>

13 <https://services.aap.org/en/news-room/news-releases/aap/2020/pediatricians-educators-and-superintendents-urge-a-safe-return-to-school-this-fall/>

14 https://globalepidemics.org/wp-content/uploads/2020/07/pandemic_resilient_schools_briefing_72020.pdf

15 https://www.unmc.edu/publichealth/_documents/UNMC_COPH_K-12_Playbookv1.pdf

16 <https://education.nga.org/>

17 <https://equityschoolplus.jhu.edu/reopening-policy-tracker/>

18 <https://www.nsba.org/Resources/coronavirus>

DATA-DRIVEN DECISION MAKING

KEY MESSAGES

- Leverage several indicators commonly used by public health experts to track the epidemiologic progression of the COVID-19 pandemic, including the percentage of tests positive for the SARS-CoV-2 virus, the number of new COVID-19 cases per day over time, and the number of COVID-19 related deaths per day over time.
- Base return-to-campus decision making on trends and thresholds in indicators at various geographic levels, including state, tribal regions, counties surrounding a school district, and school county that signal level of community transmission.
- Work with local public health departments and health leaders and utilize [dashboards](#) that present metrics of interest, to obtain and interpret the data a community decides to use to trigger the start or stop of on-campus learning.

DATA AND PROCESS FOR DECISION MAKING

During these unprecedented times, non-public-health decision makers have been thrust into the space of having to make decisions about the implementation of nonpharmaceutical interventions to prevent and control the spread of the virus that causes COVID-19 (SARS-CoV-2). Many examples exist of these types of decision makers; one critical group includes school administrators, who must decide when and how to open campuses and operate safely. We provide guidance on several factors to support decision making:

- Selecting the best indicators
- Indicator threshold considerations
- Geographic considerations for indicator selection

Selecting the best indicators. Many indicators track the epidemiologic evolution of the COVID-19 pandemic. The NGA's [Roadmap to Recovery](#)¹⁹ proposed the use of several indicators, including:

- Percentage positivity for SARS-CoV-2 among all samples tested
- Number of new COVID-19 cases per day over time
- Number of COVID-19 deaths per day over time

Because every indicator has strengths and weaknesses, school boards are encouraged to monitor several indicators to guide decisions. One of the most important limitations to consider when selecting an indicator for decision making is the timeliness of the data being reported: are the data reflective of what is happening in a community in the last day, week, or month? Accuracy of the tests used for diagnosis, and timeliness and consistency in reporting, are critical to districts using these indicators and thresholds for decision making.

As an alternative to using groups of indicators to track the evolution of the pandemic, decision makers might want to identify and use one indicator to guide their initial decision. The Edmond J. Safra Center for Ethics and Harvard Global Health Institute proposed the use of the number of new COVID-19 cases per 100,000 population to define the jurisdiction's risk strata.²⁰ According to this paradigm, if and how a school returns

¹⁹ National Governors Association and the Association of State and Territorial Health Officers. (2020). Roadmap to Recovery: A Public Health Guide for Governors. Accessed July 17, 2020 from: <https://www.nga.org/wp-content/uploads/2020/04/NGA-Report.pdf>.

to on-campus learning is defined by the number of new daily cases per 100,000 population. Notably, the Harvard University guidance document states that while this approach of using one indicator with a pre-defined threshold can be helpful, other indicators should also be considered to triangulate around this one, to ensure confidence. Appendix B: Interpretation of COVID-19 Scenarios provides an example of how the number of cases per 100,000 population can be applied to decision making.

Indicator threshold considerations. When using these indicators, use commonly accepted thresholds, established by public health experts, to guide decision making. All indicators should be at or below the accepted thresholds, when shifting to on-campus learning. As an example, in the case of the three indicators mentioned above, a school district might consider reopening if the percentage positivity for SARS-CoV-2 testing were less than five percent and stable, the number of COVID-19 cases trended downward over 14 days, and the number of COVID-19-associated deaths trended downward over 14 days, all within the relevant geographic area. Appendix C: Indicators Used to Monitor the Epidemiologic Evolution of the COVID-19 Pandemic includes a detailed explanation of possible thresholds and interpretation of the indicators.

Geographic considerations for indicator selection. In the case of K-12 schools, a decision maker should think about where their students reside as the primary geographic area of interest. This catchment area, however, might not fully capture the ways residents interact with other communities. Decision makers may want to consider other relevant established networks that would result in mixing between communities. As such, a decision maker may wish to consider each indicator by geographic level in the following order:

- State level: if residents live on a state border or mix with communities across state lines, neighboring states' data should be considered as well
- Multiple surrounding counties: examine counties surrounding the area of interest or the counties where residents mix with the counties of interest
- County level: focus on the primary catchment area of your district(s)

The selected indicators should be aligned with this geographic cascade to support decision making about returning to campus. Appendix B: Interpretation of COVID-19 Scenarios includes examples of this.

The same thresholds should be used for the basis of decision making around returning to campus and to virtual schooling. All decisions to return to campus or to virtual learning should be made in collaboration with local public health authorities and account for current public health recommendations.

WHERE CAN A DECISION MAKER FIND THE RIGHT DATA TO INFORM DECISIONS?

Data on testing, number of cases, and number of deaths related to COVID-19 are shared on state and county websites. The [COVID-19 Healthcare Coalition](#), [Johns Hopkins University](#), the [New York Times](#), [USAFacts](#), [Leavitt Partners](#), and others have aggregated these data into easy-to-use dashboards to track the status within a particular jurisdiction and compare jurisdictions. For example, the COVID-19 Healthcare Coalition developed the [Decision Support Dashboard](#)²¹ to support monitoring selected indicators, using the state and county geographic strategy described above.

20 Harvard Global Health Institute (2020). The Path to Zero and Schools: Achieving Pandemic Resilient Teaching and Learning Spaces. Accessed July 27, 2020 from: https://globalepidemics.org/wp-content/uploads/2020/07/pandemic_resilient_schools_briefing_72020.pdf.

21 The COVID-19 Healthcare Coalition (2020). The Decision Support Dashboard. Bedford, MA. Accessed July 17, 2020 from: <https://c19hcc.org/resources/decision-support/>.

INTERNATIONAL APPROACHES AND LESSONS LEARNED

KEY POINTS

- Several countries reopened schools for students and use different strategies to protect students, staff, and families. These include opening schools to a subset of students, offering smaller or staggered classes, wearing cloth facemasks, enforcing physical distancing, limiting movement and interaction, increasing hand washing, and cleaning schools regularly.
- It is difficult to gauge the effectiveness of school reopening decisions, because of the challenges of coinciding changes in COVID-19 burden within the broader community.²² Countries also relaxed their community-wide nonpharmaceutical interventions at different times in their epidemics, making comparisons between countries even more challenging.
- A growing body of evidence shows younger students are less likely to become severely ill or spread the virus to their classmates or family members.^{23,24} As a result, many countries allowed only younger students to return to campus or initiated a phased return to school starting with younger students.^{25,26,27} Evidence also suggests that older school-aged students (10-19 years old) transmit COVID-19 to their household contacts at similar rates as adults.²⁸

Several countries from around the world made the decision to send children back to campus; these approaches varied and were of mixed success. As of June 2020, more than twenty countries²⁹ brought children back to campus using strategies ranging from no restrictions, staggered schedules, selective openings based on age, mandatory cloth facemasks, hybrid virtual and on-campus learning, increased hand washing and cleaning, limited movement, and physical distancing of students.^{30, 31}

Israel was one of the first countries to reopen schools and other social institutions, in mid-May 2020.³² Schools implemented smaller classroom groups, social distancing, cloth facemasks, and regular hand washing. These mitigations were lifted two weeks later, and infections among children and adults in the wider community began rising. Within two weeks of opening schools, an increase in infection rates caused schools to close again.

21 The COVID-19 Healthcare Coalition (2020). The Decision Support Dashboard. Bedford, MA. Accessed July 17, 2020 from: <https://c19hcc.org/resources/decision-support/>.

22 https://www.nejm.org/doi/full/10.1056/NEJMms2024920?query=featured_home

23 <https://reader.elsevier.com/reader/sd/pii/S1684118220300396?token=6105686B9B46169E14981992F35E52E1F094119D1D1A74DDBB1CE9D0B00F1CB61132A65EAECDD324E5887047A0F15A8F>. Accessed July 17, 2020

24 http://ncirs.org.au/sites/default/files/2020-04/NCIRS%20NSW%20Schools%20COVID_Summary_FINAL%20public_26%20April%202020.pdf. Accessed July 17, 2020

25 <https://www.medrxiv.org/content/10.1101/2020.04.11.20056010v1.full.pdf>. Accessed July 17, 2020

26 <https://www.medrxiv.org/content/10.1101/2020.03.09.20033142v1>. Accessed July 17, 2020

27 <https://academic.oup.com/cid/article/doi/10.1093/cid/ciaa450/5821281>. Accessed July 17, 2020

28 https://wwwnc.cdc.gov/eid/article/26/10/20-1315_article

29 China, Japan, South Africa, Ghana, New Zealand, Australia, Israel, Denmark, Norway, Finland, Netherlands, Canada, France, South Korea, Vietnam, Germany, Belgium, Austria, Switzerland, Greece (Never closed: Taiwan, Nicaragua, Sweden)

30 <https://edsources.org/2020/how-schools-across-the-globe-are-reopening-amid-the-coronavirus-pandemic/634739>

31 <https://www.sciencemag.org/news/2020/07/school-openings-across-globe-suggest-ways-keep-coronavirus-bay-despite-outbreaks>. Accessed July 17, 2020

32 <https://www.jpost.com/israel-news/israel-loosens-coronavirus-rules-on-returning-travelers-reopens-parks-627591>

In Denmark and Norway, campuses reopened to younger students only and with safety measures in place, including increased hand washing, distancing in schools, and mandatory cloth facemasks. Both Denmark and Norway reportedly experienced no increase in disease burden in children.^{33, 34}

In late May, South Korean schools reopened with decreased class sizes, mandatory cloth facemasks, distancing in schools, temperature checks, plexiglass barriers on desks, and contact tracing.^{35, 36} Within weeks of reopening, some schools closed again due to infections among students. Some schools closed after identification of singular students testing positive for COVID-19 following an exposure at home. It is unclear if larger outbreaks occurred at these schools.

The experience of South Korea and Israel reflects some of the challenges associated with opening and subsequently closing schools. Abruptly closing after detecting infected individuals in a school strains the entire system and is inherently disruptive to teachers, staff, parents, and students. While no conclusions can be drawn about the effectiveness of South Korea's measures, it is worth noting that overall community transmission of COVID-19 in South Korea remains low.

Additional information about international approaches to reopening schools to on-campus learning can be found within an analysis completed by researchers at the University of Washington.³⁷ Because policies and plans are changed and modified in real time, this resource is only as recent as its date of publication.

LEARNING FROM RESEARCH STUDIES ON COVID-19 TRANSMISSION IN SCHOOLS

Anecdotes and news media reporting about the international experiences are important but insufficient to determine the effectiveness of interventions to mitigate the risk from COVID-19 in U.S. schools. Investigational studies are critical for rapid real-time learning. The results of some studies from international academic researchers can help inform district plans in the United States.

Fundamental questions must be answered about the rate of infection among children of different ages and the role of those children in spreading the virus. Preliminary data suggest that younger children are at a lower risk of contracting COVID-19, suffering poor outcomes, and transmitting the virus.

- A recent study from South Korea found that children ages 10-19 years transmitted the virus to household contacts at a similar rate as adults, while children younger than 10 years did not.³⁸
- In France, a study of students suggests younger children are less likely to become infected and transmit the disease. The study tracked individual students over time and showed the relatively low infection rate in young children remained the same over a two-week school break, while the infection rate for older children dropped sharply. This could suggest that younger children were catching the virus at home, while older children were catching the virus from their classmates.^{39, 40}

33 <https://www.reuters.com/article/us-health-coronavirus-denmark-reopening/reopening-schools-in-denmark-did-not-worsen-outbreak-data-shows-idUSKBN2341N7>

34 <https://medicalxpress.com/news/2020-05-schools-rekindled-epidemic-norway.html>

35 <https://globalhealth.washington.edu/sites/default/files/COVID-19%20Schools%20Summary%20%28updated%29.pdf>

36 <https://www.washingtonpost.com/education/2020/05/26/pictures-say-it-all-how-south-korean-schools-are-reopening/>

37 <https://globalhealth.washington.edu/file/6393/download>

38 https://wwwnc.cdc.gov/eid/article/26/10/20-1315_article

39 <https://www.medrxiv.org/content/10.1101/2020.06.25.20140178v2>. Accessed July 17, 2020

40 <https://www.medrxiv.org/content/10.1101/2020.04.18.20071134v1>. Accessed July 17, 2020

- Other studies found that children who tested positive for the virus also had an infected individual in their homes, pointing to evidence that young children are rarely the index (first) case in their households. This theme was supported by an international study of family clusters, where children were found to be index cases in only 10 percent of these clusters.⁴¹

How should these studies be interpreted? It is important to not draw broad or definitive conclusions from these studies. COVID-19 is a new disease, and we have an incomplete understanding of how it spreads in schools. These studies describe how disease spreads and what measures could be effective to interrupt its spread. It is important to remember that children of all ages can be infected and suffer serious illness. The risk of transmission upon returning to campus is real, and significant efforts should be taken to lower those risks.

It will be imperative for U.S. schools to work with public health professionals and academic researchers to plan studies of how best to protect students, teachers, staff, and families. Carefully designed monitoring and research that takes into consideration cultural, socioeconomic, and other characteristics specific to education within local communities can drive real-time learning that will improve practices and policies for safe on-campus reopening. For example, an epidemiological investigation of an outbreak among choir members in Washington state highlights the potential for super-spreader situations amplified by the act of singing.⁴² Schools might consider delay of these types of activities as part of their plans.

⁴¹ <https://www.medrxiv.org/content/10.1101/2020.03.26.20044826v1>. Accessed July 17, 2020

⁴² <https://www.cdc.gov/mmwr/volumes/69/wr/mm6919e6.htm>

WHAT HAVE SCHOOL DISTRICTS DECIDED DOMESTICALLY?

KEY POINTS

- Most states published guidance for school reopening in the fall of 2020; this guidance is variable in the topics covered and recommendations given.
- Several large districts will continue with virtual learning in the fall of 2020 while COVID-19 transmission remains above acceptable local thresholds.
- Local epidemiology of disease is guiding local school reopening plans.

The [NGA](#) tracks the actions by states to reopen educational settings.⁴³ The [Johns Hopkins University eSchool+ Initiative](#) summarized the statewide and territorial guidance documents and categorized each state's approach with respect to whether they address the following categories:⁴⁴

- Core Academics
- SARS-CoV-2 Protection
- Before & After School Programs
- School Access & Transportation
- Student Health Services
- Food & Nutrition
- Parent Choice
- Teacher & Staff Choice
- Children with special needs/English as a Second Language/Gifted and Twice Exceptional
- Children of poverty and systemic disadvantage
- Privacy
- Engagement and Transparency

States, counties, cities, and school districts announced and continually update their guidelines and plans for fall-semester learning. Approaches tend to fall into four categories: 1) return to on-campus learning, 2) virtual instruction, 3) asynchronous virtual learning, (i.e., self-/parent-directed lessons), and 4) hybrid models.

Several major districts announced their intentions for the fall of 2020. As of publication of this document, leaders in Atlanta and Houston plan to continue virtual learning for the first nine and six weeks of the school year, respectively. Noteworthy in the context of these decisions is when school years are scheduled to start.⁴⁵ Districts in Atlanta typically start their academic year during the second week of August, which may have influenced their decision to begin with virtual learning for the first six weeks, as these districts have less time for COVID-19 conditions to improve prior to the start of the school year. The Los Angeles Unified School District and the San Diego Unified School District, two of the largest in California, also announced intentions to pursue virtual learning until public health conditions permit return to campuses.⁴⁶

⁴³ <https://education.nga.org/#section-statetable>

⁴⁴ <https://equityschoolplus.jhu.edu/reopening-policy-tracker/>

⁴⁵ <https://www.cnn.com/2020/07/13/us/school-reopening-plans-major-cities/index.html>

⁴⁶ <https://edsources.org/2020/schools-in-los-angeles-san-diego-wont-reopen-for-in-person-learning-next-month/635924>

Notably, some schools in Connecticut, Detroit, and Iowa began summer school sessions in early July.⁴⁷ In Iowa and Connecticut, summer sessions were closed after students tested positive for COVID-19. These early examples of U.S. schools reopening for on-campus learning offer a potential preview of what may occur as additional schools reopen. The detection of cases will likely lead to partial or complete return to virtual learning. The feasibility of moving rapidly from on-campus to virtual learning and the potential disruption from such a transition should be taken into consideration. Lessons learned from summer camps also inform our understanding of what could happen in schools. A recent study of an outbreak of COVID-19 at an overnight summer camp in Georgia where use of cloth masks was not required revealed infections across all age groups.⁴⁸

State and local policies related to COVID-19 must be taken into consideration. For example, California Governor Gavin Newsom announced that counties on the state's watchlist for COVID-19 spread would be restricted to virtual learning.⁴⁹ Similarly, Miami-Dade County Public Schools noted that on-campus learning is not possible while Miami-Dade County remains in Phase 1 of The Plan for Florida's Recovery.⁵⁰ New York Governor Andrew Cuomo announced COVID-19 metrics that would dictate schools' ability to reopen to on-campus learning:⁵¹ New York regions must be in Phase IV of reopening, with daily infection rates below five percent, based on a 14-day average. Consistent with the guiding principle that funding will be needed to address the changes to education during the pandemic, the California guidelines also came with the announcement that \$5.3 billion had been set aside to "enhance learning during the pandemic."⁵²

Many districts across the United States have announced and then changed plans, following consultation with stakeholders, changes in local COVID-19 transmission, or changes in state or local policies. This adaptability is important; districts should adapt to new circumstances while providing resources, guidance, and transparent communication to be successful in changing plans.

47 <https://www.nbcnews.com/news/education/i-m-scared-detroit-city-hit-hard-covid-19-reopening-n1233765>

48 <https://www.cdc.gov/mmwr/volumes/69/wr/pdfs/mm6931e1-H.pdf>

49 <https://www.sfgate.com/bayarea/article/Gavin-newsom-schools-opening-California-watch-list-15416091.php>

50 <http://reopening.dadeschools.net/>

51 <https://www.governor.ny.gov/news/governor-cuomo-announces-new-data-driven-guidance-reopening-schools>

52 <https://www.sfgate.com/bayarea/article/Gavin-newsom-schools-opening-California-watch-list-15416091.php>

PLANNING FOR SUPPLIES

KEY POINTS

- Budgeting for additional cleaning supplies, PPE, and other resources should be accounted for in return-to-campus plans. This will likely require supplemental funds outside of normal budgeting processes.
- Redundancy and advanced planning (i.e., predicting future supply needs and arranging procurement) are necessary to avoid challenges with supply chains. Assistance in purchasing may alleviate inter-district competition for supplies and other supply chain challenges.
- Cost savings can be achieved by seeking alternative or reusable products, such as cloth facemasks⁵³ in place of disposable facemasks.

Throughout the COVID-19 pandemic, access to adequate quantities of cleaning supplies and PPE has proven challenging for the healthcare delivery system. Opening and operating schools will require access to increased quantities of supplies for cleaning, disinfecting, and hand washing. In addition, schools will need supplies not previously purchased or used, such as facemasks. The cost for even a few basic supplies (i.e., cloth facemasks, gloves, hand sanitizer, and disinfectant wipes) for a typical school district can be estimated to be around \$250,000. While local plans will dictate requirements for specific items, Appendix D: Estimated Cost of Supplies provides some general estimates of items potentially needed for different scenarios, as well as estimated budgets. Note that these are estimates; actual needs and costs will depend on the specific school and community needs as well as current pricing of items. Additionally, this is a partial list of all the additional supplies and equipment schools might need. The specific items schools and districts will need to purchase will depend on the specific operating plans but could include thermometers, pulse oximeters, and specialized cleaning and disinfecting equipment. Schools may also require additional contract cleaning services. Storage and access to supplies as well as safe disposal of supplies after their use should also be considered in plans and budgets.

School boards should take time to catalog the supplies, equipment, and services that will be needed to support COVID-19 operating plans and make a procurement and budgeting plan. Districts can work with state, local, tribal, or territorial leaders to coordinate purchasing to avoid competing with neighboring districts or other stakeholders for the same PPE or supplies. Continuous monitoring of inventory and consumption rates is needed to ensure availability of supplies.

As the COVID-19 situation continues to progress and change, administrators should regularly review supply availability with suppliers and peers to proactively identify any supply constraints. This will allow the school/district to act preemptively to avoid supply shortages.

Administrators should also look to alternative, reusable items. Referring to estimates in Appendix D: Estimated Cost of Supplies, if staff can use washable cloth facemasks, then the cost for staff facemasks could be reduced significantly to approximately \$8,225 for an average district (assuming the district purchased five facemasks per staff at \$5 per mask), reduced from more than \$44,000 for disposable facemasks. If reusable items are purchased and districts are responsible for cleaning and sanitizing these items, the supplies, resources, and logistics for doing so should be considered.

⁵³ Note: cloth face coverings or facemasks are not all equal and should not be confused with N95 respirators or other products used to protect healthcare workers (<https://pubs.acs.org/doi/10.1021/acsnano.0c03252>).

ROLE FOR INNOVATION AND NEW APPROACHES TO MITIGATE COVID-19 RISK

KEY POINTS

- New strategies and approaches to diagnostic testing of individuals may enhance communities' ability to manage COVID-19 and support return to on-campus learning.
- Digital tools for contact tracing may enhance manual contact tracing efforts. Schools may benefit from working with public health authorities to use these tools to facilitate the isolation of infected students and staff and quarantine those exposed.
- Consider symptom screening of family units and subsequent enforcement of public health recommendations for quarantine of exposed children.
- The World Health Organization (WHO) does not recommend temperature screening to control COVID-19.⁵⁴ Temperature screening is used widely in workplaces and ports of entry and is proposed in many school reopening plans; however, it has not proven effective in identifying individuals infected with COVID-19 who can then be isolated to prevent exposing others.

HOW TO AUGMENT CURRENT DISEASE MITIGATION STRATEGIES

Steps to mitigate the risk of disease transmission in schools include screening of students and staff for signs and symptoms, cohorting of students for the duration of the school day, cancellation of extra-curricular activities that would result in cohort mixing, use of cloth facemasks, and enhanced cleaning and disinfection. Additional consideration has been given to teaching in outdoor environments, where possible, as current evidence indicates that the vast majority of COVID-19 transmission occurs indoors.⁵⁵ Of note, however, are other important concepts being discussed by thought leaders and scientists as ways to more effectively control the spread of disease, including the role of augmented testing strategy, utility of technology in contact tracing, and family quarantine. Each of these strategies should be considered in collaboration with local public health and education leaders.

THINKING IN NEW WAYS ABOUT TESTING

Diagnostic testing is critical in the control of infectious disease outbreaks, to identify the infected, isolate them from the healthy, and prevent them from spreading the disease. The limited availability of diagnostic testing and lengthy turnaround time from sample collection to reporting of result in the United States has made the control of the COVID-19 pandemic challenging.^{56, 57, 58, 59, 60} Current testing strategy relies on individuals

54 World Health Organization. (2020). Updated WHO Recommendations for International Traffic in Relation to COVID-19 Outbreak. Geneva, Switzerland. Accessed July 22, 2020 from: <https://www.who.int/news-room/articles-detail/updated-who-recommendations-for-international-traffic-in-relation-to-covid-19-outbreak>.

55 <https://www.theatlantic.com/health/archive/2020/07/why-arent-we-talking-more-about-airborne-transmission/614737/>

56 Duke Robert J Margolis Center for Health Policy. (2020). A National COVID-19 Surveillance System: Achieving Containment. Accessed July 22, 2020 from: https://healthpolicy.duke.edu/sites/default/files/2020-06/a_national_covid_surveillance_system.pdf.

57 CIDRAP. (2020). COVID-19: The CIDRAP Viewpoint. Minneapolis, MN. Accessed July 22, 2020 from: <https://www.cidrap.umn.edu/sites/default/files/public/downloads/cidrap-covid19-viewpoint-part3.pdf>.

58 Harvard Global Health Institute. (2020). New Testing Targets. Cambridge, MA. Accessed July 22, 2020 from: <https://globalhealth.harvard.edu/new-testing-targets-as-covid-19-outbreaks-grow-more-severe-most-u-s-states-still-fall-far-short-on-testing/>.

59 The Rockefeller Foundation. (2020). National COVID-19 Testing Action Plan. Accessed July 22, 2020 from: <https://www.rockefellerfoundation.org/national-covid-19-testing-action-plan/>.

60 American Enterprise Institute. (2020). National Coronavirus Response A Road Map to Reopening. Accessed July 22, 2020 from: <https://www.aei.org/wp-content/uploads/2020/03/National-Coronavirus-Response-a-Road-Map-to-Recovering-2.pdf>.

seeking testing due to possible exposure or COVID-19 symptoms. Community testing strategies (i.e., testing outside the healthcare delivery system) or random testing strategies (i.e., periodic testing of randomly sampled individuals within a population) should be reevaluated when developing plans to return to on-campus learning. CDC recommends that districts that have the capability through school-based healthcare providers may conduct SARS-CoV-2 testing on campus but should not be required to if they lack the resources or training to appropriately conduct testing.⁶¹

Many approaches have been proposed to augment the current strategy and are not mutually exclusive. One such example is pooled real-time polymerase chain reaction testing, in which samples (e.g., nasal swabs) are pooled together, typically in groups of four to five to increase testing throughput;⁶² the Food and Drug Administration recently suggested this is a promising strategy to increase testing capacity. This strategy of pooled, mass testing is being considered by many school administrators, who have partnered with academic or commercial laboratories to investigate the possibilities of offering mass testing to their students.

If a pooled sample turns up with a positive result, all the persons whose samples were included in the pool would be tested individually. If a pooled sample turns up with a negative result, all the persons are cleared (i.e., not currently infected). When a community has few cases, pooled testing offers a way to efficiently use resources to rapidly test a large population, because it only requires follow-up individual testing where a pool is positive. This approach must be balanced against the challenges that might result from mass testing in a school setting, including the logistics of sample collection, the reporting of results to public health officials, as well as the voluntary nature of the testing. Access to tests and timely reporting of results are essential to any testing strategy, pooled or otherwise.

UTILIZING DIGITAL CONTACT TRACING

Contact tracing is the process of identifying people who were exposed to or had close contact with someone infected with SARS-CoV-2.⁶³ Quarantine of those exposed individuals and isolation of any who developed COVID-19 symptoms or tested positive for SARS-CoV-2 effectively limits the spread of the virus. Traditionally, this process of contacting and quarantining contacts is a manual process requiring trained public health professionals to conduct the outreach and communication.

To date, many efforts are underway to augment manual contact tracing with technology to identify persons who might have had close contact with someone infected with SARS-CoV-2. The technology often uses Bluetooth in a smartphone that allows users of a contact tracing application to opt in to receive notifications that they were in proximity for a selected period with someone who self-reports SARS-CoV-2 infection. In addition, software applications exist to assist with monitoring persons in quarantine, allowing those individuals to self-monitor and electronically report their symptoms to the appropriate public health authorities.

Effective utilization of these tools depends on several factors, including 1) user perceptions of privacy and security, 2) user access to smart phones, 3) user willingness to download and use the tools, and 4) strong collaboration with local public health departments to ensure effective contact tracing. Making these interventions pre-requisites as opposed to voluntary will have a greater impact in supporting the control of disease spread.

61 <https://www.cdc.gov/coronavirus/2019-ncov/community/schools-childcare/k-12-testing.html>

62 Abdalhamid B, Bilder CR, McCutchen MS, Hinrich SH, Koepsell SA, and Iwen PC. Assessment of Specimen Pooling to Conserve SARS CoV-2 Testing Resources. *Am J Clin Pathol* June 2020;153:715-718.

63 https://c19hcc.org/static/catalog-resources/Contact_Tracing_Patient_Journey_Map.pdf

FAMILY QUARANTINE

When family members display symptoms or test positive for COVID-19, students in those families should stay home. Currently, most of the screening guidance for K-12 focuses on screening the student. Given that household transmission is a common mode of infection⁶⁴ and that students might exhibit few if any symptoms when infected, students cohabitating with individuals with COVID-19 symptoms should quarantine for 14 days or until the student can provide a negative SARS-CoV-2 test result. This strategy, however, may pose challenges for guardians who might not have ready access to alternate childcare or to testing of the student. This approach should also be appropriate for families of teachers, administrators, or staff who work in school buildings.

RECONSIDERING THE ROLE OF TEMPERATURE SCREENING

Remote temperature screening was adopted by multiple organizations to identify mildly symptomatic people unaware of their fever, though the screening may not provide functional information as multiple confounding variables exist, such as:

- Some individuals with COVID-19 may not develop a fever.⁶⁵
- Some people may take medications to reduce their body temperatures.⁶⁶
- Individuals may be infectious before developing symptoms like a fever.⁶⁷
- The technology used to detect an elevated body temperature might have variable temperature results, depending on the device selected.⁶⁸

It may not be worth it for schools to make the large-scale investment needed for temperature screenings, especially given the WHO's lack of endorsement for using temperature screening to control the disease's spread. These decisions should be made in consultation with local health authorities.

64 <https://academic.oup.com/cid/article/doi/10.1093/cid/ciaa450/5821281>

65 <https://www.acpjournals.org/doi/10.7326/M20-0504>. Accessed July 18, 2020

66 <https://jamanetwork.com/journals/jama/fullarticle/2765184>. Accessed July 18, 2020

67 <https://www.nature.com/articles/s41591-020-0869-5>

68 Nguyen AV, Cohen NJ, Lipman H, Brown CM, Molinari NA, et al. (2010). Comparison of Three Infrared Thermal Detection Systems and Self-report for Mass Fever Screening. *Emerg Infect Dis.* 16 (11): 1710-17. Accessed July 22, 2020, from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3294528/#R18>.

CONCLUSION

Developing guidance to safely return to on-campus learning is a complex task, and many factors should be carefully evaluated when making these decisions. Whether a community is just starting to develop plans or is in the process of revising existing plans, several important considerations exist:

1. CDC provides federal recommendations that can guide states and jurisdictions and be used as a primary resource to develop local-level plans.
2. When infection rates are high, virtual learning is likely the safest option.
3. Making decisions in conjunction with state, local, tribal, and territorial health departments and local stakeholders about what thresholds should be used to decide between on-campus or virtual learning is helpful for all stakeholders.
4. If on-campus learning is possible:
 - Materials such as PPE as well as cleaning and disinfecting products should be purchased up front, and their consistent availability should drive decisions about safe return to campus.
 - A clear plan should be put in place for what actions would be taken upon identification of an infected individual, in terms of cleaning and disinfection, closing of select classes, or closing of the campus and for how long.
5. In general:
 - This is a difficult problem with many variables that are locally determined. The challenge is to distill these complexities into actionable steps for each community. Information gathering up front from different stakeholders will help facilitate these decisions.
 - There are no static decisions; all plans should be flexible and adaptable to the evolving epidemiology of the pandemic.
 - Implementing return-to-campus plans will take time—students, teachers, and staff will need to be trained and to adjust to the protocols and practices being put in place to keep them safe.

Based on what is known to date about the COVID-19 pandemic, we propose that school districts consider the following criteria when making decisions about returning to on-campus learning:

1. Ensure local COVID-19 community spread is controlled, as indicated by less than one new case per day per 100,000 people (10 new cases per day per million people). This threshold is consistent with the levels of community spread in countries where schools have successfully reopened without subsequent surges in COVID-19.
2. Require universal cloth facemask use, implement and enforce social distancing, reduce or eliminate indoor congregation, enhance hand hygiene, and support TTSI in the schools reopening; of note, these strategies should be implemented in the community at large to effectively control virus spread.

3. When local COVID-19 conditions permit, return to on-campus learning in stages, beginning with grades K-5 and students with special needs; measure the results and impact at each stage to inform decision making. Using the locally selected public health indicators of COVID-19 transmission, define stages of on-campus return in partnership with community stakeholders. Consider further prioritization based on:
 - Socioeconomic factors: e.g., children who rely on schools for meals, healthcare, or mental health services
 - Ease of virtual learning: e.g., children with special needs, children that lack access to tools/ connectivity needed for virtual learning, or children who are English-language learners
 - Family situations: e.g., children of essential workers, single-parent households

Conversely, children with preexisting medical conditions or family members with risk factors for serious COVID-19 illness might not be prioritized for on-campus learning. A staged reopening plan is recommended because it allows 1) students who benefit most from in-person learning to return to campus; 2) parents and guardians to return to work; and 3) physical distancing in schools, without major changes to the built environment. A staged approach is applicable only after a community has controlled local COVID-19 transmission to an acceptable threshold.

APPENDIX A:

ADDITIONAL CENTERS FOR DISEASE CONTROL AND PREVENTION GUIDANCE

Specific to school reopening guidance, the Centers for Disease Control and Prevention (CDC) also highlights some of the most critical scenarios school officials might encounter and offers recommendations, including protections for staff⁶⁹ and children⁷⁰ at higher risk for severe illness from COVID-19; state and local regulatory awareness (resources vary by state); gatherings, visitors, field trips, identifying and keeping together small groups (cohorting); staggering start and end time schedules; identifying designated COVID-19-response individuals; participating in community response efforts; communication systems for identifying and reporting positive cases;⁷¹ leave-time policies, back-up staffing plans, staff training, sharing facilities, support coping, and resilience.⁷²

Many of the principles that apply to COVID-19 transmission in other environments are also applicable to schools. The CDC's Considerations for Schools⁷³ includes information regarding staying home when appropriate,⁷⁴ hand hygiene⁷⁵ and respiratory etiquette, cloth face coverings,⁷⁶ cleaning and disinfecting,^{77, 78} signs and messages,⁷⁹ and other recommendations schools may reference when approaching daily functioning and logistics.

69 https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/people-at-increased-risk.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Fneed-extra-precautions%2Fpeople-at-higher-risk.html

70 <https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/people-with-medical-conditions.html>

71 <https://www.hhs.gov/hipaa/for-professionals/special-topics/hipaa-covid19/index.html>

72 <https://www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/managing-stress-anxiety.html>

73 <https://www.cdc.gov/coronavirus/2019-ncov/community/schools-childcare/schools.html>

74 <https://www.cdc.gov/coronavirus/2019-ncov/if-you-are-sick/quarantine.html>

75 <https://www.cdc.gov/handwashing/when-how-handwashing.html>

76 <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/diy-cloth-face-coverings.html>

77 <https://www.cdc.gov/coronavirus/2019-ncov/community/disinfecting-building-facility.html>

78 <https://www.cdc.gov/coronavirus/2019-ncov/community/disinfecting-building-facility.html>

79 <https://www.cdc.gov/coronavirus/2019-ncov/communication/print-resources.html?Sort=Date%3A%3Adesc>

APPENDIX B: INTERPRETATION OF COVID-19 SCENARIOS

SCENARIO 1

Background: School A's catchment area is County A. Various work and social networks connect County A to County B. In this scenario, we assume, as per the Harvard Global Health Institute's guidance, that less than one case per 100,000 population is considered in the green zone, one to nine cases per 100,000 population is in the yellow zone, 10 to 24 cases per 100,000 population is in the orange zone, and 25 or more cases per 100,000 population is in the red zone.⁸⁰

Table 1. Scenario 1 Epidemiologic Indicators

Indicator	State	County	
	—	A	B
Case Counts	5/100,000 per day	<1/100,000 per day	<1/100,000 per day

Interpretation: At the state level, case counts would indicate it might not be safe to open all campuses to all students, but when we focus on case counts at the county level, both County A and County B are in the green zone. This suggests that transmission of the virus is being well controlled in those counties and that a phased return to on-campus learning can be considered.

SCENARIO 2

Background: School A's catchment area is County A. Various work and social networks connect County A to County B.

Table 2. Scenario 2 Epidemiologic Indicators

Indicator	State	County	
	—	A	B
Percent positivity	11%	3%	2%
Case Counts	Decreasing for 7-13 days	Decreasing for >13 days	Decreasing for >13 days
Deaths	Decreasing for 7-13 days	Decreasing for >13 days	Decreasing for >13 days

Interpretation: At the state level, the percent positivity indicator is in the red zone, while the other two indicators are in the yellow zone. In contrast, at the county level, for both counties, all indicators are in the green zone. This would suggest that in Counties A and B, the virus spread is being well controlled with the prevention and control measures being implemented.

⁸⁰ Harvard Global Health Institute (2020). The Path to Zero and Schools: Achieving Pandemic Resilient Teaching and Learning Spaces. Accessed July 27, 2020 from: https://globalepidemics.org/wp-content/uploads/2020/07/pandemic_resilient_schools_briefing_72020.pdf.

SCENARIO 3

Background: School A's catchment area is County A. Various work and social networks connect County A to County B.

Table 3. Scenario 3 Epidemiologic Indicators

Indicator	State	County	
	—	A	B
Percent positivity	3%	3%	9%
Case Counts	Decreasing for >13 days	Decreasing for >13 days	Decreasing for 7-13 days
Deaths	Decreasing for >13 days	Decreasing for >13 days	Decreasing for 7-13 days

Interpretation: At the state level, all indicators are in the green zone. In contrast, in County B, all indicators are in the yellow zone, while in County A, all indicators are in the green zone. This would suggest that in County A, the virus spread is being well controlled with the prevention and control measures being implemented, but in County B the virus spread is not as well-controlled. Given the known interactions between County A and County B, County A should proceed with caution when considering relaxation of mitigation measures.

APPENDIX C: INDICATORS USED TO MONITOR THE EPIDEMIOLOGIC EVOLUTION OF THE COVID-19 PANDEMIC

Table 4. Indicators for Monitoring COVID-19 Epidemiologic Evolution

Name	Meaning	Epidemiologic Relevance and Considerations	Epidemiologic Relevance and Considerations		
			High	Moderate	Low
Average percent positivity for SARS-CoV-2 over the last seven days	Percent of diagnostic tests positive for SARS-CoV-2 among all samples tested averaged over seven days	• Gives a sense of the amount of transmission of the virus in the population being tested • Denominator gives an idea of the amount of testing being done	>10%	5-10%	<5%
Number of days of decline in COVID-19 case counts	Number of days that the number of SARS-CoV-2 cases* have been declining	• Gives overall sense of the number of people who have/had COVID-19 • Directly affected by the amount of testing being done if only laboratory-confirmed cases are being counted • Readily available	Decline for <7 days	Decline for 7-13 days	Decline for 13 days
Number of days of decline in COVID-19 deaths	Number of days that the number of SARS-CoV-2 deaths* have been declining	• Gives overall sense of the number of people who died due to COVID-19 • Directly affected by the amount of testing being done if only laboratory-confirmed cases are being counted • Readily available • Reflects cases that occurred 1-3 weeks earlier as deaths lag disease onset	Decline for <7 days	Decline for 7-13 days	Decline for 13 days

* The number being counted might include cases with laboratory confirmation only.

APPENDIX D: ESTIMATED COST OF SUPPLIES

Maintaining a safe school environment will require purchase of additional supplies as estimated in Table 5. These estimates are intended as a guide for administrators, and specific school and district needs will depend on several factors such as student demographics and specific reopening strategies. The supplies listed in Table 5 are intended to represent items schools can expect to use significantly more than normal or items schools do not ordinarily supply. While soap and paper towels are not included in this list, schools should expect some increase in the consumption of materials for hand washing. This list focuses on items needed for infection prevention; schools may also need to purchase additional classroom items and supplies to prevent student sharing.

Table 5. Supply Needs for School Operations⁸¹

Scenario		Average District	Small District	Moderate District	Above-Average District	Large District
Students		3,269	1,000	2,000	5,000	10,000
Staff		329	100	200	500	1000
Buildings		8	2	4	10	20
Classrooms		183	60	120	300	600
Costs						
Masks for students		\$148,190	\$45,900	\$91,800	\$229,500	\$459,000
Masks for staff		\$44,415	\$15,300	\$30,600	\$76,500	\$153,000
Gloves for custodians		\$1,440	\$360	\$720	\$1,800	\$3,600
Sanitizer for students		\$39,519	\$12,957	\$25,914	\$64,785	\$129,570
Disinfectant wipes		\$16,833	\$6,480	\$12,960	\$32,400	\$64,800
Quantity per year (assumes 180-day school year)						
Masks for students	1 per day for 30% of students	176,526	54,000			
Masks for staff	1 per day per staff member	59,220	18,000			

81 Adapted from "What Needs to Change Inside School Buildings Before They Reopen," Madeline Will, June 10, 2020, Education Week, <https://www.edweek.org/ew/articles/2020/06/11/what-needs-to-change-inside-school-buildings.html>. Accessed July 18, 2020

