

Current Best Practices: Important Re-opening Considerations for Schools, Campuses, and Commercial Buildings

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As the COVID-19 pandemic continues and schools, campuses, and large commercial buildings are resuming in-person operations, emphasis on the [development of a new, or the audit of an existing infectious disease plan and requisite control measures](#) has become increasingly essential.

The [Harvard T.H. Chan School of Public Health report “Schools for Health: Risk Reduction Strategies for Reopening Schools” \(June 2020\)](#), defines three (3) routes of COVID-19 transmission



supported by models and case studies which include close-contact transmission, long-range transmission, and [fomite transmission \(i.e., transmission of the virus from an inanimate object\)](#). Initially, mitigation guidance focused on close-contact and fomite transmission by stressing the need for increased physical distancing, wearing face coverings, and implementing an increase of cleaning procedures focused on surface decontamination.^{1,2} As evidence mounts that SARS-CoV-2 transmits both through respiratory droplets in close contact and via airborne particles in the indoor environment it has become exponentially prudent to evaluate and test ventilation effectiveness and ventilation controls prior to and then

¹ On April 5, 2021, the Centers for Disease Control and Prevention (CDC) [issued updated guidance on surface cleaning and disinfecting as it relates to COVID-19 transmission](#). With [increasing evidence illustrating that the risk of surface \(fomite\) transmission of COVID-19 is low \(less than 1 in 10,000\)](#), the CDC now advises that surface disinfection is only recommended in indoor-setting schools and homes where there has been a suspected or confirmed case of COVID-19 within the last 24 hours. When no persons confirmed or suspected to have COVID-19 are known to have occupied a shared space, a once daily cleaning with products containing soap or detergent is sufficient to reduce germs and contaminants and remove viruses on surfaces.

² The CDC’s updated guidance (April 5, 2021) states, in instances where an increased risk of COVID-19 transmission is present in shared spaces (i.e. high levels of community transmission, low rate of mask usage, infrequent hand hygiene, high-risk individuals present) the updated CDC guidance recommends cleaning more frequently or disinfecting in combination with cleaning. Further, the updated guidance suggests if there has been a sick person or a positive case of COVID-19 in a facility within the last 24 hours, the space should be cleaned and disinfected to further reduce the risk of virus transmission.

maintained after resuming in-person operations ([epa.gov](https://www.epa.gov); [Van Doremalen et. al. 2020](#); [wsj.com](https://www.wsj.com); [cidrap.unm.edu](https://www.cidrap.unm.edu)).

In regards to a return to classrooms, the [Centers for Disease Control and Prevention \(CDC\)](#) recommend that, when operating schools during COVID-19, to (1) promote behaviors that reduce the spread of COVID-19 (e.g., face coverings), (2) maintain a healthy environment (e.g., cleaning and ventilation), (3) maintain healthy operations (e.g. alternating schedules), and (4) prepare for when someone gets sick (e.g., notification).

The ventilation considerations for schools provided by the CDC for maintaining a healthy environment include:

- Consider system upgrades or improvements to increase the delivery of clean air to dilute contaminants within the school.
- increase the percentage of outdoor air and consider use of natural ventilation (i.e., opening windows where possible and safe to do so). Secured fans can be used to increase effectiveness of open windows.
- Increase the total airflow supply to occupied spaces, where possible.
- Disable demand-control ventilation (DCV) controls that reduce air supply based on temperature or occupancy.
- Improve central air filtration:
 - [Increase air filtration](#) to as high as possible without significantly diminishing design airflow.
 - Inspect filter housing and racks to ensure appropriate filter fit, check for ways to minimize filter bypass, and ensure filters are within service life.
- Consider running the HVAC system at maximum outside airflow for 2 hours before and after occupied times, in accordance with [industry standards](#).
- Inspect and ensure exhaust fans in restrooms, kitchens, and cooking areas are functional and operating a full capacity.
- [Generate clean-to-less-clean air movements](#) by re-evaluating the positioning of supply and exhaust air diffusers and/or dampers and adjusting zone supply and exhaust flow rates to establish measurable pressure differentials.
- Consider the use of portable high-efficiency particulate air (HEPA) fan/filtration systems to help [enhance air cleaning](#) (especially in higher-risk areas such as nurses offices).
- Ensure exhaust fans in restroom facilities are functional and operating at full capacity when the building is occupied.
- Consider use of ultraviolet [germicidal irradiation \(UVGI\)](#) as a supplemental technique to inactivate SARS-CoV-2, especially if options for increasing room ventilation are limited.

The American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) has released their own guidance documents on reopening and schools:

- https://www.ashrae.org/file%20library/about/position%20documents/pd_infectiousaerosols_2020.pdf
- https://www.ashrae.org/file%20library/technical%20resources/ashrae%20journal/2020journaldocuments/72-74_ieq_schoen.pdf
- https://images.magnetmail.net/images/clients/ASHRAE/attach/ashrae_reopening_schools_and_universities_c19_guidance.pdf



Further the American Industrial Hygiene Association (AIHA) has developed general and industry specific science-based guidance documents for limiting the transmission of COVID-19 and reducing the risk of COVID-19 using engineering controls at business such as childcare centers, office settings, institutions of higher education, libraries, schools (K-12), and transit systems. (backtoworksafely.org)

Air Cleaners and HVAC Filters

The US Environmental Protection Agency (EPA) stated that “When used properly, air cleaners and HVAC filters can help reduce airborne contaminants including viruses in a building or small space. By itself, air cleaning or filtration is not enough to protect people from exposure to the virus that causes COVID-19. When used along with other best practices recommended by CDC and others, filtration can be part of a plan to protect people indoors” (www.epa.gov).

Through their guidance documents, ASHRAE encourages building owners to improve the efficiency of the filters serving their current HVAC system and recommend that the Minimum Efficiency Reporting Value (MERV) rating be at least MERV 13 and preferably MERV 14 or better (ashrae.org). In addition to considering improving central filtration, the CDC recommends considering the use of ultraviolet germicidal irradiation (UVGI) as a supplemental technique to inactivate airborne viruses. UVGI uses short-wave ultraviolet energy to inactivate viral, bacterial, and fungal organisms (ashrae.org / [ASHRAE Filtration and Disinfection FAQ](#)).

Installation of new filters as well as any other significant change to a HVAC system can have an impact on overall efficiency and it is recommended to consult with a qualified HVAC technician when making any change to a building’s HVAC system.

RHP’s group of Certified Industrial Hygienists (CIHs) and Occupational Health and Safety (OHS) science professionals have decades of combined experience and knowledge to assist building owners and operators with implementing these current best-practice recommendations. We can assist with indoor air quality improvement projects including HVAC performance assessments to measure existing conditions and facilitate comparisons to current best-practices guidance, as well as provide recommendations and options for improvement.

Additional Healthy Environment Considerations for Previously Unoccupied or Low Occupancy Buildings

In addition to ventilation, maintaining a healthy environment while operating a school, campus, or other large commercial building also includes [cleaning and disinfecting materials](#) using [approved cleaning products](#), installing physical barriers, closing or modifying communal spaces, discouraging shared objects, and taking steps to ensure all water systems are safe to use, particularly after shutdowns or reduced operations like was done during isolation orders and business reduction or shut downs^{1,2}. Sampling water systems to minimize the risk of exposure to lead or copper, [Legionnaire’s disease](#), or other diseases and/or contaminants associated with water. [Proctor et. al \(2020\) and the American Water Works Association](#) provide detailed considerations for large building water quality after extended stagnation.

As the COVID-19 pandemic continues and more information becomes available, we recommend staying informed and current with regulations, industry guidance and best practices. By continuing to follow up-to-date safe and effective hygiene and work practices, RHP helps employers, facility managers, principals



and school boards ease the stress of their employees, customers, teachers, parents and students manage decisions and stress in a COVID world. Effective solutions should not be limited to a single control mechanism or practice, instead multiple control measures should be implemented to add layers of protection such as social distancing, cloth masks, personal hygiene, and engineering controls that work together to reduce risk.³

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³ On March 19, 2021, the CDC issued updated guidance on its' operational strategy for K-12 schools, specifically relating to the recommended physical distance between students in classrooms. In contrast to the previously recommended distance of at least 6', the updated CDC guidance recommends that, with a universal masking policy in place and enforced, students at the elementary school level should maintain a distance of at least 3' in classroom settings. This recommendation is applicable whether community transmission is low, moderate, substantial, or high. In middle or high school environments where cohorting of students is not possible, students should still maintain a distance of at least 6'. The 6' recommendation remains in place for older students because COVID-19 transmission dynamics are different in older students and they are more likely to be exposed to SARS-COV-2 and spread COVID-19 than younger children. In a school setting, the CDC continues to recommend at least 6' of physical distance between adults and between adults and students, in common areas, when masks cannot be worn (eating), during activities when increased exhalation occurs (singing, shouting, band practice, sports, or exercise) and in community settings outside the classroom.