



## Ventilation, Filtration, and Air Cleaning Guidance

The purpose of this document is to recommend ventilation, filtration, and air cleaning strategies for reducing exposures indoors and limiting the spread of SARS-CoV-2, the virus that causes COVID-19. These strategies are also useful for reducing exposure to other indoor air pollutants, viruses, and bacteria. More comprehensive guidance is available from the Centers for Disease Control and Prevention (CDC) [Ventilation in Buildings](#) guidelines, [U.S. Environmental Protection Agency](#) (USEPA), and [American Society of Heating Refrigerating and Air Conditioning Engineers](#) (ASHRAE).

The Illinois Department of Public Health supports CDC's recommendation that schools, child care programs, workplaces, congregate living facilities, and other locations use a layered approach to risk reduction. This includes the use of face coverings where applicable, in addition to vaccination and environmental control measures to reduce the spread of COVID-19. The strategies recommended for ventilation, filtration, and air cleaning include:

### Increasing Ventilation

1. Increasing the introduction of outside air by opening windows and doors during mild weather. In schools or commercial buildings, consider opening the outdoor air dampers on air handling units to increase the percentage of outside air brought in to mix with recirculated air.
2. Using fans to increase the effectiveness of open windows (or promote air mixing). Fan placement is important. Be careful not to direct fans so they are blowing directly from one person to another.
3. Ensuring ventilation systems operate properly and provide acceptable indoor air quality for the current occupancy level. Minimum ventilation rates and procedures for calculating outdoor air flow rates are described in [ASHRAE Standard 62.1: Ventilation for Acceptable Indoor Air Quality](#).
4. Adjusting heating, ventilating, and air conditioning (HVAC) systems to increase total air flow to occupied spaces when possible.
5. Turning off any demand-controlled ventilation controls that reduce air supply based on occupancy or temperature during school or business hours.
6. Running business and school HVAC systems at maximum outside airflow (100%) for two hours before the first individual arrives and two hours after the last individual leaves.

### Increasing Filtration and Air Cleaning

1. Installing the highest efficiency filters your HVAC system can handle without adversely impacting performance. CDC and ASHRAE recommend using filters with a minimum efficiency reporting value of 13 (MERV 13), if possible, for reducing exposure to infectious aerosols. Check with your building engineer or an HVAC professional to ensure you have the correct type of filter.
2. Using portable air cleaners with HEPA filters, especially in higher risk areas or locations where ventilation is poor. Recent studies have shown these devices to be effective at reducing

exposures in indoor environments.<sup>1 2 3</sup> This would be especially important in places or situations when masking is inconsistent, such as cafeterias, restaurants, bars, and gyms, and when caring for people who cannot safely be masked.

3. Considering using ultraviolet germicidal irradiation (UVGI) as a supplement to supply air in areas with an increased likelihood of sick people, crowded spaces, and places where people must take off masks to eat or drink. Consult with a professional who is knowledgeable and experienced with upper-room UVGI system design and installation before procurement and system installation. More information is available on CDC's [Upper-Room Ultraviolet Germicidal Irradiation \(UVGI\)](#) web page.

### **Additional Considerations**

1. Portable air cleaners work best when they are placed close to the source of exposure.
2. Avoid portable air cleaners that intentionally produce ozone or other technologies like bipolar ionization. The California Air Resources Board has a list of air cleaning devices that have been [certified](#) for low ozone emissions.
3. The [Association of Home Appliance Manufacturers](#) (AHAM) maintains a searchable online directory of certified air cleaners.
4. Choose a portable air cleaner that has a clean air delivery rate (CADR) that is at least two thirds the size of the room where it will be used. For example, the minimum recommended CADR for a 100 square foot room is 65 cfm. Multiple portable air cleaners can be used to achieve the recommended CADR for larger spaces.
5. CADRs are available for tobacco smoke, dust, and pollen. For airborne virus particles, choose a portable air cleaner that has a high CADR for tobacco smoke, which represents the smallest particles.
6. Plans for constructing an inexpensive [do-it-yourself box fan air cleaner](#) with high efficiency furnace filters are available online.
7. Additional guidance, including technical information and on-demand webinars about residential air cleaners is available from USEPA's [Air Cleaners and Air Filters in the Home](#) web page.

### **Who can I contact if I have questions?**

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<sup>1</sup> J. Curtius, M. Granzin & J. Schrod (2021) Testing mobile air purifiers in a school classroom: Reducing the airborne transmission risk for SARS-CoV-2, *Aerosol Science and Technology*, 55:5, 586-599, DOI: [10.1080/02786826.2021.1877257](https://doi.org/10.1080/02786826.2021.1877257)

<sup>2</sup> A Morris et al. The removal of airborne SARS-CoV-2 and other microbial bioaerosols by air filtration on COVID-19 surge units, *Clinical Infectious Diseases*, 2021;, ciab933, <https://doi.org/10.1093/cid/ciab933>

<sup>3</sup> W. Lindsley, R. Derk, J. Coyle, et al. [Efficacy of Portable Air Cleaners and Masking for Reducing Indoor Exposure to Simulated Exhaled SARS-CoV-2 Aerosols — United States, 2021](#). *MMWR Morb Mortal Wkly Rep* 2021;70:972-976.