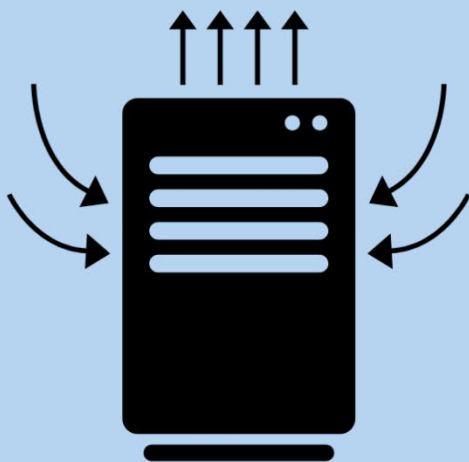
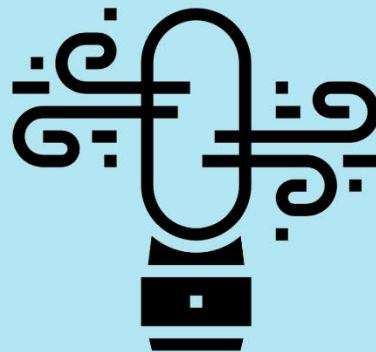
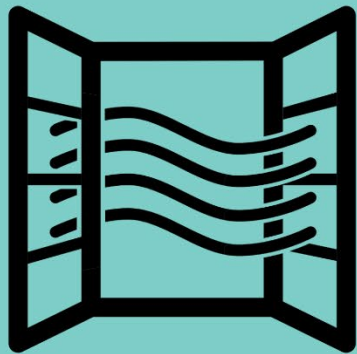


Guidance on Improving Indoor Air Quality

for building operators and
business owners



**Strategies to reduce
the risk of COVID-19
indoors**

April 28, 2021

Public Health
Seattle & King County 

INDOOR AIR QUALITY | INTRODUCTION



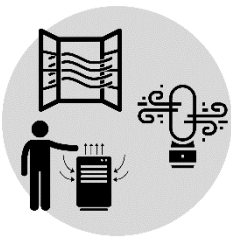
Who is this guide for?

This guide is for operators of congregate settings, schools and childcare services, restaurants, retail, residential and other public settings where people may gather. It includes strategies that can help reduce the spread of COVID-19 in their facilities.



Why does this guide matter?

The purpose of this document is to provide important information about strategies to reduce the risk transmission through the air of SARS-CoV-2 virus, the cause of COVID-19. Improving indoor air is a key mitigation strategy for any setting where people gather. Improved indoor air decreases the number of viral particles and other airborne infectious diseases that accumulate in the air of our shared spaces, helping to reduce the airborne transmission of COVID-19 and other viruses. Good ventilation, air filtration, and, in some settings, UVGI are effective environmental strategies to reduce transmission in indoor spaces, especially when used with other strategies like physical distancing, wearing masks, and cleaning and disinfection.



What is included in this guide?

This guide outlines the three main technologies that are recommended for improving ventilation and keeping indoor air clean:

1. Optimized Heating, Ventilation and Cooling (HVAC) units
2. Portable High Efficiency Particulate Air (HEPA) air cleaners
3. UVGI upper-air disinfection (with expert recommendation and guidance).

How do I use this guide?

Improving indoor air is very important for reducing the potential for spread of COVID-19 in your facility. Review each of the three recommended technologies and determine what makes the most sense to implement in your facility. We recommend using this guide as a checklist for choosing and maintaining technologies that will improve the indoor air in your facility.

The end of this document includes more specific considerations for different types of facilities: congregate settings like shelters, day centers, and other organizations that serve people experiencing homelessness; schools and childcare settings; and restaurants.

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Heating, Ventilation, & Air Condition (HVAC) Systems

Consult with your building engineer or certified HVAC specialist to optimize your HVAC system to reduce the transmission risk of COVID-19. If you rent, speak with your landlord.

For more detailed guidance, please see the [Washington Department of Health's Ventilation and Air Quality for Reducing Transmission of COVID-19](#).

HVAC systems help increase indoor air flow by pulling in outdoor air and filtering recirculated air and outdoor air entering the system. If your facility does not have an HVAC system, achieve increased air flow by opening windows and doors when safe.

The number of people in a space and the size of a space are also important considerations for determining how much air flow is needed and whether other strategies are needed. In some situations, measuring CO₂ can indicate when additional ventilation or filtration are needed.ⁱ

OPERATION

Increase air flow and function:

- Most HVAC systems work by bringing in outdoor air and mixing it with recirculated air. Recirculating air throughout a space may increase the risk for the spread of certain diseases like COVID-19. Work with your HVAC specialist to increase the setting on your HVAC system so that it intakes the maximum amount of outdoor air possible (aim for 100%).
- Work with your building engineer or HVAC specialist to generate airflow in the direction of clean to less-clean air.
- Beyond increasing outside air during normal operation, it can be helpful to flush the space with the maximum amount of outside air possible throughout the day, between groups and work shifts, and while cleaning and disinfecting. Maximizing air flow during these periods can help quickly replace the air in the room with fresh air.

FILTERS

If you are recirculating air, make sure it is filtered:

- MERV 13 HVAC filters or higher or their ISO ("3M" brand) and FPR equivalents ("The Home Depot" brand) are recommended if your HVAC system can handle them.
- HVAC systems using MERV 8 filters are not as effective at removing COVID-19 virus and other infectious agents.

- Ask your HVAC specialist about upgrading to MERV 13 filters or the highest possible filters your system can handle.

MAINTENANCE Maintain the HVAC system to ensure air flow and air filtration are maximized:

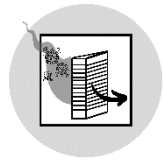
- Change filters as needed. Clogged filters make it harder to improve indoor air quality. Visually inspect filters monthly to ensure they are not thickly coated with dust.
- Inspect and clean entire HVAC systems regularly. Make repairs quickly to prevent serious issues.
- Open windows and doors to increase outside air. This may add to heating costs during colder weather but is an important COVID-19 precaution.

RESOURCES

- [American Society of Heating, Refrigerating and Air-Conditioning Engineers \(ASHRAE\) COVID-19 One Page Guidance Documents](#)
- [Centers for Disease Control and Prevention \(CDC\) Ventilation in Buildings Guidance](#)

QUESTIONS TO ASK AN HVAC SPECIALIST

- | | |
|---|---|
| • What type of filters does my HVAC system currently use? | <i>Ideally your HVAC will use MERV 13 filters or higher (14, 15, etc.) or the ISO or FPR equivalent (3M or Home Depot brand).</i> |
| • Can my HVAC system handle a MERV 13 filter? | <i>If yes, discuss upgrading your filters to MERV 13.
If no, discuss upgrading your HVAC system or taking other precautions such as purchasing HEPA air cleaners to remove pollutants indoors.</i> |
| • How often do I need to change my filters? | <i>Your HVAC specialist should know how often to replace filters or describe what a dirty filter that needs replacing looks like.</i> |
| • How often should I clean or inspect my HVAC system? | <i>At a minimum your system should be inspected, serviced, and cleaned once a year. Inspection schedules will depend on type and use of the building. If a system has both heating and cooling functions, heating should be checked in the fall and air condition checked in the spring.</i> |
| • Does airflow in my building move in the direction of clean to less-clean air? | <i>Your HVAC specialist or another expert, such as an industrial hygienist, can assess the flow of air in a building using special tools. For example, if a facility has an isolation room for sick patients, the specialist can determine if HVAC system changes can prevent air from moving from that space to other areas.</i> |
| • How do I know my HVAC system is working well? | <i>HVAC specialists assess how well the system is functioning during their regularly scheduled inspections.</i> |



Portable High Efficiency Particulate Air (HEPA) Air Cleaners

High Efficiency Particulate Air (HEPA) air cleaners are a useful tool to capture small (microscopic) airborne respiratory droplets produced when people breathe and talk. Certain activities like loud talking, singing, and aerobic exercise result in many more airborne particles being produced. These small droplets can float and move in the air like cigarette smoke. They are designed to trap up to 99.97% of smog, smoke, and soot particles and can capture viruses attached to these particles or similarly sized droplets.

Additional filtration can be used as a supplement to help reduce the amount of airborne virus in spaces where people are gathered, and especially when masks are not being utilized.

WHAT KIND OF HEPA AIR CLEANER SHOULD YOU LOOK FOR?

Select units that:

- Have a 99% - 99.97% filtration efficiency on particles down to 0.3 microns in size.
- Have a clean air delivery rate (CADR) adequate for the size of the space. Higher CADRs (above 200 cfm) will remove more particles and can be used in larger spaces.
- Do not have additional technologies or features (e.g., ionization, UV lights, and oil diffusers) because they can cause unintended health hazards, unless they are third-party verified (see last point below).
- Have a filter replacement schedule that will be easy to follow and is based on the manufacturer's recommendations.
- Are quiet for sleeping spaces. Look for a noise rating of 50 decibels (dB) or less (roughly the operating noise of a refrigerator).
- Have third-party, energy star and low-ozone emitting verification through the [Association of Home Appliance Manufacturers \(AHAM\) searchable list of portable air cleaners certification](#) and the [California Air Resources Board list of low ozone emitting units](#).

HOW MANY HEPA AIR CLEANERS DO YOU NEED FOR YOUR SPACE?

Having more than one unit in a room may be necessary for adequate filtration.

To know how many units you need:

1. Estimate the CADR for your room size using [EPA's Guide to Air Cleaners in the Home](#):

Portable Air Cleaner Sizing for Particle Removal

Room area (square feet)	100	200	300	400	500	600
Minimum CADR (cfm)	65	130	195	260	325	390

Note this chart is for estimation purposes. The CADRs are calculated based on an 8-foot ceiling. If you have higher ceilings, you may want to select a portable air cleaner with a higher CADR.

The numbers provided assume an 8-foot ceiling height. If a space has a higher ceiling, the resources provided below can help you calculate the needed CADR based on the volume of your room.

2. Purchase HEPA air cleaners that, when added, create the minimum CADR listed in the chart above. Multiple units may be placed in the same space to achieve the recommended CADR.
 - For example, if your room area (length x width) is 500 square feet with an 8-foot ceiling, you can get one HEPA air cleaner that has a CADR of 325 or higher, or two HEPA air cleaners that have a CADR of 175 each, adding up to a CADR of 350.
3. Choose a unit with a higher CADR than needed for the space. This is often helpful to allow for effective filtration using lower, quieter settings in classrooms or sleeping areas.

USING A HEPA AIR CLEANER

- Increase the amount of filtered air by selecting higher fan speeds and leaving the cleaner on for long periods of time.
- Place the air cleaner in areas where people may spend the most time.
- Avoid placing the HEPA air cleaner so that air blows from one person to another.
- Do not place air cleaners where walls, furniture, curtains, or other objects will block the unit's air intake and outlet.

- Most units plug into electrical outlets. Secure cords to avoid tripping hazards.
- Review the user manual for maintenance needs and information on when to change the filter(s).
- Always follow manufacturer safety recommendations to protect children from any possible hazards posed by the air cleaner.

Note: When pollution is high outdoors, close windows and doors while the air cleaner is on.

RESOURCES

- [Association of Home Appliance Manufacturers \(AHAM\) searchable list of portable air cleaners certification.](#)
- [California Air Resources Board \(CARB\)](#) list of devices to avoid due to harmful ozone emissions.
- [Miller et al, 2020](#) provides examples of HEPA air cleaners in a range of prices (Table 1).
- Online tool: [Harvard-CU Boulder Portable Air Cleaner Calculator for Schools](#)



Ultraviolet Germicidal Irradiation (UVGI) for Indoor Air Disinfection

Ultraviolet germicidal irradiation (UVGI) systems can be used to kill viruses and other microbes in indoor air using low-wavelength ultraviolet light (UVC light). UVGI systems are UV light fixtures designed to kill or inactivate germs in the air in the upper part of the room. UVGI systems do not remove particulates from the air.

UVGI is not recommended for every facility. Consult a UVGI expert from a reputable UVGI vendor before taking steps to install a UVGI system and review the considerations below:

IS UVGI RIGHT FOR YOUR FACILITY?

- **Unit placement and installation should be performed in consultation with the unit manufacturer, your building engineer, and/or a UVGI system expert to ensure unit safety.**
- UVGI systems are best for spaces where ventilation and air filtration are minimal or nonexistent.
- Ceiling heights must be at least 7-10 feet.
- More than one system may be needed depending on the size of the space.

WHAT YOU NEED TO KNOW TO MAINTAIN YOUR UVGI SYSTEMS

- Replace UV lights every 1-2 years. Schedule for regular bulb cleaning and replacement.
- Bulb cleaning and replacement should be conducted according to manufacturer's instructions to avoid accidental UV exposures.
- UV bulbs should be handled with care because they contain mercury. Staff should be aware of what to do if a UV light bulb is broken on site and how to safely dispose of used lamps. EPA provides [guidance on how to clean up a broken bulb](#).
- Seasonal adjustments may be needed to maintain relative humidity (RH) at 60% or less and room temperature between 68 °F to 75 °F (20 °C to 24 °C), which are optimal for low-pressure mercury lamps used in UVGI systems.

**UVGI
SAFETY**

- Only upper-room UVGI systems are recommended. Other UV devices are not recommended for cleaning the air.
- Installation should be done by your building engineer and/or a certified electrician.
- As an added safety measure, building maintenance staff should utilize radiometer or UV dosimeter indicator cards every few months to ensure UV light intensity in the upper and lower room spaces is correct and that the UV lamp is performing as it should.
- A professional who is knowledgeable in upper-room UVGI systems and system installation should be consulted before procurement and installation of the system. The number of persons properly trained in the design of upper-room UVGI systems is currently limited. Companies that manufacture, supply, and install units will recommend unit placement and provide experts who can install units in our area. Be prepared to provide companies with the following information:
 - “As built” (diagrams) of the building
 - Square footage per room
 - Ceiling heights per room
 - Number of people and activities per room (e.g., if sleeping spaces have bunk beds)

Warning: Direct exposure to UV light can be dangerous. Do not attempt to self-design or use a homemade UVGI system.

[CDC guidance](#) on the use of UVGI was developed to reduce the transmission of tuberculosis. UVGI is also now [recommended by the CDC](#) to reduce the transmission of the SARS-CoV-2 virus that causes COVID-19.

Alternative Air Cleaner Technologies

During the COVID-19 pandemic, new technologies are being marketed to eliminate COVID-19 and other pollutants from the air. This section is designed to help consumers evaluate which products might be effective.

RECOMMENDED TECHNOLOGIES KNOWN TO BE EFFECTIVE AT REDUCING SPREAD OF COVID-19

- Optimized Heating, Ventilation and Cooling (HVAC) units with increased outdoor air intake and furnace filtration using highest MERV rated filters possible with system (MERV 13 or higher).
- Portable air cleaners with true HEPA filters.
- UVGI upper air disinfection (with expert recommendation and guidance).

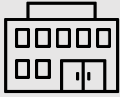
CAUTIONS FOR ALTERNATIVE TECHNOLOGIES

- Air cleaners that use ionization or oxidation may generate ozone, which is harmful to health.
- Purchase technologies that have been third party verified. Without third-party verification to confirm company claims, a new technology's effectiveness is unknown.
- Look for third-party testing by an independent organization such as Consumer Reports, American Home Appliance Manufacturers, or California Air Resources Board.
- ASHRAE provides an [overview of many different air cleaner technologies and data gaps or unknowns that may exist](#).
- Never fog or spray air with disinfectant, as it can lead to harmful health effects for those exposed.

ADDITIONAL RESOURCES

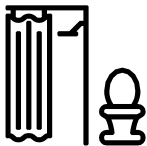
- [Washington Department of Health's Ventilation and Air Quality for Reducing Transmission of COVID-19](#)
- [ASHRAE COVID-19 Guidance Documents](#)
- [CDC Ventilation in Buildings Guidance](#)
- [COVID-19 Employer Information for Office Buildings](#)
- [ASHRAE General Recommendations](#)
- [NCCEH's overview of technologies and their potential risks](#)

Indoor Air Considerations for **SHARED OR CONGREGATE HOUSING**



FACILITY

- Reduce capacity to allow for at least six feet of physical distancing at all times for all activities.
- Mark where chairs, furniture, etc. should be placed with tape on the floor so they can easily be kept six feet apart.
- Post occupancy limits for rooms.
- Work with your building engineer to ensure ventilation and/or air filtration are adjusted to accommodate the number of people in your space. Work with a UVGI specialist to determine if that technology will work in your space.
- Turn ceiling fans off unless used in conjunction with a UVGI system and run in the reverse flow direction to draw air upwards.
- Severe weather and disaster shelter capacity should plan for 110 square feet of space per person. See [Interim Guidance for Homeless Service Providers to Plan and Respond to Coronavirus Disease 2019 \(COVID-19\) – Facility Layout Considerations](#) or [CDC’s Environmental Health Assessment for Disaster Shelters during COVID-19](#) for more information.



RESTROOMS

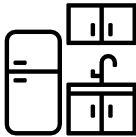
- Leave bathroom fans running at all times when the building is occupied to move moist, dirty air outside.
- Keep bathroom doors closed.
- Install lids on toilets (if they do not already have them). Post signs to encourage people to shut toilet lids before flushing. In rare instances, COVID-19 virus found in feces may become airborne when flushed.
- Provide paper towels to dry hands. Disconnect hand dryers (blowers) as they may inadvertently circulate germs.
- Ensure that face coverings are worn in the bathroom except when showering or performing hygiene activities.
- Add a trap primer to your drain, which will drain water into the trap to prevent aerosolized sewer gases, pathogens (like COVID-19), and odors escaping from sewer pipes.

- Consult with your building engineer to ensure that air flow is not moving from the bathroom to the rest of the facility.
- Limit the number of people who can use a restroom at one time to prevent person-to-person exposures while masks are removed. Limit the use of showers to every other stall.



SLEEPING AREAS

- Beds or mats should allow for six feet of distance in all directions. Shared sleeping areas should be cleaned on a regular schedule.
 - If people sleep on floor mats, floors should be cleaned daily if possible.
 - If a facility is carpeted, use a HEPA vacuum to reduce the amount of virus and other particles that may re-enter the air while vacuuming.
 - Cleaning and disinfection protocols for sleeping areas can be found on the [CDC](#), [HUD](#), [PHSKC](#), and [EPA](#) websites.



KITCHEN & DINING AREAS

- Anyone working in the kitchen must wear face coverings at all times.
- Run kitchen exhaust hood/fans, if feasible, when the kitchen is in use. Exhaust fans eliminate cooking fumes that contribute to poor air quality. They can also help pull in outdoor air through doors, windows, and small cracks in the building.
- Dining areas should be set up to maintain at least six feet of distance between each person during mealtimes.
- Families can be seated together but should stay at least six feet apart from other diners. All other diners must remain separated by six feet.
- Staggering meal times may help accommodate physical distancing.



BARRIERS

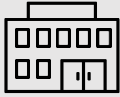
- Given that each setting is unique, Public Health does not recommend the installation of barriers without first consulting an expert who can assess airflow in the space.
 - Barriers (such as plexiglass) may be useful for certain situations on a case-by-case basis, such as for front desk staff or in situations in which distances of six feet cannot be maintained (e.g., between bathroom sinks).

- Barriers between sinks may prevent splatter during hygiene activities like teeth brushing.
- Barriers may block large respiratory droplets within a distance of six feet, but not smaller airborne particles in the air.
- Barriers may have the unintended consequence of creating “air pockets” that cause virus particles to build up over time.
- Facilities with HVAC systems should consult with their HVAC specialist to determine the impacts and/or placement of barriers in their space.
- Some facilities may decide to install barriers for sleeping spaces for reasons outside of COVID-19 mitigation strategies, for example, to promote privacy and dignity among clients. In such cases, Public Health recommends installing:
 - Low barriers that are less likely to impede air flow.
 - Easily-wipeable surfaces that become part of the daily cleaning protocol.

RESOURCES

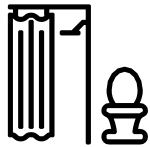
- [CDC COVID-19 Guidance for Shared and Congregate Housing](#)
- King County [Sanitation and Hygiene Guide for Homeless Service Providers](#)
- [Interim Guidance for Homeless Service Providers to Plan and Respond to Coronavirus Disease 2019 \(COVID-19\) – Facility Layout Considerations](#)

Indoor Air Considerations for **SCHOOLS & CHILD CARE SETTINGS**



FACILITY

- Refer to [Washington State Department of Health's K-12 Schools Guidance](#) for current guidance on physical distancing between students and staff. Reduce students to allow for these recommendations.
- Mark where chairs, furniture, etc. should be placed with tape on the floor so they can be kept at the distance described in [DOH's Schools Guidance](#).
- Post occupancy limits for rooms.
- Work with your building engineer to ensure ventilation and/or air filtration are adjusted to accommodate the number of people in your space and to achieve recommendations outlined for ventilation and filtration above.
- Turn ceiling fans off unless used in conjunction with a UVGI system and run in the reverse flow direction to draw air upwards.



RESTROOMS & LOCKER ROOMS

- Leave bathroom fans running at all times when the building is occupied to move moist, dirty air outside.
- Keep bathroom doors closed.
- Install lids on toilets (if they do not already have them). Post signs to remind students to shut toilet lids before flushing. In rare instances, COVID-19 virus found in feces may become airborne when flushed.
- Provide paper towels to dry hands. Disconnect hand dryers (blowers) as they may inadvertently circulate germs.
- Ensure that children 5 years and older and adults wear face coverings in the bathroom.
- Limit the number of people who can use a restroom at one time.
- In locker rooms, limit the use of showers to every other stall.
- Add a trap primer to your drain, which will drain water into the trap to prevent aerosolized sewer

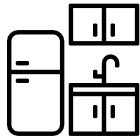
gases, pathogens (like COVID-19), and odors escaping from sewer pipes.

- Consult with your building engineer to ensure that air flow is not moving from the bathroom to the rest of the facility.



NAPPING AREAS

- Cribs or mats should allow for an adequate distance in all directions, as described in [DOH's Schools Guidance](#). Sleeping area floors should be cleaned on a regular schedule:
 - If children sleep on floor mats, floors should be cleaned daily if possible.
 - If a facility is carpeted, use a HEPA vacuum to reduce the amount of virus and other particles that may re-enter the air while vacuuming.
 - Cleaning and disinfection protocols for sleeping areas can be found on the [CDC](#), [HUD](#), and [PHSKC](#) websites.



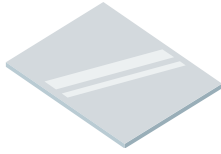
KITCHEN & CAFETERIAS

- Anyone working in the kitchen must wear face coverings at all times.
- Run kitchen exhaust fans when the kitchen is in use. Exhaust fans eliminate cooking fumes that contribute to poor air quality. They can also help pull in outdoor air through doors, windows, and small cracks in the building.
- Meals should be eaten outdoors when feasible. All cafeterias or snacking areas where meals take place should be set up to maintain an adequate distance between each person, as described in [DOH's Schools Guidance](#).
- Staggering mealtimes may help accommodate physical distancing.



SCHOOL BUSES & OTHER TRANSPORTATION VEHICLES

- Keep windows open when it does not create a safety or health hazard.
- Drivers and students over the age of 5 should wear masks while in a vehicle.
- Keep riders as far apart as possible on the bus. Reduce occupancy and increase space through scheduling and use of additional buses.



BARRIERS

- Given that each setting is unique, Public Health does not recommend the installation of barriers without first consulting an expert who can assess airflow in the space.
 - Barriers (such as plexiglass) may be useful for certain situations on a case-by-case basis, such as for front desk staff or in situations in which distances of six feet cannot be maintained (e.g., between bathroom sinks).
 - Barriers may have the unintended consequence of creating “air pockets” that cause virus particles to build up over time.
 - Facilities with HVAC systems should consult with their HVAC specialist to determine the impacts and/or placement of barriers in their space.

OTHER CONSIDERATIONS

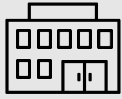
- Allow a “cooling off” period after PE classes or recess before re-entering buildings to decrease heavy breathing.
- Offer more outside time for students.

RESOURCES

- [King County Schools COVID-19 Response Toolkit: Guidance for K-12 public and private school and district staff](#)
- [King County Child Care Administrator Guidance](#)
- Washington State Department of Health [COVID-19-related information on childcare, schools, colleges, and universities](#)
- Washington State Department of Health [K-12 School - Fall 2020-2021 Guidance](#)
- Washington State Department of Health [Guidance for Child Care, Youth Development, and Day Camps During COVID-19](#)
- [Schools for Health – Risk Reduction Strategies for Reopening Schools](#)

Indoor Air Considerations for **RESTAURANTS**

Restaurants should aim for all recommendations listed in above sections of this guide.



FACILITY

- Reduce customer capacity to allow for at least six feet of physical distancing at all times for all activities.
- Mark where chairs, furniture, etc. should be placed with tape on the floor so they can easily be kept six feet apart.
- Avoid crowding in lobbies, waiting areas, or while customers are waiting in line.
- Post occupancy limits for rooms within the facility.
- Work with your building engineer to achieve recommendations for ventilation and air filtration as much as possible. Ensure these are adjusted to accommodate the number of people in your space.
- Turn ceiling fans off unless used in conjunction with a UVGI system and run in the reverse flow direction to draw air upwards.



RESTROOMS

- Leave bathroom fans running at all times when the building is occupied to move moist, dirty air outside.
- Keep bathroom doors closed.
- Install lids on toilets (if they do not already have them). Post signs to remind clients to shut toilet lids before flushing. In rare instances, COVID-19 virus found in feces may become airborne when flushed.
- Provide paper towels to dry hands. Disconnect hand dryers (blowers) as they may inadvertently circulate germs.
- Ensure that face coverings are worn in the bathroom.
- Limit the number of people who can use a restroom at one time.
- Add a trap primer to your drain, which will drain water into the trap to prevent aerosolized sewer gases, pathogens (like COVID-19), and odors escaping from sewer pipes.
- Consult with your building engineer to ensure that air flow is not moving from the bathroom to the rest of the facility.



KITCHENS

- Anyone working in the kitchen must wear face coverings at all times.
- Run kitchen exhaust hoods/fans when the kitchen is in use. Exhaust fans eliminate cooking fumes that contribute to poor air quality. They can also help pull in outdoor air through doors, windows, and small cracks in the building.
- Leave the windows and back doors near the kitchen open at all times.



DINING AREAS

- Follow [Public Health Guidance for Food Establishments](#) to ensure the facility is following the Governor's Washington State Roadmap-to-Recovery plan for reopening.
- Dining areas should be set up to maintain at least six feet of distance between individuals from different parties in all directions.
- Increase the amount of fresh air flow into dining areas by keeping doors and windows open.
- Place HEPA air cleaners throughout indoor dining areas.
- Avoid placing the HEPA air cleaner so that air blows from one person to another.
- Ensure customers are wearing masks whenever not seated at their tables.



BARRIERS

- Barriers can prevent the free movement of air within the establishment. If possible, consult with an expert to determine the best placement of barriers to avoid disrupting airflow.
 - Barriers (such as plexiglass) may be useful for certain situations on a case-by-case basis, such as for front desk staff or in situations in which distances of six feet cannot be maintained (e.g., between bathroom sinks).
 - Barriers may have the unintended consequence of creating "air pockets" that cause virus particles to build up over time.
 - Facilities with HVAC systems should consult with their HVAC specialist to determine the impacts and/or placement of barriers in their space.

RESOURCES

- [CDC's Considerations for Restaurant and Bar Operators](#)
- [Public Health Guidance for Food Establishments](#)

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For more information about indoor air considerations for other sectors, view the [CDC's Guidance for Specific Industries and Occupations](#) and [ASHRAE's Business Readiness Resources](#).

ⁱ The [CDC suggests](#) that CO₂ can be used to help monitor when additional ventilation and filtration, or reduced capacity may be needed. CDC recommends that a CO₂ benchmark number that may be useful below 800 ppm. They suggest that when this number cannot be maintained, enhanced air filtration may be needed.