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Interim Ventilation Guidance during COVID-19

COVID-19 is thought to be primarily spread from person to person through close contact interactions. However, there is growing evidence that this virus can remain airborne for longer times and further distances than originally thought. In addition to close contact with infected people and contaminated surfaces, there is the possibility that the spread of COVID-19 may also occur via airborne particles in indoor environments (particularly in those with poor ventilation). The purpose of this document is to describe steps that may be taken to reduce airborne viral transmission regarding HVAC (heating, ventilating, and air-conditioning) systems and configurations to promote the health and safety of building occupants in the context of COVID-19.

Managing a building's HVAC system can play a role as part of a plan to minimize COVID-19 transmission risk. However, it should not be relied on as the only plan - it should be recognized that other infection control practices are likely to play larger roles in COVID-19 prevention. The most effective ways to reduce the risk of COVID-19 transmission are to:

1. Stay home if you are sick and encourage others (coworkers, employees, etc.) to do so as well. Seek medical attention if you have symptoms of COVID-19.
2. Wear face coverings when in public and around others - even if you do not think you are sick.
3. Practice social/physical distancing: limit close contact with others by remaining at least 6 ft or more away at all times. Avoid physical interactions (shaking hands, hugs, etc.) and sharing items with others (e.g., pens, computers, tools).
4. Wash your hands after touching common, high-touch surfaces (e.g., door handles, elevator buttons) and perform frequent routine cleaning of surfaces and spaces.

It is important to note that the science related to SARS-CoV-2 transmission, particularly via small aerosols, is a rapidly emerging field. There is much to be learned still about the risk of transmission via small "airborne" particles and how ventilation practices may impact that risk. This document was developed based on the best available knowledge at the time, but recommendations are subject to change as more is learned about this novel virus.

In addition to the information provided in this guidance, readers are encouraged to review the following resources related to COVID-19 and indoor air:
https://www.epa.gov/coronavirus/indoor-air-and-coronavirus-covid-19
https://www.epa.gov/coronavirus/ventilation-and-coronavirus-covid-19
https://www.epa.gov/coronavirus/air-cleaners-hvac-filters-and-coronavirus-covid-19

What: Ventilation, filtration, and disinfection can reduce the transmission of airborne viruses in indoor spaces.
Ventilation: Exhaust of indoor air which is replaced by outside air either mechanically or passively through leaks or openings like windows or doors.
Filtration: Filtering of indoor air that is moved through a heating or cooling system and redelivered to the building can reduce virus spread with proper filters (MERV-13 or HEPA). Not all systems can operate properly with such filters, consult an HVAC professional.
Disinfection: UV light can disinfect air as it passes through an HVAC system. UV light disinfection systems are generally used for infection prevention in hospitals, where there is the expectation of higher levels of airborne infection risk. In most buildings occupied by the public (e.g., offices, retail stores, restaurants, schools), circulating airborne contaminant concentrations are expected to be low. Additionally, most of these systems have not been tested specifically for effectiveness related to SARS-CoV-2 / COVID-19.
Why: Increased ventilation rates has been linked to reduced transmission of viruses similar to COVID-19.

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- Ensure your HVAC system is functioning well, performing optimally as it was designed. Drastic changes to alter your HVAC systems could inadvertently create a worse situation.
- Have an HVAC technician perform regular (at least twice per year) maintenance checks, cleaning, and upkeep to ensure the system is running smoothly.
- Enough mechanical ventilation shall be provided to keep rooms free of excessive heat, steam, condensation, vapors, obnoxious odors, smoke, and fumes.
- Improve central air and other HVAC filtration to the highest quality available for your system to operate properly. Consult an HVAC professional. Too high of filtration may damage equipment.
- If possible, HVAC systems should be bringing air from the outside as much as reasonable (not just recirculating air), turning air over at least 6-12 times an hour. A qualified technician may be needed to ensure changes to systems do not create a worse situation.
- Increase outdoor air ventilation when possible. To increase outdoor air ventilation, you can:
  - Encourage natural ventilation when feasible by opening windows, or screened doors.
  - Operate a window air conditioner that has an outdoor air intake or vent, with the vent open (some window air conditioners do not have outside air intakes).
  - Open the outside air intake of the HVAC system if yours has one (uncommon). Consult your HVAC manual or an HVAC professional for details.
- Intake and exhaust air ducts shall be cleaned and filters changed so they are not a source of contamination. Filters should be handled with personal protective equipment.
- In general, disabling of heating, ventilating, and air-conditioning systems is not a recommended.
- Keep systems running longer hours, at least when occupied, 24/7 if possible, including in restrooms.
- If HVAC is turned off or airflow rates minimized when the space is unoccupied, it is recommended to turn back on or increase to full capacity and run the system for at least 2 hours before occupancy, and 2 hours after the last cleaning is completed before turning off again.
- Restaurants should avoid seating people close to air vents where air is being pushed out to avoid creating a flow of viruses from an infected person to people sitting downwind.
- Gathering spaces without mechanical ventilation should consider asking an HVAC professional to add it.
- Portable air filters are a relatively low cost and effective means for retrofitting spaces that lack filtration systems and natural ventilation. Add portable room air cleaners with HEPA or high-MERV filters with due consideration to the clean air delivery rate and room size.
  - Other filter types, including ionizers and ozone generators have not been proven in infection control and can generate harmful byproducts.
- Add restroom ventilation fans if they are not in place. Ventilation should be installed by professionals.
- If toilets are lidded, lids should be put down before toilets are flushed. Lids are not permitted or recommended in some spaces to meet ADA requirements and individual needs.
- Keep toilet doors closed, even when not in use. Restaurant toilet rooms shall be completely enclosed and provided with a tight-fitting and self-closing door. It is not recommended to prop open restroom doors.
- If using standing fans/box fans to help with airflow or heat control, do not use rotating/oscillating fan heads that create "recirculation" and can push air (that may be "dirty" with virus) around in circles. Keep the fans pointing one direction. If using fans, avoid blowing air directly over one person towards another.
  - Circulate air away from breathing zones or in an upward direction if at all possible to avoid fully recirculating the air.
  - Personal cooling fans should not be used in group settings, to reduce the potential spread of any airborne or aerosolized viruses. If personal cooling fans are removed, remain aware of, and take other steps to prevent, heat hazards.
- Maintain temperature and humidity levels. Ideal ranges are temperatures of 68-74 °F and humidity of 40-60%.

Guidance for Ventilation in Homes

When used properly, air purifiers can help reduce airborne contaminants including viruses in a home or confined space. However, by itself, a portable air cleaner **is not enough** to protect people from COVID-19. When used along with other best practices recommended by the Centers for Disease Control and Prevention, operating an air cleaner can be part of a plan to protect yourself and your family.

By itself, running your HVAC system **is not enough** to protect yourself and your family from COVID-19. However, when used along with other best practices recommended by the Centers for Disease Control and Prevention, operating the HVAC system can be part of a plan to protect yourself and your family, since running your HVAC system filters the air as it is circulated.

Service your HVAC system to ensure it is working properly. Maintain and clean ductwork for exhaust air including bath fans and exhaust from central HVAC. Clean intake grills and fans to ensure they move air efficiently; clean fans and ductwork will save energy and move more air. Repair or replace duct work that is crushed, especially ventilation ducts like bath fans. Check outside air grills for blockage and clean them regularly to maintain good outside air flow.

If you have an HVAC system:

- Run the system fan for longer times, or continuously, as HVAC systems filter the air only when the fan is running. Many systems can be set to run the fan even when no heating or cooling is taking place.
- Check to be sure the filter is correctly in place and consider upgrading the filter to a higher efficiency filter or the highest-rated filter that your system fan and filter slot can accommodate (consult your HVAC manual or an HVAC professional for details).
- Open the outside air intake, if your system has one (this is not common for home systems). Consult your HVAC manual or an HVAC professional for details.

Ensuring proper ventilation with outside air is a standard best practice for improving indoor air quality. However, by itself, increasing ventilation **is not enough** to protect people from COVID-19. When used along with other best practices recommended by the Centers for Disease Control and Prevention, increasing ventilation can be part of a plan to protect yourself and your family.

To increase ventilation in your home, you can:

- Open the windows, or screened doors, if possible.
- Operate a window air conditioner that has an outdoor air intake or vent, with the vent open (some window air conditioners do not have outside air intakes).
- Open the outside air intake of the HVAC system, if yours has one (this is not common). Consult your HVAC manual or an HVAC professional for details.
- Operate a restroom fan when the restroom is in use and continuously, if possible.

Will an Ozone Generator protect me and my family from COVID-19?
No, do not use ozone generators in occupied spaces. When used at concentrations that do not exceed public health standards, ozone applied to indoor air does not effectively remove viruses, bacteria, mold, or other biological pollutants.

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