



ASHRAE EPIDEMIC TASK FORCE

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Introduction - Home is the Safest Place



- Regardless of the kind of home we live in, we are being encouraged to stay there as much as possible to mitigate the spread of the COVID-19.
- Unless a household member is infected, homes are generally the safest environment we have.
- Contact with the outside world is unavoidable and there is the possibility that a source of infection is in or has entered the home; it is prudent to take reasonable precautions within one's home to keep it as safe as possible during the current epidemic.



Home is the Safest Place... ...Until it's not



- Household transmission of COVID-19 is common and often occurs before people show symptoms.
- If a household member is known or suspected of being infected with COVID-19, additional actions can be taken to protect others.
- What should I do if someone in my home is infected?
 - Refer to guidance on creating an [Isolation Space](#)
- What should I do to protect high-risk individuals in my home?
 - Refer to guidance on creating a [Protected Space](#)



ASHRAE Recommendations Align with CDC



- ASHRAE recommends following the [guidance](#) of the Centers for Disease Control (CDC), which includes minimizing contact as much as possible, and improving ventilation in your home.
- The CDC recommends that one has a household [plan](#) which includes basic information on how to [protect yourself](#) and how to keep your [home sanitary](#).
- The guidance in this presentation is intended to supplement these recommendations with options related to controlling virus transmission through the air using the home's heating, ventilating and air-conditioning (HVAC) equipment and related factors.
- More details on some of the options and concepts below can be found in ASHRAE's [Residential IAQ Guide](#), which ASHRAE has made available free of charge for the duration of this epidemic.



General Guidance Applicable to All Homes



Because of the variation of home construction, HVAC system and climate, some of the recommendations below may not be meaningful or practical in a given specific situation:

- **Maintain normal thermal comfort conditions:** The HVAC system should be operated and maintained consistent with its instructions, and to provide acceptable indoor thermal conditions, which is normally in the range of 68-78°F (20-25°C) and 40-60% relative humidity (RH).
- **Increase ventilation rate:** The home's ventilation system should be operated at least to provide the flow rate intended at all times. If mechanical ventilation systems are not available in single-family homes, opening multiple windows is an acceptable alternative, provided the open windows do not cause excessive draft. Whole-house "Summer Cooling" fans may also be used when weather permits. Ventilation should only be increased above required minimums if normal indoor temperature and humidity conditions are maintained.



General Guidance Applicable to All Homes (cont'd)



- **Operate Restroom Exhaust Fans:** Exhaust fans in bathrooms, toilets and lavatories should be operated whenever the facilities are in use. If possible, they should be operated continuously. Toilet lids should be closed as much as possible.
- **Operate Stand-Alone [Air Cleaners](#):** Stand-alone air cleaners (often called air purifiers) with particle filters should be operated continuously, if available. If there is only one, it should be placed in the area where the most vulnerable people in the household spend their time. If purchasing new devices, select ones that use high-efficiency media filters (such as HEPA) and have a high Clean Air Delivery Rate (CADR).
- **Increase Room Air Motion:** Increased air motion within a room, such as from a ceiling fan, may be used to augment any of the strategies above.



Additional Guidance for Homes with Forced-Air Systems



Many homes have forced-air HVAC systems that recirculate air throughout the home through ducts. The recommendations below are specific to those systems.

- **Install High Efficiency Media Filters:** Most air handlers have a slot for replaceable media/paper filters. Such filters should be upgraded to high-efficiency filters (such as MERV 13) or higher, when the system allows it. Personal Protective Equipment (PPE) is advised when [changing filters](#) that may contain virus-laden particles.
- **Operate System Continuously.** Forced air systems should be run as much as possible, such as by using a “FAN ON” setting. More complex control devices, such as smart thermostats, may allow programmable operation. Continuous operation at low speed should provide substantial filtration without undue draft.
- **Operate UltraViolet Germicidal Irradiation:** If present, **UVGI** systems should be maximally operated according to manufacturer instructions. Refer to ASHRAE guidance on [Filtration and Disinfection](#) for more information.
- **Operate Economizers:** If present and weather permits, economizers should be operated consistent with maintenance of normal indoor temperature and humidity conditions.



Additional Guidance for Multi-Family Homes



In multifamily buildings extra care should be taken to reduce the risk of infection in one dwelling unit (e.g. apartment) from spreading to another:

- **Make Sure Water is in the Plumbing Traps:** The U-shaped trap in all plumbing drains should not be allowed to go dry. The easiest action to take is to make sure every sink, shower, bathtub and floor drain is used at least once a day. 30 seconds of flow is sufficient.
- **Maintain Pressurization:** Use of exhaust systems is recommended to keep the home below the pressure of any adjacent common space, such as a corridor. Open windows should be minimized unless it's necessary to meet minimum ventilation requirements or maintain acceptable indoor temperature and humidity levels.
- **Seal Chases and Bypasses:** Any large openings that might allow air to flow to the dwelling unit should be sealed with caulk, foam, plastic or similar materials. Example of such openings include plumbing or other utility penetrations.



Additional Guidance for Creating an Isolation Space



When a household member is known to be infected, additional precautions are required in order to reduce the risk to other household members. The CDC has provided general [guidance for this situation](#). A key aspect is to use a separate room essentially as an isolation space. The following additional actions should be considered when creating such an isolation space:

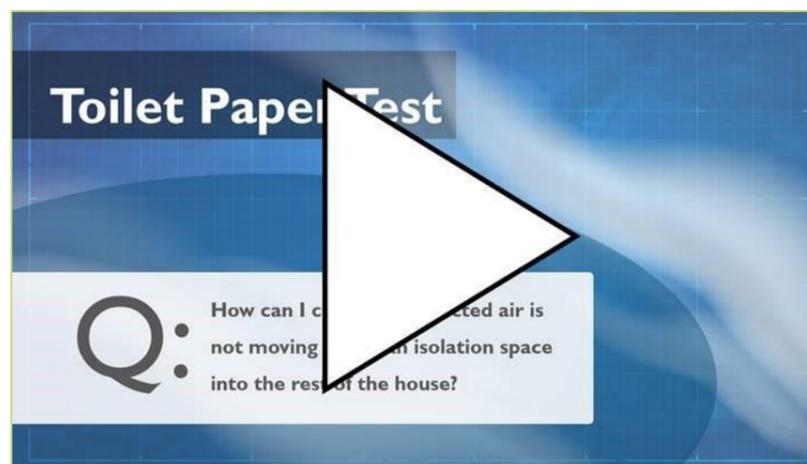
- **Select Isolation Space:** It is preferred that the space be on a high floor in the home during the heating season, but on a low floor during the cooling season. When possible, the isolation space should have its own restroom facilities. The isolation space should not be in the space that has the only return for a forced-air system.
- **Separate HVAC Systems:** A separate HVAC system is recommended for the isolation zone. If necessary, portable room heaters or room air conditioners should be used in the isolation space. If there is a forced-air system that would mix the air between the household and the isolation space, all registers, return grills or supply grills should be sealed, unless it is not possible to provide ventilation or maintain thermal comfort conditions any other way.



Additional Guidance for Creating an Isolation Space (cont'd)



- **Install Air Barriers:** Even if there is a closable door, plastic sheets, strips or similar material should be hung between the isolation space and the common space. Seal any grills connecting the isolation space to the rest of the home.
- **Operate Exhaust Ventilation:** Separate exhaust ventilation should be provided in the isolation space. If that space includes a private restroom with an exhaust fan, that fan should run continuously at high speed. Window-installable products are available to provide exhaust ventilation. Use of operable windows anywhere the home should be minimized. Exhaust fans in the main part of the home should be operated only on an as needed basis, unless required to provide minimum ventilation rates.
- See this [video demonstration](#) on the “toilet paper test”.



Additional Guidance for Creating a Protected Space



The CDC recognizes various categories of [high-risk individuals](#) and has general [guidance for high-risk individuals](#). If there is not a known infected individual but there is a high risk household member, additional protection can be afforded by creating a protected space for the high-risk individual. The following actions should be considered:

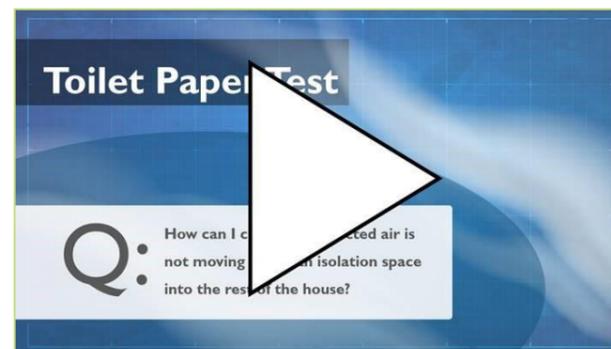
- **Select Protected Space:** It is preferred that the space be on a low floor in the home during the heating season, but on a high floor during the cooling season. When possible, the protected space should have bathroom and toilet facilities. The protected space should not be in the space that has the only return for a forced-air system.
- **Separate HVAC Systems:** A separate HVAC system is recommended for the protected zone. If necessary, portable room heaters or room air conditioners should be used in the isolation space. If there is a forced-air system that would mix the air between the household and the protected space, all registers, return grills or supply grills should be sealed, unless it is not possible to provide ventilation or maintain thermal comfort conditions any other way.



Additional Guidance for Creating a Protected Space (cont'd)



- **Install Air Barriers:** Even if there is a closable door, plastic sheets, strips or similar material should be hung between the protected space and the common space to impede airflow from the common space but allow necessary movement. Seal any transfer grills connecting the protected space to the common space.
- **Operate Supply Ventilation:** Separate outdoor air should be provided to the protected space; if possible, the air should be filtered. Appropriate fan assemblies are available for installation in a window. A normal window air conditioner usually has an “outdoor supply” mode or a small box fan can be taped into a window. If the protected space includes a private restroom with an exhaust fan, that fan should only run when the facilities are in use. Use of operable windows should be minimized throughout the home.
 - See this [video demonstration](#) on the “toilet paper test”.



- **Operate Stand-Alone [Air Cleaner](#):** If available, such a device should be used in the protected space.



Disclaimer



This ASHRAE guidance document is based on the evidence and knowledge available to ASHRAE as of the date of this document. Knowledge regarding transmission of COVID-19 is rapidly evolving. This guidance should be read in conjunction with the relevant government guidance and available research. This material is not a substitute for the advice of a qualified professional. By adopting these recommendations for use, each adopter agrees to accept full responsibility for any personal injury, death, loss, damage or delay arising out of or in connection with their use by or on behalf of such adopter irrespective of the cause or reason therefore and agrees to defend, indemnify and hold harmless ASHRAE, the authors, and others involved in their publication from any and all liability arising out of or in connection with such use as aforesaid and irrespective of any negligence on the part of those indemnified.