

Can HVAC Systems Help Prevent Transmission of COVID-19?



Although much remains unknown about COVID-19, scientists have established that the coronavirus is highly contagious and transmitted via air. Studies suggest that it primarily spreads when infected people cough, sneeze, or talk—actions that expel respiratory droplets containing particles of coronavirus in combination with mucus or saliva. If these droplets land on or are inhaled by others nearby, they could transmit the coronavirus. Touching doorknobs, computer screens, or other surfaces on which droplets have landed may also lead to infection. The now-common guidelines for wearing masks and physical distancing—typically, by remaining six feet away from others—reflect these observations.

Questions remain, however, about whether tiny coronavirus particles, of about 0.1 microns in size, can become airborne and travel greater distances. Although heavy droplets, of about five to ten microns, usually travel less than one meter before settling, smaller droplets may evaporate, leaving virus particles, referred to as aerosols, suspended in the air. A recent study demonstrated that coronavirus particles may be active for up to three hours after their release. Although the World Health Organization (WHO) initially held that the coronavirus could not be spread through aerosols, it recently reversed its stance. The WHO guidelines now state that airborne transmission of the coronavirus may be possible indoors, especially for people who spend extended periods in crowded, poorly ventilated rooms. The WHO's turnaround came after the organization received an open letter from 293 scientists asking the organization to reconsider its position on airborne transmission.

Given the concern about airborne transmission, building managers, safety experts, and others might take steps to optimize ventilation and airflow indoors and limit viral spread. Some simple moves may help (see “Low-tech strategies for preventing airborne viral transmission”). But this may also be a good time to think about improving air quality in buildings by significantly changing heating, ventilation, and air-conditioning (HVAC) systems or by making physical changes to manage indoor airflows.

Control-setting changes and upgrades to HVAC systems

HVAC systems can potentially spread a virus across rooms when high-speed air flows past an infected person to others, something that has been shown with Severe Acute Respiratory Syndrome in 2004.⁷ If airborne transmission is also

possible with the coronavirus, a few control-setting changes and upgrades may help decrease the risk of spread through this route. If building managers take such actions, they might help their tenants feel more comfortable amid all the uncertainty about the coronavirus.

One step that technicians could take involves configuring ducted HVAC systems to increase the rate of exchange with fresh fresh air from outside the building to reduce recirculation. Adjusting the settings may also help. Instead of shutting down overnight or on weekends, for instance, the HVAC system could run without interruption to increase the replacement of air and minimize airflow speeds.

In buildings with old or inflexible systems, technicians might consider upgrading HVAC hardware. Some of the most important might include these:

- replacing fixed-speed fan motors with variable-speed ones to enhance the control of airflow and allow for a minimum setting that produces lower speed airflow
- introducing sophisticated airflow-control systems, such as those that are sensitive to pressure, to allow for smoother adjustment of airflows
- installing high-performance air-purification systems, as discussed in the next section

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