

# USET Tribal Epidemiology Center Recommendations for Tribal Consideration

## USET TEC COVID-19 Guidance 2021-02: Recommendations for Re-opening: Improving Indoor Air Quality to Prevent COVID-19



### Background

SARS-CoV-2, the virus that causes COVID-19, is spread through a variety of methods, including transmission due to exposure to virus-carrying respiratory droplets. Growing evidence suggests that the amount of virus a person is exposed to can influence both their likelihood of developing symptoms as well as the severity of their illness. Therefore, it is important to avoid any exposure to the virus, or in cases when this is not possible, to take risk mitigation efforts to minimize the amount of exposure. There are several evidence-based measures recommended by the Centers for Disease Control and Prevention (CDC) that can be used to minimize exposure to SARS-CoV-2: these include masking, social distancing, surface cleaning, and ventilation. Ventilation is an important element of air quality that can minimize or eliminate airborne particles of COVID-19, therefore reducing the risk of exposure. In this document, the USET Tribal Epidemiology Center (TEC) offers recommendations for the implementation of effective ventilation strategies as an important risk reduction strategy in the fight against COVID-19.

### Transmission of SARS-CoV-2

The CDC [acknowledges three \(3\) modes of transmission of SARS-CoV-2](#) as of May 7, 2021:

- **Contact/surface transmission:** It is possible for the virus to live on surfaces. When a person encounters those contaminated surfaces (such as by touching it with their hands and then touching their nose/mouth), an infection can occur. However, this mode of transmission is the least common for SARS-CoV-2.
- **Droplet transmission:** Large respiratory droplets containing virus particles (from sneezing, coughing, breathing, etc.) are exhaled and may land on exposed mucous membranes of the nose, eyes, or mouth. These droplets are large enough that gravity works against them quickly; this causes them to float to the ground within a short period of time. As such, droplet transmission carries the most risk in enclosed spaces or crowded areas.
- **Aerosol transmission:** Aerosols are respiratory particles that are too small to be classified as droplets. Because of their small size, they can stay suspended indoors for long periods of time and travel greater distances than large droplets. In indoor spaces, inhalation of these particles may cause the greatest risk of spreading COVID-19.

### Importance of Ventilation

COVID-19 is spread more readily indoors than outdoors, due to a variety of factors including [temperature, humidity, occupancy and air flow](#). Aerosols are a particular risk as they can be effectively dispersed outdoors but linger indoors. Increasing ventilation (the flow of outdoor air to indoor spaces) can decrease the concentration of virus-containing particles. In addition, increasing the rate of filtration (cleaning) of air space can also eliminate these particles. Decreasing virus particle concentration is important in order to reduce both transmission and severity of COVID-19. On its own, ventilation cannot completely eliminate the risk of COVID-19, but when combined with other recommendation precautions (masking, social distancing, vaccination, surface cleaning) it can be [highly effective](#).

### Goals for Increasing Effectiveness of Ventilation

- Increase airflow between indoor and outdoor spaces
- Decrease exposure to virus particles by improving building air filtration
- Increase effectiveness of existing ventilation systems

### USET TEC Recommendations for Ventilation in Different Environments

Based on guidance from organizations including ASHRAE (formerly the American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc.), the Institute for Tribal Environmental Professionals (ITEP), and the CDC, the USET TEC have compiled a broad list of recommendations for improving indoor ventilation and filtration. The following recommendations have been separated by lower cost, easier to implement options (short term) and higher cost, more sustainable strategies.

The USET Tribal Epidemiology Center (TEC) is charged under the Indian Health Care Improvement Act with providing epidemiologic and public health support to federally recognized Tribal Nations in the Nashville Area. The USET TEC is a designated public health authority.

# USET TEC COVID-19 Guidance 2021-02: Recommendations for Re-opening: Improving Indoor Air Quality to Prevent COVID-19



## Homes (Non-public) spaces

- Short Term
  - Open windows and doors to increase airflow, where weather/climate permits
  - Operate fans, especially window fans which move indoor air to the outdoors
  - Use existing exhaust fans, such as those in kitchens
- Long Term
  - Install and run window unit air conditioners, when the temperature allows, with the vent control open (if the unit has one)
  - Use portable high-efficiency particulate air (HEPA) filters throughout the building
  - Add and run low-level continuous exhaust fans

## Schools

- Short Term
  - Open windows to increase airflow, where possible
  - Hold activities, classes, and lunch/meals outside
  - Use child-safe fans to direct airflow of opened windows
  - Use portable HEPA filters for individual classrooms
- Long Term
  - Ensure heating, ventilation, and air conditioning (HVAC) systems are increased to higher MERV (Minimum Efficiency Reporting Values) rating filters, depending on the max rating allowed by the system (MERV of 13 is recommended)
  - Install particulate matter (PM) and carbon dioxide (CO<sub>2</sub>) meters in classrooms to monitor air quality
  - Increase outside air intake if CO<sub>2</sub> level is above 700 ppm

## Offices, Commercial Buildings (Stores, Casinos, etc.)

- Short Term
  - Limit the number of people in a space to increase the effective rate of ventilation per person
  - Implement non-smoking areas to avoid particulate matter from commercial tobacco use
  - Ensure heating, ventilation, and air conditioning (HVAC) systems are increased to higher MERV (Minimum Efficiency Reporting Values) rating filters, depending on the max rating allowed by the system (MERV of 13 is recommended)
  - Use portable HEPA filtration systems to increase the effectiveness of air filtration
  - Run HVAC system at maximum outside airflow settings both before and after the building is occupied to flush airspace
- Long Term
  - Consult with HVAC and indoor air quality specialists to regularly review ventilation systems
  - If upgrading HVAC system, ensure it allows for increased filtration (higher MERV rating filters) and increased outside air intake
  - Install permanent HEPA filters if HVAC capacity allows it
  - Permanent HEPA filters and upgraded HVAC are particularly recommended for businesses that allow commercial tobacco use indoors
  - Install PM and CO<sub>2</sub> monitors and provide training to appropriate staff for their use
  - Increase outside air intake if CO<sub>2</sub> level is above 700 ppm
  - Install ultraviolet germicidal irradiation (UVGI) systems to enhance air filtration
  - Use licensed trained HVAC engineers to design UVGI system and licensed trained HVAC technicians to install it
  - UVGI is especially useful for inactivating SARS-CoV-2 when other ventilation options are limited.

## Health Centers

- Guidance is similar for commercial buildings but may require a higher rate of filtration and ventilation due to increased exposure to infection
- In particular, it is important that ventilation systems are properly set up for patient isolation rooms

# USET TEC COVID-19 Guidance 2021-02: Recommendations for Re-opening: Improving Indoor Air Quality to Prevent COVID-19



## Summary of Recommendations

Providing good ventilation is an essential tool in an effective multi-pronged strategy to prevent COVID-19. While there are many different “air cleaners” available, many of these are unproven technologies, including ozonation, ionization, and bi-polar ionization. The recommendations in this document focus on those strategies that have been proven effective for years: primarily, the upgrading of HVAC systems and the use of CO2 monitors to regularly monitor indoor air quality. These recommendations reflect the USET TEC’s interpretation of leading experts’ ventilation guidance with respect to the needs of our member Tribal Nations. All these recommendations may be applicable or necessary to your communities, and the USET TEC is available for consultation should Tribal Nations, under their Tribal Sovereignty, require further assistance in implementing any of these recommendations.

## Resources

Harvard T.H. Chan School of Public Health. Healthy Buildings Program: Portable Air Cleaner Purification Calculator and Maximum CO2 Concentration Calculator: <https://schools.forhealth.org/covid-19-tools/>

National Tribal Air Association. Indoor Air Quality (IAQ) Considerations to Assist Tribes in RE-Opening Tribal Buildings During COVID: <https://www.ntatribalair.org/indoor-air-quality/>

## References

ASHRAE. (January 6, 2021). Core recommendations for reducing airborne infectious aerosol exposure. Retrieved May 24, 2021 from: <https://www.ashrae.org/file%20library/technical%20resources/covid-19/core-recommendations-for-reducing-airborne-infectious-aerosol-exposure.pdf>

ASHRAE. (2021). Upgrading building readiness. Retrieved May 24, 2021 from: <https://www.ashrae.org/technical-resources/building-readiness#upgrading>

Centers for Disease Control and Transmission (CDC). (March 23, 2021). Ventilation in Buildings. Retrieved May 21, 2021 from: <https://www.cdc.gov/coronavirus/2019-ncov/community/ventilation.html>

CDC. (May 7, 2021). Scientific brief: SARS-CoV-2 Transmission. Retrieved May 21, 2021 from: [https://www.cdc.gov/coronavirus/2019-ncov/science/science-briefs/sars-cov-2-transmission.html?CDC\\_AA\\_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Fscience%2Fscience-briefs%2Fscientific-brief-sars-cov-2.html](https://www.cdc.gov/coronavirus/2019-ncov/science/science-briefs/sars-cov-2-transmission.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Fscience%2Fscience-briefs%2Fscientific-brief-sars-cov-2.html)

Healthy Buildings. (November 2020). Healthy schools: Risk reduction strategies for reopening schools. Retrieved May 24, 2021 from: <https://schools.forhealth.org/risk-reduction-strategies-for-reopening-schools/download/>

Tang, S., Mao, Y., Jones, R. M., Tan, Q., Ji, J. S., Li, N., Shen, J., Lv, Y., Pan, L., Ding, P., Wang, X., Wang, Y., MacIntyre, C. R., & Shi, X. (2020). Aerosol transmission of SARS-CoV-2? Evidence, prevention and control. *Environment international*, 144, 106039. <https://doi.org/10.1016/j.envint.2020.106039>

United States Environmental Protection Agency (EPA). (January 13, 2021). Implementing a layered approach to address COVID-19 in public indoor spaces. Retrieved May 27, 2021 from: <https://www.epa.gov/coronavirus/implementing-layered-approach-address-covid-19-public-indoor-spaces>

Wang J, Tang K, Feng K, et al. Impact of temperature and relative humidity on the transmission of COVID-19: a modelling study in China and the United States. *BMJ Open* 2021;11:e043863. doi: 10.1136/bmjopen-2020-043863