



# Coronavirus (COVID-19) transmission from air-circulating, wind-blowing devices and activities

Frequently asked questions - 4 December 2020

## Coronavirus (COVID-19) infection

Coronavirus (COVID-19) is commonly spread between humans by respiratory droplets and contact transmission. This can happen when a person comes into close contact with another person with coronavirus (COVID-19) or by touching a contaminated surface or item (known as fomites). The person may become infected if they touch their nose, eyes or mouth with a contaminated hand or object.

Respiratory droplets are made when an infected person coughs, sneezes or talks. Respiratory viruses spread when large respiratory droplets (>5 microns), which are carrying infectious pathogens, are expelled from the respiratory tract of infectious individuals and land on a susceptible person or another surface. Respiratory droplets also spread during aerosol generating procedures (AGPs) and aerosol generating behaviours when a fine spray of droplets (<5 microns) are suspended in the air.

Poor ventilation and airflow in indoor environments have been suspected to increase the risk of transmission of coronavirus (COVID-19) (World Health Organisation, 2020).

## Purpose

This document provides technical guidance on the use of air generating, air moving, and wind blowing devices and activities in healthcare, non-healthcare and community settings and the risk of transmission of coronavirus (COVID-19). This includes fans, air conditioning units, wind blowing instruments and choirs.

## Key points

- Ventilation is important to maintaining air quality in an environment with the removal of stale air and the introduction of fresh air.
- Modelling and studies of outbreaks suggest that heating, ventilation and air conditioning (HVAC) systems may increase the dispersal of infectious particles and lead to increased transmission of coronavirus (COVID-19), however there is currently insufficient evidence to prove this (Chirico F, et al. 2020, Borro L, et al. 2020).
- There is a lack of research into small air circulating devices such as hand dryers and fans and the risk of spread of coronavirus (COVID-19). Previous studies into the risk of the spread of bacteria or viral particles from hand dryers demonstrated increased contamination in the immediate environment (air and surfaces) (Huang C, et al, 2012).
- World Health Organization (WHO) guidelines state well maintained HVAC systems can reduce transmission, and caution against the use of fans in indoor environments without adequate outdoor ventilation (World Health Organization, 2020).
- There is emerging literature about wind blowing musical instruments and certain musical activities for example choirs and their potential role in the spread of coronavirus (COVID-19).

# Frequently asked questions about air circulating devices, wind blowing devices and activities

## What are air circulating devices or systems?

Air circulating devices include:

- Small air circulating devices
  - hand dryers
  - hairdryers
  - personal fans
  - handheld fans
- Larger air circulating devices
  - office fans, pedestal and ceiling fans industrial fans, for example cool rooms
  - heating, ventilation and air conditioning (HVAC) units.

## Hand dryers

### Is it safe to use hand dryers in office bathrooms?

Yes. Drying hands with a hand dryer or paper towel are both considered safe practices. There is some evidence that hand dryers disperse water droplets from hands during the drying process. The most important factor in reducing the spread of germs during drying is to thoroughly wash your hands, especially rinsing the soap off (and hence germs), before you dry them.

## Hair dryers

### Is it safe to use hair dryers?

Yes, it is safe to use hair dryers. There is a theoretical risk that a hair dryer may spread contaminated air around a room if there is an infected person in the room (Natale N, 2020). However, it is very unlikely that coronavirus (COVID-19) would spread in this way unless respiratory droplets (for example, from an infected person coughing) were directly in the path of the hair dryer when it was being used and another person was present. During active phases of the pandemic (as measured by active COVID-19 cases in hospitals and in the community), hair dryers are most safely used if a person is alone in a room, or in a shared space when distance of more than 1.5 metres can be maintained between people, regardless of whether they are infected with coronavirus (COVID-19).

## Fans

### Is it safe to use personal and ceiling fans in offices or shared spaces?

When there is active community transmission, small personal fans and ceiling fans should be avoided for heating or cooling purposes in shared indoor spaces such as open offices or industrial settings. This is because fans can transfer air from one area to another more quickly, thereby potentially spreading contaminated aerosols and droplets further. It is safe to use fans in single occupancy rooms with the door closed.

An alternative can be to open doors or windows to increase general air circulation and exchanges of outdoor air (World Health Organization, 2020).

### Are fans and air scrubbers safe for use in hospital ward spaces?

Fans are safe for use in single occupancy rooms but should be turned off when another person enters the room. In isolation rooms under negative pressure, fans may alter the directed airflow pattern and may result in

microorganism transmission and possible infection. In this setting, ward staff should check with hospital engineers if the use of fans will have any impact on existing air conditioning systems.

Fans for air circulation in open hospital ward spaces where there are several people present are typically not recommended even outside of a pandemic. There is evidence that fans assist in dispersing other microorganisms, (such as bacteria and viruses found in hospitals) allowing their spread to other patients in indoor clinical areas. It is therefore safer to not use fans in shared patient areas, particularly during active phases of the pandemic (as measured by active COVID-19 cases in hospitals and in the community). (Global Health Information Network, 2020).

An air scrubber is a portable air circulator which draws air through a series of filters to remove particles and gases before releasing purified air (BACS Contamination Control, 2020). Air scrubbers can recirculate air back into a room or be ducted to exhaust air outside a containment area. When air conditioners or fans are used in conjunction with air scrubbers, aerosol particles may be effectively removed. These devices are safe for use in hospital ward spaces.

### **Can fans be used safely in indoor spaces at home?**

Fans can be used safely at home among family members that are living together who do not have coronavirus (COVID-19) (World Health Organization, 2020). Air blowing from an infected person directly towards another person in closed spaces may increase the risk of transmission of the virus. Therefore, the use of fans should be avoided when a family member is unwell or has been diagnosed with coronavirus (COVID-19) and is not isolated away from other people in the household (World Health Organization, 2020).

Opening windows to increase circulation of fresh air can also improve ventilation in rooms (World Health Organization, 2020).

### **Can fans be used in residential aged care?**

In a single occupied room small personal and ceiling fans may be used with the door closed, regardless of the infection status of the individual. In non-outbreak settings fans can be safely used in communal areas. During active phases of the pandemic (as measured by active coronavirus (COVID-19) cases in hospitals and in the community), fans should not be used in communal areas and should be turned off when another person enters the room as anyone entering may be at risk from air blowing from an infected person in closed spaces.

### **Can fans be used in gyms?**

Currently, the use of fans in the gym environment is not recommended by the department. This advice is subject to change for community gyms based on whether there are still no active coronavirus (COVID-19) cases in hospitals and the community.

Exercise leads to increased production of sweat and breathing may stimulate expulsion of respiratory droplets. The use of fans may spread these respiratory droplets and body sweat further than coughing would alone.

To reduce the need for fans in gyms, gym operators could:

- reduce the air conditioning temperature of the gym by 1-2 degrees Celsius.
- open windows or adjust air-conditioning to increase ventilation in common areas and avoid use of recirculated air via ventilation systems (Safe Work Australia, 2020).

People should not wear masks during strenuous exercise as masks may make it difficult to breathe comfortably, especially if the mask becomes wet or damp from sweat. Wet or damp masks also provide less protection to the wearer. Maintaining physical distancing of at least 1.5 metres from other people is one of the most important preventative measures during exercise (World Health Organization, 2020).

## Air conditioning and ventilation systems

### What are the optimal air conditioning settings?

Reducing or eliminating recirculation of air and increasing the use of outdoor air of heating ventilation and air conditioning (HVAC) systems can help to reduce the risk of transmission of coronavirus (COVID-19) (World Health Organization, 2020). Air conditioning and ventilation systems that are well-maintained and operated should not increase the risk of virus transmission.

All air conditioning and ventilation systems should be regularly inspected, maintained and cleaned.

### Which air conditioner settings should be used in hospital settings?

WHO recommends that recirculation modes on air conditioners should not be used when coronavirus (COVID-19) positive patients are present in wards (World Health Organization, 2020).

When considering ventilation specifications for COVID-19 wards, prioritise areas with a greater number of air exchanges per hour, and greater proportion of fresh (vs recycled) air.

Coronavirus (COVID-19) and suspected COVID-19 patients should be placed in single rooms with negative air pressure if available. Contaminated air should be exhausted to the outdoors. Wherever possible air handling units with central recirculation should be switched to 100% outdoor air or as much as reasonably possible. Toilet and bathroom ventilation systems should be kept at negative pressure and run 24 hours, 7 days a week if possible.

In hospitals, the optimal air exchange rate per hour (ACH) in a standard patient room is recommended to be a minimum of 6 ACH. In negative pressure rooms, the standard is between 12-15 ACH for airborne respiratory viruses (CDC USA, 2020). It is crucial that HVAC system filters, especially systems which use recirculated air, be maintained according to manufacturer and facility standards. Hospital staff should clarify any concerns regarding air conditioners with hospital engineers.

### Which air conditioning settings should be used in buildings?

Wherever possible, supply as much outdoor air as is reasonably possible. The ratio of outdoor air to indoor air should be greater than 40%.

For systems which cannot use outdoor air (run only on recycled air), check manufacturer's device maintenance instructions to determine if there are any alternative options. In these cases, windows should be open as much as possible. In large buildings with poor natural ventilation (for example shopping centres), it is safer to use recirculating ducted air conditioning than to turn it off.

Where HEPA filters or opening of windows are not feasible, appropriate filters or individual air cleansing / handling units may be used as a viable alternative for increasing ventilation and filtering contaminated air (Alberta Health Services COVID-19 Scientific Advisory Group, 2020).

## Wind-blowing devices and activities

Wind-blowing devices include:

- police devices for breath testing
- medical equipment for spirometry.

Wind-blowing activities include:

- playing musical instruments such as wind and brass instruments
- singing in a choir.

## Police devices

### Can personal breath testing equipment be safely used?

Yes. While there is a small theoretical risk of transmission of infectious diseases with the use of breathalysers, if used correctly and cleaned and disinfected between use, the risk of transmission of infection and coronavirus (COVID-19) in particular, is minimal.

Police officers regularly use personal breath testing equipment or 'breathalysers'. Breathalyser devices can operate in two modes – active or passive. The passive mode requires the person to speak closely into the device but not touch it directly. The active mode requires the person to blow directly into the device.

In active mode, a person is required to blow with one long continuous breath into a disposable mouthpiece attached to the, usually handheld, device. Where possible this active test should be conducted outside and there must be at least 1.5 metres distance between the police officer and the person blowing into the device. Police officers must wear a mask and gloves during this procedure. The mouthpiece and used gloves can be disposed of in a normal rubbish bin and the police officer must perform hand hygiene after disposal of the mouthpiece (New South Wales Health, 2020).

## Medical equipment

### Can spirometry equipment be used in outpatient settings?

Spirometry is a routinely performed test to look at pulmonary or lung function. It measures the amount and speed of air going in and coming out of the lungs when breathing through a tube into a spirometry machine.

To ensure safe working practices when performing spirometry, develop a procedure that includes:

- screening clinical risk of all clients before they are tested, including:
  - clinical screening for coronavirus (COVID-19) symptoms (fever, cough, shortness of breath, sore throat, loss of smell or taste)
  - epidemiological screening to ask about contact with a confirmed or suspected case in the previous 14 days, possible high-risk occupation, and whether the patient resides or has travelled through an area with elevated risk of community transmission
  - a temperature check may be included (temperature should be less than 37.5 degrees Celsius).
- spirometry testing should not be undertaken on anyone who has either symptoms or other risk factors for coronavirus (COVID-19). If unwell, refer them to their GP or advise they be tested for coronavirus (COVID-19).
- ensure standard infection prevention and control precautions are followed, such as appropriate use of personal protective equipment (PPE) and hand hygiene
- all assessments and procedures undertaken should be performed with 1.5 metre physical distancing wherever possible.

### Can spirometry be performed in acute care settings?

In acute care settings, spirometry can be essential for patient care in some instances. During a coronavirus (COVID-19) outbreak:

- Spirometry on confirmed or suspected coronavirus (COVID-19) cases must only be performed if deemed essential for patient care and must have medical clearance. The spirometer in use must have a disposable viral filter and spacer in place (for example Vitalograph Alpha Spirometer). The European Respiratory Society Group (ERS) 9.1 recommends that spirometry tests should always be carried out with a high specification disposable in-line bacterial and viral filter in place (European Respiratory Society, 2020). ERS recommend filters with minimum proven efficient for high expiratory flow to 600-700L/min). Use of disposable mouthpieces or sensors

is not recommended at this time with the exception if an additional filter can be added to the patient circuit and not degrade the measurement.

- Where reusable items are utilised, they should be managed carefully and thoroughly cleaned and disinfected between patient use according to infection control guidelines.
- Spirometry should be only used in single patient rooms with the door closed.
- The spirometry procedure should be treated as an aerosol generating procedure and airborne precautions should be used (Thomas, 2020).
- Spirometry may be performed on coronavirus (COVID-19) negative cases and patients where there is no suspicion of COVID-19, as clinically indicated using any spirometer (for example EasyOne Spirometer).

## Musical instruments

### Do musical instruments pose a risk of spreading coronavirus (COVID-19)?

Some instruments pose a higher risk of spreading coronavirus (COVID-19) than others. This is because different instruments generate different concentrations of aerosols (He R, et al, 2020). Higher-risk instruments generate higher aerosol concentration levels and a smaller aerosol size when played in comparison to lower risk instruments and speaking. This generation of higher numbers of aerosol particles may lead to an increased risk of airborne disease transmission, including coronavirus (COVID-19).

The variability of aerosol concentration from different instruments can be attributed to the combined effects of sound production mechanisms of with the instrument type, (that is, brass versus woodwind), the type of mouthpiece (that is, air-jet, single reed or double reed) and tube structure (that is, tube length, turnings and valves).

The type of mouthpiece and the instrument type affect how aerosols are injected into the instrument and the tube structure influences how the aerosol is transported inside the instrument tubes. Instruments with a straight tube design, like oboes, have an increased risk of aerosol generation.

High-risk musical instruments include trumpets, bass trombone, and oboes. Saxophones are likely to produce lower levels of aerosols compared with trumpets (He R, et al, 2020).

Breath condensate ('spit') in brass instruments could potentially represent a risk of droplet, aerosol or fomite transmission if not carefully collected and disposed of. Musicians must drain this fluid and dispose of it in a rubbish bin and then perform hand hygiene.

Transmission could also occur if reeds from woodwind instruments, such as saxophone or oboe, are touched or shared by other musicians (O'Keefe J, 2020).

### Can wind and brass instruments be used safely?

Musical instruments may still be used during the coronavirus (COVID-19) pandemic. There are several measures that may prevent or significantly reduce the risk of infection transmission.

- Reducing the number of people present. This could include reviewing seating arrangements for different musical activities involving wind and brass instruments, including; orchestras, bands or music classes.
- Incorporating additional physical distancing between the musicians. Those musicians playing high-risk instruments (trumpet, bass trombone, oboe) should be more than two metres apart (to account for the length of the instrument) and maximise distance between those playing wind instruments and other musicians.
- Any audience should be distanced as far as is practical from brass and wind musicians and should wear masks.
- Increase room ventilation for example, by opening windows (He, R, 2020).
- Performers playing non-wind instruments (percussion and string players) should wear a face mask.
- Users of brass instruments must regularly monitor and drain their breath condensate ('spit valve'). Musicians must drain this fluid and dispose of it in a rubbish bin and then perform hand hygiene.

- Wind instruments are for individual use and should not be shared unless thoroughly cleaned and disinfected before reuse.
- Using a barrier cap on the bell of a brass instrument significantly reduces the release of respiratory aerosols into the immediate surroundings (He R, 2020). This offers a possible mitigation method for playing in groups, especially in hard to ventilate spaces.

## Choirs

### Can choirs resume safely?

Group singing may transmit coronavirus (COVID-19). Singing inside in a poorly ventilated area with singers not physically distanced for several hours has been associated with the spread of coronavirus (COVID-19) (Hamner L, 2020). Humming and singing softly is of lower risk. A study has shown that normal singing produces more aerosol particles than normal talking, and loud singing generates more particles than normal singing (Alsved M, 2020). Wearing a face mask reduces the level of aerosol particles produced to about that of normal talking. Interestingly, some consonants, for example 'p', 'b', 'r' and 't', generated a high number of small to large droplets (Alsved M, 2020).

It is important that anyone attending group singing does not have any symptoms of coronavirus (COVID-19) to ensure the safety of others. People at high-risk of severe illness should not participate in group singing while there is active community transmission of coronavirus (COVID-19).

Group singing is safest when the following measures are applied:

- singing outside or in a well-ventilated room (with windows open)
- physical distancing of at least 2 metres between each person while singing
- short performances (of less than an hour)
- singing softly.

Outdoor lessons, class or practice is permitted with the number of singers based on current restrictions. Singing lessons need to ensure enough space to allow for physical distancing – allowing for people to keep at least 1.5 metres apart.

Attending indoor lessons, classes and practice is permitted based on current restrictions.

For information on the current restrictions visit [Coronavirus \(COVID-19\) roadmap for reopening](https://www.coronavirus.vic.gov.au/coronavirus-covid-19-restrictions-roadmaps)  
<<https://www.coronavirus.vic.gov.au/coronavirus-covid-19-restrictions-roadmaps>>

If you are running an outdoor class, you may need a permit from your local council.

If a singing assessment is required, the assessor must wear an P2/N95 respirator mask when there is active community transmission of coronavirus (COVID-19). Consideration should be given to introducing glass petitioned rooms, videoing in another room, or recording video from home when there is active community transmission of coronavirus (COVID-19) (Community Music Victoria, 2020).

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**To find out more information about coronavirus and how to stay safe visit**

[DHHS.vic – coronavirus disease \(COVID-19\)](https://www.dhhs.vic.gov.au/coronavirus)

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**If you need an interpreter, call TIS National on 131 450**

**For information in other languages, scan the QR code or visit**

[DHHS.vic – Translated resources - coronavirus \(COVID-19\)](https://www.dhhs.vic.gov.au/translated-resources-coronavirus-disease-covid-19)

<<https://www.dhhs.vic.gov.au/translated-resources-coronavirus-disease-covid-19>>



**For any questions**

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