



Aeration and ventilation for airborne pathogens including SARS-CoV-2

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There have been several requests for more information about ventilation in a clinical setting. The following documents are useful references for increasing knowledge in this field.

To summarise, ventilation is recommended in a clinical setting for reducing exposure to airborne pathogens in the clinical setting.

In the current pandemic of COVID-19 we know that people can shed the virus 2-3 before they are symptomatic. It is thought that they can shed the virus in both droplet and aerosol forms. Droplets will fall relatively quickly downwards (less than 15 minutes) but aerosols can remain airborne for up to 3 hours. It is therefore recommended to ventilate rooms to disperse and reduce the concentration of aerosols.

More information is emerging about getting COVID-19 disease and SARS-CoV-2 viral load exposure. Therefore it is prudent to consider preventing, reducing duration of exposure and the viral concentration in the work setting.

There are different types of ventilation natural and mechanical. For many only natural ventilation or basic extractor fans will be possible to use.

Two air exchanges are thought to eliminate the majority of airborne pathogens but of course the time this will take will vary dependent on: room size, size of windows, air flow and air currents and the natural weather conditions.

A general 'rule of thumb' is 20 minutes but this is not definitive.

When ventilating a room, thought to have been contaminated or potentially contaminated, it is sensible that the room is empty to reduce unnecessary exposure to the aerosols.

If both patient and clinician are wearing masks this should prevent most of the droplet dispersal but not any aerosols.

Public Health England

The rate of clearance of aerosols in an enclosed space is dependent on the extent of any mechanical or natural ventilation – the greater the number of air changes per hour (ventilation rate), the sooner any aerosol will be cleared.

The time required for clearance of aerosols, and thus the time after which the room can be entered without a filtering face piece (class 3) (FFP3) respirator, can be determined by the number of air changes per hour (ACH) as outlined in WHO guidance; in general wards and single rooms there should be a minimum of 6 air changes per hour, in negative-pressure isolation rooms there should be a minimum of 12 air changes per hour.

Where feasible, environmental decontamination should be performed when it is considered appropriate to enter the room or area without an FFP3 respirator. A single air change is estimated to remove 63% of airborne contaminants, after 5 air changes less than 1% of airborne contamination is thought to remain. A minimum of 20 minutes, that is 2 air changes, in hospital settings where the majority of these procedures occur is considered pragmatic.

Reference:

<https://www.gov.uk/government/publications/wuhan-novel-coronavirus-infection-prevention-and-control/transmission-characteristics-and-principles-of-infection-prevention-and-control>

Centre for disease control: USA CDC

Tables for air exchanges:

<https://www.cdc.gov/infectioncontrol/guidelines/environmental/appendix/air.html>

WHO: Natural Ventilation for Infection Control in Health-Care Settings

This document has a lot of information about ventilation systems and flows.

https://www.who.int/water_sanitation_health/publications/natural_ventilation.pdf.