

Managing infections - don't forget about the indoor air in your care home

As winter takes hold and energy costs rise, it is tempting to try and keep residents warm and fuel costs down by hunkering down until the weather gets warmer. But keeping all the windows and doors shut may not be the best idea: homes need ventilation, whether our own or in care homes.

Why does ventilation matter?

The COVID-19 pandemic revealed just how important [ventilation](#) is as part of infection prevention and control especially for respiratory infections. Tiny particles are released when infected people sneeze, cough, talk or breathe which can transport viruses and bacteria. If enough are inhaled these germ carrying particles can cause infections. Some particles can be carried more than 2m in the air and, reduced ventilation means they can build up in air and infection risk increases. This is especially possible in communal areas and social spaces in care homes where people come together for longer periods of time.

Good ventilation can reduce infection risks and brings wider benefits from removing other pollutants, smells and excessive moisture from indoor air. Ventilation can improve the health and well-being of people living, visiting or working in care homes – it helps concentration and sleep quality, increases an individual's satisfaction with their environment, lowers staff sickness rates and reduces exposure to a wider range of – ultimately harmful – air pollutants. Poorly ventilated buildings can also suffer from [damp and mould](#), which is hard and expensive to tackle in care homes, as well as being associated with an increase in the chances of respiratory infections in residents, staff and visitors.

Older people are [particularly vulnerable](#) to the consequences of respiratory infections. Although vaccination significantly reduces risks of infection, premature death, and disease severity, COVID-19 and influenza outbreaks in care homes still happen. Recognising that effective ventilation needs to be balanced against thermal comfort, we need to make well-informed decisions about what we can do. As people age, become less active and their metabolism drops, they are likely to be more [sensitive to the temperature](#) in a home. However, there are still ways of balancing comfort, improved ventilation and better quality of life for staff, visitors and residents.

Understanding and managing ventilation

Some straightforward things that can help with ventilation in care homes include:

1. Understand *your* home's ventilation

Care homes vary significantly in design, from converted houses likely to have predominantly natural ventilation, to purpose built modern buildings with a mixture of natural and mechanical ventilation.

Naturally ventilated buildings use windows, doors and vents such as air bricks or trickle vents to allow air to flow in and out of a building. The amount of ventilation depends on the weather, with windy days more likely to create ventilation than still days. Mechanical ventilation uses fans to move air into and out of rooms. This can vary from simple systems such as a bathroom extractor or a cooker hood, to more complex systems that provide and extract air through grilles in walls or ceilings.

Many homes use local air conditioning units in warmer weather. You may not know that most devices simply cool and recirculate air within a space, but they don't provide any fresh air. This means that a room can feel more "comfortable" but not be better ventilated, and so infection risks remain.

A walk around with the maintenance lead and team can help identify different ways rooms are ventilated. Their knowledge can help suggest practical ways of ensuring rooms have sufficient fresh air. When combined with a home manager's knowledge of staff and residents, balancing ventilation, comfort and care delivery can all be considered together to provide the best approaches in different places. It can sometimes be difficult to work out *how* places are ventilated, but clues include vents in the ceiling, trickle vents on windows. Simply asking "how does air get in and out of this room?" can help. If a space is often stuffy or smelly then ventilation is likely to be inadequate.

It is much easier to ensure good ventilation if you can avoid cold and draughts, so when you check the heating system also consider ventilation at the same time. Some small things can make a big difference – for example radiators under windows help to warm incoming fresh air and mix it in the room, but if the radiators are on internal walls, air coming in from the trickle vent will feel like a draught. Make sure heating systems are regularly maintained and avoid blocking radiators with covers or furniture or drying things on radiators. Understanding how your heating system is controlled can also make a big difference.

2. Make sure things work properly in your home

Enabling good ventilation means making sure things work as they should and just as importantly, check people know how to use them. Mechanical ventilation needs regular servicing to ensure filters and grilles are clean and the system is working properly.

In naturally ventilated buildings keeping window trickle vents open means a small amount of background ventilation goes on even when windows are closed. While in extreme weather conditions these might need to be closed for a while, don't forget about them, and remember to open them later. If ventilation relies on opening windows, make sure the catches and handles work, and rooms don't have furniture getting in the way of them being opened. It is also important to consider safety and security, and it may be necessary to install devices like window opening restrictors to enable both ventilation and a safe care environment. Again, in cold or windy weather, windows may not need to be open all the time, but occasional opening to clear the air can be beneficial.

3. Prioritise spaces where people get together

Airborne infection risk is greatest in shared spaces where people gather for longer periods of time, such as in communal lounges or dining rooms. Short periods of time in a poorly ventilated space are unlikely to pose a significant risk but spending hours in a poorly ventilated room with a lot of people means particles build up in the air and are more likely to be breathed in by more people with an increasing risk.

Ongoing research looking at environmental aspects of air quality in care homes suggests communal lounges and dining rooms are likely to have the poorest ventilation and are where most people congregate. But don't forget staff spaces such as offices or kitchens as they often have people in the same room for a substantial period of time.

Special occasions such as the run up to Christmas or Easter may involve more visitors coming into a home. This doesn't just increase the amount of particles in circulation in the air in a room, but also the range of different germs that may be present in a home.

Some studies suggest risk may be greater in spaces where people are active. Exercise classes or singing can increase the amount of virus being breathed out by an infected person. Simply opening windows and/or doors where it is safe to do so may help to provide the extra ventilation that could make a difference. This may only need to be for short periods of time if it is cold, helping to change the air and stop particles building up

4. Make the air quality "visible"

Carbon dioxide (CO₂) meters are simple, relatively low-cost devices, able to help home staff judge the effectiveness of ventilation efforts. As we all breathe out CO₂, how much CO₂ is in the air in a room reflects both the number of people in the room *and* the ventilation rate. If a room is over occupied, or the ventilation rate too low, a CO₂ meter's reading can prompt action to improve ventilation.

CO₂ is measured in parts per million (ppm). CO₂ of around 800ppm or less usually indicates good ventilation. A CO₂ level over 1500ppm for more than around 20 minutes suggests a room may be poorly ventilated and pose more of a respiratory infection risk. The longer the time and the higher the level of CO₂, the more the risk for people living, visiting and working in the home.

CO₂ monitors can help a building manager carry out a ventilation assessment by informing a home's plan for managing ventilation or indicating where maintenance or engineering work is warranted. In social spaces like dining rooms, a CO₂ monitor can indicate ventilation in real-time and in use. For example, in a room with natural ventilation, a CO₂ monitor can serve as a prompt for staff to open or close windows.

CO₂ meters are not a foolproof way of judging ventilation as false or inaccurate readings happen. The best monitors are those that use a "non-dispersive infra-red (NDIR)" sensor, and they should be regularly checked and if necessary calibrated according to manufacturer guidance. Measurement needs to happen when spaces are occupied, and data gathered for at least 1 hour to increase measurement reliability. Readings are much more reliable in spaces with more people in them, and where monitors are located away from open windows or air vents.

Most CO₂ monitors also provide information on temperature and humidity, so balancing comfort, ventilation and damp and mould risk is easier and informed. Maintaining spaces at 19-24 °C, with humidity between 40% and 60% as far as possible helps minimise virus transmission and ensures a more comfortable space for occupants.

5. Support your staff to understand why ventilation matters and what they can do

To provide effective ventilation for both comfort and infection prevention and control, it is important that staff know why ventilation matters and what *they can do* in the different spaces in their care home.

Information on ventilation could be provided to staff as part of health and safety or infection prevention and control training to help staff understand how respiratory infections can spread in the air and why ventilation is part of the solution.

This may include explaining what the ventilation and heating systems are in the care home and providing advice on what to do to enable good ventilation in different parts of the home. Discussions with staff may also flag up if there are particular areas that are hard to ventilate or individuals who might find cold and draughts more difficult to deal with.

Using simple posters, staff meetings or online information can help to regularly remind staff what they should do in different spaces in a care home as well as advise on what to do if there is a problem with a ventilation system and how they should report it.

If using CO₂ monitors, then giving [guidance](#) to staff on what a CO₂ monitor is, how and where to use them, and what measures can be taken to reduce CO₂ is an important part of supporting improved ventilation quality in homes.

6. Explore ventilation technology

In spaces with poor or difficult ventilation, investing time in a plan for upgrading systems to ensure reliable ventilation may be the best approach. Simple things like making sure windows can open may be quite affordable, but larger changes such as installing mechanical systems can be costly and so may need to be part of longer-term strategic plan for estate improvement.

As an interim solution, air cleaning devices can reduce exposure to pathogens and other air pollutants. These are usually portable, use a normal electrical socket, and can be positioned easily where they are most needed. Research suggests air cleaning devices can be an effective solution for reducing pathogens in air and infection risk.

Many different air cleaners exist and choosing an effective one can be complex. Devices with a HEPA or comparable high-grade filter are usually most effective. Cleaners using ultra-violet lamps may also work. Avoid devices that produce ozone or other chemicals as the chemicals may be a respiratory irritant.

It is also important to look at how much air the device can clean - a small air cleaner in a large room will have very little effect. Cost, maintenance, noise, trip hazards from cables and usability should also be factored into any choice. As devices need to be kept running and be maintained it is essential to have a plan for training staff how to look after them.

Take the next step

Ventilation can be complex and with many companies offering “simple” solutions such as air cleaning devices and other technological solutions, identifying products that are genuinely worthwhile can be challenging. There is a lot of information available and it may help to check these resources for understanding and managing ventilation:

- The Health and Safety Executive guidance on [ventilation in workplaces](#) including how to assess and improve ventilation and [use a CO₂ monitor](#)
- The British Occupational Hygiene Society simple tool called [Breathe Freely](#) to support assessment of ventilation.
- [Detailed guidance](#) for workplaces and public buildings by the Chartered Institution of Building Services Engineers (CIBSE). This provides information about different ventilation systems and explains approaches to assessing and managing ventilation for COVID-19, including some specific information on air cleaning devices.

- A [recent blog](#) from the PROTECT National Core study explains the current evidence for air cleaners as well as links to resources to support selection of devices.
- Good [resources on using CO2 monitors](#) produced by the Co-Schools project. Although aimed at schools, they include videos and are applicable to many other environments

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