



Indoor Air Quality

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Contents

Why Good IAQ Is Important3

 What kinds of things influence IAQ?4

Methods to Improve IAQ in Homes.4

 Source control4

 Dilution by ventilation.4

 Air filtration5

 Air purifiers5

Choosing an IAQ Service Professional6

Conclusion6

Sources7



Indoor Air Quality

The air we breathe has a significant impact on our health. The cleanliness of the air inside buildings, or Indoor Air Quality (IAQ), is particularly important because Americans spend approximately 90% of their time inside.¹ The COVID-19 pandemic has highlighted this topic even further, because there is growing evidence that the virus is spread through airborne particles in indoor environments.²

Commercial buildings like schools and office buildings have building code requirements, including systems to ensure an acceptable level of indoor air quality. In general, there are no such requirements for residential buildings. That leaves homeowners to decide for themselves how to address IAQ in their home.

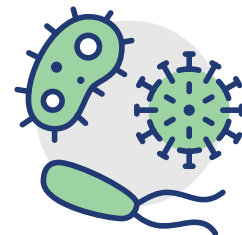
Understanding what IAQ is, the research-backed solutions to improve it, and how to choose a quality service provider are crucial to overall health and well-being.



Why Good IAQ Is Important

The indoor air quality of any structure directly impacts the people that spend time inside of it. IAQ directly affects occupant health, comfort, and productivity.³ Poor IAQ can lead to a number of well-documented impacts, including:

- Increased allergy and asthma symptoms
- Transmission of colds, viruses, and infectious diseases
- Carbon monoxide (CO) poisoning
- Reduced alertness, productivity, and energy levels



When IAQ is good, it protects against negative health effects. Good IAQ means a more comfortable indoor environment, which improves focus⁴, sleep, and overall quality of life.

Homeowners make many choices to ensure a healthy home environment, like keeping dishes clean, sanitizing surfaces, and vacuuming carpeted areas. Similarly, maintaining good IAQ is both proactive and preventative in a healthy home.

What kinds of things influence IAQ? Indoor air quality is most impacted by what is inside a home and how it got there. Cleaning supplies like bleach and detergents are an obvious culprit. Fragrant sprays and burning candles alter the IAQ as well, and not always favorably. Everything inside a home has an impact on indoor air quality: furniture, appliances, clothing, linens, groceries, pets, people - it all matters. The tightness of a home, or how well it is sealed from the outside, also plays an important role in the indoor environment.

“Good” indoor air quality is impossible to define by one single metric. That is because in order to have good IAQ, there must be low levels of known air contaminants, limited airborne transmission of virus, and occupants exhibit no symptoms of health concerns. Therefore, homeowners must make conscious choices to both improve the IAQ of their home, while limiting the actions that are detrimental to IAQ.



Methods to Improve IAQ in Homes

Traditional residential heating and cooling systems recirculate air in the home. Pollutants that enter the home will have a negative impact on IAQ until they are diluted by fresh air, captured in a filtration system, eliminated by an air purifier, or the molecules exit the building via an opening.



Source control - The most effective way to improve indoor air quality is to reduce or eliminate the source of pollutants. In some cases, the sources may be obvious, such as indoor smoking. One way to do this is by ensuring the home is “tight” or properly sealed. For example, ensuring that a door to an enclosed garage is properly sealed can limit the amount of carbon monoxide that makes its way into living spaces. A weatherization service professional can evaluate the tightness of a home and provide recommendations on how to seal it.



Dilution by ventilation - The most effective way to combat unwanted pollutants is to infuse the home with fresh air. This dilutes the bad air molecules with good air molecules, improving IAQ. There are two types of ventilation: natural ventilation and mechanical ventilation. Natural ventilation is opening doors and windows to allow fresh air to flow

through. This method is free of investment cost to most homeowners. The disadvantages include: 1) negative impact on thermal comfort if outdoor conditions are not pleasing, 2) potentially introducing new contaminants to the environment if the outdoor air quality is poor. The other method of ventilations is mechanical ventilation. In mechanical ventilation, a fresh air intake duct is attached to the heating and cooling system. The air is conditioned and filtered before it is introduced to the home. Mechanical ventilation is a sure way to improve the indoor air quality of any home, and this method eliminates the disadvantages of natural ventilation. A ventilation system requires space and construction work, which may not be suitable for every home.



Air filtration - The air inside a home recirculates continuously. In a traditional system with a furnace and split direct expansion (DX) air conditioner, the fan inside the furnace pulls air from inside the home through an air filter, then pushes the air through a cooling coil, and ultimately through ductwork and into spaces. In many homes, the furnace air filter is the only method of air cleansing. Air filters are available in different sizes, depths, and efficiency ratings. Minimum Efficiency Reporting Values, or MERVs, directly correlate to the size of air particles a filter can capture. However, the higher the MERV rating, the more resistance there is in the system. This can lead to reduced air flow or higher energy use, or both, which are harmful to system performance.⁵ Homeowners should check with a North American Technician Excellence (NATE) certified professional about the highest MERV rating suitable for their system.⁶ Air filters should be changed every 3 months at a minimum, or more frequently if people living in the home have allergies or asthma, if there are pets in the home, or if indoor air quality is a concern.



Air purifiers - Air purification systems generally use a combination of air filters and electronics to clean and disinfect the air. A fan moves air through the air cleaning media to remove pollutants. The media and precise method of air cleaning differs from device to device. For example, some air cleaning devices produce ozone in order to sanitize air, because ozone can chemically destroy some types of air pollutants.⁷ However, ozone itself is an air pollutant and can pose health risks. Before selecting any air purification system, homeowners should do their research or work with a Heating Ventilation and Air Conditioning (HVAC) service provider that is proficient in IAQ. Air purification devices should have documented performance data ideally from independent, third party sources.⁸ There are many commercially-available plug-in portable air cleaners. These devices are effective and suitable for single rooms.⁹ Whole-home air purifiers are installed out of sight inside the heating and cooling system, ensuring constant air purification to the entire home.



Choosing an IAQ Service Professional

Homeowners can partner with a professional to make the best choices for IAQ in their home. HVAC professionals are the most experienced with indoor air quality systems and solutions. Homeowners should look for companies that are 1) well-established in the area, 2) employ NATE Certified technicians, 3) are members of the Air Conditioning Contractors of America (ACCA) or the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE). Qualified professionals will also have plenty of testimonials from previous IAQ customers to share.

CONCLUSION

Indoor air quality plays an important role in the overall health and well-being. By making choices to improve indoor air quality, homeowners can reduce health risks and improve quality of life. Improving IAQ is a two-prong approach; taking some steps to reduce pollutant entry and taking other steps to clean pollutants already inside. Since every home is different and the needs of each family are unique, choosing a qualified professional to support IAQ decision-making can illuminate the most effective solutions.

Sources:

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