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An Introduction to Indoor Air Quality

Ever wondered what indoor air quality has to do with your health?

If You're Indoors, Then Indoor Air Quality Matters

Americans spend nearly 90% of their time indoors, whether it is at home, at work, at school, or in a vehicle. Particles in the air enter the lungs with every breath. Indoor air quality is *everything* if you have asthma. Exposure to indoor air pollution can make asthma worse, increasing the frequency and severity of attacks.

If you or your loved one's asthma is triggered by indoor allergens, you know how important it is to keep your home as dust-free and clean as possible. But you may not know where to look for pollution sources or how to address them to reduce indoor air pollution. This eGuide can help.

Even if you don't have asthma, indoor air pollution can cause congestion, sneezing, fatigue, nausea and other symptoms. In severe cases, poor indoor air quality can affect your quality of life, and in extreme cases can cause illness and lung disease.



Finding the Source of Indoor Air Pollution Isn't Easy

Sometimes it can be difficult to identify what is causing the symptoms. Sick building syndrome is a condition where people get sick when in a particular building and feel better when they are away, but with no easily identifiable cause. There are some guesses that the majority of cases have to do with the air circulation system, but no one knows for sure. They have not identified the exact source of the illness yet, but that doesn't mean that it is all in their heads. Take asbestos, for instance.

When asbestos was first used in construction, no one had any idea that long term exposure to asbestos fibers could cause lung cancer. Now every state except Wyoming requires a state-level license for contractors working in asbestos removal, to guarantee that they are qualified. There are similar requirements for contractors and renovators working on older buildings where lead paint is likely to have been used.

Do you or someone you love suffer from indoor allergies or asthma? Does your business' productivity suffer due to employee illness or cold-like symptoms that last for weeks?

We have developed this guide to give you an idea of what the indoor pollutants are, how to remove them or lessen their impact, and other concrete steps you can take today to improve your indoor air quality. We hope you will find it helpful.

Indoor Air Pollution

Indoor air pollution exists:

- When there is a source releasing pollutants into the air as gas or small particles.
- When these airborne pollutants are trapped indoors because there is not enough ventilation.

Our indoor air is polluted by a cocktail of chemical substances, fungi, and gases, as well as biological contaminants. Some of this pollution is from the manufactured carpets, furniture and cleaning products that we bring into our homes and businesses.

Buildings Collect Pollutants

Within the last few decades, building practices have changed, deliberately cutting off drafts that used to continuously move outdoor air inside. For greater energy efficiency, we sacrifice the natural ventilation that refreshes indoor air and reduces the concentration of indoor air pollutants.

Without enough ventilation, the levels of pollutants can build up over time. Indoor air can actually be several times more polluted than the air right outside the window. And in some office buildings, the windows don't even open! Even just breathing can increase indoor CO₂ levels well above normal outdoor levels.

Indoor Air Pollution Is Not a New Problem

Just think back to how people cooked and heated their homes little more than a century ago. People living in developing countries today still burn organic materials, like wood, coal and manure, for day-to-day needs like heating the home or cooking meals. This pollution source could be significantly reduced with proper ventilation and adequately vented stoves, but, without ventilation, it is a significant health risk.



Understanding Indoor Pollution

Source control is critical to improving your indoor air quality. When you identify the sources of the indoor air pollution, you can try to find ways to prevent the pollutants from entering the air in the first place.

Some pollutants will enter your home or business from the surrounding areas, whether it's vehicle exhaust from high traffic, dust from nearby construction or demolition, or cigarette smoke from passersby. Others will originate from within the building, either from its furnishings, cleaning products, or biological contaminants.

Find out more about some of the common pollutants that can affect indoor air quality.

Pet Allergens

Pet allergens, like dander, tend to be concentrated in areas where the dog or cat spends a lot of time, like the couch, or a particular spot on the carpet. Since dander is also airborne, it enters the air circulation system as well and collects in the air ducts. Some allergic individuals may have reactions from residual dander on pet owner's clothes or shoes and brought into the workplace or other public places.

Even if you don't have a pet, you can react to pet allergens in a new residence even months after the pet stopped living there. This is due to dander, but also to allergens in animal urine that may have saturated the carpet, carpet padding, or the floor boards.



Biological Contaminants

Pollen, dust mite waste, cockroach waste, mold spores. Add in high humidity or other moisture, and microorganisms can have a population explosion. These contaminants are easily found in carpets, rugs, upholstery, mattresses, and other soft furnishings, as well as within the air ducts. Cockroach waste may also be found in the kitchen or around water pipes. Your pet may also bring in extra pollen and dust from adventures outdoors.

Volatile Organic Compounds

Volatile organic compounds (VOCs) are carbon-based chemicals with a low boiling point. The boiling point is low enough, that they readily enter indoor air as a vapor at normal room temperature. On a long term basis, low level exposure to VOCs might make asthma worse or cause symptoms in those particularly sensitive to chemicals. VOCs are found in many regular household items, and these products should be used with adequate ventilation, according to the manufacturer's instructions. For an in depth look at what chemicals are found in household products, see <http://hpd.nlm.nih.gov/products.htm>.

Products with VOCs should be used with plenty of ventilation. Ventilation should also be increased for a few days after new carpet installation, painting and other repair work, or after adding a new piece of furniture to your home.

Building Materials

Older buildings especially may have been constructed with asbestos products or have lead-based paint layered on the walls. As long as these materials are not disturbed, they will not affect indoor air quality. Take extra care and hire a contractor licensed for asbestos or lead abatement when undertaking renovations or when repairing water damage.

Carbon Monoxide

Carbon monoxide is odorless and colorless, and completely poisonous, causing death within minutes at high concentration. Carbon monoxide is released within the home through combustion of gas and kerosene, and insufficient venting. This can also be an issue with gas dryers when the dryer vent is blocked by lint. Carbon monoxide can enter the home through cracks or damages in the chimney liner, so it is always a good idea to have your chimney cleaned and checked annually before lighting a fire in the fireplace.

Secondhand Smoke

Smoking tobacco products indoors can contribute to indoor air pollution through secondhand smoke. Secondhand smoke can cause ear infections, respiratory illness and asthma attacks in children. For more information on secondhand smoke, see the CDC fact sheet at http://www.cdc.gov/tobacco/data_statistics/fact_sheets/secondhand_smoke/general_facts/

Radon

Radon is a radioactive gas found in the soil that seeps into buildings through cracks or gaps in the foundation. It is very important to test your home for the presence of radon. Radon gas breaks down into radioactive particles that when breathed in have been associated with lung cancer over long term exposure.

If testing detects radon, don't despair – there are repairs that can be made to your home to keep radon from entering.

Why Indoor Air Quality Matters

Indoor air quality matters because indoor pollution can affect your health and productivity, whether in the short term or in the long term. It's about what you allow to enter your body, and how your body will react to these contaminants in your lungs.

Short Term Effects

There are significant risks to indoor air quality. The most common symptoms of air quality problems include:

- eye, nose, and throat irritation
- unexplained headaches
- dizziness
- nausea
- fatigue

Allergens in the indoor environment can cause allergy flare-ups or asthma attacks. Millions of people in the United States suffer from allergies, many of them children. Exposure to dust mite and cockroach waste in the home has been definitively linked to the development of asthma in children and in individuals with dust mite allergies. Between one and two of every 10 children in the USA have asthma.



Long Term Effects

Taking steps to improve your indoor air quality can immediately improve your health. But even if there are no current health problems, indoor pollutants may harm your health in the long term.

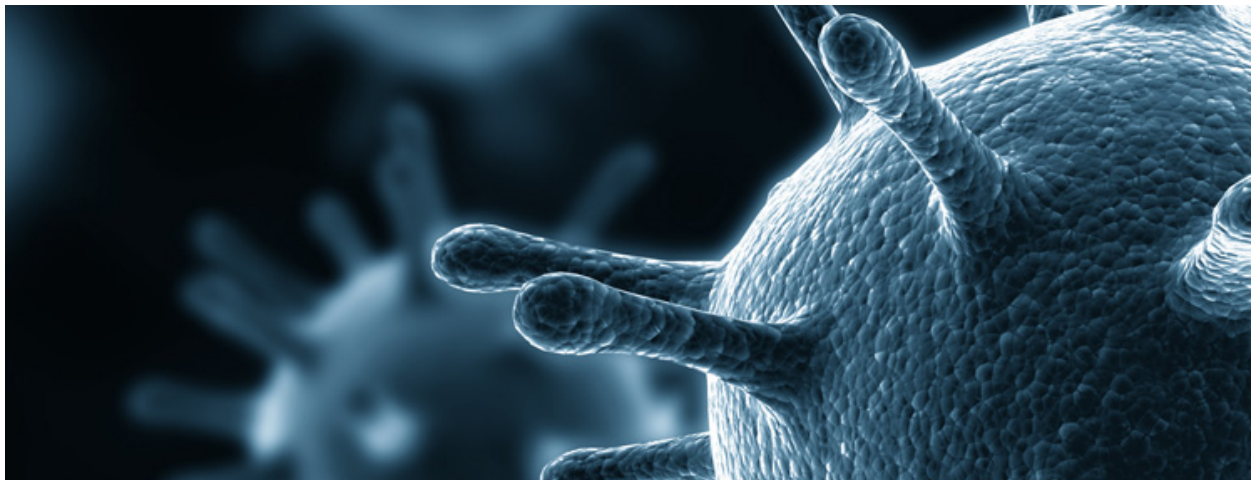
It is kind of like buying organic produce. One of the reasons people choose organically grown fruits and vegetables is to avoid ingesting the pesticides and chemical fertilizers used in non-organic farming. There are few proven consequences to consuming them in trace amounts, but what if they build up in the body over time? Small children have immature immune systems, and there may be future unforeseen health consequences for them even from low levels of exposure. Individuals with other chronic health issues may also be particularly at risk.

This is what the Environmental Protection Agency has to say regarding the possible long term effects of indoor air quality:

It is prudent to try to improve the indoor air quality in your home even if symptoms are not noticeable. <http://www.epa.gov/iaq/ia-intro.html>

Just think about that for a second. *Even if symptoms are not noticeable.*

It is a strong statement. The fact is that we don't know how indoor air pollution will affect our health in the future, what quantities are dangerous, for what length of exposure. But one of the things we do know is that too much of anything is never good. And it means that no one can afford to ignore indoor air quality.



How to Improve Your Indoor Air Quality

Once you have identified which contaminants may be polluting your indoor air, you can make changes in your indoor environment for cleaner, more healthful living.

Reducing allergy and asthma symptoms by improving indoor air quality is a process, and you may not immediately achieve the results that you were hoping for. It is always good to consult with a doctor for allergy and asthma treatment options, as well as advice on how to reduce triggers in the home and at work.

Here are some tips for improving your indoor air quality.

Reduce Allergens

It is impossible to completely eliminate indoor allergens. The fact is, the minute you clean them up, they start accumulating again, landing on every surface. Allergenic particles are lightweight, so they float through the air, and they are sticky, so they can remain on surfaces unless disturbed by someone sitting or walking past.

Luckily, you don't have to get rid of all allergens to improve the indoor air quality. Even reducing the concentration of the allergens can make a huge difference, but it's not something you can take care of once and never have to do again.

Cleaning

Regular cleaning is important to reduce the concentration of common indoor allergens, like dust mites, mold, pollen, and dander. A vacuum cleaner with a HEPA filter will keep the allergens from entering the air as you vacuum. Hard surfaces should be wiped clean with a moist cloth to keep the allergenic particles from becoming airborne again.

Professional carpet and rug cleaning, upholstery cleaning, and mattress cleaning are the best way to reduce an existing population of dust mites. The cleaning may have to be repeated more frequently for continued allergy relief, or you may find it helpful to remove carpeting and replace it with a hard flooring surface.



Control Humidity

Dust mites and mold both grow best in high humidity, so keeping your home at a relative humidity between 30% and 50% will help keep the concentrations lower. You can purchase a hygrometer to measure your home humidity for less than \$10. Monitoring the indoor humidity can

Clean Up from Outdoor Allergens

If you spend time outdoors on high pollen count days, or on windy fall days when mold spores may be blown into the air outdoors, it is a good idea to shower and change your clothes immediately upon reentering the home, to keep from spreading the pollen or mold to different rooms in the house.

Protect Your Mattress from Dust Mites

Purchasing mattress and pillow covers designed to keep dust mites out of the bedding will help reduce allergens in the bedroom. Also change the sheets and blanket frequently and wash in hot water to kill dust mites.

Clean Your Air Ducts

An important step that is often overlooked in allergen reduction is to clean the air ducts and HVAC system. By removing the contaminants in the air ducts, you eliminate the risk of them coming back into your home when the furnace or air conditioner switches on. As a bonus, regular maintenance of the HVAC system will help your furnace and air conditioner run more efficiently and reduce wear and tear on the machinery.

For more information on allergens, see the Asthma and Allergy Foundation of America (<http://www.aafa.org/display.cfm?id=9&sub=18>).



Choose Less Polluting Products

When you bring new carpet in your home, it is a good idea to increase ventilation for a few days after installation, to allow VOCs to off gas, both from the carpet and any adhesive that might be used. A better solution is to choose carpets and adhesives with low VOC emissions.

If you must store paint, stain, sealant, or other home improvement supplies, make sure they are sealed as tightly as possible. Air fresheners and other products with artificial fragrances are typically high VOC contributors, so consider giving them a pass, as well as bug sprays.

Balance Humidity for Wintertime Health

The winter weather causes more issues with health and indoor air quality. Because windows and doors are often shut tight to make heating more efficient, the air is not well ventilated, and as the air is heated by the furnace to a higher temperature, the relative humidity in the home can drop quite low.

Dry winter air can lead to dry mucus membranes, increasing your susceptibility to illness. The influenza virus survives well in cold, dry conditions, so too low humidity at home could also increase your chances of catching the flu.

To combat too dry air, you should use a humidifier, but cautiously. Increasing humidity too much in the home or office can lead to increased mold growth, and even mold growth in the air ducts themselves if moisture condenses on dust and dirt collected along the duct walls.

Humidifiers must be cleaned and maintained according to the manufacturer's guidelines to maintain a healthy living or working environment. Anytime water is allowed to sit or is not properly drained from system components, you run the risk of not only mold growth but also bacterial growth. And you don't want your humidifier to spread bacteria into the air.



Increase Ventilation

The simplest way to increase home ventilation is to open the windows and air out the house for a few hours a day. Of course, it is not always practical to do so, especially on very cold or very hot days, or any time when you might be concerned about outdoor air pollution: high pollen count days, when the lawn is being mowed, et cetera.

Using the exhaust fan over your stove while cooking or running the dishwasher helps remove excess moisture and pollution from the kitchen area. Similarly, you should turn on the fan in the bathroom for 20 minutes after showering, to help expel the moisture from the bathroom and to make sure that none is left in the vent duct that could cause mold growth.

If you are interested in home renovation to improve ventilation, a simple modification is adding a fresh air intake vent with a filter to your existing duct system. The filter will allow fresh air from outdoors to enter the building while filtering out polluting particles from the outdoor air, before they can add to indoor air pollution. You can also consider a whole house fan system, which draws the air upwards and vents it through the attic vents, reducing pollution by keeping the indoor air from getting stale.

A dehumidifier is also a good idea, especially in moister, more humid climates.

Air Cleaning

After cleaning, source removal, and increasing ventilation, you may also wish to look at the air filtering and air cleaning options and appliances available today. No air cleaning or filtration system can be 100% effective, but it can definitely help with maintaining good indoor air quality on a regular basis.



How to Choose an Air Cleaner

A quick search on Google reveals dozens of small appliances going under the name air cleaner or air purifier. They range in size from small plug-in devices that sit like a nightlight on the electrical outlet, to tabletop units and floor-standing towers. These are all intended only for single room use.

The reason there are so many variations of air purifiers is because they work on one of 5 basic premises:

- **Filtering** – You are probably familiar with your furnace’s filter. Air passes through the filter and the filter removes particles from the air. The size of particle that will be captured varies depending on the density of the filter. Pleated filters are much more effective, due to the increased surface area of the filter. All filters must be cleaned (if reusable) or replaced to keep cleaning the air.
- **Ionizing** – This changes the electrical charge of the air particles, so that they are either attracted to a plate in the collecting device, or so they attract each other and cluster together until they become large enough and heavy enough to settle out of the air.
- **Ultraviolet Light** – UV light is used to kill mold spores, bacteria and viruses.
- **Ozone Generator** – An ozone generator uses ozone to clean the air. Due to concerns about ozone in the environment, we do not recommend using any air purifier that releases ozone into your living space.
- **Activated Charcoal (or other adsorbents)** – An adsorbent is a porous material that can trap polluting particles as they pass by. It will be better at attracting certain particles based on the chemical makeup of the material.

Rather than a room-sized unit, an air purifier can be installed within your air circulation system to address the entire residence or office. Air filters can be installed within the air duct system, with filters also available, if desired, at every return vent.



What You Need to Know About Furnace Filters

What's the difference between a dirty filter and a brand new, high efficiency filter? When it comes to protecting particles from entering your home, it may not be much. And the effects on your furnace may be identical.

Filters are rated to capture different sizes of particles. The smaller the particle, the smaller the mesh of the filter has to be to trap that particle and not let it through. And the finer the mesh on the filter, the more it restricts air flow from the furnace, making the furnace work harder. So in that way, a filter that filters too well for your furnace is no different than an extremely dirty filter – it will make your furnace work way too hard to push air through the filter and this may damage the furnace, causing it to break down sooner.

Filtering is about finding a balance between capturing particles and letting air through. The manufacturer for your furnace has guidelines as to what filter should be used for best performance. These guidelines will most likely refer to the minimum efficiency reporting value (MERV) rating of the filter. MERV ratings range from 1 to 16. The higher the number, the smaller the particle and the higher the number of overall particles it can remove. However, no filter will stop all particles. For example, MERV 16 filters up to 95% of particles

Minimum efficiency reporting value (MERV) 1-20, higher number the more particles can remove.

No filter stops all particles. MERV 16 filters will stop 95% of particles across all particle sizes, but it cannot filter every particle. Most home filters are recommended in the MERV 8-11 range

Electrostatic filters are an effective and economical option for many homes. Electrostatic filters combine normal, mechanical filtering with electrostatic filtering, where smaller particles are attracted to the filter by an electrostatic charge and stick to the filter. Electrostatic filters allow for a looser mesh for greater air flow, while still capturing particles at a smaller size. They are also designed to be reusable, with a one-time purchase price lasting for years. Simply rinse the filter clean monthly, allow it to dry, and reinsert it into the filter housing.



From Our Customers

“When we moved into our new home, it just didn’t smell clean. I tried baking soda on the carpets, air fresheners, anything I could think of. It just wouldn’t go away.

My friend asked if I had checked out the air ducts. So I called Dustless Duct. They showed up on time, and were able to show me how dirty the air ducts were. I told them to go ahead, and I am so happy I did! The smell is gone!”

Meghan T., Takoma Park

“Never thought I would say this about any business, but Dustless Duct is the bomb. Not only are my allergies better, but they gave me a good price for dryer vent cleaning, too. Thank you very much.”

Bob C., Columbia

“Great service, decent prices.

The guys that came were really professional.

Would recommend.”

Jeremy & Diane, Reisterstown

Your Clean Air Solution

It isn’t always easy to improve your indoor air quality, but Dustless Duct is here to help. Thanks for taking the time to read our eGuide.

If you would like more information on how to make your indoor air cleaner and less polluted, give us a call. You can also find additional information on our website, www.DustlessDuct.com.

