



Air Quality in the Home

Common Pollutants & Remedies

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Indoor air quality matters greatly to our health. The average American spends 90% of the time indoors. Identify the possible pollutants in your home and learn how to improve your air by reducing your exposure. Air pollutants fall into three categories: particulates, gases, and radon.

Particulates

Tiny particles from woodstoves and unvented appliances such as gas stoves can penetrate deep into the lungs and stay for a long time, causing acute or chronic effects. Larger particles – such as mold, pollen, dander, and dust – don't penetrate as deeply but can cause allergic responses. The health effects of particulates depend on the types and concentrations of particles present, the frequency and duration of exposure, and an individual's sensitivity.

Gaseous Pollutants

Carbon Monoxide (CO) is a colorless, odorless gas that is a byproduct of incomplete fossil fuel combustion. CO interferes with the delivery of oxygen in the body. It can cause headaches, dizziness, weakness, nausea, confusion, fatigue, increased chest pain in people with chronic heart disease, and death. California now requires that residences with fossil fuel sources or attached garages have CO detectors installed. Nitrogen Dioxide is also a byproduct of burning fossil fuels. It is a smelly, reddish-brown gas that irritates the mucous membranes in the eye, nose, and throat and can cause shortness of breath. There is evidence that high concentrations or continuous exposure to nitrogen dioxide increases the risk of respiratory infection. Animal studies suggest that repeated exposures to elevated nitrogen dioxide levels may contribute to the development of lung disease such as emphysema. Risk is higher in children and individuals with asthma and other respiratory diseases.

Volatile Organic Compounds

VOCs are a certain class of compounds that vaporize readily and can enter the air we breath. Formaldehyde, benzene, toluene, and styrene are well-known VOCs. A related group of chemicals are called semi-volatile organic compounds (SVOCs), and include phthalates, halogenated fire retardants, perfluorocarbons, and some pesticides. Effects of exposure to VOCs include eye, nose, and throat irritation; headaches, loss of coordination, nausea; and damage to liver, kidney, and central nervous system. Some VOCs are suspected or known to cause cancer in humans.

Radon

Although it's not common in the East Bay, radon is one of the most serious indoor air hazards in the US and Europe. Radon comes from uranium in the soil or rock on which homes are built. As uranium naturally breaks down, it releases radon gas, which is colorless, odorless, and radioactive. A low-cost test can be purchased at hardware stores to determine radon levels, and simple solutions can be implemented to fix the problem.

Sources of Indoor Air Pollution:

Clothes, Linens, Curtains, Furniture, Mattresses

The chemical most widely used in dry cleaning – perchloroethylene – accumulates in body fat and studies have shown that women exposed to it have an increased risk for breast cancer. Short-term exposure may cause skin irritation, dizziness, and headaches. The EcoDirectory lists cleaners who use alternative methods for dry cleaning. New clothing, drapes, and linens may have been treated with formaldehyde. Wash them before using or unwrap and let them air outside for a week before bringing them in. Shower curtains made from vinyl (PVC) emit VOCs and phthalates. Shower curtains made from cotton, hemp, or EVA

factsheet

Air Quality in the Home (continued)

plastic are better alternatives. Flame retardants used on couches, futons, mattresses, and foam furniture have been shown to cause developmental and reproductive harm, cancer risks, and other health impacts. Advocate for changes to laws that require toxic chemical flame retardants. Call manufacturers and ask about their use of flame retardants before you purchase. Check the EcoDirectory for listings for natural material mattresses and reused furniture.

Candle, Incense, Cigarette & Woodsmoke

Most candles are made with paraffin, a petroleum product. When burned, paraffin candles release known carcinogens (cancer-causing substances) such as benzene, toluene, formaldehyde, acetaldehyde, and acrolein. They also release asthma-causing soot. Most incense contains formaldehyde and phthalates. When burned, carcinogenic chemicals are released into the air, along with CO, sulfur dioxide, and nitrogen dioxide. Woodsmoke and cigarettes release a similar stew. Burning incense produces the VOCs benzene, toluene, and xylene, which cause respiratory irritation and may trigger DNA mutations. Gasses and particulate matter permeate rapidly through indoor spaces and can leave toxic residue. Solutions: Beeswax and soy candles do not generally produce soot or toxins when burned. To clear the air, open windows and doors. Try a drop of essential oil in a bowl set on a radiator or in an aromatherapy candleholder. Please note that some people may be sensitive to essential oil as well. Simmer apple cider with spices, or simmer mint, citrus peel, rosemary, bay leaves, and cloves. [Better Basics for the Home](#) by Annie Berthold-Bond contains many recipes for creating scents.

Appliances

Appliances that run on natural gas or kerosene such as stoves and furnaces should be vented. They release carbon monoxide, particulates, and nitrogen dioxide. Use an exhaust fan over gas stoves and ranges that vents to the outdoors. Keep the burners properly adjusted to burn with a blue-tipped flame; a persistent yellow-tipped flame indicates maladjustment. All furnaces, flues, and chimneys should be inspected and repaired annually. When using a fuel space heater, follow manufacturer instructions carefully and ventilate the room. Clean the filter on forced air furnaces frequently.

Building Materials

Formaldehyde can enter the air from furniture, building materials, particleboard, and cabinetry. The EPA lists formaldehyde as a probable carcinogen and the California Air Resources Board lists it as a Toxic Air Contaminant with no safe level of exposure. Formaldehyde may cause burning sensations in the eyes and throat, nausea, and difficult breathing. High concentrations may trigger asthma attacks. When possible, choose reused furniture: the VOCs are more likely to have evaporated. Pick solid, sustainably harvested wood rather than particleboard.

Carpet and Vinyl Flooring

New carpet and vinyl flooring can off-gas VOCs. Carpet can also hold particulates that cause respiratory problems. Of the chemicals released from synthetic carpet, most notable are styrene and 4-phenylcyclohexane (4-PC), both of which come from the synthetic latex backing used on 95 percent of carpets.

The “new carpet” aroma is the odor of 4-PC off-gassing. 4-PC irritates eyes, respiratory system, and central nervous system. The adhesive used to affix carpet to the floor typically contains benzene and toluene. Solution: Even the best wall-to-wall carpet is a haven for dust mites, mold spores, and lingering VOCs, and is often one of the largest hosts of contaminants in our homes. Avoid wall-to-wall carpet. Choose area rugs on a bare floor that can be cleaned to remove pollutants that collect in them. Choose natural linoleum rather than vinyl flooring.

Cleaners, Air Fresheners, Body Products & Perfumes

Cleaning products often contain ingredients listed as asthmagens, carcinogens, reproductive toxins, or toxic air contaminants. Volatile components are emitted into the air during and after the cleaning processes and can degrade air quality. For safer alternatives, refer to the Ecology Center's Alternative Cleaning Recipes fact sheet. Fragrance is added to many cleaners, laundry detergents, and fabric softeners. The chemical formulas of fragrances are considered trade secrets, so companies aren't required to list ingredients on labels, even though many contain VOCs linked to asthma, allergies, headaches, and cancer. VOCs and SVOCs are released from many deodorants, hair sprays, shampoos, toners, nail polishes, perfumes, and air fresheners. To avoid these chemicals, select fragrance-free products and avoid aerosols. Wear essential oils in lieu of perfumes or no scents at all.

Pesticides & Disinfectants

Common pesticides and disinfectants used indoors can contain chemicals that irritate eyes, nose, and throat, and cause headache, dizziness, muscular weakness, and nausea. Exposure has been linked to increased cancer risk, and chronic exposure to some pesticides can damage the liver, kidneys, endocrine and nervous systems. Integrated Pest Management (IPM) strategies exist that minimize the need for harmful pesticides. Hydrogen peroxide, vinegar, and alcohol can be effective sanitizers.

Biological Contaminants

Biological contaminants include molds, mildew, animal dander, cat saliva, house dust mites, cockroaches, and pollen. All can trigger allergies or asthma. To control exposure to these contaminants, clean and vacuum regularly, preferably with a HEPA filter. Wash bedding in hot water. Mold, mildew, and roaches thrive in humid conditions; control indoor humidity by using bath and kitchen exhaust fans. Refer to the California Health Department fact sheet on mold for more guidance.

Other Great Ideas

You can address indoor air problems by removing the source, ventilating, and using air cleaners. From time to time, open your windows and doors and let fresh outdoor air circulate. NASA has compiled a list of houseplants that filter significant amounts of benzene, formaldehyde, and trichloroethylene from indoor air. Air cleaners are available that can help with ongoing problems. Be sure to get out in nature and visit the great outdoors.

Recommended Resources

Ecology Center EcoDirectory, ecologycenter.org/directory
EPA Indoor Air Guide, epa.gov/iaq/