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MEDfacts

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INDOOR AIR POLLUTION

Why are we concerned about indoor air pollution?

Since the energy crisis of the early 1970's, emphasis on energy-efficient homes has skyrocketed. A great deal of attention centers on making homes airtight to decrease the amount of energy and expense needed for heating, which may decrease natural ventilation (an exchange of outside and inside air). Because of this, we have become concerned about the health effects of indoor air pollution within the home.

We spend approximately 80 percent of our time indoors. The percentage for children and the elderly is usually higher; in fact, they may venture outside only one hour a day, especially during the colder months of the year. Therefore, it is important to look at sources within the home that may emit particulates, gases and fumes harmful to our health.

Where are the pollutants coming from?

Many different sources within the home can emit pollutants. Some of these sources continually pollute, such as those used in building materials and home furnishings: pressed wood products and insulation with urea-formaldehyde. Other sources may emit pollutants intermittently, such as those released from wood-burning and gas stoves, along with organic compounds released from cleaning and hobby supplies.

Some of the more common pollution sources within the home release through combustion: wood-burning stoves, fireplaces, unvented kerosene and gas space heaters and gas stoves. Carbon monoxide, nitrogen dioxide, polycyclic aromatic hydrocarbons and acid aerosols are examples of some pollutants which can be emitted by combustion.

Organic chemicals are another source of concern and are commonly found in household products such as paints, varnishes, degreasing agents, disinfectants and hobby products. These organic compounds may include benzene, perchloroethylene, paradichlorobenzene and methylene chloride.

Another common source of pollution released through combustion is secondhand smoke from cigarettes or cigars. The EPA concludes that in adults, secondhand smoke is a Class A carcinogen. It is responsible for approximately 3,000 lung cancer deaths every year in U.S. non-smokers and is associated with increased risk of severe asthma exacerbation in children.

It is important to remember that once an activity has stopped, the particulates emitted can remain in the air and continue to pose a health threat for long periods of time. In the case of cigarette smoke, there is growing evidence that particles settling on surfaces continue to pose a risk to children's health in the form of their hand smoke.

What effects do these pollutants have on our health?

Exposure to hazardous pollutants may have an immediate or a long-term effect, which may not show up for many years. The significance of the exposure depends upon the source, how much is emitted from the source, how harmful the pollutants are, and how much of the pollutants have accumulated within the home.

Some immediate symptoms of exposure may include:

- Headache,
- Dizziness,
- Fatigue,
- Upper airway irritation of the nose, throat and eyes,
- Wheezing and shortness of breath.

These symptoms may recur with repeated exposures.

People at Greater Risk

Several factors may influence the vulnerability of an individual's health when exposed to pollutants. The very young and the elderly may experience more problems. In addition, people with pre-existing health problems, such as asthma, COPD and heart disease, can be at higher risk.

Symptom Triggers

Carbon monoxide, nitrogen dioxide and breathable particles released from combustion products can trigger a number of symptoms.

Carbon monoxide, which can interfere with the delivery of oxygen throughout the body, may cause fatigue, headaches, dizziness, nausea, confusion and disorientation when inhaled at high levels. As you may know, when carbon monoxide is inhaled at very high levels it can cause unconsciousness and death. Those with cardiac and respiratory disease may be more sensitive to lower levels of this gas.

Nitrogen dioxide can be very irritating to the upper airways, especially in those people with lung diseases such as emphysema and asthma. Inhaled particles can also be irritating and may contribute to damage within the lungs.

Organic compound exposures may induce symptoms such as headaches, dizziness, eye, nose and throat irritation and memory and visual impairment. However, we need to learn a great deal more about the effects caused by exposure to organic compounds; some are toxic, others are not. Some have been linked to cancer in animals as well as humans.

Formaldehyde is another gas that can be very irritating, causing burning sensations in the eyes, nose and throat. It can also act as a trigger for those with asthma.

Gas and wood burning stoves. A few studies have been done indicating a decrease in lung function in children raised in homes using gas stoves with inadequate ventilation. Another study showed that preschool children raised in homes using wood-burning stoves as the primary source of heat experienced an increase in respiratory symptoms.

A great deal of uncertainty remains regarding the concentrations and length of exposure required to produce adverse health effects from exposure to indoor air pollutants. In addition to the studies mentioned above, more studies need to be done in the area before conclusions may be made.

How can we decrease our exposure to these pollutants?

Because of the uncertainties and further research needed in this area, it is important to try to minimize your exposure to these gases and particulates as a preventive health measure.

- Use exhaust fans vented to the outside when using gas stoves. Keep gas appliances adjusted properly.
- If using an unvented kerosene or gas space heater, follow directions carefully. A continuous "yellow tipped" flame indicates faulty adjustment, which causes more pollutant emissions. Consider purchasing a vented space heater. Keep windows slightly opened and doors open when using non-vented space heaters.
- Always keep the flue open when gas or wood fireplaces are in use.
- There are new wood-burning stoves certified to meet the Environmental Protection Agency's emission standards. Make sure that the stove is properly installed, and glass doors are tightly fitted. Never burn chemically treated wood.
- Have a professional inspect and clean central heating systems, including chimneys, flues, and furnaces.
- All furnaces should be vented to the outside. Change filters as indicated by the manufacturer.
- Work with organic compounds outside or in well ventilated areas. Follow manufacturers' directions carefully, and be cautious in storing these containers. Buy only the amount needed for a particular use, then dispose of the remains safely. Methylene chloride, found in paint strippers, aerosol spray paints and other products, is known to cause cancer in animals.

- Purchase pressed wood products labeled "exterior grade" to decrease formaldehyde exposure. These do not emit as many pollutants because they contain phenol resins, not urea resins. Keep windows open whenever possible to increase ventilation. Increased humidity and high temperatures can increase the release of formaldehyde; therefore, a dehumidifier can be helpful where high humidity is common. Over time, the amount of formaldehyde released from products decreases. In 1985 the Department of Housing and Urban Development placed strict guidelines on the amount of formaldehyde that can be emitted from construction materials in prefabricated and mobile homes.
- Try to improve the overall ventilation within your home. It is helpful to open windows and doors as weather permits. Heat recovery ventilators (air-to-air heat exchangers) are an excellent, energy-efficient way to bring outside air into the home. These systems are available in portable window units or can be added to the central air system.
- Any smoking should be done only outside of the home and care, even when others are not present, due to continuing effects from second-hand and third-hand smoke. Smoking jackets can be worn then changed after returning indoors in order to minimize third-hand smoke exposure.

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