Health Effects of Environmental Tobacco Smoke

In 1992, EPA completed a major assessment of the respiratory health risks of ETS (Respiratory Health Effects of Passive Smoking: Lung Cancer and Other Disorders EPA/600/6-90/006F). The report concludes that exposure to ETS is responsible for approximately 3,000 lung cancer deaths each year in nonsmoking adults and impairs the respiratory health of hundreds of thousands of children.

Infants and young children whose parents smoke in their presence are at increased risk of lower respiratory tract infections (pneumonia and bronchitis) and are more likely to have symptoms of respiratory irritation like cough, excess phlegm, and wheeze. EPA estimates that passive smoking annually causes between 150,000 and 300,000 lower respiratory tract infections in infants and children under 18 months of age, resulting in between 7,500 and 15,000 hospitalizations each year. These children may also have a build-up of fluid in the middle ear, which can lead to ear infections. Older children who have been exposed to secondhand smoke may have slightly reduced lung function.

Asthmatic children are especially at risk. EPA estimates that exposure to secondhand smoke increases the number of episodes and severity of symptoms in hundreds of thousands of asthmatic children, and may cause thousands of non-asthmatic children to develop the disease each year. EPA estimates that between 200,000 and 1,000,000 asthmatic children have their condition made worse by exposure to secondhand smoke each year. Exposure to secondhand smoke causes eye, nose, and throat irritation. It may affect the cardiovascular system and some studies have linked exposure to secondhand smoke with the onset of chest pain. For publications about ETS, go to Smoke Free Homes web site, the IAQ Publications page.

Reducing Exposure to Environmental Tobacco Smoke. Don't smoke at home or permit others to do so. Ask smokers to smoke outdoors.

The 1986 Surgeon General's report concluded that physical separation of smokers and nonsmokers in a common air space, such as different rooms within the same house, may reduce - but will not eliminate - non-smokers' exposure to environmental tobacco smoke.

Top of page

If smoking indoors cannot be avoided, increase ventilation in the area where smoking takes place.

Open windows or use exhaust fans. Ventilation, a common method of reducing exposure to indoor air pollutants, also will reduce but not eliminate exposure to environmental tobacco smoke. Because smoking produces such large amounts of pollutants, natural or mechanical ventilation techniques do not remove them from the air in your home as quickly as they build up. In addition, the large increases in ventilation it takes to significantly reduce exposure to environmental tobacco smoke can also increase energy costs substantially. Consequently, the most effective way to reduce exposure to environmental tobacco smoke in the home is to eliminate smoking there.

Do not smoke if children are present, particularly infants and toddlers.

Children are particularly susceptible to the effects of passive smoking. Do not allow baby-sitters or others who work in your home to smoke indoors. Discourage others from smoking around children. Find out about the smoking policies of the day care center providers, schools, and other care givers for your children. The policy should protect children from exposure to ETS.

Biological Contaminants

Biological contaminants include bacteria, molds, mildew, viruses, animal dander and cat saliva, house dust mites, cockroaches, and pollen. There are many sources of these pollutants. Pollens originate from plants; viruses are transmitted by people and animals; bacteria are carried by people, animals, and soil and plant debris; and household pets are sources of saliva and animal dander. The protein in urine from rats and mice is a potent allergen. When it dries, it can become airborne. Contaminated central air handling systems can become breeding grounds for mold, mildew, and other sources of biological contaminants and can then distribute these contaminants through the home. (See www.epa.gov/mold)

By controlling the relative humidity level in a home, the growth of some sources of biologicals can be minimized. A relative humidity of 30-50 percent is generally recommended for homes. Standing water, water-damaged materials, or wet surfaces also serve as a breeding ground for molds, mildews, bacteria, and insects. House dust mites, the source of one of the most powerful biological allergens, grow in damp, warm environments.

Health Effects From Biological Contaminants

Some biological contaminants trigger allergic reactions, including hypersensitivity pneumonitis, allergic rhinitis, and some types of asthma. Infectious illnesses, such as influenza, measles, and chicken pox are transmitted through the air. Molds and mildews release disease-causing toxins. Symptoms of health problems caused by biological pollutants include sneezing, watery eyes, coughing, shortness of breath, dizziness, lethargy, fever, and digestive problems.

Top of page

Allergic reactions occur only after repeated exposure to a specific biological allergen. However, that reaction may occur immediately upon re-exposure or after multiple exposures over time. As a result, people who have noticed only mild allergic reactions, or no reactions at all, may suddenly find themselves very sensitive to particular allergens.

Some diseases, like humidifier fever, are associated with exposure to toxins from microorganisms that can grow in large building ventilation systems. However, these diseases can also be traced to microorganisms that grow in home heating and cooling systems and humidifiers. Children, elderly people, and people with breathing problems, allergies, and lung diseases are particularly susceptible to disease-causing biological agents in the indoor air.

Reducing Exposure to Biological Contaminants

Install and use exhaust fans that are vented to the outdoors in kitchens and bathrooms and vent clothes dryers outdoors.

These actions can eliminate much of the moisture that builds up from everyday activities. There are exhaust fans on the market that produce little noise, an important consideration for some people. Another benefit to using kitchen and bathroom exhaust fans is that they can reduce levels of organic pollutants that vaporize from hot water used in showers and dishwashers.

Ventilate the attic and crawl spaces to prevent moisture build-up.

Keeping humidity levels in these areas below 50 percent can prevent water condensation on building materials.

If using cool mist or ultrasonic humidifiers, clean appliances according to manufacturer's instructions and refill with fresh water daily.

Because these humidifiers can become breeding grounds for biological contaminants, they have the potential for causing diseases such as hypersensitivity pneumonitis and humidifier fever. Evaporation trays in air conditioners, dehumidifiers, and refrigerators should also be cleaned frequently.

Thoroughly clean and dry water-damaged carpets and building materials (within 24 hours if possible) or consider removal and replacement.

Water-damaged carpets and building materials can harbor mold and bacteria. It is very difficult to completely rid such materials of biological contaminants.

Top of page

Keep the house clean. House dust mites, pollens, animal dander, and other allergy-causing agents can be reduced, although not eliminated, through regular cleaning.

People who are allergic to these pollutants should use allergen-proof mattress encasements, wash bedding in hot (130° F) water, and avoid room furnishings that accumulate dust, especially if they cannot be washed in hot water. Allergic individuals should also leave the house while it is being vacuumed because vacuuming can actually increase airborne levels of mite allergens and other biological contaminants. Using central vacuum systems that are vented to the outdoors or vacuums with high efficiency filters may also be of help.

Take steps to minimize biological pollutants in basements.

Clean and disinfect the basement floor drain regularly. Do not finish a basement below ground level unless all water leaks are patched and outdoor ventilation and adequate heat to prevent condensation are provided. Operate a dehumidifier in the basement if needed to keep relative humidity levels between 30-50 percent.

To learn more about biological pollutants, read *Biological Pollutants in Your Home* issued by the U.S. Consumer Product Safety Commission and the American Lung Association. For contact information, see the section, "Where to Go For Additional Information."

Stoves, Heaters, Fireplaces, and Chimneys

In addition to environmental tobacco smoke, other sources of combustion products are unvented kerosene and gas space heaters, woodstoves, fireplaces, and gas stoves. The major pollutants released are carbon monoxide, nitrogen dioxide, and particles. Unvented kerosene heaters may also generate acid aerosols.

Combustion gases and particles also come from chimneys and flues that are improperly installed or maintained and cracked furnace heat exchangers. Pollutants from fireplaces and woodstoves with no dedicated outdoor air supply can be "back-drafted" from the chimney into the living space, particularly in weatherized homes.

Health Effects of Combustion Products

Carbon monoxide (CO) is a colorless, odorless gas that interferes with the delivery of oxygen throughout the body. At high concentrations it can cause unconsciousness and death. Lower concentrations can cause a range of symptoms from headaches, dizziness, weakness, nausea, confusion, and disorientation, to fatigue in healthy people and episodes of increased chest pain in people with chronic heart disease. The symptoms of carbon monoxide poisoning are sometimes confused with the flu or food poisoning. Fetuses,

infants, elderly people, and people with anemia or with a history of heart or respiratory disease can be especially sensitive to carbon monoxide exposures. Top of page

Nitrogen dioxide (NO_2) is a reddish-brown, irritating odor gas that irritates the mucous membranes in the eye, nose, and throat and causes shortness of breath after exposure to high concentrations. There is evidence that high concentrations or continued exposure to low levels of nitrogen dioxide increases the risk of respiratory infection; there is also evidence from animal studies that repeated exposures to elevated nitrogen dioxide levels may lead, or contribute, to the development of lung disease such as emphysema. People at particular risk from exposure to nitrogen dioxide include children and individuals with asthma and other respiratory diseases.

Particles, released when fuels are incompletely burned, can lodge in the lungs and irritate or damage lung tissue. A number of pollutants, including radon and benzo(a)pyrene, both of which can cause cancer, attach to small particles that are inhaled and then carried deep into the lung.

Reducing Exposure to Combustion Products in Homes

Take special precautions when operating fuel-burning unvented space heaters.

Consider potential effects of indoor air pollution if you use an unvented kerosene or gas space heater. Follow the manufacturer's directions, especially instructions on the proper fuel and keeping the heater properly adjusted. A persistent yellow-tipped flame is generally an indicator of maladjustment and increased pollutant emissions. While a space heater is in use, open a door from the room where the heater is located to the rest of the house and open a window slightly.

Install and use exhaust fans over gas cooking stoves and ranges and keep the burners properly adjusted.

Using a stove hood with a fan vented to the outdoors greatly reduces exposure to pollutants during cooking. Improper adjustment, often indicated by a persistent yellow-tipped flame, causes increased pollutant emissions. Ask your gas company to adjust the burner so that the flame tip is blue. If you purchase a new gas stove or range, consider buying one with pilotless ignition because it does not have a pilot light that burns continuously. Never use a gas stove to heat your home. Always make certain the flue in your gas fireplace is open when the fireplace is in use.

Top of page