



*February 2000*

**"You can take several simple, practical actions to help remove sources of biological pollutants."**

## **WHAT ARE THEY?**

Biological agents include bacteria, viruses, fungi, pollen, dust mites and other insects, animal dander (tiny scales from hair, feathers, or skin) and molds. They can travel through the air and are often invisible. They are usually inhaled, either alone or by attaching themselves to particles of dust and then entering the respiratory system.

## **WHERE ARE THEY FOUND?**

While the majority of biological pollutants are found indoors, some are of outdoor origin. Some of these substances are in every home; it is impossible to get rid of them all.

Two conditions are essential to support biological growth of all kinds:

*Nutrients.*

*Moisture.*

Bacteria, fungi and molds find nourishment and can flourish in improperly maintained air ducts, air conditioners, humidifiers, dehumidifiers, air-cleaning filters, carpets and in improperly ventilated places where moisture is likely to collect, such as bathrooms, kitchens, laundry rooms and basements.

Viruses can be carried indoors and spread by people, while plants, pets and insects are potential sources of pollen, dander, and other allergens. Dust mites and other insects can thrive in sofas, stuffed chairs, carpets and bedding.

## **HEALTH EFFECTS**

All of us are exposed to biological pollutants. However, the effects on our health depend upon the type and amount of biological pollution and the sensitivity of the individual. Some people do not experience health reactions from certain biological pollutants, while others may experience one or more of the following reactions:

- Allergic
- Infectious
- Toxic

Except for the spread of infections indoors, ALLERGIC REACTIONS may be the most common health problem associated with poor indoor air quality in homes. They are often connected with animal dander (mostly from cats and dogs), with dust mites (microscopic animals living in household dust), and with pollen. Allergic reactions can range from mildly uncomfortable to life-threatening, as in a severe asthma attack. Some common signs and symptoms are:

- Watery eyes
- Runny nose and sneezing
- Nasal congestion
- Itching
- Coughing
- Wheezing and difficulty breathing
- Headaches
- Fatigue

Health experts are especially concerned about people with asthma. These people have very sensitive airways that can react to various irritants, making breathing difficult. The number of people who have asthma has greatly increased in recent years—up 61 percent between 1982 and 1994, to a total of 14.6 million persons in the United States. Asthma in children under 18 years of age increased by 72 percent in the same period, to a total of approximately 5 million children. The number of deaths from asthma rose 45.3 percent between 1985 and 1995, to more than 5,600 deaths annually.

**INFECTIOUS DISEASES** caused by bacteria and viruses, such as influenza, measles, chicken pox, and tuberculosis, may be spread indoors. Most infectious diseases pass from person to person through physical contact. Crowded conditions with poor air circulation can promote this spread. Some bacteria and viruses thrive in buildings and circulate through indoor ventilation systems. For example, the bacterium causing Legionnaires' disease, a serious and sometimes lethal infection, and Pontiac Fever, an influenza-like illness, have circulated in some large buildings.

**TOXIC REACTIONS** are the least studied and understood health problem caused by some biological air pollutants in the home. Some fungi are known to produce toxic substances as a by-product of their metabolism, which can cause a variety of adverse health effects. Short-term symptoms can include dermatitis, respiratory irritation, headaches and fatigue. Long-term health effects can include cancer, damage to the central nervous system, and suppression of the immune system. One of the toxic fungi that has received the most attention in recent years is *Stachybotrys atra*, a slimy black mold that has been associated with dozens of cases of pulmonary hemorrhage in infants, including several deaths. Other toxigenic fungi include *Aspergillus*, *Fusarium*, and *Trichoderma*. In general, the presence of these molds indoors indicates a long-standing water problem.

## **CONTROLLING THE PROBLEM**

There is no simple and cheap way to sample the air in your home to determine the level of all biological pollutants. Experts suggest that sampling for biological pollutants is not a useful problem-solving tool. Even if you had your home tested, it is almost impossible to know which biological pollutants cause various symptoms or health problems. The amount of most biological substances required to cause disease is unknown and varies from one person to the next.

You can take several simple, practical actions to help remove sources of biological pollutants, to help get rid of the pollutants themselves, and to prevent their return. Begin by touring your household. Follow your nose and use your eyes. Two major factors help create conditions for biological pollutants to grow: nutrients and constant moisture with poor air circulation. During your walk-through, look for such conditions, and plan ways to make improvements.

- A musty odor, moisture on hard surfaces, and water stains are a sign of water leaks or condensation. Common problem areas include air-conditioning units; basements, attics, and crawl spaces; bathrooms; humidifiers and dehumidifiers; and refrigerator drip pans. Fix all leaks; increase air movement and ventilation; and keep appliance drip pans clean.
- Dust and construction materials, such as wood, wallboard, and insulation, contain nutrients that allow biological pollutants to grow, and must be kept clean and dry.

- Carpet absorbs moisture and nutrients, and is an ideal environment for biological pollutants. Pay special attention to carpeting on cool concrete floors, where moisture can condense and become trapped.
- Firewood is also a source of moisture, fungi, and bugs, and should be stored outdoors.

A healthy dose of common sense is the best way to control the spread and multiplication of biological agents. Regular and thorough cleaning of places where biological pollutants are likely to grow will keep them at a minimum. You will never be able to get rid of biological agents totally, but you can inhibit their growth.