

# INDOOR AIR FACT SHEETS



# Indoor Air Facts No. 1 (Revised)

## EPA and Indoor Air Quality

### Background

Most people are aware that outdoor air pollution can damage their health but may not know that indoor air pollution can also have significant harmful effects. U. S. Environmental Protection Agency (EPA) studies of human exposure indicate that the levels for many pollutants may be 2-5 times higher indoors than outdoors. High levels of indoor air pollutants are significant because it is estimated that people spend as much as 90% of their time indoors.

Over the past several decades, our exposure to indoor air pollutants has increased due to a variety of factors, including the construction of well-sealed buildings, reduced ventilation rates, the use of synthetic building materials and furnishings, and the use of chemically formulated personal care products, pesticides, and household cleaners.

In recent years, comparative risk studies performed by EPA's headquarters and regional offices have consistently ranked indoor air pollution among the top five environmental risks to people's health.

### Adverse Effects of Indoor Air Pollution

#### Long-Term Health Effects

Some health effects may show up either years after exposure has occurred or only after long or repeated periods of exposure and thus can be characterized as long-term health effects. These effects, which include respiratory diseases and cancer, can be severely debilitating or fatal. Long-term health effects are associated with sources of indoor air pollutants such as radon and asbestos.

#### Immediate Health Effects

Immediate effects, which may appear after a single, high dose exposure or repeated exposures, include

irritation of the eyes, nose, and throat, headaches, dizziness, and fatigue. These immediate effects are usually short-term and treatable by some means. Sometimes the treatment is simply eliminating the person's exposure to the source of the pollution, if it can be identified. Symptoms of certain diseases, including asthma, hypersensitivity pneumonitis, and human fever, can appear soon after exposure to some indoor air pollutants. When symptoms of diagnosable illness can be attributed directly to airborne building contaminants, they are referred to as *building-related illness*.

In contrast, there are situations in which building occupants experience symptoms that do not fit the pattern of any particular illness and are difficult to trace to any specific source. This phenomenon, referred to by some as *sick building syndrome*, is often temporary, but some buildings have long-term problems. Frequently, problems result when a building is operated or maintained in a manner that is inconsistent with its original design or prescribed operating procedures.

Occupants may complain of one or more of the following symptoms: dry or burning mucous membranes in the nose, eyes, and throat; sneezing; stuffy or runny nose; fatigue or lethargy; headache, dizziness, nausea, irritability, and forgetfulness. Contributing factors may include inadequate ventilation, chemical and biological contamination from indoor or outdoor sources, and other non-pollutant stressors such as temperature, humidity, lighting, ergonomic problems, and job-related psychosocial issues.

Initial efforts by EPA to assess the costs of indoor air pollution (see *Report to Congress on Indoor Air Quality, August, 1989*) concluded that although spe-

cific cost estimates were virtually impossible due to data limitations, it was reasonable to estimate that the costs of indoor air pollution in terms of direct medical costs and lost productivity were probably in the tens of billions of dollars per year. The major types of economic costs associated with indoor air pollution are direct medical costs for people whose health is affected by poor indoor air quality and who receive treatment; lost productivity from absence due to illness, decreased efficiency on the job, and materials and equipment damages due to exposure to indoor air pollutants.

## **EPA's Indoor Air Quality Program**

### ***Legislative Authority***

*Superfund Amendments and Reauthorization Act (SARA) Title IV*

In October 1986, Congress reauthorized the Superfund program and included in the bill the Radon Gas and Indoor Air Quality Research Act (Title IV). Title IV directs EPA to: 1) gather data and information on all aspects of indoor air quality in order to contribute to the understanding of health problems associated with the existence of air pollutants in the indoor environment; 2) coordinate Federal, State, local, and private research and development efforts relating to the improvement of indoor air quality; and 3) assess appropriate Federal government actions to mitigate the environmental and health risks associated with indoor air. In addition, EPA is required to disseminate information to the public.

### ***Program Highlights***

The Indoor Air Division (IAD) conducts a multifaceted program designed to achieve two key goals: to enhance scientific understanding and public awareness of the complex factors that affect indoor air quality; and to bring about substantial reductions in human exposure to the entire range of indoor air pollutants.

The Division's approach is non-regulatory, relying heavily on the development and dissemination of basic information on indoor air quality to key audiences, including State and local government officials, architects and other design professionals, engineers, builders, building owners and managers, and building occupants. Highlights of Division activities follow:

***Reducing pollutant levels indoors.*** The Division has set a very high priority on improving the way in which buildings are operated, having concluded that people's exposure to indoor air pollutants can be reduced significantly by implementing current knowledge about sound operation and maintenance practices.

Notwithstanding this emphasis on a "buildings approach," the Agency continues to utilize its combined legislative authorities to identify specific pollutants that present direct health risks in the indoor environment, and to use a variety of means to reduce their levels indoors.

EPA currently is preparing a quantitative risk assessment of lung cancer and other respiratory diseases from environmental tobacco smoke. A second document, also in progress, is a guide for corporate and governmental decisionmakers on controlling involuntary exposure of non-smokers to tobacco smoke in the workplace.

The Agency recently completed a year long "dialogue" with carpet floor covering industries to explore ways of reducing the emission of volatile organic compounds (VOCs) from new carpet and related installation materials, such as carpet cushion and adhesives. As a result of this voluntary process, the carpet industry agreed to test new carpet floor covering materials for total VOC emissions. EPA expects to conduct similar discussions with other industry groups to see whether additional reductions in indoor pollutant emissions can be achieved through voluntary actions.

***Improving our knowledge base.*** IAD is conducting studies to assess indoor air conditions in the nation's existing building stock. Special emphasis is being given to identifying those factors that exert the greatest influence on overall indoor air quality (IAQ) and on occupant health symptoms. The information gained will be used to improve IAQ diagnostic procedures as well as to provide a basis for evaluating the effectiveness of our pollution reduction strategies over time. Another set of studies now underway is designed to quantify the costs of key indoor air pollution control options for typical building structures.

**Training key indoor air audiences.** Because indoor air quality problems are a relatively recent phenomenon, many of the people who are in the best position to prevent their occurrence or resolve them when they do occur are not sufficiently informed about the issue.

Many indoor air quality problems can be avoided through sound building operation practices, or resolved by knowledgeable building personnel without the need for potentially costly outside assistance. The Division has developed a training course for building owners to acquaint them with the guidance contained in *Building Air Quality: A Guide for Building Owners and Facility Managers* (December 1991). Because many indoor air quality problems are best resolved by responsible government agencies at the State and local level, the Division has developed both a live instructional course on indoor air quality issues, entitled *Orientation to Indoor Air Quality*, and a self-paced learning module entitled *Introduction to Indoor Air Quality* (April 1991) for these audiences.

**Increasing access to IAQ information.** To ensure that a full range of information about indoor air quality problems and solutions is readily available to both the technical and non-technical public, the Division plans to open a national Indoor Air Quality Information Center in Spring 1992. This Center will be equipped with toll-free, operator-assisted telephone access, and will be able to provide written information including fact sheets and brochures, perform literature searches, and make referrals to appropriate Federal, State and Regional resources.

### **Research Activities**

EPA's Office of Research and Development conducts a multidisciplinary research program on indoor air quality which encompasses studies of the health effects associated with indoor air pollution exposure, assessments of indoor air pollution sources and control approaches; building studies and investigation methods, risk assessments of indoor air pollutants; and a recently initiated program on biocontaminants.

### **Other EPA Indoor Air Activities**

**Radon.** The Indoor Radon Abatement Act of 1988

(Title III of the Toxic Substances Control Act (TSCA)) established a national goal of achieving indoor levels of radon which are no greater than outdoor levels. It further authorized EPA to undertake a range of activities to achieve this goal, including revising public information materials, providing financial and technical assistance to States, developing and encouraging the adoption of radon resistant building practices, establishing training centers, operating industry proficiency programs, and conducting studies in schools and Federal buildings.

**Asbestos.** Title II of TSCA, the Asbestos Hazard Emergency Response Act (AHERA) requires EPA to establish a regulatory framework for addressing asbestos in schools. The Agency also must set standards for accreditation of personnel involved in asbestos management or abatement in all non-residential buildings. EPA is involved in a range of regulatory, grant, and technical assistance activities.

**Toxic Substances.** TSCA grants EPA broad authority to control chemical substances and mixtures that present an unreasonable risk of injury to health and the environment. EPA has authority to require testing of chemical substances and mixtures; regulate hazardous chemical substances and mixtures by prohibiting or restricting their manufacture, processing, distribution, and disposal; and imposing labeling or notification requirements.

**Pesticides.** The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) authorizes EPA to control pesticide exposures by requiring that any pesticide be registered with EPA before it may be sold, distributed, or used in this country. EPA is evaluating the health impacts of indoor products including insecticide sprays, termiticides, and wood preservatives.

**Volatile Organic Compounds (VOCs).** The Safe Drinking Water Act (SDWA) authorizes EPA to set and enforce standards for contaminants in public water systems to protect against both health and welfare effects. EPA sets standards for VOCs that can reach the air through volatilization from water used in a residence or other building. The Agency is also conducting studies, under a number of statutes, to identify key sources of VOC emissions in the indoor environment and explore potential control strategies.

## Federal Agencies with IAQ Information

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### US Environmental Protection Agency

Public Information Center (PM-211B)  
401 M Street, SW  
Washington, DC 20460  
202-260-2080

*Distributes indoor air quality publications*

National Pesticides Telecommunications Network  
1-800-858-7378

*Provides information on pesticides*

TSCA Hotline Service  
202-554-1404

*Provides information on asbestos, PCB, VOCs, and other toxic substances.*

### National Institute for Occupational Safety and Health

Requests for Information:  
1-800-35-NIOSH

*Conducts research, recommends standards to the U.S. Department of Labor, and conducts training on various issues including indoor air quality to promote safe and healthful workplaces. Undertakes investigations at request of employees, employers, other federal agencies, and state and local agencies to identify and mitigate workplace problems*

### Consumer Product Safety Commission

*For a copy of CPSC's booklets about combustion appliances, asbestos, biological pollutants, lead, methylene chloride, humidifiers, and formaldehyde in your home, write to:*

U.S. Consumer Product Safety Commission  
Washington, DC 20207

*To report an unsafe consumer product or a product-related injury, call*

1-800-638-CPSC

### Occupational Safety and Health Administration

*Promulgates safety and health standards, facilitates training and consultation, and enforces regulations to ensure that workers are provided with safe and healthful working conditions. For further information contact OSHA Regional Offices in Seattle, San Francisco, Denver; Kansas City, MO, Dallas, Chicago, Atlanta; Philadelphia, New York; and Boston*

### U.S. Department of Energy Office of Conservation and Renewable Energy

1000 Independence Avenue, SW, CE-43  
Washington, DC 20585  
202-586-9455

*Quantifies the relationship among reduced infiltration, adequate ventilation, and acceptable indoor air quality.*