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The Colorado Department of Public Health and Environment's Air Pollution Control Division recognizes Indoor Air Quality (IAQ) as a growing public concern. Currently, there are no regulations directly addressing non-occupational indoor air quality in Colorado. Most other states and the Environmental Protection Agency also do not have regulations for non-occupational indoor air quality. The division is working to develop guidelines and would welcome input from the public. You may e-mail questions and comments to any of the links below. Three members of the division have extensive backgrounds in IAQ investigation and are available to answer questions and may be contacted by e-mail or phone. Please put IAQ in the subject line so that we may more readily identify your e-mails. You may also check with your county health departments for individuals who are knowledgeable about IAQ concerns.

**Indoor Air Quality Concerns**

Poor indoor air quality can be a serious health risk, and Americans should take the appropriate steps to protect themselves and their families, according to air quality and respiratory health experts. Most people spend as much as 90 percent of their time indoors; air quality conditions in homes, schools, and the workplace can greatly affect morale, productivity, and health.

Many factors that can play a part in determining the indoor air quality include pollutants that come in from outside the building, pollutants generated by materials or products used within the building, and the activities of building occupants. Sources of indoor air pollution include tobacco smoke and combustion sources such as oil, gas, kerosene, coal, wood, and candles. Building materials and furnishings as diverse as deteriorated asbestos-containing insulation, lead-based paint, wet or damp carpet, and cabinetry or furniture made of certain pressed wood products, also can produce indoor air contaminants.

Products used for household cleaning and maintenance, personal care, or hobbies; central heating and cooling systems and humidification devices; and outdoor sources,

such as radon, pesticides, and other outdoor ambient air pollution also can adversely affect indoor air quality. Common household cleaning products and room deodorizers can contain harmful chemicals. Residues from household pesticides also can accumulate indoors, while new carpeting, wood paneling and furniture made with pressed wood can give off formaldehyde or other gases. Appliances that are not properly maintained can emit carbon monoxide and other pollutants.

Purchasing non-chemical replacements for many common household products and properly maintaining and venting furnaces and water heaters can reduce the risks of poor indoor air quality. All homes and workplaces should be properly vented. Newer, more energy efficient homes and buildings can unintentionally lead to a build up of indoor air pollution by reducing fresh air ventilation. By simply being mindful of the types of household products used and properly maintaining appliances, the risk can be minimized while retaining the benefits of an energy-efficient design.

Health Effects

Health effects from indoor air pollutants may be experienced soon after exposure or even years later. These include irritation of the eyes, nose, and throat; headaches; dizziness; and fatigue. Symptoms for diseases like asthma, hypersensitivity pneumonitis, and humidifier fever, may be triggered and/or made more severe soon after exposure to some indoor air pollutants. Immediate effects are usually short-term and treatable. Treatment usually involves eliminating the person's exposure to the source of the pollution once it is identified.

The likelihood of immediate reactions to indoor air pollutants depends on several factors. Age and pre-existing medical conditions are two important influences. In other cases, whether a person reacts to a pollutant depends on individual sensitivity, which varies markedly from person to person. Some people can become sensitized to biological pollutants after repeated exposures, and it appears that some people can become sensitized to chemical pollutants as well. Second-hand smoke, or environmental tobacco smoke, also is a major indoor pollutant. Smokers should always smoke outside. Further, Coloradans should test their homes for radon - a common indoor air pollutant that occurs naturally in some soils and can seep into a home through cracks or openings in the foundation.

Defining an Indoor Air Quality Problem

Indoor Air Quality concerns have often been grouped into three categories: Comfort Issues, "Sick Building Syndrome" and Building Related Illness. In many cases, there is overlap between the categories.

Comfort Issues can be described as dissatisfaction with the "feel" of a building environment. Complaints may range from; too hot, too cold, stuffy, drafty, noisy, odors, closeness, etc. This is normally the easiest type of IAQ problem to diagnose, but the fix can sometimes be difficult to achieve. Raising the satisfaction rate of some building occupants may affect the comfort of others. Polling building occupants can give information as to general trends in comfort issues. In this case, building maintenance and heating, ventilation and air conditioning (HVAC) personnel are the best individuals to construct solutions.

"Sick Building Syndrome," or SBS, has been described as a set of symptoms that

affect a significant portion of building occupants. These symptoms range from; irritation of mucosal membranes (eyes, mouth and nose), upper respiratory irritation and headaches, lethargy, decreased concentration and even nausea. These symptoms may occur shortly after entering the building and usually disappear after the individual leaves the building. Most often, there are no easily identifiable causes for this type of problem. Inadequate ventilation or building maintenance, misuse of chemical products and building activities may be the cause. Questionnaires for building occupants and possible solutions can be found on some of the web pages listed below. It is often advisable to contact an independent IAQ specialist, listed in the yellow pages under the categories of Industrial Hygienist or Environmental Consultants. These professionals can conduct investigations and recommend solutions.

Building Related Illness is the term for an illness, normally diagnosed by a physician, which can be directly attributed to exposure an occupant receives while in a building. Illnesses include: Legionnaire's disease, Pontiac Fever, humidifier fever, hypersensitivity pneumonitis and others. These illnesses may effect anywhere from a few, to the majority of building occupants. Quick determination of these types of illness is important, some of these diseases can cause lasting damage and while others can be fatal if not treated promptly. The type of disease can give vital clues as to the source and means of spreading of these illnesses.

Do I Have an Indoor Air Quality Problem?

IAQ problems can occur in any size building - from private homes with few occupants to large-scale office buildings or schools. Most people feel that there are some problems with their building environment. Many sources suggest that an 80 percent occupant satisfaction rate denotes a "healthy" building. In other words, if more than 20 percent of building occupants experience discomfort/dissatisfaction with the building environment, an investigation into the problem may be warranted. Note that with the more serious Building Related Illness, numbers of affected individuals may be much less.

There are a number of steps that you can take to try to determine the cause of your IAQ problems. Quite often, you can perform these initial steps yourself and solve the problems without outside help.

1. Try to determine which of the three categories your complaint falls into. Some helpful activities include:
 - Writing down problems that have occurred. Keep a diary about when and where problems occur - times of day, seasons, and atmospheric conditions - all can contribute to identify the cause(s) of concern.
 - Categorize symptoms - do they fall into:
 - Irritation upper respiratory tract (coughing, sneezing, etc.)?
 - Irritation of mucosal membranes (eyes, nose, etc.)?
 - Sinus irritation (persistent infection, headaches, post nasal drip, etc.)?
 - Skin irritation?
 - Headaches, lack of concentration
2. Consider the building - Are the complaints localized to one area or spread over the entire building?
3. Walking the building:

- Look for products that affect air quality:
 - Pesticides
 - Cleaning products
 - Art supplies
 - Office products
 - Foods and cooking areas
 - Building maintenance chemicals
 - Manufacturing products/chemicals
- Are the proper work practices for these products being used? In other words, have you followed the directions of the manufacturer?
- Look for activities that affect air quality:
 - Cooking
 - Art classes
 - Shop classes
 - Beauty salon
 - Manufacturing
 - Any activity that uses chemicals
 - Any activity that produces dust/debris
- Are there animals present?
- How about unwanted animals - rodents, birds, and bats?
- What about insects?

Microbials

Recently, there has been growing concern over mold in the indoor environment. News stories have focused on numerous health concerns reportedly caused by exposure to mold in the home or office. The most common (documented) symptom is an allergic reaction. At this time, there is still much to learn about what other health effects can actually be directly related to mold exposure.

There are no regulatory limits for mold in the home or office environment (federal, state or local). Because of this, air sampling may or may not prove useful. Sample results can vary widely based on a number of variables. Be sure to discuss with your consultant what it is you expect to determine from any sampling activity.

The best advice is as follows: If you suspect you have a mold problem, look for a source of moisture. Microbials can be found any place. They need a source of moisture and a source of food to grow and multiply. Before successful remediation can take place, the source of moisture must be eliminated or the problem can reoccur.

If you have visible mold, clean it up. Remediation tips can be found at www.epa.gov/iaq/molds. Please be advised, some materials may not be able to be cleaned and may need to be discarded.

Indoor Air Quality Consultants

We have compiled a list of IAQ consultants (below), and will be keeping this list updated on this web page as well as giving it out to people who call. If you would like to be included on this list, please contact Paula Ross for more information on how to be added.

 [List of IAQ Consultants and Resources](#) (PDF file, 13 pages)

The American Industrial Hygiene Association (AIHA), an organization whose members promote occupational and environmental health and safety within the workplace and the community, has developed guidelines for selecting an Indoor Air Quality Consultant. Please see the following link for this information: http://www.cal-iaq.org/guide_aiha_9901.htm

Sources of Information

General Indoor Air Quality Mailbox: IAQ@state.co.us

Colorado Department of Public Health & Environment Contacts:

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|----------------|----------------|
| Steve Fine | (303) 692-3164 |
| Eric Peters | (303) 692-3153 |
| Paula Ross | (303) 692-3184 |
| Laura Shumpert | (303) 692-3102 |

Other Contacts:

| | | |
|---|--------------------|----------------|
| EPA Region 8 | Ron Schiller | (303) 312-6017 |
| Denver County | Paul Riedesel | (720) 865-5455 |
| El Paso County | John James | (719) 578-3139 |
| Jefferson County | John Moody | (303) 271-5714 |
| Pueblo County | Emmet Hance | (719) 583-4328 |
| Tri-County (Adams, Arapahoe & Douglas) | Michelle Kenshella | (303) 846-6229 |

Colorado Department of Public Health & Environment Web Sites:

[Asbestos Compliance Assistance Group](#)

[Lead-Based Paint Compliance Assistance Group](#)

[Asthma Program](#)

[Indoor Radon](#)

[Tobacco Education and Prevention Partnership](#)

Other Web Sites:

[US EPA's IAQ](#)

[EPA Region 8 IAQ](#)

[City and County of Denver, Division of Environmental Protection](#)

[Consumer Product Safety Commission](#)

[American Lung Association](#)

[American Lung Association of Colorado](#)

[National Institute for Occupational Safety and Health](#)

[Healthy Indoor Air for America's Homes](#)

[Occupational Safety and Health Administration](#)

[Informacion En Español](#)

[Stationary Source Home Page](#) | [Air Pollution Control Division Home Page](#)

Suggestions and comments regarding the Air Quality Control Division can be forwarded to comments.apcd@state.co.us

