

The Facts About Mold



Operation Outreach

Mold/IAQ Resources from AIHA

More AIHA Operation Outreach Brochures:

- Do I Work In a Sick Building?
- Guidelines for Selecting an Indoor Air Quality Consultant
- Is Air Quality a Problem in My Home?

Publications:

- Current IAQ Practices Worldwide: Proceedings from the 4th IAQ Symposium
- Report of Microbial Growth Task Force
- The Industrial Hygienist's Guide to Indoor Air Quality Investigations
- The Practitioner's Approach to Indoor Air Quality Investigations: Proceedings of the Indoor Air Quality International Symposium

Locate a consultant at www.aiha.org.

AIHA offers courses and Distance Learning programs in addition to the annual American Industrial Hygiene conference and exposition (AIHce). Go to www.aiha.org to learn about our current education opportunities.

This brochure is a joint effort by the following AIHA technical committees:

Biosafety and Environmental Microbiology

Environmental Microbiology Laboratory Accreditation (EMLAC)

Indoor Environmental Quality (IEQ)



Your Essential Connection

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Stock No. 560-PR-03

Introduction

Mold is in the news. People are talking about its potential health and economic impact. But what are the real risks and issues?

The available science is incomplete and sometimes controversial. Although there are several guidance documents available, there is no accepted national standard. Validated methods to measure contamination are still in their infancy, and even when measurement techniques are available, there are no clear benchmarks or standard values to compare the results against. Similar scientific uncertainties exist in the medical diagnosis of some mold-related health effects.

The scientific complexities alone would be a huge challenge, but the truth is that other difficulties dwarf them. The intense public and media attention on this topic often creates emotionally charged circumstances that make scientific judgment and reasoned dialogue difficult. In some instances, building owners tend to ignore or dismiss potentially serious problems. In other instances, building occupants or public officials can react with excessive alarm to perceived potential threats, complicating the scientific component of the evaluation and making risk communication very difficult.

While experts and practitioners disagree on which trend is of more concern, it is clear that both are real and sizable. The biggest obstacle, however, is the amount of money that can be involved in these disputes. As a result, the issue is increasingly clouded by the acrimony and distorted partisanship of mushrooming liability battles in the legal arena.

This brochure represents a consensus statement by a group of experts about important aspects of the “state of the science.” The guidance offered is practical information and does not claim to be a definitive or comprehensive position statement. Because it is not comprehensive, it

should always be used in conjunction with other existing guidance documents, as well as professional judgment.

Public and occupational health practice is rarely an exact science. Prevention always poses the challenge of making tough and often costly decisions with incomplete information or understanding. For a more complete analysis of the situation, see the AIHA *Report of Microbial Growth Task Force*, available from www.aiha.org or (301) 283-3064.

The Facts About Mold: For Everyone

What is mold? Molds are forms of fungi found all year round both indoors and outdoors. Outdoors, molds live in the soil, on plants, and on dead or decaying matter. Another common term for mold is mildew. Mold growth is encouraged by warm and humid conditions, although it can grow during cold weather. There are thousands of species of mold and they can be any color. Many times, mold can be detected by a musty odor. Most fungi, including molds, produce microscopic cells called “spores” that spread easily through the air. Live spores act like seeds, forming new mold growths (colonies) with the right conditions. All of us are exposed to fungal spores daily in the air we breathe.

How does mold get into a house or building? Most, if not all, of the mold found indoors comes from outdoor sources. It needs moisture to grow and becomes a problem only where there is water damage, high humidity, or dampness. Common sources of indoor moisture that cause mold problems include flooding, roof and plumbing leaks, damp basements or crawl spaces, or any moisture condensation on cold surfaces. Bathroom showers and steam from cooking may also create problems if not well ventilated.

How can I prevent mold growth?

Controlling excess moisture is the key to preventing and stopping indoor mold growth. Keeping susceptible areas in the home clean and dry is very important. Ventilate or use exhaust fans (vented to the outdoors) to remove moisture where it accumulates, particularly in bathrooms, kitchens, and laundry areas. Clothes dryers should be vented to the outside. Repair water leaks promptly, and either dry out and clean or replace water-damaged materials. Materials that stay wet for more than 48 hours are likely to produce mold growth. Lowering humidity indoors helps prevent condensation problems. To lower humidity during humid weather, use air conditioners and dehumidifiers. Proper exterior wall insulation helps prevent condensation from forming inside during cold weather.

Can mold be toxic? Some molds produce toxic substances called mycotoxins. Airborne mycotoxins have not been shown to cause health problems for occupants in residential or commercial buildings. The health effects of breathing mycotoxins are not well understood and are currently under study. In rare cases, high or chronic airborne exposures, typically associated with certain occupations like agricultural work, have been associated with illnesses. More is known about the health effects of consuming moldy foods or feed containing mycotoxins than about the effects of breathing mycotoxins.

What is “black mold”? The news media often refer to “black mold” or “toxic black mold.” It is usually associated with *Stachybotrys chartarum*, a type of greenish-black mold commonly associated with heavy water damage. Not all molds that appear to be black are *Stachybotrys*. The known health effects from exposure to *Stachybotrys* are similar to other common molds, but have been inconclusively associated with more severe health effects in some people.

Why are we concerned about mold? Small amounts of mold growth in workplaces or homes (such as mildew on a shower curtain) are

not a major concern. But no mold should be allowed to grow and multiply indoors. Large quantities of mold growth may cause nuisance odors and health problems for some people. In addition, mold can damage building materials, finishes, and furnishings and, in some cases, cause structural damage to wood.

How do molds affect people? Most people have no reaction when exposed to molds. Allergic reactions, similar to common pollen or animal allergies, and irritation are the most common health effects for individuals sensitive to molds. Flu-like symptoms and skin rash may occur. Molds may also aggravate asthma. In rare cases, fungal infections from building-associated molds may occur in people with serious immune disease. Most symptoms are temporary and eliminated by correcting the mold problem.

Who is affected by exposure to mold? There is a wide variability in how people are affected by mold exposure. People who may be affected more severely and quickly than others include:

- Infants and children
- Elderly people
- Pregnant women
- Individuals with respiratory conditions or allergies and asthma
- Persons with weakened immune systems (for example, chemotherapy patients, organ or bone marrow transplant recipients, and people with HIV infections or autoimmune diseases)

Those with special health concerns should consult their doctor if they are concerned about mold exposure. Symptoms that may seem to occur from mold exposure may be due to other causes, such as bacterial or viral infections or other allergies.

What should I do if I see or smell mold in my home? The most important step is to identify and fix the moisture sources causing mold growth. For small mold problems, use

detergent and water to wash mold off hard surfaces, and dry completely. Replace moldy porous or absorbent materials (such as ceiling tiles, wallboard, and carpeting). If you do not see mold growth but notice a musty odor, mold may be growing behind water-damaged materials, such as walls, carpeting, or wallpaper. Persons cleaning mold should wear gloves, eye protection, and a dust mask or respirator to protect against breathing airborne spores (an N95 dust mask or respirator may be purchased in hardware stores). If you have health concerns, you should consult your doctor before doing any mold cleanup.

Should I test my home for mold?

Probably not. Looking for evidence of water damage and visible mold growth should be your first step. Testing for mold is expensive, and you should have a clear reason for doing so. In addition, there are no standards for “acceptable” levels of mold in the indoor environment. When testing is done, it is usually to compare the levels and types of mold spores found inside the home with those found outdoors. If you know you have a mold problem, it is more important to spend time and resources getting rid of the mold and solving the moisture problem causing the moldy conditions.

Who do I call to deal with extensive mold growth in a building? A professional experienced in mold evaluation and remediation, such as an industrial hygienist, may need to be hired to address extensive mold growth in a building. It is important to correct large mold problems as soon as possible by first fixing the source of the moisture problem and removing contaminated materials, then cleaning the surfaces, and finally drying the area completely. If you use outside contractors or professionals, make sure they have experience cleaning up mold. Check their references, and have them follow the recommendations and guidelines given in the information resources at the end of this brochure.

Resources

Listings of indoor air quality consultants can be obtained from AIHA's Consultants Listing, although AIHA does not recommend specific consultants. You can find the AIHA consumer brochure "How to Select an Indoor Air Quality Consultant" at www.aiha.org or call (703) 849-8888. Resources are added to the AIHA website regularly.

For more information:

- State or Local Department of Health
- Environmental Protection Agency (EPA): www.epa.gov/iaq
- EPA and FEMA (Federal Emergency Management Agency) Flood Clean-Up Guidelines: www.epa.gov/iaq/pubs/flood.html and www.fema.gov/hazards/floods/
- Centers for Disease Control and Prevention (CDC): www.cdc.gov/nceh/airpollution/mold/default.htm
- California Indoor Air Quality Program: www.cal-iaq.org/iaqsheet.htm
- New York City Department of Health "Guidelines on Assessment and Remediation of Fungi in Indoor Environments": www.nyc.gov/html/doh/html/epi/moldrpt1.html
- American College of Occupational and Environmental Medicine guideline "Adverse Human Health Effects Associated With Molds in the Indoor Environment": www.acoem.org/guidelines/pdf/mold-10-27-02.pdf

The Facts About Mold: A Glossary

Allergen: A substance that elicits allergic reactions. Fungal allergens are proteins found in either the mycelium or spores. Only a few fungal allergens have been characterized, but all fungi are thought to be potentially allergenic.

Biocide/Fungicide: Chemicals that limit the growth of or kill microorganisms such as fungi.

“Black mold”: This poorly defined term, which has no scientific meaning (also called “toxic black mold”), has been associated with *Stachybotrys chartarum*. While only a few molds are truly black, many appear black. Not all molds that appear to be black are *Stachybotrys*.

Fungi: Neither animals nor plants, fungi are classified in their own kingdom. The fungi kingdom includes a very large group of organisms, including molds, yeasts, mushrooms, and puff-balls. There are more than 100,000 accepted fungal species—but current estimates range up to 10 million species. Mycologists (people who study fungi) group fungi into four large groups according to their reproduction method.

Hidden mold: Visible mold growth on building structures that is not easily seen. For example: above drop ceilings, within a wall cavity (the space between the inner and outer structure of a wall), inside air handlers, or within the ducting of a ventilation system.

Microbial volatile organic compounds (MVOCs): Chemicals produced by fungi as a result of their metabolism. Some of these chemicals are responsible for the characteristic moldy, musty, or earthy smell of fungi, whether mushrooms or molds. Some MVOCs are considered offensive or annoying. The human nose is very sensitive to mold odors, sometimes more so than current analytical instruments.

The Facts About Mold: A Glossary (Continued)

Mold: A group of organisms that belong to the fungi kingdom (see *Fungi*). Although the terms mold and fungi have been commonly referred to interchangeably, all molds are fungi, but not all fungi are molds.

Mycotoxin: Compounds produced by “toxigenic fungi” that are toxic to humans or animals.

Remediate: To fix a problem. Related to mold contamination, remediation includes fixing the water/moisture problem and the cleaning, removal, and/or replacement of damaged or contaminated materials.

Spore: General term for a reproductive structure in fungi, bacteria, and some plants. In fungi, the spore is the structure that may be used for dissemination and may be resistant to adverse environmental conditions.

Stachybotrys Genus that includes approximately 10 species and occurs mainly on dead plant materials. Of these, *Stachybotrys chartarum* is the most common. This species is widespread and typically grows on straw. In the indoor environment, it is commonly found on cellulosic materials including paper, canvas, and jute which have become very wet. This is a toxigenic mold.

“Toxic mold”: This has no scientific meaning, since the mold itself is not toxic. The metabolic byproducts of some molds may be toxic (see *Mycotoxin*).

Toxigenic fungi: Fungi that can produce mycotoxins (see *Mycotoxin*).

What is industrial hygiene?

Industrial hygiene is the science of keeping people safe at work and in their communities. Industrial hygienists (IHs) are professionals dedicated to the health and well-being of workers.

Originally industrial hygienists worked primarily in factories and other industrial settings but as our society has changed, so has the definition of industrial hygiene. Today, IHs can be found in almost every type of work setting. Industrial hygienists also use the term OEHS or occupational and environmental health and safety to refer to the work that they do.



What does an industrial hygienist do?

IHs still work to prevent illness or injury from hazards in industrial settings. They may also be found working to prevent ergonomic injuries in the office; measuring noise levels at an airport; supervising the safe removal of lead, mold or asbestos; and in thousands of other settings.

Industrial hygienists may sample air, soil or water to determine if there are harmful substances present. They may fit test a respirator to ensure that a worker is breathing cleaner air.



What is the benefit of OEHS?

Workplace safety and health programs make a difference in preventing occupational fatalities, injuries, and illnesses. Since the Occupational Safety and Health Act was passed in 1970, workplace injuries and illnesses declined significantly. The Bureau of Labor Statistics reports that in 2001 there were 5,900 workplace related fatalities and 5.2 million non-fatal injuries and illnesses reported. That is a rate of 5.7 injuries per 100 workers, less than half of the 1973 number of 11 injuries or illnesses for each 100 workers.



Industrial hygiene saves lives, improves quality of life, and increases productivity. Safe, healthy workers are more efficient. Injuries can mean many days or weeks out of work, or even permanent disability, causing serious economic hardship to a worker and his or her family.

What is AIHA?

Founded in 1939, the American Industrial Hygiene Association (AIHA) is the premier association of occupational and environmental health and safety professionals. AIHA's 12,000 members play a crucial role on the front line of worker health and safety every day. AIHA produces books, consumer brochures, conferences and other opportunities to learn more about occupational and environmental safety. For more information, go to www.aiha.org.



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