

Mold in My Home: What Do I Do?

Revised July 2001

This is an update of our March 1998 info sheet to provide basic information to people who have experienced water damage to their home. It describes health concerns related to mold exposure, and it also provides general guidelines on prevention, mold detection, as well as cleanup of mold-contaminated materials. Additional resources and documents are referenced.

ABOUT MOLD

What are Molds?

Molds are simple, microscopic organisms, present virtually everywhere, indoors and outdoors. Molds, along with mushrooms and yeasts, are *fungi* and are needed to break down dead material and recycle nutrients in the environment. For molds to grow and reproduce, they need only a food source – any organic material, such as leaves, wood, paper, or dirt— and moisture. Because molds grow by digesting the organic material, they gradually destroy whatever they grow on. Sometimes, new molds grow on old mold colonies. Mold growth on surfaces can often be seen in the form of discoloration, frequently green, gray, brown, or black but also white and other colors. Molds release countless tiny, lightweight spores, which travel through the air.

How am I exposed to indoor molds?

Everyone is exposed to some mold on a daily basis without evident harm. It is common to find mold spores in the air inside homes, and most of the airborne spores found indoors come from outdoor sources. Mold spores primarily cause health problems when they are present in large numbers and people *inhale* many of them. This occurs primarily when there is *active* mold growth within home, office or school where people live or work. People can also be exposed to mold by touching contaminated materials and by eating contaminated foods.

Can mold become a problem in my home?

Molds will grow and multiply whenever conditions are right—sufficient moisture is available and organic material is present. Be on the lookout in your home for common sources of indoor moisture that may lead to mold problems:

- Flooding
- Leaky roofs

- Sprinkler spray hitting the house
- Plumbing leaks
- Overflow from sinks or sewers
- Damp basement or crawl space
- Steam from shower or cooking
- Humidifiers
- Wet clothes drying indoors or clothes dryers exhausting indoors

Warping floors and discoloration of walls and ceilings can be indications of moisture problems. *Condensation on windows or walls* is also an important indication, but it can sometimes be caused by an indoor combustion problem! *Have fuel-burning appliances routinely inspected by your local utility or a professional heating contractor.*

Should I be concerned about mold in my home?

Yes, if indoor mold contamination is extensive, it can cause very high and persistent airborne spore exposures. Persons exposed to high spore levels can become sensitized and develop allergies to the mold or other health problems. Mold growth can damage your furnishings, such as carpets, sofas and cabinets. Clothes and shoes in damp closets can become soiled. In time, unchecked mold growth can cause serious damage to the structural elements in your home.

HEALTH EFFECTS

What symptoms are commonly seen with mold exposure?

Molds produce health effects through inflammation, allergy, or infection. Allergic reactions (often referred to as hay fever) are most common following mold exposure. Typical symptoms that mold-exposed persons report (alone or in combination) include:

- Respiratory problems, such as wheezing, difficulty breathing, and shortness of breath
- Nasal and sinus congestion
- Eye irritation (burning, watery, or reddened eyes)
- Dry, hacking cough
- Nose or throat irritation
- Skin rashes or irritation

Headaches, memory problems, mood swings, nosebleeds, body aches and pains, and fevers are occasionally reported in mold cases, but their cause is not understood.

How much mold can make me sick?

It depends. For some people, a relatively small number of mold spores can trigger an asthma attack or lead to other health problems. For other persons, symptoms may occur only when exposure levels are much higher. Nonetheless, indoor mold growth is unsanitary and undesirable. Basically, *if you can see or smell mold* inside your home, take steps to identify and eliminate the excess moisture and to cleanup and remove the mold.

Are some molds more hazardous than others?

Allergic persons vary in their sensitivities to mold, both as to the amount and the types to which they react. In addition to their allergic properties, certain types of molds, such as *Stachybotrys chartarum*, may produce compounds that have toxic properties, which are called *mycotoxins*. Mycotoxins are not always produced, and whether a mold produces mycotoxins while growing in a building depends on what the mold is growing on, conditions such as temperature, pH, humidity or other unknown factors. When mycotoxins are present, they occur in both living and dead mold spores and may be present in materials that have become contaminated with molds. While *Stachybotrys* is growing, a wet slime layer covers its spores, preventing them from becoming airborne. However, when the mold dies and dries up, air currents or physical handling can cause spores to become airborne.

At present there is no environmental test to determine whether *Stachybotrys* growth found in buildings is producing toxins. There is also no blood or urine test that can establish if an individual has been exposed to *Stachybotrys chartarum* spores or its toxins.

Who is at greater risk when exposed to mold?

Exposure to mold is not healthy for anyone inside buildings. Therefore, it is always best to identify and correct high moisture conditions quickly before mold grows and health problems develop.

Some people may have more severe symptoms or become ill more rapidly than others:

- Individuals with existing respiratory conditions, such as allergies, chemical sensitivities, or asthma.
- Persons with weakened immune systems (such as people with HIV infection, cancer chemotherapy patients, and so forth)
- Infants and young children
- The elderly

Anyone with health problems they believe due to molds should consult a medical professional.

Additional fact sheets on Mold and Health Effects are available from CDHS:

- *Health Effects of Toxin-Producing Molds in California*
- *Stachybotrys chartarum (atra) — a mold that may be found in water-damaged homes*
- *Fungi and Indoor Air Quality*
- *Misinterpretation of Stachybotrys Serology*

These documents are available from the Environmental Health Investigation Branch, (510) 622-4500, or on the web at www.dhs.ca.gov/ehib/.

DETECTION OF MOLD

How can I tell if I have mold in my house?

You may suspect that you have mold if you *see* discolored patches or cottony or speckled growth on walls or furniture or if you *smell* an earthy or musty odor. You also may suspect mold contamination if mold-allergic individuals *experience* some of the symptoms listed above when in the house. *Evidence of past or ongoing water damage should also trigger more thorough inspection.* You may find mold growth underneath water-damaged surfaces or behind walls, floors or ceilings.

Should I test my home for mold?

The California Department of Health Services does not recommend testing as a first step to determine if you have a mold problem. Reliable air sampling for mold can be expensive and requires expertise and equipment that is not available to the general public. Owners of individual private homes and apartment generally will need to pay a contractor to carry out such sampling, because insurance companies and public health agencies seldom provide this service. Mold inspection and cleanup is usually considered a housekeeping task that is the responsibility of homeowner or landlord, as are roof and plumbing repairs, house cleaning, and yard maintenance.

Another reason the health department does not recommend testing for mold contamination is that there are few available standards for judging what is an acceptable quantity of mold. In all locations, there is some level of airborne mold outdoors. If sampling is carried out in a home, an outdoor air sample also must be collected at the same time as the indoor samples, to provide a baseline measurement. Because individual susceptibility varies so greatly, sampling is at best a general guide.

The simplest way to deal with a suspicion of mold contamination is: **If you can see or smell mold, you likely have a problem and should take the steps outlined below.** Mold growth is likely to recur unless the source of moisture that is allowing mold to grow is removed and the contaminated area is cleaned.

GENERAL CLEAN-UP PROCEDURES

The following is intended as an overview for homeowners or apartment dwellers. We recommend that you consult one of several more thorough documents currently available as guidance, listed in the USEFUL PUBLICATIONS section below.

Elements of the Clean-up Procedures

- Identify and eliminate sources of moisture
- Identify and assess the magnitude and area of mold contamination
- Clean and dry moldy areas – use containment of affected areas
- Bag and dispose of all material that may have moldy residues, such as rags, paper, leaves, and debris.

Assessing the Size of a Mold Contamination Problem

There will be a significant difference in the approach used for a small mold problem – total area affected is less than 10 ft² – and a large contamination problem – more than 100 ft². In the case of a relatively small area, the clean-up can be handled by the homeowner or maintenance staff, using personal protective equipment (see below). However, for cases of much larger areas, it is advisable that an experienced, professional contractor be used. For in-between sized cases, the type of containment and personal protection equipment to be used will be a matter of judgment.

Can cleaning up mold be hazardous to my health?

Yes. During the cleaning process, you may be exposed to mold, strong detergents, and disinfectants. Spore counts may be 10 to 1000 times higher than background levels when mold-contaminated materials are disturbed. Take steps to protect you and your family's health during cleanup:

- When handling or cleaning moldy materials, it is important to use a respirator to protect yourself from inhaling airborne spores.

Respirators can be purchased from hardware stores; select one that is effective for particle removal (sometimes referred to as an N-95 particulate respirator). However, respirators that remove particles will not protect you from fumes (such as bleach). Minimize exposure when using bleach or other disinfectants by ensuring good ventilation of the area.

- Wear protective clothing that is easily cleaned or discarded.
- Use rubber gloves.

- Try cleaning a test area first. If you feel that this activity adversely affected your health, you should consider paying a licensed contractor or other experienced professional to carry out the work.
- Ask family members or bystanders to leave areas that are being cleaned.
- Work for short time periods and rest in a location with fresh air.
- Air out your house well during and after the work.

Never use a gasoline engine indoors (e.g., water pump, pressure washer or generator), as you could expose your family to toxic carbon monoxide.

Removal of Moldy Materials

Clean up should begin *after* the moisture source is fixed and excess water has been removed. Wear gloves when handling moldy materials.

- Discard porous materials (for example, ceiling tiles, sheetrock, carpeting, and wood products).
- Bag and discard moldy items; if properly enclosed, items can be disposed with household trash.
- Dry affected areas for 2 or 3 days.

Spores are more easily released when moldy materials dry out, hence it is advisable to remove moldy items as soon as possible.

If there was flooding, sheetrock should be removed to a level above the high-water mark. Visually inspect the wall interior and remove any mold-contaminated materials.

What can I save? What should I toss?

You should discard moldy items that are porous and from which it will be difficult to remove mold completely: paper, rags, wallboard, rotten wood, carpet, drapes, and upholstered furniture. Contaminated carpet is often difficult to thoroughly clean, especially when the backing and/or padding can become moldy. Solid materials – glass, plastic, and metal – can generally be kept after they are thoroughly cleaned.

Clean-up

When attempting to clean less porous items (i.e., solid items such as floors, cabinets, solid furniture), the first step is to remove as much mold as possible. A cleaning detergent is effective for this purpose. Wear gloves, mask and eye protection when doing this cleanup.

- Use non-ammonia soap or detergent, or a commercial cleaner, in hot water, and scrub the entire area that is affected by the mold.
- Use a stiff brush or cleaning pad on cement-block walls or other uneven surfaces.

- Rinse cleaned items with water and dry thoroughly. A wet/dry vacuum cleaner is helpful for removing water and cleaning items.

Disinfection of Contaminated Materials

Disinfecting agents can be toxic for humans, not just molds. They should be used only when necessary and should be handled with caution.

Disinfectants are intended to be applied to thoroughly cleaned materials and are used to ensure that most microorganisms have been killed. *Therefore, do not use disinfectants instead of, or before, cleaning materials with soap or detergent.* Removal of mold growth from nonporous materials usually is sufficient. Wear gloves, mask and eye protection when using disinfectants

- After thoroughly cleaning and rinsing contaminated materials, a solution of 10% household bleach (for example, 1½ cup household bleach per gallon of water) can be used as a disinfectant.
- **Using bleach straight from the bottle is actually LESS effective than diluted bleach.**
- Keep the disinfectant on the treated material for the prescribed time before rinsing or drying; typically 10 minutes is recommended for a bleach solution
- **Bleach fumes can irritate the eyes, nose, and throat, and damage clothing and shoes. Make sure working areas are well ventilated.**
- When disinfecting a large structure, make sure that the entire surface is wetted (for example, the floors, joists, and posts).
- Properly collect and dispose extra disinfectant and runoff.
- **Never mix bleach with ammonia; toxic fumes may be produced.**

Can air ducts become contaminated with mold?

Yes. Air duct systems can become contaminated with mold. Duct systems may be constructed of bare sheet metal, sheet metal with fibrous glass insulation on the exterior, or sheet metal with an internal fibrous glass liner, or they may be made entirely of fibrous glass. Bare sheet metal systems and sheet metal with exterior fibrous glass insulation can be cleaned and disinfected. If water damaged, ductwork made of sheet metal with an **internal** fibrous glass liner or made entirely of fibrous glass will often need to be removed and discarded. Ductwork in difficult-to-reach locations may have to be abandoned. If you have other questions, contact an air duct cleaning professional or licensed contractor.

Can ozone air cleaners help remove indoor mold or reduce odors?

Sometimes air cleaners are promoted to remove indoor mold or associated odors, and some of these are designed to produce ozone. Ozone is a strong oxidizing agent that is used as a disinfectant in water and sometimes to eliminate odors. However, ozone is a known lung irritant. Ozone generators have been shown to sometimes produce indoor levels above the safe limit. Furthermore, it has been shown that **ozone is not effective in controlling molds and other microbial contamination**, even at concentrations far above safe health levels. Also, ozone may damage materials in the home, for example, cause rubber

items to become brittle. For these reasons, **the California Department of Health Services strongly recommends that you NOT use an ozone air cleaner in any occupied space.** Refer to the CDHS IAQ Info Sheet: *Health Hazards of Ozone-generating Air Cleaning Devices* (January 1998), available on the CDHS-IAQS web site.

How can I *prevent* indoor mold problems in my home?

Inspect your home regularly for the indications and sources of indoor moisture and mold listed on Page 1. Take steps to eliminate sources of water as quickly as possible. If a leak or flooding occurs, it is essential to act *quickly*:

- Stop the source of leak or flooding.
- Remove excess water with mops or wet vacuum.
- Whenever possible, move wet items to a dry and well ventilated area or outside to expedite drying. Move rugs and pull up areas of wet carpet as soon as possible.
- Open closet and cabinet doors and move furniture away from walls to increase circulation.
- Run portable fans to increase air circulation. Do NOT use the home's central blower if flooding has occurred in it or in any of the ducts. Do NOT use fans if mold may have already started to grow - more than 48 h since flooding.
- Run dehumidifiers and window air conditioners to lower humidity.
- Do NOT turn up the heat or use heaters in confined areas, as higher temperatures *increase* the rate of mold growth.
- If water has soaked inside the walls, it may be necessary to open wall cavities, remove baseboards, and/or pry open wall paneling.

USEFUL PUBLICATIONS

Links to the following documents can be found at www.cal-iaq.org/MOLD/.

General Information

Molds, Toxic Molds, and Indoor Air Quality. Detailed overview for the legislature by the California Research Bureau.

Mold in Workplace – CDHS-HESIS Infosheet. Useful overview with specific resources for workers.

Biological Pollutants in Your Home. Concise booklet by U.S. EPA and ALA aimed at affected homeowner.

Mold and Moisture. Appendix H in the U.S. EPA IAQ Tools for Schools

Clean-up Guidance

Repairing Your Flooded Home. Excellent resource by the American Red Cross and FEMA, with details on technical & logistical issues.

Guidelines on Assessment and Remediation of Fungi in Indoor Environments. Widely referenced guidelines developed by the New York City Department of Health.

Mold Remediation in Schools and Commercial Buildings. Valuable, new guidance by U.S. EPA, also applicable to residences.

Consultants, Laboratories & Clinics

CDHS Listing of Consultants Offering IAQ Services in California. Self-reported database of contractors.

CDHS List of Laboratories for Bioaerosol (Mold) Testing. Identifies labs providing bioaerosol testing.

Association of Occupational & Environmental Clinics. www.aeec.org.

Additional Information:

U.S. EPA IAQ INFO, 800-438-4318,

9 am to 5 pm, Eastern Time, www.epa.gov/iaq/

CDHS Indoor Air Quality Section, 2151 Berkeley Way (EHLB), Berkeley, CA 94704, Phone: 510-540-2476, <http://www.cal-iaq.org/>

FOR LOCAL ASSISTANCE:

Contact your County or City Department of Health, Housing, or Environmental Health

***California Department of Health Services (CDHS)
IAQ Info Sheet***

Gray Davis, Governor

State of California

Grantland Johnson, Secretary

Health and Human Services Agency

Diana M. Bontá, R.N., Dr.P.H., Director

Department of Health Services

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