

California Department of Public Health (CDPH)

Indoor Air Quality Info Sheet

Mold in My Home—What Do I Do?

Updated March 2009

This info sheet provides basic information on water damage in the home. It describes molds, why they may grow indoors, health concerns related to mold exposure, the detection and prevention of indoor mold, and cleanup procedures for mold-contaminated materials with reference to additional resources and documents.

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 plant and animal material and recycle nutrients in the environment. For molds to grow and reproduce, they need only a food source—any organic matter, such as leaves, wood, or paper—and moisture. Because molds grow by digesting organic material, they gradually destroy whatever they grow on. Sometimes, new molds even grow on old mold colonies. Mold growth on surfaces can often be seen in the form of discoloration, frequently white, gray, brown, or black but also green and other colors.

How am I exposed to indoor molds?

Molds release countless, tiny spores, which travel through the air. Everyone inhales some mold every day without apparent harm. It is common to find mold spores in the air inside homes. In fact, 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 exposure is high. This may occur when there is active mold growth within a home, office, school, or other building in which people live or work for long periods. People also can be exposed to mold by touching contaminated materials and by eating contaminated foods.

Can mold become a problem in my home?

Yes. Molds will grow and multiply whenever conditions are right, that is, when sufficient moisture is available and organic matter is present. Be on the lookout for the following common sources of moisture inside and outside your home that may lead to mold problems:

- Flooding
- Leaky roof
- Sprinkler spray hitting the house
- Plumbing leaks and overflow from sinks or sewers
- Damp basement or crawl space
- Steam from showers or cooking or humidifiers
- Wet clothes hung to dry indoors or a clothes dryer that exhausts indoors

Warped floors and discoloration on walls and ceilings can be indications of moisture problems. Condensation on windows or walls also is an important indication of excessive dampness and can be caused by some of the sources listed above. However, condensation also can be caused by an indoor combustion problem.

- ❖ Therefore, inspect fuel-burning appliances annually, and contact your local utility or a professional heating contractor if you have questions.

General information on gas appliance safety is available at:

<http://www.pge.com/myhome/edusafety/gaselectricsafety/gasappliancesafety/>.

A ten-point furnace safety and efficiency checklist is available at:

http://www.pge.com/about/news/mediarelations/newsreleases/q4_2007/071109.shtml.

Should I be concerned about mold in my home?

Yes. If indoor mold contamination is extensive, it can lead to very high and persistent exposures to airborne spores. Persons exposed to high spore levels can become sensitized and develop allergies to the mold or they may develop other health problems (see below).

Mold growth also can damage your furnishings, such as carpets, chairs and sofas, and cabinets. Clothes and shoes in damp closets can become soiled and start to fall apart.

Unchecked, mold growth can seriously damage the structural elements in your home, for example, floors, walls, and ceilings.

HEALTH EFFECTS

What symptoms can mold cause?

Molds produce health effects through inflammation, allergy, or infection. Allergic reactions (often referred to as hay fever) are the most common responses following mold exposure. Mold-exposed persons may experience some of the following symptoms:

- Respiratory problems, such as wheezing, difficulty breathing, and shortness of breath

- Nasal or sinus congestion
- Eye irritation (burning, watery, or reddened eyes)
- 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 causes are 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, identify and eliminate excess moisture and cleanup and remove the mold (see below).

Are some molds more hazardous than others?

Perhaps. 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 with toxic properties known as *mycotoxins*.

A mold may not always produce mycotoxins, depending on the material on which it is growing, the indoor temperature or humidity, the pH of the material, or other, as yet unknown, factors. When produced, mycotoxins may be present in both living and dead spores as well as materials that were contaminated with mold.

A wet layer encloses *S. chartarum* spores while they are growing, preventing them from readily becoming airborne. However, when the mold dries up, air currents or physical handling can release spores into the air.

At present there is no environmental test to determine whether *S. chartarum* found in buildings is producing toxins, nor can blood or urine tests establish that an individual has been exposed to *S. chartarum* spores or toxins.

Are some persons at greater risk if exposed to mold?

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

Some persons may have more severe symptoms or become ill more readily than others:

- Individuals with existing respiratory conditions, such as allergies, chemical sensitivities, or asthma
- Persons with weakened immune systems (such as HIV infected persons, cancer chemotherapy patients, and so forth)
- Infants and young children
- Older persons
- ❖ Anyone with a health problem they believe to be due to mold should consult a medical professional.

The following additional fact sheets on mold and health effects are available from the CDPH Environmental Health Investigations Branch, (510) 620-3620 or their webpage,

http://www.ehib.org/cma/topic.jsp?topic_key=15:

- *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*

MOLD DETECTION

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 also should trigger a more thorough inspection for damp conditions. You may find mold growth underneath water-damaged surfaces (for example, wallpaper) or behind walls, floors, or ceilings.

Should I test my home for mold?

It depends. CDPH 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. Private home and apartment owners generally will need to hire a contractor, because insurance companies and public agencies seldom provide this service. Mold inspection and cleanup usually is considered a housekeeping task that is the responsibility of a homeowner or landlord, as are roof and plumbing repairs, house cleaning, and yard maintenance.

Another reason CDPH does not recommend mold testing is that individual susceptibility varies so greatly and there are few standards for an acceptable quantity of indoor mold. If you do sample, an outdoor air sample must be collected at the same time as indoor samples to provide a baseline measurement for comparison because there always is some mold in outdoor air and this air may enter a building.

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 to correct it.

GENERAL CLEAN-UP PROCEDURES

The following information is intended as an overview for homeowners and apartment dwellers. For further details, consult the more thorough documents listed in the USEFUL PUBLICATIONS section below.

Judging how large a problem you have

Small mold problems—total area less than 10 square feet can be handled by the homeowner or apartment maintenance personnel using personal protective equipment (see below). Large contamination problems—areas greater than 100 square feet may require an experienced, professional contractor. For in-between cases, the type of containment and personal protection will be a matter of judgment.

What can I save? What should I toss?

Discard items from which it will be difficult to remove mold completely. Solid materials generally can be kept after they are cleaned thoroughly.

- First, fix the moisture problem and remove excess water.
- A wet/dry vacuum cleaner may help remove water and clean the area.
- Discard porous materials, for example, mold-damaged ceiling tiles, drywall or wallboard, carpeting, drapes, upholstered furniture, and wood products. Spores are more easily released when moldy materials dry out, therefore, remove moldy items as soon as possible.
- Contain the area in which you work to reduce the spread of dust to other areas, for example, close the door or use plastic sheets to separate the room and run a suction fan that exhausts the air outdoors.
- Remove drywall to a level above the high-water mark. Visually inspect the interior, and remove any mold-contaminated material, such as insulation.

- Carpet is often difficult to clean thoroughly, especially when the backing or padding is moldy, in which case it should be discarded.
- If properly bagged or enclosed, mold-contaminated items can be discarded with household trash.
- Clean nonporous materials, for example, glass, plastic, metal, and ceramic tiles
- Wear gloves, an N-95 respirator, and eye protection.
- Use a non-ammonia soap or detergent, or a commercial cleaner, in hot water, and scrub the entire mold-affected area.
- Use a stiff brush or cleaning pad on cement-block walls and other uneven surfaces.
- Rinse cleaned items with water and dry thoroughly.

Disinfection of contaminated materials

Disinfecting agents can be toxic for humans as well as molds; therefore, they should be used only when necessary and should be handled with caution. Disinfectants should be applied only to thoroughly cleaned materials to ensure that the mold has been killed.

- Wear gloves and eye protection when using disinfectants and ventilate the area well
- A 10% solution of household bleach can be used as a disinfectant. Use 1½ cups of household bleach per gallon of water.
- When disinfecting a large structure, make sure that the entire surface is wetted, for example, the floors, joists, and posts
- Keep the disinfectant on the treated material for the prescribed time before rinsing or drying
- 10 minutes typically is recommended for a bleach solution.
- Properly collect and dispose of extra disinfectant and runoff

Remember

- ❖ *Do not use disinfectants instead of, or before, cleaning nonporous materials with soap or detergent.*
- ❖ *Bleach straight from the bottle is actually LESS effective than diluted bleach.*
- ❖ *Never mix bleach with ammonia because this may produce toxic fumes.*
- ❖ *Bleach fumes can irritate the eyes, nose, and throat, and spilled bleach can irritate skin and damage clothing and shoes.*

FIRST AID

(<http://www.thecloroxcompany.com/products/msds/bleach/cloroxregularbleach0505.pdf>):

Eye Contact: Hold eye open and rinse with water for 15–20 minutes. Remove contact lenses, after first 5 minutes. Continue rinsing eye. Call a physician.

Skin Contact: Wash skin with water for 15–20 minutes. If irritation develops, call a physician.

Ingestion: Do not induce vomiting. Drink a glassful of water. If irritation develops, call a physician. Do not give anything by mouth to an unconscious person.

Inhalation: Remove to fresh air. If breathing is affected, call a physician.

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 your and your family's health during cleanup.

- Use a respirator when handling or cleaning moldy materials to protect yourself from inhaling airborne spores
- You can purchase respirators from hardware stores. Select an N-95 respirator that is effective for particle (particulate) removal.
- Wear protective clothing that is easily cleaned or discarded
- Use rubber gloves
- Clean a test area first
- ❖ ***Beware that respirators that remove particles will not protect you from fumes, such as from bleach. When using bleach or other disinfectants, minimize exposure by ventilating the area well.***

If this activity bothered you, consider hiring a licensed contractor or other experienced professional to carry out the work. The California Department of Consumer Affairs (CDCA) provides information on how to hire a contractor and describes the different classifications of licensed contractors:

What Kind of Contractor Do You Need?

<http://www.cslb.ca.gov/Consumers/HireAContractor/>

Licensing Classifications.

<http://www.cslb.ca.gov/GeneralInformation/Library/LicensingClassifications/>

- Ask family members or bystanders to leave areas that are being cleaned

- Work for short time periods and rest where you can breath fresh air
- Air out your home well during and after the work
- ❖ ***Never use a gasoline engine indoors (e.g., a water pump, pressure washer, or generator) as you could expose yourself and your family to toxic carbon monoxide.***

Can air ducts become contaminated with mold?

Yes. Duct systems may be constructed of bare sheet metal, sheet metal with fibrous glass insulation on the outside, sheet metal with fibrous glass on the inside, or entirely of fibrous glass. Bare sheet metal systems and sheet metal with exterior insulation can be cleaned and disinfected.

Water-damaged fibrous glass liner often will need to be removed and discarded, and ductwork in difficult-to-reach locations may have to be abandoned. If you have questions, contact an air duct cleaning professional or licensed contractor.

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

No. Ozone is not effective in controlling indoor molds and other microbial contamination, even at concentrations far above levels safe for humans. Ozone is a strong oxidizing agent and a known lung irritant, and may damage materials in the home, for example, rubber items may become brittle.

- ❖ **For these reasons, CDPH strongly recommends that you NOT use an ozone air cleaner in any occupied space. Refer to the Air Resources Board, *Hazardous Ozone-Generating "Air Purifiers"*, <http://www.arb.ca.gov/research/indoor/ozone.htm>**

A particle removing air cleaner should only be used as a short-term means to reduce mold exposure. The underlying moisture problem must be identified, and moldy materials must be removed or cleaned.

How can I prevent indoor mold problems in my home?

Inspect your home regularly for the signs and sources of indoor moisture and mold listed on page one. Take steps to eliminate water sources as quickly as possible. Act immediately if a leak or flooding occurs.

- Stop the source of leak or flooding
- Remove excess water with mops or wet vacuum
- Move wet items to a dry, well-ventilated area or place them outdoors to speed drying

Move rugs and pull up wet carpet as soon as possible.

- Open closet and cabinet doors and move furniture away from walls to increase circulation
- Open wall cavities, remove baseboards, or pry open wall paneling if necessary to allow the area to dry thoroughly
- Run portable fans to increase air circulation
- Run dehumidifiers to remove moisture from the air
- Depending on the time of year, determine if a window air conditioner or portable heater would help dry the area
- ❖ Do NOT use the home's central blower if it or any of the ducts were flooded because this could spread mold throughout the home.
- ❖ Do NOT use fans if mold has already started to grow as this also could spread mold.

LOCAL ASSISTANCE

Your city or county health department may be able to answer questions or provide assistance on handling mold problems. Links to local California health departments can be found at

<http://www.cdph.ca.gov/programs/immunize/Pages/CaliforniaLocalHealthDepartments.aspx>.

Other information on local government programs is available at

<http://www.ca.gov/About/Government/Local.html>.

USEFUL PUBLICATIONS

Links to the following documents can be found at <http://www.cdph.ca.gov/programs/IAQ/Pages/IndoorMold.aspx>. [? links not at new site ?]

General Information

U.S. Environmental Protection Agency. *A Brief Guide to Mold, Moisture, and Your Home.* An overview plus links to additional resources.

<http://www.epa.gov/mold/moldresources.html>; (800) 438-4318, 9 a.m. to 5 p.m., Eastern Time, <http://www.epa.gov/mold/index.html>

U.S. Centers for Disease Control and Prevention. *Mold homepage.* Information on mold and health; an inventory of state indoor air quality programs; advice on assessment, cleanup efforts, and prevention of mold growth; and links to resources.

<http://www.cdc.gov/mold/default.htm>

Facts about Mold and Dampness.

http://www.cdc.gov/mold/dampness_facts.htm

CDPH Occupational Health Branch. *Mold in Indoor Workplaces.* An overview with specific resources for workers.

<http://www.cdph.ca.gov/programs/hesis/Pages/default.aspx>. [? I could not locate this document ?]

California Research Bureau. *Indoor Mold: A General Guide to Health Effects, Prevention, and Remediation.* A report to the California legislature. <http://www.library.ca.gov/crb/06/01/06-001.pdf>

New York City Department of Health. An overview and info sheets on *Facts About Mold*, *Flood Fact Sheet*, *Healthy Homes: Facts About Mold*, and *Healthy Homes: Mold Tear-Off*. <http://www.nyc.gov/html/doh/html/epi/mold.shtml>

Health Canada: *Fungal Contamination in Public Buildings*

A Guide to Recognition and Management (1995).

http://www.hc-sc.gc.ca/ewh-semt/alt_formats/hecs-sesc/pdf/pubs/air/tools_school-outils_ecoles/fungal-guide-mgmt-fongique_e.pdf

Fungal Contamination in Public Buildings: Health Effects and Investigation Methods (2004).

http://www.hc-sc.gc.ca/ewh-semt/alt_formats/hecs-sesc/pdf/pubs/air/fungal-fongique/fungal-fongique_e.pdf

Residential Indoor Air Quality Guidelines: Moulds (2007).

Information on the *Physical and Chemical Properties, Causes of Mold Growth, Health Effects*, and the *Canadian Guideline*. <http://www.hc-sc.gc.ca/ewh-semt/pubs/air/mould-moisissure-eng.php>

Mould, Dampness, and Humidity. Information on the *Effects of Mould on Health, Mould: Get Rid of It*, and *What is Mould?* <http://www.hc-sc.gc.ca/ewh-semt/air/in/poll/mould-moisissure/index-eng.php>

Clean-up Guidance

U.S. Environmental Protection Agency. *Mold Remediation in Schools and Commercial Buildings.* Also applicable to residences.

http://www.epa.gov/mold/mold_remediation.html

U.S. Centers for Disease Control and Prevention. *Prevention and Remediation Strategies for the Control and Removal of Fungal Growth.*

http://www.cdc.gov/mold/strats_fungal_growth.htm

American Red Cross/Federal Emergency Management Agency. *Repairing Your Flooded Home.* Guidance for recovery after flooding disasters addressing technical

and logistical issues (also available in Spanish)
<http://www.fema.gov/library/viewRecord.do?id=1418>

New York City Department of Health. Widely referenced guidelines developed by the New York City Department of Health. *Mold Guidelines (2008)*.
<http://www.nyc.gov/html/doh/html/epi/moldrpt1.shtml>

Consultants, Laboratories, and Clinics

CDPH Listing of Consultants Offering IAQ Services in California. Self-reported database of contractors and advice on using the list. <http://www.cal-iaq.org/FIRMS/> and <http://www.cal-iaq.org/FIRMS/Howto.htm>

CDPH List of Laboratories for Bioaerosol (Mold) Testing. Identifies laboratories that can test for mold. <http://www.cal-iaq.org/BioLabs.htm> [? this list not updated since 2003; replace with following ?]

American Industrial Hygiene Association. Listing of laboratories accredited in environmental microbiology. http://apps.aiha.org/qms_aiha/public/pages/reports/publicscopeview.aspx?ProgramCode=38

Association of Occupational and Environmental Clinics. Directory of clinics in California and other states. <http://www.aoec.org/directory.htm>

PROGRAM CONTACT INFORMATION

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