Mold & Mildew

Cleaning Up Your Flood-Damaged Home

FEMA B-606/July 2008

FEMA

The Problem With Mold

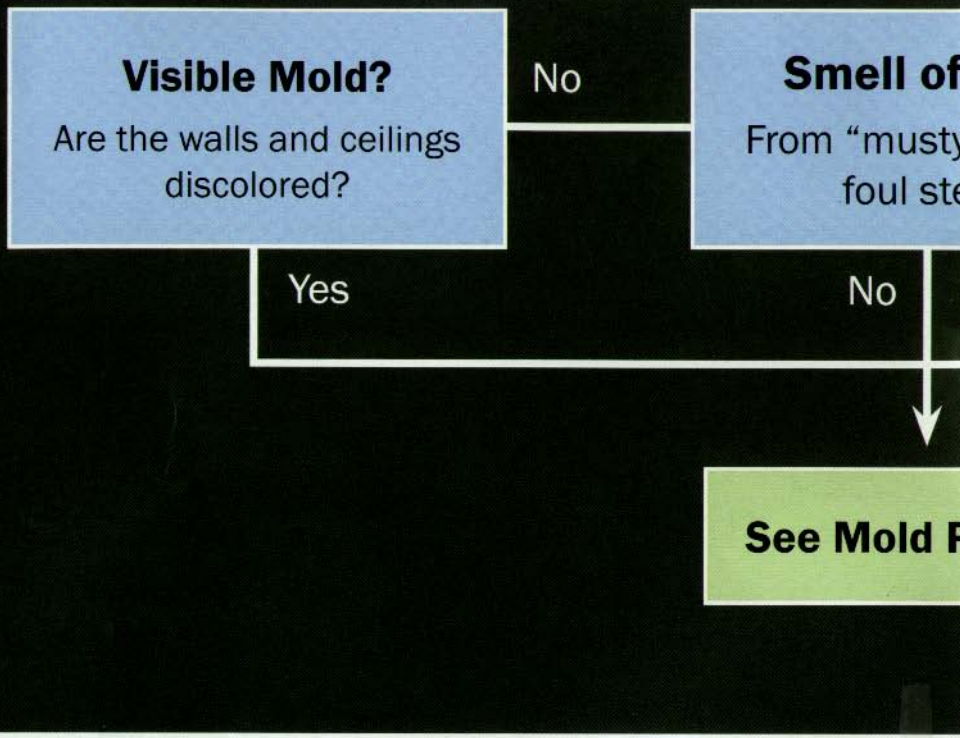
Mildew and molds are fungi - simple microscopic organisms that thrive anywhere there is a moist environment. Molds are a necessary part of the environment; without them, leaves would not decay and aspects of soil enrichment could not take place. It is their ability to destroy organic materials that makes mold a problem for people.

Mildew (mold in its early stages) and molds grow on wood products, ceiling tiles, cardboard, wallpaper, carpets, drywall, fabric, plants, foods, insulation, decaying leaves and other organic materials. Mold colonies can start to grow on a damp surface within 24 to 48 hours. They reproduce via spores - tiny, lightweight "seeds"- that travel through the air. Molds digest organic material, eventually destroying the material they grow on, and then spread to destroy adjacent organic material. In addition to the damage molds can cause in your home, they can also cause mild to severe health problems. See the **Health Problems From Mold** section to check for possible mold related health problems.

The Environmental Protection Agency has this to say about mold: During a flood cleanup, the indoor air quality in your home or office may appear to be the least of your problems. However, failure to remove contaminated materials and to reduce moisture and humidity can present serious long-term health risks. Standing water and wet materials are a breeding ground for microorganisms, such as viruses, bacteria, and mold. They can cause disease, trigger allergic reactions and continue to damage materials long after the flood.

New Orleans, LA, October 23, 2005
This New Orleans resident searches for salvageable items in her home following Hurricane Katrina. Like many of the other homes located in the 9th Ward neighborhood, this home had significant mold damage to the walls.

FEMA Photo/Andrea Booher



Mold In Your Home?

You may have mold and/or mildew growing in your home if your home has water damage due to:

- Flooding
- Sewage back-up from flooding in the area
- Plumbing or roof leaks
- A damp basement or crawl space
- Overflows from sinks or bathtub
- High humidity (steam cooking, dryer vents, humidifiers)

Mold and mildew will develop within 24-48 hours of water exposure. Even worse, it will continue to grow until steps are taken to eliminate the source of moisture, and effectively deal with the mold problem. Use the diagram above to assess the extent of mold in your home. Then refer to the **Solution** section for steps you need to take to remedy the problem. Also refer to the **Prevention** section for tips on keeping mold out of your home in the future.

Mold?

earth" to
nch.

Yes

Identify & Eliminate Source of Moisture

revention

How Much Mold is Present?

Visible sq. ft. _____

*Hidden sq. ft. _____

+

Total sq. ft. _____

If less than 25 sq. ft.,
Follow instructions in this booklet.

If more than 25 sq. ft.,
Consult a professional contractor.

Solutions to Mold Problems

Dry Out a Mold or Water Damaged House

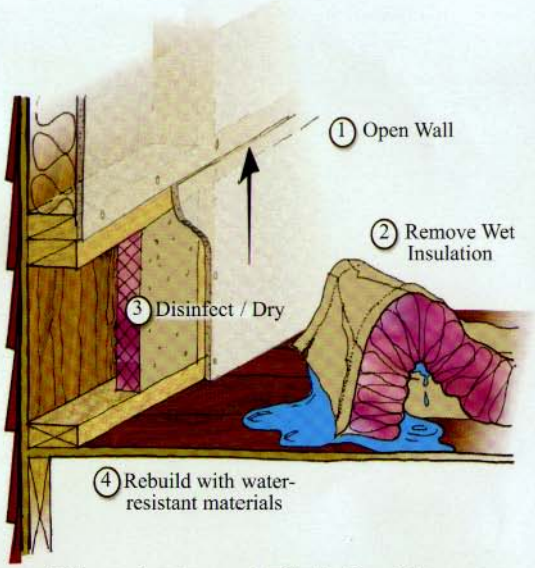
General Turn off main power if wiring is wet or moldy. Have an electrician check the house's electrical system before turning power on again. Open the house to fresh air when the humidity is lower outside than inside. Use fans and dehumidifiers to remove moisture unless mold has already started to grow (fans may spread existing mold). Use the furnace only if the ducts have not been inundated (any forced air central heating ducts that have come in contact with water or mold should be professionally checked). Remove all wet items such as furniture, rugs, bedding and toys. Discard soaked or moldy carpeting. Clean and disinfect other items. Discard all food products that were not stored in a water tight container.

Interior walls and Ceilings Remove all wet or contaminated porous materials such as ceiling tiles, drywall and wood by-products. If wallboard is soaked, remove to a foot above the watermark and discard. Drain walls by removing the baseboards and drilling holes near the floor. Dry panel-type walls by pulling the bottom edge out from the studs. Check the interior of the wall for hidden mold.

Floors and Exterior Walls
Remove all wet insulation. Discard all but rigid insulation. Rigid insulation can be reinstalled after disinfecting and drying.

Materials You'll Need

- Buckets and trash bags
- Scrub brush, sponges, and rags
- Gloves (latex, rubber) and mask (painter's or respirator)
- Broom, mop, and wet-dry shop vacuum
- Non-ammonia soap or commercial cleaner (phenolic or pine-oil based)
- Disinfect with liquid chlorine bleach
  1 ½ cup of bleach to 1 gallon of water



Some General Cautions:

- Exercise caution in cleaning and disinfecting molds because they release mold spores when disturbed. Wear gloves and a mask.
- Never mix bleach with ammonia; doing so will create toxic fumes.
- When discarding items contaminated with mold, use extreme caution or hire a professional.

Cleaning and Disinfecting

Before you begin:

- Wear gloves and a mask; protect your eyes.
- Make sure the working area is well ventilated.
- If mold is present, clean a small test patch. If you feel your health is adversely affected, consider hiring a professional to do the work.
- Only apply disinfectants to already cleaned materials.

Hard Surfaces Wash items such as metal, glass, solid wood, plastic and other nonporous materials with a non-ammonia detergent and hot water. Use a stiff brush on rough surface materials such as concrete. Use a Wet-Dry shop vacuum to remove water and to clean items such as studs or exposed wood framing. Disinfect all cleaned surfaces with a bleach solution (1 ½ cup of bleach in 1 gallon of water). Let the solution stay on the surface for at 10 minutes before rinsing with clear water and allowing to dry.

Porous Materials This includes upholstered furniture made of pressed particle materials. Deciding whether or not to keep a contaminated item? Remember, when in doubt, throw it out. If an item has been wet for less than 48 hours, it may be able to be cleaned and disinfected with phenolic or pine-oil cleaner. It should then be completely dried and monitored for several days for any fungal growth and odors – if any mold develops, discard the item. **Allow the wet area to dry completely (usually two to three days) before beginning to rebuild or replace the damaged items.**

Health Problems From Mold

We are exposed to many kinds of mold both inside and outside the house. The exposure is greater in damp or wet conditions, especially when timely drying out does not have a chance to occur.

Of the thousands of molds that exist, some are known allergens (aggravating or causing skin, eye and respiratory problems) and a few molds produce harmful mycotoxins that can cause serious problems. But all molds, in the right conditions and high enough concentrations, are capable of adversely affecting human health.

The potential for health problems occurs when people inhale large quantities of the airborne mold spores. For some people, however, a relatively small number of mold spores can cause health problems. Infants, children, immune-compromised patients, pregnant women, individuals with existing respiratory conditions and the elderly are at higher risks for adverse health effects from mold.

Serious Health Problems from Mold Exposure

Typical symptoms reported from mold exposure include:

- Respiratory problems – sneezing, asthma attacks, etc.
- Nasal and sinus congesting or dry, hacking cough
- Eye irritation – burning, watery, redness
- Nose or throat irritation – sneezing fits, bloody noses
- Skin irritations – rashes or hives
- Nervous system – headaches, memory loss, mood changes
- Aches and pains

The more serious health problems have been associated with Stachybotrys atra, a highly toxic mold. The mold is a greenish-black and slimy, resembling tar or black paint. Stachybotrys typically grows only on repeatedly wetted materials that contain cellulose like paper and ceiling tiles, and any kind of wood. In most cases, this mold can be removed by a thorough cleaning with a bleach solution. Severe mold infestations may require the assistance of a professional with experience in dealing with Stachybotrys.

If mold exposure is unavoidable, sensitive people should wear tight-fitting masks or respirators.

Mold Prevention

There is no practical way for you to eliminate all of the molds and mold spores in the indoor environment. But there are many ways to help control moisture and mold growth in your home.

Stop the Water

- Fix leaks in pipes and any damp areas around tubs and sinks so that biological pollutants don't have a growing environment.
- Rebuild or retrofit using water-resistant materials such as tile, stone, deep-sealed concrete, galvanized or stainless steel hardware, indoor/outdoor carpet, waterproof wallboard, water-resistant glues and so on.
- Prevent seepage of water from outdoors into your house. Rain water from gutters needs to drain away from the house. Ground around the house needs to slope away to keep the basement and crawl space dry.
- Cover dirt in crawl spaces with plastic to prevent moisture coming from the ground. Ventilate the area as much as possible.

Keep it Clean

- Clean fabrics often and store them in a well-ventilated area to keep them dry. Soiled fabric promotes mold growth.
- Consider having your air ducts cleaned if you suspect mold exists on the inside surfaces or if the duct insulation has been wet.
- Routinely check potential problem spots like the bathroom and laundry for moldy odors and disinfect as necessary with bleach (1 ½ cup of bleach in 1 gallon of water).

Keep it Dry

- Reduce the moisture in the air with dehumidifiers, fans and open windows or air conditioners, especially in hot weather. Do NOT use fans if mold may already exist; a fan will spread the mold spores.
- Try to keep the humidity in your home below 40%.
- In moisture-prone areas, choose carpets made from man-made fibers.
- Reduce potential for condensation on cold surfaces by insulating.

For More Information

An excellent publication from the American Red Cross and the Federal Emergency Management Agency (FEMA) is **Repairing Your Flooded Home**. This source of comprehensive information is available for free from the FEMA Distribution Center:

FEMA Publications
PO Box 2012
Jessup, MD 20794
(800)480-2520

Local information and/or assistance is available through your county or city. Contact any of these agencies or departments:

- Health
- Social Services
- Environmental Health
- Housing

More information on cleanup after a flood and ways to reduce damages from future disasters can be found at:

- www.fema.gov Go to link at bottom right corner: Resource Library
- www.floodsmart.gov

FEMA

FEMA No. B-606
Catalog No. 07228-1