

## MOLD REMEDIATION

Kathleen Parrott, Ph.D.  
Professor of Housing, Virginia Tech

Virginia Cooperative Extension has three publications to help you deal with **mold** in your home:

- *Mold Basics*: What is mold? How does it grow? What are the health concerns?
- *Mold Prevention*: Can we prevent water problems in the home? How do we keep water problems from becoming mold problems?
- *Mold Remediation*: What do we do if we have mold in our homes?

### Help! I Think I Have Mold! What Can I Do?

Molds are natural, common, and typical in the environment. They are actually an important part of our ecosystem as they help decompose dead organic matter. However, we do not want an excess of mold growing in our homes, decomposing the structure and damaging our possessions.

Do you have a mold problem in your home? Answer the following questions:

- Can you see visible mold growth? Look for evidence of mold in high moisture locations, especially bathrooms, kitchens, basements, and laundry areas. Keep in mind that mold can come in many colors, and look fuzzy, slimy, or sticky.
- Do you notice a musty or sour odor, especially in damp places? This is a typical sign of mold growth and would be a clue to look for evidence of mold growth.
- Do you have evidence of excess moisture, condensation, or water damage? If building materials have been damp or wet more than 24 to 48 hours, you probably have mold growth.
- Could you have hidden mold growth? If you have areas where there are water problems or you detect a musty odor, you may have hidden mold growth. Mold may be growing behind or underneath wall board, paneling, wall paper, vinyl wall coverings, carpet or furniture.



If your answers to the above questions confirm that you have a mold problem, then let's consider what to do next. Solving a mold problem is more than just cleaning. Environmental or mold experts talk about mold *remediation* (to remedy the matter or correct something that is deficient). Therefore, we need to think of mold remediation as:

- *Finding and fixing the underlying water problem* that led to the mold growth, including leaks, flooding, and condensation.

- *Cleaning and removing mold* from materials and surfaces in the home.
- *Disposing of mold contaminated materials* that cannot reasonably and successfully be cleaned.

It is important to emphasize solving and fixing the water problem as part of a mold remediation plan. No matter how effective the mold cleaning or removal, **if the water problem is not solved – the mold will return.**

Common places in homes where there are water problems include:

- Plumbing fixtures, including underneath sinks and lavatories and around the base of the toilet.
- Around and underneath water-using appliances such as the clothes washer and dishwasher.
- Places where rain water could enter the house, including the roof, windows, doors, and foundation walls and floor.
- High moisture spaces in the home, such as the bathroom and kitchen.
- Areas where condensation can be a problem, including a basement or crawlspace.
- Cold surfaces that could have condensation, such as cold water pipes, bathroom windows, closets on exterior walls, or exterior walls.
- Places where drainage could be a problem, such as around the foundation or at a sump pump.

We will focus, in the rest of this publication, on mold clean-up and removal. However, the Virginia Cooperative Extension MOLD PREVENTION Fact Sheet has helpful information on solving and preventing water and moisture problems that can lead to mold problems.



### **Does it Matter How Much Mold There Is in My Home?**

Another key part of a mold remediation plan is to consider the *extent* of the mold contamination. This is critical to several decisions that must be made about cleaning and removing the mold. We are going to follow the protocol of the U.S. Environmental Protection Agency (EPA), which considers *small*, *medium*, and *large* areas of mold contamination. Let's define what is meant by the different size areas, and then we can discuss more about how the size or extent of mold contamination determines mold clean-up and removal.

- *Small Area of Mold Contamination* – Less than about 10 square feet
  - With attention to detail, this amount of mold contamination is safe for you to clean-up and/or remove. A minimum amount of personal protection equipment is needed and it is usually not necessary to contain or separate the mold contaminated area from the rest of the building.
- *Medium Area of Mold Contamination* – About 10 to 100 square feet

- The recommendation for this amount of mold contamination includes experience or training of the person doing the mold clean-up and/or removal, more extensive personal protection equipment, and limited containment or separation of the mold contaminated area from the rest of the building. If you are inexperienced, you may want to consider professional assistance.
- *Large Area of Mold Contamination – Over 100 square feet*
  - This amount of mold contamination usually requires the services of a professional who will use full personal protection equipment and will fully contain or separate the mold contaminated area from other parts of the building. The professional should follow a recognized protocol, such as from the EPA or the New York City Department of Health.

As you evaluate the amount of mold you have to clean and remove, do not forget to consider the possibility of hidden mold. This mold problem can greatly increase the amount or extent of a mold problem.

### **Do I Need to Test for Mold?**

If you can see mold or smell the distinctive musty odor of mold, you have mold. If you have water problems in your home that have caused building materials to become wet for extended periods of time, you probably have mold. Testing for mold will most likely not tell you anything you do not already know – *you have mold, and it needs to be remediated.*

Mold testing may document the type of mold, but this usually is not an issue in remediation. Mold testing can confirm mold growth, but that typically is known before testing is requested. Mold testing cannot tell you where the mold is growing. Mold testing takes time and this can interfere with getting the mold cleaned and removed.

There are no governmental standards for mold levels. Therefore, mold testing cannot be used to tell whether a building is in compliance with any standards for mold control.

Occasionally, mold testing may be advised. In some situations, a health concern suggests that the mold species needs to be identified. Litigation may require testing, especially to document reduction in mold levels with cleaning and removal. If you decide to test, a professional that follows a protocol from the American Industrial Hygiene Association ([www.aiha.org](http://www.aiha.org)) or the American Conference of Governmental Industrial Hygienists ([www.acgih.org](http://www.acgih.org)) is recommended.

### **What Is the Safe Method to Clean-Up Mold?**

Anyone in a mold clean-up area needs adequate personal protection. Review the section below: “How Can I Protect Myself When Cleaning Up Mold?” before beginning remediation.

### *Small Areas of Mold (Less than About 10 Square Feet)*

These recommendations assume that mold has not penetrated the surface of the materials. If the mold has grown into the materials, or the materials are water damaged, remove, seal in plastic bags, and discard as normal waste.

The following is the recommended method for mold cleaning for most household materials. The exception is gypsum wall board (dry wall). For wall board, *skip steps 1 and 2*.

1. Using a wet vacuum, clean the surface to remove all visible mold. If needed, dampen work area to minimize dust that would spread mold spores.
2. Clean surfaces with a cleaner appropriate to the material.
  - Hard surfaces such as concrete, vinyl, laminate, linoleum, and ceramic tile can be cleaned with an all purpose cleaner or a water and detergent solution. Check the label of cleaning products for the types of surfaces that can be safely cleaned with the product.
  - Carpets and upholstery can be steam cleaned.
  - Wood should be cleaned with a cleaner specifically for wood.
3. Thoroughly dry all surfaces and materials.
4. Vacuum all surfaces with a vacuum cleaner with a HEPA (high efficiency particulate air) filter. Dispose of the contents of the filter in a sealed plastic bag.

### *Medium Areas of Mold (About 10 to 100 Square Feet)*

As a minimum, the area of mold needs to be a *limited containment* area that separates it from the rest of the building to minimize the spread of mold spores. Limited containment requires:

- Polyethylene sheeting ceiling to floor around the mold contaminated area, with a slit entry covered by a flap.
- Maintenance of negative pressure in the limited containment area by a HEPA-filtered exhaust fan.
- Blocking all supply and return air vents of the heating or cooling system in the limited containment areas.

With larger areas of mold contamination, there is likely to be materials where mold has penetrated the surface of the material. This is particularly true of cellulosic or porous materials like carpet, carpet backing, upholstery, wall board, insulation, and wood. These materials will need to be removed and discarded. Remove all moldy material plus material extending about 12 inches around the contaminated area. Seal the moldy materials in plastic bags while in the containment area and discard as normal waste.

Once the mold contaminated area has been isolated as a limited containment area and contaminated materials are discarded, the cleaning protocol is the same as for *smaller areas* of mold.

### *Large Area of Mold Contamination (Over 100 Square Feet)*

As recommended above, mold contamination this extensive should be handled by a trained professional who will fully contain the mold contaminated area.

Some mold damaged materials may have sentimental value, such as photographs, or may be expensive items, such as antique furniture. In these cases, it is recommended that a professional conservation specialist is consulted. Look for someone knowledgeable about furniture, art, or antiques, as appropriate to what you want to restore. Ask for references and professional affiliations.

### **Should I Use Bleach to Remove Mold?**

Chlorine bleach is a *biocide*, which means that it is a disinfectant chemical that will kill germs to control infections. Bleach may kill the mold spores, but it does not remove the mold hyphae. Using bleach to clean mold may not be adequate to stop mold growth or prevent health effects from mold by-products. In addition, bleach evaporates easily and can affect indoor air quality. Therefore, in most situations, using a biocide to clean mold is not recommended.

Cleaning mold from flood waters or sewer back-up is a unique situation where biocides may be used. In these situations, the water leading to mold growth was contaminated and the biocide is part of the decontamination process. It would be very important that any detergents or cleaning products used to clean and remove mold are non-ammonia, in case they mix with bleach. Bleach and ammonia will form poisonous gas.

### **How Can I Protect Myself When Cleaning Up Mold?**

Personal protection is very important when working in mold contaminated areas or cleaning and/or removing mold. Anyone in the mold contaminated area should have the same personal protection equipment. A long sleeve shirt and long pants are suggested to protect arms and legs. In addition, the minimum safety protection is:



- Gloves, preferably extending to the middle of the forearm
  - If you will be using a biocide, or any chemical cleaners, check to see that your gloves are resistant to the chemical.
- N-95 respirator (approved by the National Institute of Occupational Safety and Health)
- Goggles or eye protection

If working in a limited containment area, such as for a medium area of mold contamination, a half-face respirator with a HEPA filter is recommended. Plus, the following additional protection is needed:

- Disposable overalls

Any clothes, shoes, or protective equipment worn in the mold contaminated area should be removed in that area and cleaned before leaving the area. Alternatively, clothes and equipment can be placed in plastic bags and taken outside of the building for cleaning. This is to prevent mold spores from being distributed all over the building.

### **How Can I Learn More About Molds?**

Virginia Cooperative Extension has two additional fact sheets on mold that you can read:

- MOLD BASICS
- MOLD PREVENTION

You may also want to consult the following references (current as of 1/09):

- Environmental Protection Agency (EPA) at [www.epa.gov/mold](http://www.epa.gov/mold). In particular, consult:
  - *A Brief Guide on Mold, Moisture and Your Home*.
 For more detailed information, consult:
  - *Mold Remediation in Schools and Commercial Buildings*
  - *Mold Course: Introduction to Mold and Mold Remediation for Environmental and Public Health Professionals*.
- American Industrial Hygiene Association at [www.aiha.org](http://www.aiha.org). Select the mold link for:
  - *The Facts about Mold* (consumer brochure)
- Federal Emergency Management Agency (FEMA) at [www.fema.gov](http://www.fema.gov). This web site has fact sheets and case studies about mold clean-up and prevention after flooding, hurricanes and other weather disasters.
- Building Science Corporation at [www.buildingscience.com/resources/mold](http://www.buildingscience.com/resources/mold). Search the data base for detailed information on moisture and mold control in buildings.
- New York City Department of Health and Mental Hygiene: Guidelines on Assessment and Remediation of Fungi in Indoor Environments at: <http://home2.nyc.gov/html/doh/downloads/pdf/epi/epi-mold-guidelines.pdf>. These guidelines are generally considered the standard for remediation and mold clean-up.

photo acknowledgements: <http://www.epa.gov/mold/moldcourse/imagegallery1.html>

Thanks to the following professionals for their review of the Mold Fact Sheets:

Linda Jackson Cole, Extension Agent, Family and Consumer Sciences, Chesterfield, VA  
 Johanna Hahn, Extension Agent, Family and Consumer Sciences, Newport News, VA  
 Joseph Ponessa, Extension Specialist in Housing and Energy, Rutgers Cooperative Extension (retired)  
 Cristin Sprenger, Extension Agent, Family and Consumer Sciences, Verona, VA