

News and Analysis of Breaking Issues in Affordable Housing

National Affordable Housing Management Association

526 King Street, Suite 511- Alexandria, Virginia 22314 - 703-683-8630 - FAX 703-683-8634 -

www.NAHMA.org - E-Mail George.Caruso@NAHMA.org or Chris.Lord@NAHMA.org - all rights reserved

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Toxic Mold Issues for Multifamily Housing Managers and Owners

In certain parts of the country it has been difficult to pick up a newspaper without seeing an article on Toxic Mold. There has been an upsurge in lawsuits against, owners, builders and insurance carriers in several states. To date there have been a few high profile cases involving both rental and for sale housing resulting in six and seven figure awards.

Those of us who own boats have dealt with mold and mildew control since the time the first item was stored on the first closed cabin ship millennia ago. Mold in indoor environments is not a new event. While there is no recorded history of it, the first mold problems were likely noted when humans first started using caves as shelter. So long as there is warm, moist air that is not moving and a few spores you will have mold issues.

In recent months press coverage about lawsuits and health studies involving mold has focused on one type of mold called *Stachybotrys chartarum*, which has been named "the toxic mold." It is only one of a half dozen common molds with some toxic elements. There is no particular reason why *Stachybotrys* should be singled out, but it has been tagged as the problem by the press in some stories. The medical and public health communities have been looking at these issues for some years, and there is not yet any fully agreed conclusions on what is and what is not a problem. There are some cautions and protective procedures that are recommended by the Centers for Disease Control and the Environmental Protection Agency. There are ongoing investigations of the links between mold and disease. The current science on these issues is in flux, preliminary investigations suggest that some cautions should be observed. As was the case with Asbestos and Lead Paint, we are dealing with an evolving health issue, recommended practices and procedures are not fully defined and will no doubt change over time.

This NAHMAanalysis is not meant to be a complete treatment of the issue, it is a summary of the issues derived from some of the available literature. You will have to evaluate your practices and approach to this issue. As major studies and suggested procedures become available we will pass them along to you. There are potential health consequences from exposure to mold, and from clean-up and repair techniques. Medical Professionals are not agreed yet as to the severity and extent of medical problems arising from mold. The Centers for Disease Control and various academic institutions are involved in continuing research.

Readers need to be aware that some of the reference documents we have reviewed contain

conflicting and inconclusive information about health effects from exposure to mold, clean-up procedures, acceptable indoor air moisture levels and ventilation. We are dealing with an issue that is far from settled at the moment.

The two issues most experts agree upon are:

1. Active mold growth should be removed.
2. Eliminating excessive moisture is required to stop mold growth.

Our Colleagues at the NAHB Research Center have put together a fine primer on this issue, from that document here is some background on the issue.

MOLD IN THE ENVIRONMENT

Molds are a subset of the fungi family and are common, abundant, and an essential part of the world's ecological system. Fungi are found nearly everywhere and are necessary for recycling organic material, which is required to sustain plant and animal life.

Mold spores are airborne and travel into and out of buildings as air is exchanged and with the movement of people and their belongings. Mold grows on wet surfaces and, if left untreated, may eventually release spores into the air. Airborne mold spore concentrations can become unhealthful when large areas are wet for prolonged periods. Resolving excessive moisture conditions can prevent and minimize mold growth in the indoor environment.

MOLD GROWTH

In order to reproduce, molds release tiny spores just as plants produce seeds. The spores settle on surfaces and, when conditions are favorable, they begin to consume organic material in their immediate vicinity. Molds can grow on cloth, carpet, leather, wood, wallboard, household dust, and on anything that is made of organic material. Sustained mold growth requires moisture, organic material (a food source), and a suitable temperature generally in the range of 40°/to 100°/F. When one or more of these three conditions are unsatisfactory, the mold colony will become dormant. When favorable conditions are restored, the dormant colony will resume its metabolic activity.

Molds can produce compounds that become airborne along with the mold spores. A toxic substance called mycotoxin can cling to the surfaces of spores; other substances may be found within spores. Molds also produce volatile bioaerosols that are released directly into the air. These compounds often have strong, unpleasant odors (a musty smell) that are commonly associated with molds.

HOW TO LIMIT MOLD GROWTH

The most practical approach to limit mold growth is early detection and prompt resolution of excessive moisture. If you can see mold or detect an earthy or musty odor, you can assume you have a moisture problem that must be resolved to achieve a permanent solution to arresting mold growth. Mold growth is found behind walls or under materials where water has damaged surfaces. Look for discoloration and mold on surfaces.

Controlling indoor air moisture will limit the probability of supporting mold growth from condensing

water on interior surfaces; such as on walls, windows, and areas near air conditioning supply registers. Relative humidity is a measure of the amount of water vapor in air. Relative humidity meters are useful for detecting excessive moisture and they are available from most hardware stores. Moisture sources that increase indoor air relative humidity are: habitation (people release moisture), bathing, cooking, plants, washing and air-drying of dishes and clothes, unvented combustion appliances, humidifiers, and outdoor ventilation air in humid climates.

Another moisture source is water from leaks; such as from pipes, rain water leakage through windows, roof flashing, ice dams, etc.

Listed below are strategies that can help minimize mold growth.

- Take notice of musty odors in the home because they indicate the presence of mold. Look for visible signs of mold and abate the moisture source.
- Watch for condensation and wet spots and eliminate sources of moisture.
- Prevent moisture resulting from condensation by increasing surface temperatures or reducing moisture levels in the air. To increase the surface temperature, insulate or increase the circulation of heated air. To reduce moisture levels in the air, repair leaks, increase ventilation (if outside air is cold and dry), or dehumidify.
- Perform building and HVAC inspections and maintenance. Repair the condensate drain if the air conditioning system's drip pan overflows with water.
- Vent clothes dryers to the outdoors.
- Run the air conditioner and/or a dehumidifier during the humid months of the year. Controlling indoor air moisture to below 65 percent relative humidity will limit the probability of supporting mold growth.
- Keep the relative humidity as low as is comfortable during the winter season for houses in cold climates. Mold growth on interior surfaces of exterior walls can occur during the heating season. The combination of cool surfaces and excessive humidity can cause a high near-surface relative humidity and condensation. Experience has shown that an air moisture level below 40 percent relative humidity during the heating season will prevent condensation on surfaces. This level of humidity may not be appropriate for houses in severe cold climates. A sign of excessive humidity is condensation on the inside of windows. If condensation is present for prolonged periods take steps to reduce the moisture source or increase ventilation.
- Clean and dry any wet or damp areas within 48 hours.
- Provide drainage for roof rainwater and maintain the ground with a slope that drains water away from the foundation.
- Repair water leaks in the building envelope as soon as possible.
- Do not store organic materials such as paper, books, clothes, etc., in humid locations (such as in unconditioned basements).
- Exercise extra care when cleaning up after water damage from flood and sewer water. The EPA has suggested guidelines for worker protection which are noted later in this analysis.
- Consider the use of dehumidifiers in areas such as unconditioned basements.

MOLD ABATEMENT AND REMEDIATION

The New York City Department of Health publishes a guideline for professional mold assessment

and remediation service providers. The guideline establishes five levels of abatement based on size of the affected area and discusses health protection measures for workers and occupants. Copies are available at: <http://www.ci.nyc.ny.us/html/doh/html/epi/moldrpt1.html>

The California Department of Health Services also publishes clean-up procedures that are more oriented toward homeowners. The clean-up procedures established by this California agency recommend the use of a disinfectant (chlorine bleach) whereas the New York City guideline does not make a recommendation for use of a disinfectant. Copies are available at: <http://www.cal-iaq.org/mold9803.htm>

The U.S. Environmental Protection Agency published the "Mold Remediation in Schools and Commercial Buildings" document that also provides guidelines and insight on clean-up procedures. You can download a copy of this manual which is quite useful for training maintenance and supervisory staff at: <http://www.epa.gov/iaq/molds/graphics/moldremediation.pdf>

Common suggestions among the various documents include:

- Correct the source of excessive moisture.
- When handling or cleaning moldy materials, consider using a mask or respirator for protection against inhaling airborne spores. Respirators can be purchased from hardware stores; select one for particle removal (sometimes referred to as a N95 or TC-21C particulate respirator).
- Wear protective gloves, eye protection glasses, and clothing should be immediately washed.
- Take care to remove or clean contaminated materials in a way that prevents the emission of fungi and dust contaminated with fungi from leaving a work area and entering an occupied area.
- Non-porous (e.g., metals, glass, and hard plastics) and semi-porous (e.g., wood, and concrete) materials that are structurally sound and are visibly moldy can be cleaned and reused.
- Cleaning should be done using a detergent solution.
- Porous materials (e.g., ceiling tiles and insulation, and wallboard) with more than a small area of contamination should be removed and discarded. Porous materials that can be cleaned, can be reused, but should be discarded if possible.
- A professional restoration consultant should be contacted when restoring porous materials with more than a small area of fungal contamination.
- All materials to be reused should be dry and visibly free from mold.
- Periodic inspections should be conducted to confirm the effectiveness of remediation work.

TESTING FOR MOLD

State health agencies and experts do not recommend testing to determine if you have a mold problem. Mold sampling can be expensive and requires special equipment and trained technicians to acquire reliable samples and test results.

Another issue is that there are few available standards for judging what is an acceptable concentration of mold. If sampling is carried out, an outdoor air sample needs to be taken at the same time as the indoor sample. This baseline provides a measure to determine if the indoor air mold spore

count is greater than the outdoor concentration.

If you decide in favor of testing, consider engaging the services of a qualified laboratory and technician. Check with your local health department for recommendations on selecting a testing service. Also, the American Board of Industrial Hygiene operates a certified associate industrial hygienist program that requires its certified members:

- to have at least a bachelor's degree from an acceptable college or university with a minimum of 30 semester hours of science, as well as specific industrial hygiene coursework;
- to have completed a minimum of four years of professional level-1 industrial hygiene experience;
- to demonstrate that industrial hygiene responsibilities constitute more than 25 percent of the candidate's time and that the candidate is supported by professional references (one must be a certified industrial hygienist or associate credential holder); and
- to pass a comprehensive one-day examination.

EXPOSURE STANDARDS

There is no health-based standard for exposure to mold.

POSSIBLE HEALTH EFFECTS OF MOLD EXPOSURE

Health effects associated with mold fall into four groups as follows:

No effect: Physiological mechanisms in healthy people may allow exposure to mold at low and high levels.

Allergic sensitization and immune responses:

These can include allergic rhinitis (hay fever), asthma, hypersensitivity pneumonitis (inflammation of lung tissue), and allergic skin diseases.

Infectious growth of the mold in or on the body:

People with compromised immune systems may be more vulnerable to infections by molds. Healthy individuals are usually not vulnerable to infections from airborne mold exposure.

Disruption of cellular function:

This level occurs with toxigenic effects by toxic compounds produced by certain molds.

The Centers for Disease Control and Prevention has published a useful briefing sheet on Mold, it is detailed below:

In 1994, the U.S. Centers for Disease Control reported the deaths of several infants in Cleveland in a case that involved a type of mold called *Stachybotrys chartarum*. The alleged cause of the deaths was idiopathic pulmonary hemorrhage (IPH). Though the deaths were associated with exposure to *Stachybotrys chartarum*, a summary of peer reviews concluded that the association between IPH and exposure to *Stachybotrys chartarum* was not proven.

Q1: How do molds get in the indoor environment and how do they grow?

A: Molds grow naturally in the indoor environment. Mold spores may also enter your house through open doorways and windows through heating, ventilation, and air conditioning systems. Spores in the outside air also attach themselves to people and animals, making clothing, shoes, bags, and pets convenient vehicles for transporting mold indoors. When mold spores drop on places with excessive moisture, such as where leakage may have occurred in roofs, pipes, walls, or plant pots or where flooding may have occurred, molds will grow. Many building materials provide suitable nutrients that encourage mold to grow. Wet cellulose materials, including paper and paper products, cardboard, ceiling tiles, wood, and wood products, are particularly conducive for the growth of some molds. Other materials such as dust, paints, wallpaper, wallboard, carpet, fabric, and upholstery commonly support mold growth.

Q2: How do you know if you have a mold problem?

A: Large mold infestations can usually be seen or smelled.

Q3: I heard about toxic molds that grow in homes and other buildings. Should I be concerned about a serious health risk to my family and me?

A: The hazards presented by molds that may contain mycotoxin should be considered the same for other common molds that can grow in your house. There is always a little mold everywhere-in the air and on many surfaces. There are very few case reports that toxic molds (those containing certain mycotoxin) inside homes can cause unique or rare health conditions such as pulmonary hemorrhage or memory loss. A causal link between the presence of the toxic mold and these conditions has not been proven. A common-sense approach should be used for any mold contamination inside buildings and homes. The common health concerns associated with molds include hay fever like allergic symptoms. Certain individuals with chronic respiratory disease (chronic obstructive pulmonary disorder, asthma) may experience difficulty breathing. Individuals with immune suppression may be at increased risk for infection from molds. If you or your family members have these conditions, you should consult a qualified medical clinician for diagnosis and treatment. For the most part, routine measures will prevent mold growth in the home.

Q4: What is *Stachybotrys chartarum* (*Stachybotrys atra*)?

A: *Stachybotrys chartarum* (also known by its synonym *Stachybotrys atra*) is a greenish-black mold. It can grow on material with a high cellulose and low nitrogen content, such as fiberboard, gypsum board, paper, dust, and lint. Growth occurs in the presence of moisture from water damage, excessive humidity, water leaks, condensation, water infiltration, or flooding. Constant moisture is required for its growth. It is not necessary, however, to determine what type of mold you may have. All molds should be treated the same with respect to potential health risks and removal.

Q5: How common is mold, including *Stachybotrys chartarum* (also known by its synonym *Stachybotrys atra*), in buildings?

A: Molds are very common in buildings and homes and will grow anywhere indoor where there is moisture. The most common indoor molds are *Cladosporium*, *Penicillium*, *Aspergillus*, and *Alternaria*. We do not have accurate information about how often *Stachybotrys chartarum* is found in buildings and homes. While it is less common than other mold species it is not rare.

Q6: What are the potential health effects of mold in buildings and homes?

A: Mold exposure does not always present a health problem indoors. However, some people are sensitive to molds. These people may experience symptoms such as nasal stuffiness, eye irritation, or wheezing when exposed to molds. Some people may have more severe reactions to molds. Severe reactions may occur among workers exposed to large amounts of mold in occupational settings, such as farmers working around moldy hay. Severe reactions may include fever and shortness of breath. People with chronic illnesses, such as obstructive lung disease, may develop mold infections in their lungs.

Q7: Who is most at risk for health problems associated with exposure to mold?

A: People with allergies may be more sensitive to molds. People with immune suppression or underlying lung disease are more susceptible to fungal infections.

Q8: Does *Stachybotrys chartarum* (*Stachybotrys atra*) cause acute idiopathic pulmonary hemorrhage among infants?

A: To date, a possible association between acute idiopathic pulmonary hemorrhage and *Stachybotrys chartarum* (*Stachybotrys atra*) among infants has not been proved. Further studies are needed to determine what causes acute idiopathic hemorrhage.

Q9: What if my child has acute idiopathic pulmonary hemorrhage?

A: Parents should ensure that their children get proper medical treatment.

Q10: How do you get the molds out of buildings, including homes, schools, and places of employment?

A: In most cases, mold can be removed by a thorough cleaning with bleach and water. If you

have an extensive amount of mold and you do not think you can manage the cleanup on your own, you may want to contact a professional experienced in cleaning mold in buildings and homes.

Q11: What should people do if they determine they have *Stachybotrys chartarum* (*Stachybotrys atra*) in their buildings or homes?

A: Mold growing in homes and buildings, whether *Stachybotrys chartarum* (*Stachybotrys atra*) or other molds, indicates a problem with water or moisture. Thus, the first step is to address the water/moisture problem. With that issue resolved, the second step is to clean surfaces with a weak bleach solution. Mold under carpets typically requires removal of carpets. Once mold starts to grow in insulation or wallboard, the only way to deal with it is by removal and replacement. In areas where flooding has occurred, prompt cleaning of walls and other flood-damaged items with water mixed with chlorine bleach, diluted 10 parts water to one part bleach, is necessary to prevent mold growth. Never mix bleach with ammonia. Moldy items should be discarded. The precautions with *Stachybotrys chartarum* (*Stachybotrys atra*) follow the same steps.

Q12: Are there any circumstances where people should vacate a home or other building because of mold?

A: Decisions about vacating premises have to be made individually. If you believe you are ill because of exposure to mold in a building, you should consult your physician to determine the appropriate action.

Q13: How do you keep mold out of buildings and homes?

A: As part of routine building maintenance, buildings should be inspected for visible mold and evidence of water damage. The conditions causing mold (such as water leaks, condensation, infiltration, or flooding) should be corrected to prevent mold from growing.

MANAGEMENT AND MAINTENANCE ISSUES

A review of the currently available literature suggests that Owners and Managers need to revisit their policies and procedures in several areas.

1. Reports of leakage, backups of sewers, or flooding will need to be acted upon very quickly. Mold can begin developing in 24 to 36 hours, and getting any wet areas opened up, treated and dried quickly is essential.
2. Residents who have respiratory or immune system issues will need to be moved or protected from possible mold exposures in any situation where there is water or flood damage.
3. Given that several of the problem molds thrive on drywall facing paper, and kraft paper insulation facing it is important to open up areas affected by leaks enough to ensure that all contaminated materials are removed and disposed. Special care needs to be taken to insure hidden damage and possible mold development are found and dealt with properly.
4. Both Staff and affected Residents need to understand that clean up and treatment procedures are in many cases dealing with spores that are too small to see, difficult to contain, and can

- be redistributed into the repaired areas or furnishings if the wrong repair techniques are used.
5. The EPA has made specific recommendations for worker protection and work area containment. You should review the recommendations and revise maintenance techniques accordingly.
 6. As insurance policies come up for renewal you will want to review your replacement coverages carefully. In several states major insurance carriers in both the single and multifamily markets are revising their policies, adding exclusions for mold related issues, and in some cases declining to renew policies on buildings with recent histories of water damage.
 7. In flood situations in addition to repairing damage to the building, you will need to assess damage to furnishings and other soft materials belonging to residents. Areas that are correctly treated and repaired can be re-contaminated by furnishings in the unit that were not treated, or are not possible to treat for mold.

Of the currently available literature, the best guide to maintenance and worker protection procedures is the EPA guide; "Mold Remediation in Schools and Commercial Buildings". Copies can be downloaded from <http://www.epa.gov/iaq/molds/graphics/moldremediation.pdf>

We continue to monitor developments in this area and will keep you advised.