



Basic Information: Mold and the Indoor Environment

by Dan Chavez



Do you remember the line in the 1989 movie “Field of Dreams”; what was that famous quote; “if you build it, they will come”? To some degree, if you change the line a bit, it will identify our relationship with moisture and mold in the indoor environment; “if you water it, it will grow!”

Adverse environmental issues develop as a result of one essential, but lacking component; moisture.

Moisture is the missing trigger that begins the life cycle of a mold problem. However it happens, a sudden water incident like a water pipe break, washer hose failures, foundation wall leak, etc.; these water intrusions can transition into mold problems relatively quickly as a result of slow or inefficient drying. Other mold situations can develop over an extended period; from a plumbing leak, roof leak, or window failure, etc.

Mold problems are not new; we have been living with and hassled by mold difficulties for a long time.

There are even references to mold contamination in the Bible {Leviticus 14; 33-57}; they speak of mold damage as a “Leprous Disease” of the structure; in need of a priest.

Since the 1980’s, much has been done to conserve energy, structures have become tighter and more energy efficient in both design and building.

Some building materials like OSB products, vapor barriers, thermal insulation, and their use in construction has continued to evolve over the years. Most of these changes had a direct effect on the amount of moisture that escaped out of our indoor environment, as our structures tend to “breathe” less now than before. This excess moisture can also contribute to the potential for activation of mold growth.



Mold Basics

Keep in mind that we all live with surface and airborne mold spores daily; they are a part of the air we breathe indoors as well as outdoors. Mold problems will typically show telltale clues of fungal growth; fuzzy visual signs, musty odors can be more evidence of active growth, but you won't always have those markers to help you identify the problem. Without some qualitative professional environmental air testing, the level and type of contamination can only be a guess.

1. Mold spores are microscopic and cannot be seen with the human eye, without significant magnification.
2. The “fuzzy” green, red, black, etc. patches we see on substrates are “tell-tale” signs of mold activity; signs that mold was or is actively growing.
3. The process of “killing” mold alone doesn't solve the problem, as nonviable mold spores can still be allergenic and toxigenic as a “dead” spore.
4. You can't always count on visual signs or odor to announce the problem.
5. Mold exposure will not affect all individuals the same way.
6. Fungal fragments, which can also be allergenic and toxigenic, can contribute to the problem and significantly outnumber indoor spore counts.
7. All repairs should be made to control excess moisture before the remediation process begins. As mold remediation is not a permanent fix, if the conditions that led to the initial mold growth continue (wet, high moisture, etc.), or reoccur; mold contamination is likely to begin again.
8. It is not reasonably possible to remediate a structure of all mold spores since they are a part of our everyday air. Professional mold remediation is about reducing mold spore counts to acceptable levels, or normal “everyday” levels.
9. Many times, the term “black mold” is used as a scare-to-action tactic, as the black mold refers to a particular mold named *Stachybotrys Chartarum*. *Stachybotrys Chartarum* is “black” in color and was a common link found in public housing in Cleveland, OH in 1994. Exposure to the indoor mold spore levels was thought to cause bleeding lungs in 30 children, 9 of which died. The media referred to mold as “the black toxic mold,” and thus the black mold scare began. However not every mold that is black is *stachybotrys*, and other molds can produce toxins at the same level as *stachybotrys*, but are not black in color.
10. Actual mold species and their toxicity can only be determined through microscopic analysis by a qualified mycologist or an indoor environmental professional.
11. There are no federal regulations for “permissible exposure limits” (PELs) or “threshold limit value” (TLV) for human exposure to mold.

10 Things You Should Know About Mold

Exposure to mold and the potential to affect human health is always debated, but science hasn't settled on a conclusion as of yet. As individuals, our immune systems are unique to us and will react, respond and tolerate microbial exposure in a countless number of ways. Add to the equation the multitude and variety of mold spores and their ability to be allergenic, and in some cases toxigenic, you can begin to see how complex the issue of exposure and health can be.

Since there are many unknowns regarding health and mold exposure, it would be prudent to play it safe and protect your health by limiting your exposure to mold.

1. Health effects and symptoms associated with mold exposure may include allergic reactions, shortness of breath, asthma, and other respiratory issues.
2. Exposure to high indoor mold levels may include; headaches, fatigue, memory loss, nose bleeds, bleeding lungs, nausea, etc.
3. The key to controlling mold growth is controlling excess moisture. The ideal target for indoor relative humidity is 30% to 60%. Relative humidity above 60% can sustain microbial activity.
4. Respond to water intrusions immediately. Repair the source of moisture and completely dry all affected areas.
5. Do not allow those unfamiliar with mold remediation to disturb contaminated areas.
6. Never spray bleach or other chemicals on colonized mold contamination, as spores could be dispersed and become airborne.
7. Using biocides to kill mold doesn't reduce the problem of airborne mold spores, which can still be allergenic and toxigenic.
8. Some species of mold can germinate in as little as 12 hours.
9. Those most vulnerable to the health effects of mold exposure are; pregnant women, young children under the age of 7, senior citizens, those with respiratory ailments, and compromised immune systems.
10. Hidden problems won't be apparent and can only be detected by professional air sampling to find airborne contaminants.



Question The Authority

There may be a variety of professionals you might encounter through the course of a mold problem. Some may be home inspectors, realtors, general contractors, insurance adjusters, remediation contractors, environmental testing professionals, etc. each with different perspectives, experiences and all with their own opinion. Some may be less trained, some with agendas, and some their own goals.

I have identified some very straightforward insights that will give you a gauge for whether the company or professional you are prospecting is knowledgeable about mold contamination. When seeking counsel from professionals, you have to be your own advocate!

1. Question any environmental testing company that also performs remediation as a service, or any remediation company that performs their own environmental testing as a service. Since mold is a microscopic problem, the lack of a reputable independent third-party tester is an inherent "conflict of interest".
2. Question any professional that uses or specifies Chlorine to "kill the mold," Chlorine has not been proven to kill mold, and killing mold is not part of professional remediation.
3. Question any environmental professional that uses the term "black mold" as a specific identification of a type of mold. Professional mold identification is not about the color of the residue; some colors of mold growth will be determined by the food source that the mold is digesting.
4. Question anyone that that uses sight or odor to identify mold species; as in "this isn't the bad mold!"
5. Question any professional that uses or specifies the use of "paint sealers" to bury or entomb mold without remediation. There are many sealers today that are manufactured with antimicrobial properties, but unproven in the long-term application. These sealers should only be used as a preventive after remediation.

6. Question any professional that uses or specifies “instant spray mold killers”. These sprays have a bleaching effect on surfaces, but won’t be as effective as remediation. There are many products that are manufactured to “kill” mold, the chemical makeup of these products can be aggressive and dangerous. Although, they can be quick and cheap, they are also unproven in the long-term application, and not professional remediation.
7. Question anyone that says; “since mold is all around us, if mold was a problem, we’d all be sick!” Mold is ubiquitous in our environment; professional testing will show a distinction between “typical indoor mold species and spore levels” and “unique indoor mold species or elevated spore levels”.
8. Question anyone that uses themselves as barometer, as in: “I’m allergic to mold, so I’d know if you have a problem”. There are thought to be thousands of mold spores, only of which approximately 800 are identified and studied. The likelihood someone would be allergic to all the molds in your structure or have a reaction to short term exposure is remote at best.
9. Question anyone that fails to understand that mold contamination is a microscopic problem. This means they cannot see the actual airborne contamination; they can only see the “tell-tale” signs (fuzzy hair) that mold is or was active. The health concerns stem from fungal spores that cannot be seen that become airborne, which degrades the indoor air quality.
10. Question anyone that fails to understand that mold problems began as an excess moisture problem, without the excess moisture, you wouldn’t have a mold problem. Effort should be given to “cause and effect”, the moisture problem should be determined before remediation begins.
11. Question anyone that uses the “New York City Guidelines” (Guidelines on Assessment and Remediation of Fungi in Indoor Environments) as their standalone guidance for handling mold problems. Although it was an important first step in recognizing mold exposure as a problem, the information is dated, along with questionable remediation procedures.

Mold Must-Haves

Navigating your way through an environmental issue can be confusing, troublesome, financially expensive and a downright hassle! Help yourself with these tips!

1. Since mold contamination is a microscopic problem, we recommend utilizing an experienced professional for evaluation, testing, and consultation. Seek the best professional advice or service, not the cheapest.
2. Don’t allow inexperienced or poorly trained personnel to perform mold remediation. The problem can be made worse!
3. Confirm the quality of remediation with a “post remediation verification,” to insure the efficacy of the process.
4. Use an independent third party for evaluation or testing; separate from a remediation company to avoid a “conflict of interest.”
5. Always use an independent and experienced indoor environmental professional as your advocate for consulting and testing.
6. If mold remediation or environmental testing is being performed on your property, don’t be left out of the conversation. Be your own advocate.

The Contractor Mentality

My first mold remediation project began in 1999, since then I have run across very few general contractors, plumbers, window contractors, etc. that understood or cared to understand the nuances of mold contamination or remediation. My experience has been that most have one of two mentalities; the “I’ll spray something and kill it” or “just tear-it-out, I’ve never had a problem before,” and both dispositions come with their standard “bull in the china shop” action plan.

***The “I’ll kill it mindset”**- Actually killing mold spores is not an easy proposition, and just using chlorine bleach doesn’t come close to solving the problem! The first challenge is spraying the spores, microscopic means you can’t see the spores to spray the spores. There should be an understanding and distinction between surface mold growth, which you can see and “unbound” airborne mold spores that you can’t. There are mold treatment products that will change the color of the substrate by bleaching it, but that doesn’t mean the spores are dead.

Some contractors have been known to fog hazardous chemicals into the air with the hope of killing airborne spores. Fogging a harsh chemical can not only be very dangerous to those applying it, but also for those who live and work in the treated area and are left with the resulting odor and residue that may continue to off-gas. Also, many times these chemicals are so aggressive they damage the painted and metal surfaces in the treated area, all in an effort to “kill” mold.

As a reminder; dead mold spores can still be both allergenic and toxigenic, so killing them is not remediation.

***The just tear it out mindset**- Removing the visual signs of growth from the wall is a good step, but without proper containment controls in place, the resulting airborne contamination could be raised as much as a 1000% as the contaminated areas are disturbed. Adjacent rooms and their contents could become contaminated by airborne mold spores without adequate containment procedures. Any contractor can cut a hole into a wall, but an untrained contractor can make a small mold problem a much larger environmental event by not understanding the results of their actions.

When questioned or confronted with the facts about mold and fungal issues, a poorly trained contractor will defend their previous experiences, in which they did everything wrong, with a “I’ve never had a problem before!” mentality.

Professional remediation requires basic fungal knowledge, planning, airflow containment, specific remediation equipment, as well as trained and protected personnel.

For the best remediation results:

1. Don’t allow untrained individuals to disturb contaminated areas of mold contamination.
2. Don’t let an unskilled contractor “cross-contaminate” previously uncontaminated areas.
3. Don’t allow any untrained individuals to erect critical barriers; install containment controls or negative air scrubbers.
4. Don’t let unknowledgeable individuals begin remediation without a written protocol of their work plan.
5. Don’t allow an unknowledgeable third-party (adjuster, contractor, etc.) to hire unprofessional remediation or testing services in an effort to save their money. Their effort to save money may be detrimental to your property, possessions, and your health.
6. Don’t let an untrained contractor spray any chemical unless you know what it is and you are comfortable that it won’t harm you, leave a harmful residual residue or damage interior surfaces.

The Indoor Environmental Professional

Don’t underestimate the value of an independent third-party professional for evaluation, testing and guidance. Since mold contamination is a microscopic problem there inevitably will be some “nuance” and “conjecture” involved in determining and establishing a corrective protocol. This underscores the need for a trained and knowledgeable professional. An experienced professional will identify the levels of contamination, interpret the lab results of testing, write a remediation protocol, give recommendations during the process and finally arrive at a Post Remediation Verification.

I think the guidance from a skilled Indoor Environmental Professional can save you time, money and hassle, the trick is finding one. There are many more untrained or less professional mold testers willing to take on your project. Usually, these folks will have other unrelated jobs or trades, and they do mold testing on the side.

Air sampling- I think air sampling from a spectator’s perspective is very unimpressive, no magic involved, just a small air pump and a hose. As a function, the information obtained can be invaluable. Typically, air sampling is performed by using a small air pump for a specific amount of time, as the air is drawn through a small hose the microscopic particles that travel in the air are then sucked up and captured in a small filter, or embedded in a gel-like substance. Once that is done, the media is sent to a lab for a microscopic examination of the particles collected, this is performed to identify what types of spores and estimate the number of mold spores found in your indoor environment. This information is used to customize and formulate an action plan.

As I see it, there are three options when assessing a mold problem; each has advantages and disadvantages.

***Option 1-** A “do-it-yourself” approach, with a simple purchase of a mold kit from a large hardware store. These kits have a small container that you open and let mold spores “settle” into it for a predetermined period of time and then send it off to a lab for examination. The results are sent back, and you’re done.

Advantage- Very inexpensive can be done quickly and on your schedule!

Disadvantage- Less than reliable results! This process is full of “false” positives and “false” negatives. The lab will identify some of the mold spores found, but what is your comfort level that a simplified test will be accurate? Once you receive your results, what’s the next step? You will still have questions that this kit cannot answer: Can the sofa be saved, what, if anything, should be thrown away?

***Option 2-** Hiring a contractor who is less knowledgeable, or less experienced in environmental testing in an attempt to “save” money.

Advantage- This can be relatively inexpensive, and someone else does the work!

Disadvantage- Not very reliable! This option is also full of “false” positives and “false” negatives. Usually, this service comes without consultation and guidance; they can’t give what they don’t have! Typically this person will have insufficient knowledge of indoor air quality, fungal issues, microbial testing, or remediation training.

***Option 3-** Hire a qualified Indoor Environmental Professional. This choice may include the most cost, but I believe the extra value will be worth it in the long run. A quality environmental professional has been trained in fungal issues, microbial testing, and indoor air quality. They will have background knowledge in remediation, construction, air management, and building related illness issues.

Advantage- Indoor Environmental Professionals will provide reliable test results, consultation regarding interpretation of the lab results, provide a written protocol for remediation, as well as offering guidance and consultation throughout the remediation process.

Disadvantage- The cost of hiring a professional can be initially expensive, but the cost of not having one may be much more by the completion of the project.

The Environmental Professional Shortlist

- 1.** Never use an environmental company for testing which also offers remediation as a service. This presents an inherent conflict of interest; this conflict is understood and accepted in the environmental testing industry, individuals that don’t adhere to their industry standards are either unaware or don’t care, neither of which is a positive situation for you!

2. Question environmental professionals that are too flexible with their standards to accommodate “budget” dilemmas. Cost is always a consideration and “plan B’s” can be real-world solutions but you need professional advice and guidance that you can trust. Don’t let anyone undercut the testing process by trying to save dollars.
3. Ask questions before you hire! You should be comfortable with the person and the company that is doing your environmental testing from beginning to end.
4. If someone else is hiring the environmental professional for testing and consultation on your property, be involved in the process! Hoping others will do what’s in your best interest is foolish, don’t get left out of the process and stay involved!
5. The results are in ... now what? What does it mean? A quality professional will guide you through the process. A person who is just a “mold tester” will not be able to answer your questions.
6. You may feel like your environmental professional is evasive when explaining mold and its relationship to your health. As they are not doctors, environmental professionals should not be giving health advice or diagnosing health issues. They should only serve as an instrument for confirming or denying elevated spore counts, if an indoor environmental problem exists and direction to address health concerns with a healthcare professional.

Final Observation

Final Observation: Mold spores are ubiquitous, so the question is not; “do I have mold?” The better question would be; “is my mold out of control?” On the one hand, it can be said that mold is naturally occurring and a part of nature, so it has to be innocuous; but can the same can be said about naturally occurring anthrax? Naturally occurring and part of nature doesn’t mean it won’t cause harm.

As a company, we try to help clients find the right balance between inaction and emergency, slumber and hair-on-fire! Mold is like many things in nature; a little exposure doesn’t hurt you and a lot might, depending on the individual. The fact of finding evidence of mold in your home doesn’t qualify as an indoor “mold problem,” but a combination of many small signs may lead you to seek consultation.

From a health and exposure standpoint, mold can be like many household products; milk, peanuts, caffeine, laundry soap... each can bring a different reaction for different individuals at the point of exposure and sometimes a different reaction with extended exposure. Ultimately, as individuals, our existing health, age, immune system or lack of it will determine what we can tolerate and for how long, some exposures to microbial contaminants may bring acute and/or chronic reactions.

I have tried to identify some issues based on my experience over my last 18 years of mold remediation. If you have an environmental problem at home or work, I would emphasize that you become knowledgeable with the basics and have an understanding of any plans in place for remediation. The more information and knowledge you possess will help ensure the right corrective steps are taken. Be your own advocate!



Additional Mold Information Resources

If you need more information about mold in homes and buildings or mold remediation, here are several official websites that are reliable resources for information. Please feel free to contact us with any questions you may have regarding your mold remediation project.

- **“Mold Resources”**

United States Environmental Protection Agency

<http://www.epa.gov/mold/moldresources.html>



- **“Molds in the Environment”**

Centers for Disease Control and Prevention, US Department of Health and Human Services

<http://www.cdc.gov/Mold/>



- **“Questions and Answers on Stachybotrys Chartarum and Other Molds”**

Centers for Disease Control and Prevention, US Department of Health and Human Services

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

- **“Guidelines on Assessment and Remediation of Fungi in Indoor Environments”**

New York City Department of Health, Bureau of Environmental and Occupational Diseases Epidemiology

<http://www.nwhealth.org/pubs/NYC%20DOH%20Guidelines.pdf>

- **RIA- Restoration Industry Association-** <http://www.restorationindustry.org/>

- **IAQA- Indoor Air Quality Association-** <http://www.iaqa.org/>

- **IAQA online training-** <http://www.iaqa.org/iaqa-university>

- **IICRC-** Institute of Inspection, Cleaning and Restoration Certification <http://www.iicrc.org/standards/iicrc-s520/>



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