

Common Sense Guidance on Mold

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Since 1998, toxic black mold has been the pathogen of choice for many people when they feel sick or have breathing problems at home or work. They surf the web, talk to their friends, and too-often conclude that there must be a problem with toxic black mold in their house or place of employment. If they see any black mold growth, they zero-in on it as the possible cause because it might be the “bad one” that they have heard about. If they don’t see any mold growth, they conclude that it might still be present somewhere in the structure, but hidden behind a wall or above a ceiling.

This widespread conviction – that toxic black mold is a major cause of illness – originated with the Centers for Disease Control and Prevention (CDC) in 1994, was picked up by the media, and has been moving full steam ahead on the internet ever since (1). It is bolstered by home renovation companies that do mold testing before starting home repairs, and by home inspectors who conduct mold testing as part of real estate transactions. It doesn’t help that black-colored and toxin-producing molds DO grow in homes where humidity is elevated – inside shower stalls, in sink cabinets with chronic plumbing leaks, or on basement walls near foundations with chronic leaks.

It may come as a surprise, then, to read that there is no research to support fears that there are any life-threateningly-toxic black-colored molds in buildings that must be identified and eliminated.

Don’t misunderstand me – I am not saying that mold growth in buildings is good. Healthy living environments are clean and dry. But, if

you’re anything like me, you have answered many telephone calls from clients who are extremely worried about their home or work environment due to an actual or perceived mold presence. And, you might have wished that you had some guidance on how to answer their questions. So, let’s take a few moments to discuss the real issues associated with mold in order to provide accurate, informative, and useful information to our clients:

Where did this idea – that toxic black mold could seriously hurt people – originate?

In the late 1990’s, a series of articles published by the CDC and other scientific publications linked the presence of a particular black-colored mold, *Stachybotrys*, with serious illness and even the death of infants (2-6). As you might remember, this news hit the media like a bomb – it was common to see newspaper and television articles about toxic black mold and about people who had allegedly been negatively affected by toxic black mold. You might remember several lawsuits brought against employers, home builders, and other entities in which the plaintiffs desired restitution not just for mold-damaged houses and contents, but also for unusual and extreme health problems (such as migraines, memory loss, and insomnia) that they insisted were the result of exposure to toxic black mold. Three of the most famous were the lawsuits filed against home builders by Ed McMahan (remember Johnny Carson?), Melissa Ballard, and Erin Brockovich (remember the Julia Roberts movie?) in the 2000’s. One local lawsuit was in West Carrollton, Ohio (7).

What wasn’t so well-reported by the media (read “not reported at all”) was the 1999 report by the CDC Workgroup on Pulmonary Hemorrhage/Hemosiderosis, which concluded that the initial reports had not been well-researched and that the reported link between mold and infant illness and death was not proven (8). In fact, no peer-reviewed studies exist that show a cause-and-effect link between the presence of mold growth in a house

and subsequent illness or death in infants.

What also wasn't well-reported about the lawsuits was that, while costs to remediate actual water and mold damage to houses and contents were upheld, costs for treatment and compensation for suffering from unusual health problems were dismissed. All of the famous plaintiffs were awarded settlements for real damage to their houses, but were not paid damages for health effects from exposure to mold (9-11).

Nevertheless, internet searches still link to stories about them and the dire health effects they said were caused by mold growth in their houses.

So, we come to TAKE HOME MESSAGE

NUMBER ONE - There are NO studies proving a causal link between the presence of mold (even evil-colored black mold) in a home and rare or unique health conditions.

But some mold species are black, right?

Yes! Several common fungal species that grow in damp areas of buildings can be dark-colored. Several good examples are Cladosporium, Penicillium, Aspergillus, and Alternaria. You have probably observed these molds in shower stalls, in cracked tile grouting, in the caulk around bathtub surrounds, and on metal casement windows. But many molds are also white, cream-colored, green, and virtually every other color in the rainbow.

The color of the mold growth is not significant.

So, we come to TAKE HOME MESSAGE

NUMBER TWO - Molds come in many different colors and the problem is that the area where the mold is growing is DAMP not that the color of the mold is BLACK.

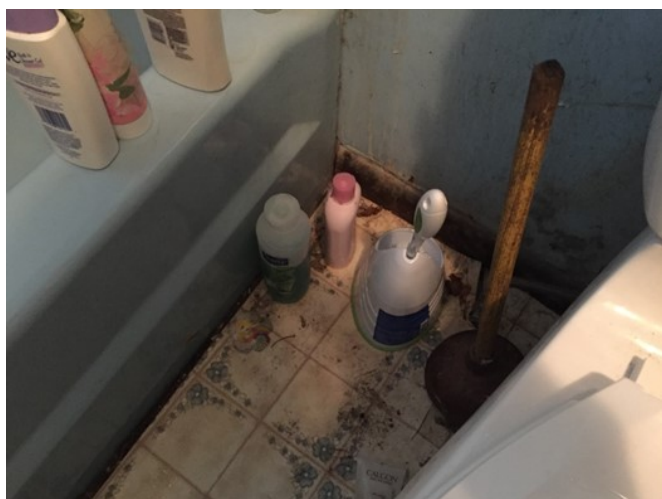


Figure 1. Mold on caulk & baseboards in a damp bathroom.

But some mold species do produce toxins, right?

Yes again! Many fungal species produce toxins (called mycotoxins) at some point in their development. These mycotoxins are “secondary metabolites” – organic compounds that aren't directly involved with growth and reproduction, but are used against the mites, insects, bacteria, and fungi that occupy the same ecological niche. Molds that produce mycotoxins are termed “toxigenic”. This can be a worrisome term for people.

What is not made clear on the internet or in mold testing reports is that these mycotoxins are not usually present in mold spores (remember, they are secondary metabolites produced when a mold is growing). They also are not “spritzed” out of mold growth like perfume so they do not become airborne. To ingest a mycotoxin, a person usually must breathe in large amounts of mold particles (see PPE below) or actually eat it. Some of the worst cases of foodborne illness in history have been associated with aflatoxin, a common fungal mycotoxin (12). The physiological basis for the “hysteria” of the Salem witchcraft trials may have been ergotism, caused by the ingestion of rye grain contaminated by Claviceps purpurea (13). And many instances of gastroenteritis have been associated with eating moldy foods (14).

So, TAKE HOME MESSAGES NUMBER

THREE & FOUR - Mycotoxins are not always present and are never released as a gas. Don't eat moldy bread or moldy building materials.



Figure 2. Frozen plumbing and mold growth on floor joists. Note, some of the mold growth is white.

Okay, so molds aren't as bad as people think. Isn't it still a good idea to err on the side of caution and have a house cleaned and sanitized by a professional to eliminate all mold and mold spores?

Sounds reasonable, but, as you probably remember from lower plants class back in college, fungi produce spores to survive harsh conditions and to reproduce. These spores detach from larger fungal growth and float in the air like dust or pollen. That means they really are everywhere – inside all structures and outside in virtually all environments. They enter buildings through windows, doors, ventilation systems, on shoes, and on pet feet. If you could somehow super-clean a house to remove all mold spores, you would re-inoculate the space as soon as you opened a door.

So, TAKE HOME MESSAGE NUMBER FIVE - Mold spores are ubiquitous (big word for everywhere) and can't be eliminated for any reasonable length of time (unless you live in an operating theater). Spending money on professional cleaning for anything other than a major water and mold problem is a waste of money.

Why does mold grow in a house or workplace in the first place?

As with most living things, mold spores germinate in a “welcoming” spot. Their idea of a welcoming spot is moist (50-60%), warm (slightly more than room temperature), supplied with oxygen, and edible (like most of the cloth, paper, wood, and fiber content of houses). So, it's not surprising that human structures are full of potentially “welcoming” spots – where do you think the mold growth on the shower curtain, doggy-bag leftover, and laundry that was forgotten in the washing machine came from? If a mold spore flying through the air happens to land on a spot that is “not welcoming” (like the cool dry top of a coffee table or a clean metal shelf) it just sits there or flies away with the next draft.

Mold especially grows in chronically damp areas caused by deferred maintenance (sheathing under aged shingles, drywall near cracked foundations, or wood under neglected gutters & downspouts) OR by neglected interior fittings (subflooring under leaking bathtub surrounds, cabinets under leaking plumbing, & walls behind

old tile grouting) OR by lack of electrical service (empty houses with no temperature/humidity control or basements with no working sump pumps).

And, surprisingly, mold can grow well in houses that are well-built, well-insulated, and well-maintained, if a lack of sufficient bathroom, kitchen, and laundry room exhaust allows humidity levels to rise inside the building. Remember, mold likes humidity levels greater than 60%.

So, TAKE HOME MESSAGE NUMBER SIX - Mold will grow easily if the mold spore lands in a “welcoming” spot.

If mold is present and we want rid of it, mold testing is a good place to start, right?

No! No! No!

Why?!

Mold tests are incredibly NOT useful.

- Knowing the species of a mold doesn't help with fixing the underlying dampness problem or doing the cleanup.
- There aren't different cleaners and cleanup methods for different species of molds.
- If you SEE mold growth, you don't need to test for its presence. You can see it.
- If you DON'T see mold and DO a test, the test will always be positive, even in houses that aren't damp or have a mold problem.

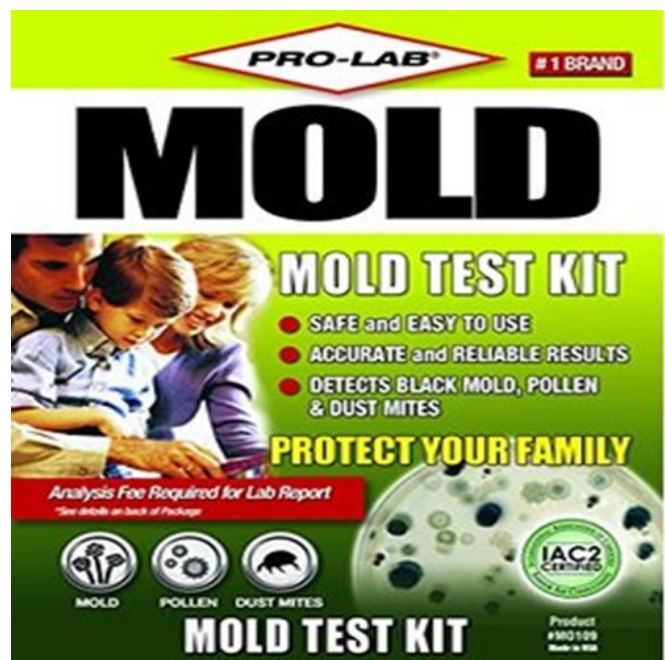


Figure 3. Typical mold test kit (image copied from internet).

Howzat?! Always positive?

Let's repeat that last bullet point: If you DON'T see mold and DO a test, the test will **always** be positive, even in houses that aren't damp or have a mold problem. Remember what we said above about mold spores flying through the air, landing on an un-welcoming spot (like the cool, dry top of a coffee table) and just sitting there? Well, if a mold test kit is placed on top of that coffee table, the mold test kit becomes a "welcoming spot" – it is a petri dish after all. So whatever mold spore that happens to land on it will germinate.

This leads quite well to the next problem with mold testing. Mold tests are incredibly confusing.

- a. Most healthy people are not seriously affected by normal exposure to mold spores in typical indoor and outdoor environments (15). Thank goodness, because we are surrounded. If you think the Zombie Apocalypse sounds bad, imagine what would happen if untold quadrillions of microscopic mold spores turned on us.
- b. There is no data on the number of mold spores needed to make a person ill (16) so a report listing mold spore counts sounds professional and ominous at the same time, but doesn't actually mean anything.
- c. There are no standards for "acceptable", "elevated", or "normal" levels of mold spore counts in structures either (17). So, a report categorizing mold spore counts in these terms sounds, again, professional and ominous, but, again, doesn't actually mean anything.

And THAT leads to the most pernicious aspect of mold testing. Mold tests are often misleading and possibly even dishonest.

- a. Mold testing reports often highlight a mold species as "black mold", "toxin-producing mold", or "toxigenic" in a way that seems to indicate that the mold is imminently dangerous (18). Remember what was said above about what mycotoxins actually ARE and what "toxigenic" really MEANS. Mold testing reports that use these terms frighten their clients.
- b. Mold testing reports often define "elevated" mold spore counts by comparing indoor levels to outdoor levels (19). Under normal

conditions, indoor and outdoor mold spore counts vary independently every day, during the day, and in every season (20). So, at any time of the year, the indoor or outdoor levels will be different. Mold testing reports that use such comparisons are engaged in pseudo-science, at best

- c. Home repair companies sometimes insist on mold testing as part of the home repair bill. This is either a misconception on the part of the company about the probable health risks of mold exposure for their employees (and who can blame them given what they read on the internet?) OR an attempt to pad a bill.
- d. Home inspection companies that conduct mold testing are sometimes financially linked with companies that do mold remediation, in which case they are not disinterested.

So, TAKE HOME MESSAGE NUMBER SEVEN - Mold testing is not useful and is usually confusing. It can also be misleading or even dishonest.

So, what can we do?

We can help our clients by:

- a. Informing them that the water problem should be fixed and the area dried.
- b. Helping them understand the common maintenance problems that can lead to chronic damp conditions (21).
- c. Discouraging mold testing.
- d. Encouraging safer and greener cleaning with detergents, not with concentrated sanitizers like bleach.
- e. Informing them that the dried area should be assessed to determine if any reconstruction is even needed because not all water- or mold-damaged materials have to be discarded (22).
- f. Helping them understand the impossibility of anyone, even a "professional", permanently ridding a house of all mold spores.
- g. Informing them that, if the water-damaged and moldy area is large (more than 10 square feet) and the cleanup/renovation project will generate a cloud of air-borne dust, dirt, mold, and other particles, professional help is advised and sensible personal protective equipment (PPE), such as an N-95 mask, is a good idea (23).

- h. Informing them that, if cleaners and sanitizers will be used to wash and wipe the area, sensible PPE (such as plastic gloves) should be worn to protect their hands from the drying effects of the chemicals NOT the harmful effects of touching mold (24).

So, this leads, finally, to the **FINAL TAKE HOME MESSAGE** which I'd like to joke about, but actually isn't funny. Clients who are poorly informed about public health issues, are frightened

by questionable mold testing reports, or have been bilked out of thousands of dollars during home repairs or real estate transactions are NOT funny. **Public health professionals must take the lead in providing accurate, informative, and useful information about mold to our clients.**

Important decisions should be made without fears based on rumor, misinformation, and inflammatory statements. **We, as public health professionals, can help people make good decisions. We have a duty to do so.**

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