

NOT ALL REMEDIATION IS THE SAME

Improving the Environment for Sensitized Individuals

Part 1 of 2

There is a growing awareness that when certain individuals become ill from the contaminants in a water-damaged-building (WDB), their bodies develop sensitivity to those specific pollutants, as well as to other compounds. In such cases “normal” remediation or cleaning does not result in an environment that is helpful or acceptable to the client. With new studies showing that up to 25% of the population could be genetically susceptible to this type of exposure ailment, it is crucial for both restoration contractors and the impacted people to know how to approach such problems so that any remediation or ancillary cleaning has the best chance of success.

Looking for Mold-Related Health Answers in all the Wrong Places

People who have been sickened by mold or who have been assisting in the restoration and repair of water-damaged buildings have seen it over and over again. The musty odor or visible fungal growth often produced by water damage can cause greatly varying problems from person to person, despite similar occupancy patterns. Some individuals become debilitated, and somehow know that it is the structure that is causing their problems. In contrast, a much greater number of similarly exposed people experience minor symptoms or none at all!

Such situations do not fit a typical risk assessment from a safety and health standpoint. Training in the arena of chemical exposures teaches that there is a *dose/response* relationship. We are conditioned to expect that a higher dose of an offending compound is more likely to impact a greater number of individuals with more severe symptoms. However, when contamination situations do not fit that familiar pattern some investigators (and in this case, most of the mold control industry) fail to consider other possibilities and lazily fall back on the psychosomatic excuse for the sick people: “It’s all in their heads.”

This grip on the classic industrial hygiene approach to illness has led to a large number of narrowly focused research efforts that tried to force the “mold problem” back into the dose/response box. In particular, there have been extensive attempts to quantify occupant exposure levels to various mycotoxins. Although it has been known for centuries that various fungal organisms create chemical compounds that are poisonous to other organisms (think of toxic mushrooms and antibiotics derived from *Penicillium* mold that kills bacteria), many

carefully controlled studies failed to show that occupants in water-damaged buildings could ever inhale or ingest enough of these toxic substances to reach a threshold of harm.

Sadly, that research was hindered by two assumptions that, even today, keep many mold remediation professionals from seeing the big picture of health effects from water-damaged buildings. The first supposition that impacted the data is the one that we mentioned previously—the dose/response expectation as the root of the symptoms. This was compounded by a narrow focus on mycotoxins as the serious culprit, almost to the exclusion of the irritant effects of fungus-generated gasses and the allergenic nature of microscopic spores and fragments. An even broader effort would look beyond mold and realize that any wet environment supporting fungal growth is also harboring bacteria and a host of other microorganisms.

Medical Science Explains Some Anecdotal Data that Occupants and Remediation Professionals Have Long Puzzled Over

What if the reaction of some people to a water-damaged building is not related to the standard dose/response model of exposure illnesses? To further complicate things, what if different organisms in wet environments affected people in a variety of ways? Once doctors and scientists moved in that direction, the search was on to identify mechanisms that trigger symptoms and to figure out what separates ill individuals from the majority that do not exhibit the same symptoms.

Taking a broader view led many researchers back to the idea that wet interior environments provide a suitable home for more than just mold. Research reports began filtering in that suggested that some symptoms reported by individuals in water-damaged buildings could be the result of combined exposure to both bacterial and fungal materials. In June of 2012 scientists participating in a long-term study of environmental health effects in the Cincinnati area reported that they identified two specific types of bacteria in water-damaged buildings that, in conjunction with mold, increase the negative health effects experienced by occupants.¹

A new look at the allergenic nature of mold exposure was also necessary when some physicians moved beyond the dose/response relationship and began investigating whether particular fungal contaminants could be sensitizers, in contrast to the typical approach where more exposure equates with worse symptoms. This alternate concept was supported by a 2012 study of items that impact indoor environments, which concluded with a list of 374 known asthmagens, identified by government agencies, third-party regulatory agencies, and academic sources.² The report used the term “asthmagen” instead of “allergen” to emphasize a growing recognition that even contaminants that do not typically evoke an allergic response can be asthma triggers.

Occupant sensitization is now recognized as a significant problem by both government agencies and the private sector.^{3,4} In essence, scientists and doctors now realize that sensitization can

occur in situations where it was never anticipated in the past. Now, some of the puzzle pieces seem to be fitting together. Some individuals exposed to mold and other contaminants in water-damaged buildings will develop symptoms that conform to an allergic response. For those with an allergy to mold, elimination of exposure by either leaving the structure or remediating the problem generally results in self-healing and resolution of symptoms. However, individuals who become sensitized experience ever-increasing levels of symptoms even with smaller and smaller exposures. In the worst cases, even removal of the offending contaminants does not lead to an improvement in symptoms.

Once the idea of sensitization was validated, many of the difficult-to-explain symptoms made sense because they were the result of an *innate* immune response illness (symptoms triggered by processes in the body itself) rather than an *acquired* immune response illness (symptoms triggered by an invader from outside the body). In layman's terms, exposure to water-damaged buildings causes some people's immune systems to go into overdrive and not shut off—even after the trigger contaminants are reduced to minute levels. Such responses have been labeled biotoxin illness, or more precisely, chronic inflammatory response syndrome (CIRS).

Finally, in the last few years DNA sampling has been instrumental in explaining why certain people in a water-damaged building will develop CIRS and others will not. There is now solid evidence validating the hypothesis that nearly a quarter of the population has a genetic susceptibility towards CIRS if they have a significant exposure to mold and other contaminants in water-damaged buildings.⁵ As a result, some people never get sick and others, who are genetically susceptible, get sick with seemingly trivial exposures.

What Does this Mean to Occupants and Remediation Contractors?

While these particulars about allergens, asthmagens, sensitization, CIRS, and WDB may seem inconsequential, they actually have a direct bearing on remediation contractors. One of the biggest issues is the realization that the standard classes of occupants thought to be most susceptible to mold probably are not. Training for fungal remediation routinely emphasizes that infants, the elderly, and those with pre-existing health problems are at greatest risk during a remediation effort. While those individuals should surely be protected, it can just as likely be healthy adults who develop a myriad of life-altering symptoms from exposures in a water-damaged building, simply because of their genetic makeup.

In these situations, professionals always look for a simple, inexpensive test to help identify who might be at the greatest risk. Incredibly, that hurdle may have been surmounted by the adaptation of a standard vision test called visual contrast sensitivity. Although the test was originally developed for identification of other diseases such as glaucoma, it was found to also be useful for diagnosing systemic illnesses such as diabetes. It has now been adapted to the point where many physicians claim that it can be an accurate assessment of the overall effect of neurotoxins on a

patient's system. According to multiple reports, for people who report potential exposure to water-damaged buildings, failing this test is a strong indicator of a biotoxin illness, with a diagnosis accuracy rate of about 92%.

This is one of the major reasons there is an evolving trend for restoration professionals to be responsible not only for removing contamination, but also for conducting complete structure cleaning, and even completing the repair/rebuild to minimize future problems. While it is true that many hygienists and contractors limit their scope of work based on cost factors and deal only with visible fungal growth, this tactic does not resolve the problem for sensitized individuals. In those cases, the contamination situation in a building that has been water damaged must be viewed as having four distinct components to be managed:

1. **Sources** of fungal contamination (both visible and hidden)
2. **Transport mechanisms** that allow spores to migrate from one area to another (with HVAC systems being the most important)
3. **Contents** such as clothing, furniture, and personal belongings that have become sources of contamination because they are supporting fungal colonies or have been cross contaminated with spores and other fragments
4. **Reservoirs** of fungal spores and fragments in the structure (carpets, walls, ceilings, and many other surfaces)

Unless all of these aspects of the fungal contamination issue are addressed, relief of symptoms by the occupants will often remain elusive.

Proper Removal of Fungal Sources is Not Rocket Science—But Must be Science Based

Currently there are very few federal or state regulations that actually control the mold remediation process (Texas being the notable exception, but even in that state there is a current push to deregulate those activities). Therefore, true industry professionals must be aware that their efforts are subject to an industry *standard of care*. Unlike a regulation, a standard of care must be pieced together from a number of different documents. While there is some debate about which references really form the core of the mold control industry, the following seven documents are cited frequently:

1. American Conference of Governmental Industrial Hygienists; *Bioaerosols: Assessment and Control*; 1999
2. American Industrial Hygiene Association; *Report of Microbial Growth Task Force*; 2001
3. Environmental Protection Agency; *A Guide for Mold Remediation in Schools and Commercial Buildings*; 2001

4. Canadian Construction Association; *Mould Guidelines for the Canadian Construction Industry*; 2004
5. New York City Department of Health; *Guidelines on Assessment and Remediation of Fungi in Indoor Environments*; 2008
6. Institute of Inspection Cleaning and Restoration Certification; *Standard and Reference Guide for Professional Mold Remediation S520*; 2008
7. Occupational Safety and Health Administration; *A Brief Guide to Mold in the Workplace*; Safety and Health Information Bulletin, updated November 2013

Despite the fact that guidance for mold situations is coming from a variety of sources, there is a surprising consistency in the overall tone and approach. Since many mold remediation contractors come from a background of dealing with other hazardous contaminants such as asbestos or lead, all of the accepted reference documents emphasize understanding that mold is a biological agent. Since it has the ability to grow under the right conditions, isolation and deferred action to remove the source of the problem may not be possible, as it is with asbestos materials. With mold a delay may allow contamination inside a building to grow to a point where it poses a hazard greater than when initially discovered.

Another key point emphasized by all of the documents is that the presence of mold growth means that there is or has been moisture intrusion in the building. Removing surface mold contamination and not identifying and correcting the underlying moisture problem would be tantamount to a doctor treating symptoms rather than the disease that is causing them. This aspect of the mold remediation process has taken on even greater importance since we have recognized that other contaminants present in water-damaged buildings are also contributing to the problems experienced by occupants.

A third element that makes up the standard of care for the removal of fungal sources is that the work be done in such a way as to avoid cross-contamination. As is stated in bold type at the beginning of the remediation section of the New York City guidelines: *The goal of remediation is to remove or clean mold-damaged materials using work practices that protect occupants by controlling the dispersion of mold from the work area and protect remediation workers from exposures to mold.*

Even though it should not be necessary to add this warning, a word about chemical use is important. Too many advertisements related to mold remediation fall into the category of "spray and pray." Despite the fact that the advertisements and sales pitches talk about how the product is "all-natural," "developed by NASA for the space station," "used by the military to decontaminate anthrax," and a number of other impressive statements, such an approach does not fit the industry standard of care. More important, fogging, spraying, or atomizing chemicals into a structure occupied by a sensitized individual can be downright dangerous. Spraying such materials into a

building and praying that they take care of the problem the first time, divert energy and financial resources away from the real work of physical removal of fungal sources and reservoirs.

To be continued...

References

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4. California Department of Public Health; “Statement on Building Dampness, Mold, and Health”; September 2011.
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7. Pinto, Michael A., Mike Davis, Sara Eager; “Mold Clean-Up Projects—Post-remediation criteria are crucial to success”; *Professional Safety*; November 2004.
8. Wonder Makers Environmental; “Recommended Cleaning Practices for Materials Potentially Contaminated by Mold”; July 2001.
9. Stull, Jeffrey O., International Personnel Protection, Inc.; “Evaluation of the Cleaning Effectiveness and Impact of Esporta and Industrial Cleaning Techniques on Firefighter Protective Clothing - Technical Report”; May 10, 2006.

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