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By Michael A. Pinto, CSP, CMP

The Answer to the Mold Illness Question: All of the Above

I don't often crow, "I told you so!" But regarding the continuing developments of medical research related to mold exposure, I really did tell you so. Readers who have followed my work in industry publications over time know that I have always advocated a holistic, comprehensive understanding of potential health effects related to fungal exposures. Even in the first edition of our textbook, *Fungal Contamination: A Comprehensive Guide for Remediation*[1], I included descriptive information about bacterial contaminants as well as fungal organisms. The rationale for this additional information is that fungal contaminants such as mold do not occur in isolation but as a response to wet or damp environments.

This understanding of the world as a complex and interrelated place where problems have multiple factors to be juggled simultaneously works extremely well for cleaning and restoration contractors offering services beyond standard fire and water loss. As it turns out, it is also the most appropriate approach to understanding how exposures from fungal contamination and wet structures lead to the symptoms reported by occupants.

A Plethora of New Medical Information

Over the past 2 ½ years, individual medical studies have provided compelling evidence to answer the question, "How does exposure to contaminated environments lead to the reported/observed symptoms?" More importantly, the combination of these studies through a research method called meta-analysis has provided clear direction for those seeking to understand the potential health impact of such exposures.

Just a few months ago, the California Department of Public Health (CDPH) released one of the most blunt interpretations of this growing body of medical evidence: "CDPH has concluded that the presence of *water damage*, *dampness*, *visible mold* or *mold odor* in schools, workplaces, residences and other indoor environments is unhealthy." (Access the document, "Statement on Building Dampness, Mold and Health," in its entirety at *www.cal-iaq.org/mold/mold-publications.)*

The new California document does not get into the nitty-gritty of why such environments are hazardous. Rather, its primary purpose is to "increase awareness of the hazards from indoor dampness and mold and to reduce exposure to these hazards."

The CDPH statement builds upon reports released over the last few years by credible groups, including the Institute of Medicine (IOM) and the World Health Organization (WHO).[1]

A Shift in Thinking

The understanding of diseases associated with mold exposure and damp environments has followed a pattern that is common to a host of contaminants. Medical knowledge about the effects of radiation, cigarettes, asbestos, lead, PCBs and other natural and man-made substances went through a similar process. Initially, medical professionals and other interested parties have a hard time understanding how the symptoms reported by exposed individuals can be caused by the contaminant. As awareness of a potential problem grows, early medical studies have to be very limited in scope as researchers control variables to isolate the primary causative factor.

For example, early medical studies trying to explain mold-related illnesses focused almost exclusively on the toxigenic properties of certain chemical compounds naturally produced as part of the fungal life cycle. These mycotoxins are, indeed, very powerful poisons, but could not be shown to be the primary reason for many of the reported symptoms. Research efforts then bounced back to examining the infectious and allergenic nature of mold exposures. While these studies could answer some of the questions, they were not able to explain all of the documented health problems.

More recent studies have identified secondary reactions that occur in the body after exposure to fungal spores and metabolites. There is now good science documenting that exposure to fungal contaminants and damp environments not only triggers

> *The current research should also lead contractors to adopt a strengthened policy regarding the use of personal protective equipment.*

standard allergenic responses, but pushes certain parts of the immune system into overdrive. In essence, the body's defense system ends up attacking itself as well as the biological invaders. This was a common theme of many of the presentations given by scientists from around the world at the 6th International Scientific Conference on Bioaerosols, Fungi, Bacteria, Mycotoxins in Indoor and Outdoor Environments and Human Health, held Sept. 6-9, 2011, in Saratoga Springs, N.Y.

The Sum is Greater Than the Whole

A simple analogy to explain all of this is a multiple-choice test. In the early days of medical research, scientists were trying to figure out which aspect of fungal contamination was the primary cause of the reported symptoms:

- Allergenic
- Infectious potential
- Mycotoxins
- Hyper response of the immune system

As they tried to determine the correct answer, they were not necessarily looking for the bubble that said, "All of the above." Now, fortunately, most of the researchers in the field of fungal health understand that it is not an either/or proposition, but a multifactorial situation.

The concept of synergy helps explain the health effects from biological contamination. While each impact of mold can be debilitating in its own right, it is now clear that the combination of these health effects is worse than their additive results. This connection was first publicized by some fascinating research conducted in 2004 by the Finnish National Public Health Institute. That research demonstrated synergism between various indoor fungi and the bacterium *Streptomyces californicus*. Their study showed an increase in production of chemicals in the immune system that typically fight tumors (known as tumor necrosis factor), but can damage body systems when produced in excessive concentrations.

This was followed two years later by a Michigan State University report. It described exacerbated damage when exposure to a mycotoxin was preceded by exposure to a bacterial fragment. (The article entitled "A Spreading Concern; Inhalation Health Effects of Mold" in the June 2007 edition of *Environmental Health Perspectives* gives a good layperson's description of some of the early research that explains the synergistic effects of mold and bacteria.) More and more studies are examining the connection between fungal and bacterial contaminants and how multiple contaminants compound potential health effects in a multiplicative rather than additive way.

The Impact for the Cleaning and Restoration Contractor

It can be valuable for contractors dealing with water losses and fungal contamination to keep abreast of the current trends in health research. If nothing else, understanding that there is a growing body of evidence that connects fungal contaminant exposure to a wide assortment of health symptoms makes the contractor more empathetic to the occupant's plight.

It should also cause them to think more seriously about protecting their employees from both short- and long-term health problems by instituting appropriate engineering controls for projects involving damp environments and mold. The current research should also lead contractors to adopt a strengthened policy regarding the use of personal protective equipment.

Finally, a greater awareness of health problems resulting from mold and wet buildings can be shared with those who are suffering. Restoration contractors can give them hope that proper remediation can indeed have a positive impact on their life. **RIA**

1. These documents can be accessed at Institute of Medicine. *Damp Indoor Spaces and Health.* Washington, D.C.: National Academies Press, 2004; *www.nap.edu/openbook.php?isbn=0309091934*, and World Health Organization. *WHO Guidelines for Indoor Air Quality: Dampness and Mould.* Copenhagen: WHO Europe, 2009; *www.euro.who.int/_data/assets/pdf_file/0017/43325/E92645.pdf.*

Michael Pinto, CSP, CMP, is the CEO of Wonder Makers Environmental, Inc. He has more than 30 years of safety and environmental experience from jobs in the private sector, the nonprofit arena and regulatory agencies. Pinto is the author of five textbooks and more than 150 published articles. He can be reached at map@wondermakers.com.