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Hazardous Times

The Science Of Mold

Fungi will always be present in any indoor or outdoor environment. They are ubiquitous and have populated the earth long before man arrived, allowing a great deal of time for humans to acclimate to them. Although one might presume that water damaged indoor environments would harbor vast concentrations of mold spores and significant levels of mycotoxins, the average homeowner's compost pile is a seething mass of fungi, as is the forest floor, with very high levels of spores and possibly significant levels of mycotoxins.

The Centers for Disease Control (CDC) considers Cladosporium, Penicillium, Aspergillus, Alternaria and Mucor to be the most common molds. Stachybotrys chartarum, which seems to have drawn the most interest for its mycotoxin generating ability, is said to be of unknown prevalence because it is far less common, but hardly rare.

Effects Of Mold

Inhalation of fungal spores, fragments, or metabolites (e.g., mycotoxins and volatile organic compounds) from a wide variety of fungi may or have been alleged to cause immunologic (allergic) reactions, toxic effects and infections.

Allergic Reactions

Fungi can cause allergic reactions, but not toxic ones. The most common symptoms of allergic fungal reactions are a runny nose, eye irritation, cough, congestion, and aggravation of asthma. The assertion that allergic reactions to molds will be experienced by some residents or indoor workers cannot be disputed, although their contribution to the overall number of common complaints of nasal and sinus congestion, watery eyes, headache, and throat irritation remains unknown. None of these effects are life-threatening or incapacitating and most will abate with cessation of exposure or seasonal changes.

The fact that many mold organisms can trigger allergic reactions in some individuals should not be surprising, given the prevalence of allergies in general. Some of these allergic effects attributed to molds may instead be allergies to pollen, pet dander, insect debris, etc.

Toxic Reactions

It is currently estimated that there are well over 100 species of fungi that can produce mycotoxins. The estimates of fungal species capable of producing mycotoxins is likely to increase given the

total number of fungal species—estimated to be between tens of thousands to over 300,000. One should expect that the ability to produce mycotoxin confers some evolutionary advantage to those species that possess it, making a wider distribution in the future quite likely. While that sounds ominous from the human exposure standpoint, mycotoxin concentrations in the air must reach toxic levels before illness occurs.

There is little question about the ability of mycotoxins to cause acute illness when ingested, as on rotting cereal grains (ergotamine in rye or aflatoxins on peanuts), with a clear linkage to dosage—a linkage not yet possible to establish for airborne mycotoxins.

Exposure to airborne mycotoxins has been alleged to cause symptoms such as fatigue, headaches, nausea, respiratory and eye irritations, discomfort, inability to concentrate and asthma. Animal studies have also demonstrated that heavy exposure to mycotoxins can result in infertility, hemorrhaging from the lungs or intestines, brain damage, and cancer.

The toxic effects from airborne mycotoxins are not accepted by many mycologists and clinical practitioners. In the most notable case of this type, 10 infants who developed pulmonary hemosiderosis (bleeding in the lungs), were causally linked to mycotoxins in water damaged homes. In March 2000, the CDC essentially retracted an earlier finding of linkage to mold toxicity, in these cases, noting:

- The narrow age distribution of affected persons;
- An acute presentation of illness;
- Absence of an iron deficiency typical of hemosiderosis;
- Failures to blind the investigators who later took air samples in the homes, producing a possible bias; and
- Incorrect calculation of the odds ratio as 9.8, reduced to 5.5 upon recalculation and further reduced to 1.5 when the delayed sampling in one home heavily infested with Stachybotrys chartarum was eliminated.

Further, the CDC reconsideration noted that no serologic (blood testing) evidence of exposure to fungi or mycotoxins was obtained from affected infants. The corrected odds ratio of 1.5 is considered to be far too close to "null" (an odds ratio of 1) to be meaningful, given the small sample sizes.

Causal links between airborne fungal sources and serious adverse health effects—hemosiderosis, memory loss, chronic fatigue, and organ damage—are not yet proven in the scientific literature given the vague symptoms for some effects and the weak linkage to fungal organisms in others (e.g., hemosiderosis). As with such ailments as "chronic fatigue syndrome," "Gulf War illness," and "multiple chemical sensitivities," there are at least as many skeptics as proponents, which points to the lack of any unusual serologic findings or evidence of immune system disorders in these cases.

The National Center for Environmental Health reports very few cases alleging that toxic molds (those producing mycotoxins) inside homes can cause unique or rare health conditions such as pulmonary hemosiderosis or memory loss. But there are some.

The CDC gets more inquiries regarding mold than any other indoor air quality issue, but they have not been granted any funds to study the potential for adverse health affects of mold.

Infections

Infections caused by molds can be very severe and are difficult to treat with conventional medicines. However, such examples as lung infections, including other systemic infections, are very rare in all but the immune-compromised who can be infected by daily exposure to molds in the external environment. While infections caused by molds remain rare, they have occurred to groups of patients in hospital settings, usually triggered by renovation work. The claims we have seen to date do not seem to fall into this category.

Testing

Clinical tests that can determine the source, place, or time of exposure to fungi or their by-products are not currently available. Antibodies developed by persons exposed to fungal agents can only document that exposure has occurred. Since exposure to fungi routinely occurs in both indoor and outdoor environments, this information is of limited value.

Visual assessment and bulk/surface sampling are the best methods for determining the presence of all types of mold. (Studies estimate, however, that 50% of mold in buildings is not visible.) Air testing is prone to false negatives. In general, any results from indoor air testing are difficult to interpret because different molds have different absorption rates, and the amount of mold spores and mycotoxins in the air may depend on when the mold was last disturbed as well as a variety of other factors. Therefore, there are no accepted standards for air concentrations for any of the various molds.

The only method of air testing currently available is to test and compare the levels of mold in the indoor air versus the outdoor air.

The presence of fungi on building materials as identified by a visual assessment or by bulk/surface sampling does not necessitate that people exposed to specific fungi will exhibit adverse health effects. In order for humans to be exposed indoors, fungal spores, fragments or metabolites must be either released into the air and inhaled, physically contacted (dermal exposure), or ingested.

Symptoms in people depend on the amount of exposure and the individual person's susceptibility. This varies with genetic predisposition, age, state of health, and concurrent exposures. For these reasons, and because measurements of exposure are not standardized and biological markers of exposure to fungi are largely unknown, it is not possible to determine *safe* or *unsafe* levels of exposure for people in general. Microscopic identification of the spores/colonies collected from buildings requires considerable expertise and specialized laboratory work.

Mold growths will contain many different types of species (both allergic and toxic) and the relative concentrations of the various types will affect the severity of the reactions. Therefore, it seems likely that health officials will consider the presence of any mold as cause for immediate remediation.

Where And How Does Mold Grow?

Mold can occur anyplace where there is water intrusion. The water intrusion does not have to be chronic, and mold can grow from a one time sudden and accidental type of event. Thus, mold damage can arise from water intrusion caused by flooding, storm damage, plumbing leaks, sewage backups, or faulty construction. Even high humidity is enough to cause mold growth (although all the claim activity we have seen has been linked to water intrusion). In the U.S., mold growth occurs in buildings in all 50 states. Most of the litigation/claims activity has currently taken place in California, Texas and Florida, but several recent cases have been filed in New York, Illinois, Hawaii and other states.

According to one of the presenters at a seminar on toxic mold contamination sponsored by *Mealey's Publication* in January 2001, 42% of commercial buildings have reported water damage and 30 to 40% of residential buildings have reported water damage.

Mold can live on a wide variety of construction materials including wood, sheetrock/wall board, ceiling tiles, fiberglass insulation, concrete, wall paper, fireproofing and adhesives. These molds are everywhere in the environment and only become a problem when the environment allows them to proliferate. Scientists currently believe that there are over 100 species of mold that present the most significant health threat; however, prolonged exposure to other mold types can still result in allergic reactions including asthma.

Remediation

The City of New York promulgated remediation guidelines several years ago, and these have been adopted by about 30 other municipalities in the U.S. and Canada. However, certified industrial hygienists presenting at the recent mold seminar stressed that these guidelines may be inadequate, and thus the remediation efforts recommended in the guidelines should be viewed as a bare minimum.

Remediation costs vary with the scope of mold growth. If mold growth is found throughout a building and behind walls, remediation can be very expensive. Examples include an apartment complex where ongoing remediation has cost the building owner over $9 million, and a courthouse where remediation included taking the building down to the frame and rebuilding the courthouse at a cost of $40 million.

Current Insurance Language

To date, all of the standard bureau coverage forms that we are aware of and that specifically address mold in any fashion are first party property coverages. They essentially exclude any damage caused by or resulting from mold, except when the mold is the result of a covered peril. A specific example is found in ISO's (Insurance Services Office) current HO 3, 2000 edition, a portion of which follows:

"2. We do not insure, however, for loss:

a. Excluded under Section I - Exclusions;

b. Involving collapse, except as provided in E.8. Collapse under Section I - Property Coverages; or

c. Caused by: (5) Mold, fungus or wet rot. However, we do insure for loss caused by mold, fungus or wet rot that is hidden within the walls or ceilings or beneath the floors or above the ceilings of a structure if such loss results from the accidental discharge or overflow of water or steam from within:

(a) A plumbing, heating, air conditioning or automatic fire protective sprinkler system, or a household appliance, on the "residence premises;" or

(b) A storm drain, or water, steam or sewer pipes, off the "residence premises." For purposes of this provision, a plumbing system or household appliance does not include a sump, sump pump or related equipment or a roof drain, gutter, downspout or similar fixtures or equipment; or..."

To date, we are not aware that either of the major insurance bureaus, ISO or AAIS (American Association of Insurance Services), is developing specific modifications affecting third party liability coverages.

On the other hand, we are aware of efforts by some insurers, on either an individual risk basis, class of risk, or line of business—such as Commercial General Liability—to develop exclusionary language as company filed endorsements. Other insurers have elected to continue providing coverage, but only for a sublimited amount of liability. Such sublimits typically apply to both bodily injury and property damage. In some cases, it has been suggested that the reason for such restrictive approaches is not necessarily due to a concern for actual loss (especially with regards to the bodily injury allegations), but due to the high costs of defending such cases as a result of expenses for expert witness testimony.

Conclusion

At this time, as a reinsurer, both on individual risks as well as program or treaty lines, we are examining various coverage modifications and tracking the developing knowledge of mold science carefully. We will continue to do so, and as more definitive information and specific conclusions are drawn, we will endeavor to keep our reinsurance clients informed.

For More Information

If you have any questions about the information presented here, or contributions to the ongoing study of this potential exposure, we encourage you to contact your GeneralCologne Re account executive.

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