

# FOCUS on Industrial Hygiene

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## Health Effects of Mold: What Does the Evidence Tell Us?

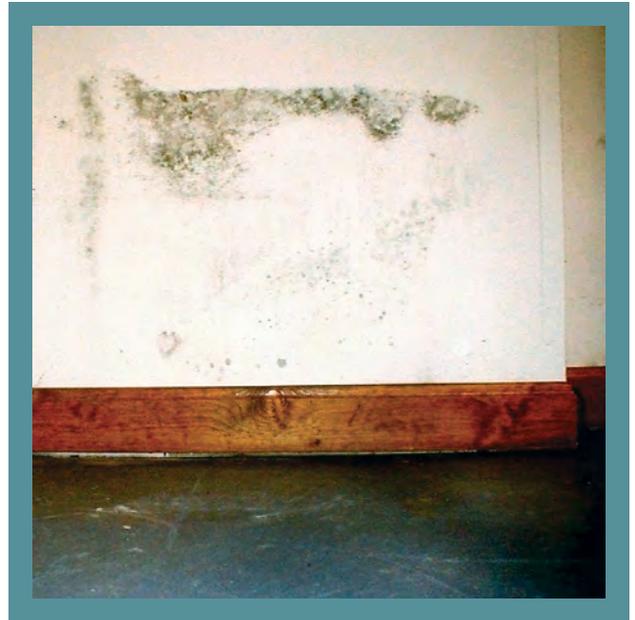
Mold is everywhere and exposure is unavoidable. Mold can be easily detected in all but the most isolated indoor environments, such as highly filtered organ transplant isolation units and in clean rooms used for electronic assembly and other electronic manufacturing environments.

Molds reproduce by developing microscopic particles known as spores. When airborne mold spores land in a moist environment with an adequate food source and appropriate temperatures, a biological spark is triggered and mold begins to grow. Damp, porous building materials such as ceiling tiles, sheetrock, insulation, carpeting, fabric, upholstery, wall paper, and even wood are all adequate nutrient sources for mold. Mold will even grow on dust and other organic matter found on the surfaces of metal framing studs in commercial buildings. When mold grows and amplifies unchecked in the indoor environment, the risk of building damage and employee complaints about perceived adverse health effects increase.

### Health Effects

After several decades of scientific research, a general consensus on the most common health effects of indoor exposure to mold has emerged and can be summarized as follows:

- Most individuals can be continuously exposed to mold with no apparent health effects. For some individuals, however, exposure to mold can increase the risk of developing or exacerbating allergies, such as allergic rhinitis. It has been estimated that approximately five percent of the population has mold allergies. Breathing in mold spores in indoor environments may also exacerbate asthma. For these reasons alone, mold should not be allowed to grow indoors.<sup>1</sup>



- The National Academy of Sciences (NAS), Damp Indoor Spaces and Health Committee (2004), reported that otherwise healthy children living in damp or water-damaged buildings have an increased incidence of lower respiratory illness, and they called for studies to compare ways to limit moisture and evaluate whether the interventions improve the building occupants' health.
- Exposure to low-molecular weight volatile organic compounds (VOCs) produced by molds as they break down nutrients in their environment may cause irritation to the eyes and nasal passages and may lead to headaches. These microbial VOCs include aldehydes, alcohols, and ketones, and are responsible for the musty odors that are often associated with damp indoor environments.

- Fungal infections are rare for healthy individuals but can be a concern for those with severely compromised immune systems or underlying lung disease.

Many types of molds, including the species *Stachybotrys Chartarum*, can produce secondary metabolites called mycotoxins. These metabolites are high molecular weight, non-volatile compounds, and do not “off-gas” into the environment like microbial VOCs. Some metabolites even have extremely valuable medical uses, such as penicillin and cyclosporine. According to the American College of Occupational and Environmental Medicine (ACOEM), a large body of scientific research does not provide evidence for human health effects from airborne mycotoxin exposure. With respect to *Stachybotrys*, the Centers for Disease Control (CDC) reports that there is no evidence of an association between exposure to this mold species, its metabolites, and unique adverse health conditions, including memory loss or pulmonary hemorrhage that have been alleged by some individuals.

Currently there is no scientific information that can justify regulatory limits or best practice guidelines for airborne exposures. Given the complexity of the relationship between indoor airborne mold and health effects, the development of standards for acceptable levels of airborne mold spore concentrations in indoor environments are unlikely in the near future.

## Prevention

The underlying principle for the prevention of indoor mold-related health effects is to control unwanted and excessive moisture in buildings. Effective application of moisture controls also helps prevent damage to building materials. Companies that wish to control moisture issues must develop proactive standard operating procedures to help prevent or mitigate problems and implement effective action plans for acute moisture incursion events.

Refer to Risk Control Reference Notes: Mold Guidelines for Contractors and Facility Owners, RC 5062, and Remediation of Mold and Bacteria from Clean, Gray, and Black Water Contamination in Buildings, RC 5428 for additional information on mold prevention and moisture incursion strategies.

## References

1. Recognition, Evaluation, and Control of Indoor Mold. American Industrial Hygiene Association. 2008
- [American College of Occupational and Environmental Medicine. Position Paper: Adverse Human Health Effects Associated with Mold in the Indoor Environment \(February 24, 2011\)](#)
  - [National Academy of Sciences. Damp Indoor Spaces and Health. 2004](#)
  - <http://www.cdc.gov/mold>
  - Fungi and Mold in Indoor Environments, RC 6106
  - Mold Guidelines for Contractors and Facility Owners, RC 5062
  - Remediation of Mold and Bacteria from Clean, Grey, and Black Water Contamination in Buildings, RC 5428

## For More Information

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