



## Guide for Clinicians Caring for Patients with Mold-related Complaints

Evaluating the patient who is concerned about mold-related illness can be challenging. Not only may the accurate diagnosis and appropriate therapeutic steps appear to be obscure, but there may be a heightened perception of risk due to personal anecdotes and perceived symptoms, incomplete or inaccurate data (e.g., house mold testing results), alarming stories in the media, and even litigation. In addition to what the patient brings to the encounter, the clinician may be under scrutiny or even pressure from Commanders, Facilities, and the media. Despite expectations, the physician has limited or no knowledge of or control over the patient's home, school, work, or recreational environment.

### General Background information

- Mold is ubiquitous in both indoor and outdoor environments, year round, and is usually harmless. Higher levels may be present in moist or humid environments, including after rainfall.
- Molds and their spores circulate through the air and may be present on surfaces.
- Mold exposure may be associated with a variety of effects, symptoms, and health conditions.
  - The most common result of excessive mold growth is an unpleasant odor due to the volatile organic compounds (VOCs) molds produce.
  - Airborne mold or mold particles may trigger IgE-mediated allergic or asthmatic reactions or irritant/non-allergic responses in sensitive or predisposed individuals (many of whom demonstrate symptoms to a variety of environmental allergens or triggers such as dust mites, cockroaches, mice droppings, pollen, pet dander, viruses, bacteria, tobacco smoke, scented candles, air fresheners, etc.). About 10% of the population may be allergic to mold, and about half of those allergic will manifest clinical symptoms (nasal stuffiness, lacrimation, red and itchy eyes, coughing, sneezing, wheezing, and itchy skin or eczema) after exposure to airborne mold.
  - Much less common conditions associated with mold sensitization are allergic bronchopulmonary aspergillosis, allergic fungal sinusitis, or hypersensitivity pneumonitis.
  - Infections due to mold generally occur in persons who are immunosuppressed (e.g., people being treated for cancer), who have chronic lung illnesses (e.g., obstructive lung disease), or who have experienced overwhelming exposure (e.g., in industrial or agricultural settings such as grain silos). There are a few virulent molds that may cause infections in healthy persons: *Blastomyces*, *Coccidioides*, *Cryptococcus*, and *Histoplasma*. Offending organisms can usually be identified by testing body fluids or cavities (fungal cultures). Infections due to mold are distinct illnesses identified by specific diagnoses (e.g., acute pulmonary blastomycosis). Treatment, if indicated, may include anti-fungals and surgical processes, and should be according to current infectious disease guidelines.
  - Many molds can produce toxins ("mycotoxins") under certain conditions. Exposures to mycotoxins sufficient to cause adverse health effects generally occur only by ingestion (e.g., aflatoxin in peanuts) or with overwhelming (e.g., industrial or agricultural) airborne exposures. Currently, there is insufficient research to validate testing blood or urine for mycotoxin levels except in rare acute poisonings.
- Patients with underlying allergic conditions (including asthma), immunosuppression, or who are at the extremes of age are more prone to develop mold-related symptoms or disease.

### Mold Growth

- Mold can enter homes through open doorways, windows, vents, and heating and air conditioning systems. Mold in the air outside can also attach itself to clothing, shoes, bags, and pets, and can be carried indoors. In the presence of moisture, mold grows well on paper products, cardboard, wood products, dust, paints, wallpaper, insulation, drywall, carpet, fabric, and upholstery.
- Generally speaking, indoor mold levels are lower than outdoor mold levels, but this may vary in certain climates (e.g., in especially arid areas).
- There are no health standards for what are unacceptable levels of mold in the indoor environment.
- Unchecked mold growth in an indoor, inhabited area is not an acceptable situation, regardless of whether there are associated symptoms or health problems.

- Mold growth smells bad, is unsightly, and ruins the building materials on which it grows. Appropriate response and remediation are documented elsewhere. The Environmental Protection Agency's (EPA) recommended mold remediation guidance is based on physical inspection for mold and water damage. If mold is visible, it should be cleaned or removed (e.g., non-porous surfaces can generally be cleaned with soap and water or disinfected by 1:10 hypochlorite solution, whereas porous material may require sterilization or replacement) and the moisture source stopped.
- The following are indicators of possible increased levels of mold: presence of visible mold or discoloration; musty or mildew odor; history of water intrusion or condensation; and house plants, aquariums, terrariums, indoor pools, or water fountains may serve as additional sources of humidity or harbor mold.

## Biologic Mold Testing Of People

- Low levels of mycotoxins are found in many foods and in the urine of healthy persons.
- Mycotoxin levels that predict disease have not been established.
- Urine mycotoxin tests are not approved by Food and Drug Administration (FDA) for accuracy or for clinical use, and the CDC does not recommend biologic testing of persons who work or live in water-damaged buildings.
- For persons using direct-to-consumer laboratory tests that have not been approved by the FDA for diagnostic purposes, their health care providers need to understand that these tests might not be valid or clinically useful. Using unvalidated laboratory tests to diagnose illness can lead to misinformation and fear, incorrect diagnoses, unnecessary, inappropriate, and potentially harmful medical interventions, and unnecessary or inappropriate occupational and environmental evaluations.

## Physician's Recommendations and Expectations for Management

- Physicians should evaluate and treat a patient with concerns about mold exposure (or any environmental exposure) as any other patient. Symptoms and history should guide the physical exam, evaluation, tests and other studies, diagnosis, and treatment.
- Tests (e.g., blood or skin testing for mold allergy or infection) should be guided by symptoms and findings, not by results of environmental mold tests.
- The clinician should not allow himself or herself to be influenced by the patient or parent to diagnose a mold allergy before an adequate work-up is completed.
- Medical providers should avoid commenting on the habitability, integrity, or remediation requirements of specific buildings and consult with Occupational and Environmental Medicine (OEM), Preventive Medicine (PM), and Industrial Hygiene (IH) as necessary.
- The clinician should resist the impulse to write a prescription or letter stating the patient "must not be exposed to mold" or "must not live in a house or be in a building with mold."
  - It is impossible to avoid all mold exposure. Typical mold spore concentrations vary and can be from 1,000 up to 10,000 mold spores per cubic meter in outdoor air.
  - Such notes are confusing, tend to heighten anxiety, and may result in the patient losing his or her job, affect insurance, or being forced to relocate.
  - Statements in the medical record that are accurate and helpful may include wording such as, "The patient is allergic or sensitive to mold and has experienced symptoms consistent with mold allergy. It is recommended that mold exposure be minimized, either through mold remediation, building (e.g., ventilation) modification, relocation, or, as a last resort, use of personal protective equipment (e.g., respirator)."
- Medical providers should avoid interpreting mold tests (e.g., measurements of indoor air quality mold testing, concentrations of mycotoxins in blood or urine, or other test). Patients or parents may present with a list of mold testing results and ask the clinician for an interpretation; however, such lab tests do not have established reference standards and cannot be properly interpreted in relation to either human health or building habitability.
- Individuals sensitive to mold should be recommended to avoid outdoor areas as well that are likely to have higher levels of mold (e.g., compost piles, cut grass, wooded areas). For individuals who are sensitive to mold or have medical conditions exacerbated or related to indoor environment triggers, controlling or eliminating the sources of indoor/building mold and other indoor allergens, along with medical treatment, will lead to improvement or resolution of symptoms.

## References

1. **Institute of Medicine.** Damp indoor spaces and health. The National Academies Press. Washington, DC, 2004. <https://www.nap.edu/read/11011/chapter/1>. Page last accessed March 6, 2019.
2. **CDC.** Mold. <https://www.cdc.gov/mold/>. Page last accessed March 6, 2019.
3. **EPA.** Mold Remediation in Schools and Commercial Buildings Guide. US Environmental Protection Agency, Office of Air and Radiation, Indoor Air Division. EPA 402-K-01-001, Reprinted September 2008. <https://www.epa.gov/mold/mold-remediation-schools-and-commercial-buildings-guide>. Page last accessed March 6, 2019.
4. **Bush RK, Portnoy JM, Saxon A, Terr AI, Wood RA.** The medical effects of mold exposure. American Academy of Allergy, Asthma and Immunology environmental and occupational respiratory disorders position paper. February 2006. J Allergy Clin Immunol Volume 117, Number 2. <https://www.ncbi.nlm.nih.gov/pubmed/16514772>. Page last accessed March 6, 2019.