



Guidance for Clinicians Caring for Patients with Complaints Related to Mold and Damp Environments

Mold exposure is sometimes associated with adverse health effects, including infections, hypersensitivity disorders, and toxic or irritant effects from their by-products. The information provided below is a consensus summary of mold information and practices. The safety and welfare of our patients is, as always, of utmost concern to DoD and Navy Medicine. This guide is NOT intended to be a substitute for professional medical judgment.

Recommendations for Medical Providers

- Medical providers 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.
- Medical providers should consult with Public Health if there is a question about the habitability, integrity, or remediation requirements of specific buildings.
- Medical providers should instruct the patient to contact their housing point of contact about their concerns regarding potential exposures in housing. The housing point of contact is the appropriate authority to log, investigate, coordinate, track, and mitigate any housing-related safety and health issues.
- Patients or parents may present with a list of building mold testing results and ask the clinician for an interpretation; however, such lab tests do not have established reference standards and may not discover a significant source of mold that was not already apparent. It is impossible to avoid all mold exposure.
- Individuals sensitive to mold should be advised to avoid outdoor areas 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 or building mold, other indoor allergens, and moisture intrusion that contribute to mold growth, along with medical treatment, may lead to improvement or resolution of symptoms.
- The clinician should not diagnose a mold allergy before an adequate work-up is completed. Formal consultation for allergy testing should be considered.

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. Typical mold spore concentrations vary from 1,000 to 20,000 (and may be less than 50 or exceed 100,000) mold spores per cubic meter in outdoor air. Outdoor air concentrations are generally several times higher than those of indoor air in that area.
- 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 congestion, lacrimation, red and itchy eyes, coughing, sneezing, wheezing, and itchy skin or eczema).-- 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., cystic fibrosis), 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. (Those organisms are found in outdoor environments and are unrelated to indoor mold exposures.) 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., allergic bronchopulmonary aspergillosis). Treatment, if indicated, may include anti-fungal medications and surgical processes, and should follow 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. Testing blood or urine for mycotoxins is not advised except in rare acute poisonings, as there are no established standards and any mycotoxins found would be from food, where concentrations are 100 or more times higher than in residential or office bioaerosols.

-- Damp environments have been associated with allergy and upper respiratory complaints (although causation has not been established).

- 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.
- Indoor mold levels are usually 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 comprise 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. The Environmental Protection Agency's (EPA) mold remediation guidance is based on physical inspection for mold and water damage. If mold is visible, the item or surface should be cleaned according to EPA guidelines or be removed 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.

Additional Resources

1. **Institute of Medicine.** Damp indoor spaces and health. The National Academies Press. Washington, DC, 2004. <https://www.ncbi.nlm.nih.gov/books/NBK215643/> (accessed 11/15/2024).
2. **Centers for Disease Control.** Mold. <https://www.cdc.gov/mold-health/about/index.html> (accessed 11/15/2024).
3. **Environmental Protection Agency.** Mold Remediation in Schools and Commercial Buildings Guide. US Environmental Protection Agency, 4. 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-chapter-1> (accessed 11/15/2024).
4. **WHO Guidelines on Indoor Air Quality: Dampness and Mould.** <https://www.who.int/publications/i/item/9789289041683> (accessed 11/15/2024).
5. **AIHA.** Mold and Dampness in the Built Environment White Paper Version 3. October 9, 2024.
6. **Environmental Allergens Workgroup.** Exposure and Health Effects of Fungi on Humans. Baxi SN, Portnoy JM, Larenas-Linnemann D, et al. J Allergy Clin Immunol Pract 2016; 4:396. <https://pubmed.ncbi.nlm.nih.gov/26947460/> (accessed 11/15/2024).
7. **Mold allergy revisited.** Portnoy JM, Jara D. Ann Allergy Asthma Immunol. 2015 Feb;114(2):83-9. doi: 10.1016/j.ana.2014.10.004. PMID: 25624128. <https://pubmed.ncbi.nlm.nih.gov/25624128/> (accessed 11/15/2024).
8. **Environmental Allergens Workgroup.** Clinical Evaluation and Management of Patients with Suspected Fungus Sensitivity. Larenas-Linnemann D, Baxi S, Phipatanakul W, Portnoy JM. J Allergy Clin Immunol Pract. 2016 May-Jun;4(3):405-14. doi: 10.1016/j.jaip.2015.10.015. PMID: 26755100. <https://pubmed.ncbi.nlm.nih.gov/26755100/> (accessed 11/15/2024).