
Excerpts from:

Disaster Preparedness Workbook for U.S. Navy Libraries and Archives

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Response Procedures: Minor Mold Outbreak in the Collection

Spores of mold and mildew are found almost everywhere, but they require the proper conditions (moisture, nutrients, temperature, and often darkness or dim light) to proliferate. Media such as paper, cloth, leather, and adhesives may be consumed or stained by many types of mold.

The most critical factor in the development of mold is the moisture content of the materials on which the mold is growing. High moisture content is most often the result of high humidity or of dampness/wetness of collections. In the case of flood or other water damage to a building, furnishings, and/or collections, experience has shown that mold will “blossom” within 48 to 72 hours if action is not taken. Wet collections must be dried or frozen within that time, and buildings must be dried out. General cleanliness and the removal of dust and dirt reduce the risk of infestation, and good air circulation can be helpful in avoiding a mold outbreak (although air circulation should be limited once mold has occurred, to avoid spreading mold spores).

Even small amounts of mold can be a serious health hazard to staff and patrons. There are no federal or state regulations that govern exposure to mold, as there are for exposure to asbestos and other hazardous substances. It is impossible to specify “safe” or “unsafe” levels of exposure because the

effects of mold will differ depending on the type of mold, the level of exposure, and the susceptibility of the person(s) exposed. Some people are more sensitive to mold than others, and even people who do not have a sensitivity to mold can develop one very quickly, with very little exposure. It is best to “assume the worst” and proceed with caution.

Mold must be dealt with promptly, and in a manner that safeguards everyone’s health. Under no circumstances should staff members work with moldy collections unprotected. A dust mask does NOT provide sufficient protection; an appropriate and properly fitted respirator must be worn. More information on the use of respirators is provided in Appendix D2, but the bottom line is that unless you have someone on staff that has been or can be fit-tested with a proper respirator, you should not clean mold in-house.

Cleaning Moldy Collections

In the case of office buildings and homes, it is generally recommended that mold-infested materials like books and papers be discarded-but for libraries and archives, the cleaning of valuable or unique collections will be a priority. It is important to ask, however, whether or not the mold-infested materials need to be retained. Can items be discarded or replaced? For those items that must be retained, the focus should be on removing mold while avoiding contamination of collections that are not affected.

During the cleaning process, it is very important to document everything that is done (e.g., which materials are infested, the type of mold, the environmental conditions, the location of objects in temporary storage, the drying and cleaning methods that are used), since all of this information will be helpful if there is a recurrence of mold later.

It is also important to prevent cross-contamination between items and high levels of mold spores in the work area:

- Do not handle objects unless absolutely necessary, as handling dislodges spores into the air
- Place objects in polyethylene bags during transport to the area where they will be cleaned
- Reduce air movement in the work area
- Wipe worktable surfaces periodically with disposable cloths, using a detergent solution, 70% ethyl alcohol, or a dilute bleach solution
- Clean all tools, gloves, and respirators frequently during cleaning of objects
- Place the object to be cleaned on a clean piece of paper, and when finished fold the paper into itself and dispose of it
- When vacuuming, ensure that the vacuum exhaust does not cause air movement within the room; it is best to use a fume hood or to exhaust the vacuum to another room if possible
- Place cleaned dry objects into polyethylene bags immediately to ensure they are not contaminated further
- Dispose of vacuum bags, filters, and disposable protective clothing carefully, sealing them in plastic bags to minimize spreading of spores.

Remove mold only with a vacuum that contains a HEPA filter. Do not use a wet/dry vacuum; vacuums that filter air through water will not capture small particles of mold; they will be exhausted into the air. Even if the wet/dry vacuum contains a chemical to kill the mold, the dead spores that are expelled are still dangerous.

Do not vacuum fragile items directly, as the suction can damage them. Cover the vacuum nozzle with cheesecloth or screening to avoid picking up small pieces of the items. Papers or other flat items can be vacuumed through a plastic screen held down by weights. Boxes can be vacuumed directly. Remember not to clean active mold, since this may cause it to smear and embed into the item. Mold must be dormant (dry and powdery) before it can be vacuumed.

Before collections are returned to the shelves, the shelves must be cleaned (either with a detergent solution or a fungicide such as diluted bleach, if necessary) and thoroughly dried to ensure that moisture will not cause additional mold growth. The area will need to be monitored routinely to ensure that the humidity remains at safe levels.

Addressing a Serious Mold Problem

A serious mold problem is one that affects a significant portion of the collection and/or involves both the collection and the building. This type of situation almost always requires the assistance of an outside vendor (preferably one that has worked with cultural institutions before) to perform the mold remediation. This section is meant to provide a basic familiarity with remediation procedures and to facilitate the process of working with a vendor.

Although there are no federal or state regulations governing mold remediation, useful guidelines for dealing with a mold problem have been developed by several agencies and organizations. These include: the New York City Department of Health and Mental Hygiene's Guidelines on Assessment and Remediation of Fungi in Indoor Environments, and the Environmental Protection Agency's Mold Remediation in Schools and Commercial Buildings. These resources and others cited in Further Resources at the end of this appendix provide detailed information on procedures for mold remediation. Vendors used for mold remediation should be familiar with these guidelines and proceed according to their recommendations.

Choosing a Vendor for Mold Remediation

It is important to be aware that some water damage and mold recovery vendors may not understand the particular needs of library and archival collections. If it is possible to choose a vendor with experience in recovering library and archival collections from water damage and mold, you should do so.

If you choose to hire a vendor with less experience, you will need to ask a variety of questions to ensure that the work is done properly. Most of these vendors will provide supervisors, but the rest of the workers will be hired for the job. Thus, they will have little experience in cleaning mold and they will not know much about your collections and their needs. What will the ratio of supervisors to workers be? How will workers be trained? Are the workers properly insured? What health precautions will be taken for the workers? What techniques will they use when cleaning? Do they correspond with those described in the section on cleaning above? Can they provide you with a demonstration?

Further Resources

Chicora Foundation web site, Mold section. At www.chicora.org/mold.htm.

Program Leaflet Number 5. Atlanta, GA: Southeastern Library Network, 1987 (revised and updated 2001). www.solinet.net/preservation (click on Preservation Publications).

United States EPA, Indoor Air-Mold, www.epa.gov/iaq/molds/. Basic overview of mold issues, plus links to other resources.

Health Canada, Fungal Contamination in Public Buildings: Health Effects and Investigation Methods. 2004. www.hc-sc.gc.ca/hecc-sesc/air_quality/generalpubs.htm.

United States EPA, Office of Air and Radiation, Indoor Environments Division, Mold Remediation in Schools and Commercial Buildings. EPA 402-K-01-001, 3/2001. www.epa.gov/iaq/molds/mold_remediation.html.

NIOSH, Building Air Quality: A Guide for Building Owners and Managers. 1991. www.cdc.gov/niosh/baqtoc.html. A guide to diagnosing and resolving indoor air quality (IAQ) problems. Appendices on measurement of IAQ; HVAC systems and IAQ; and moisture, mold, and mildew.

New York City Dept. of Health, Bureau of Environmental & Occupational Disease Epidemiology, Guidelines on Assessment and Remediation of Fungi in Indoor Environments. 11/2000. www.ci.nyc.ny.us/html/doh/html/epi/moldrpt1.html. Not specific to library collections, information on health risks of mold exposure, environmental assessment, and procedures for cleanup of mold-infested buildings.