# A Guide to Fungal Growth



## What are fungi?

Fungi are a broad group of eukaryotic organisms that include molds, yeasts, and mushrooms. Indoor growth of fungi is often referred to as mold or mildew.

## How can fungi affect your health?

Most fungi are not able to directly cause infectious disease in humans unless the host is immunocompromised. Fungi use external food sources such as wallpaper paste, cellulose from papers and fabrics, and lignins in wood products as nutrients. As these materials are degraded, fungi produce metabolic products in the form of volatile and non-volatile organic compounds (mycotoxins). Fungi also produce spores as part of their life cycle, which may cause infection and hypersensitivity in susceptible individuals. In addition to mycotoxins and spores, many fungi produce allergenic proteins and glucans that can produce irritant effects.

We are exposed to some amount of naturally occurring fungi each day. However, the presence of visible fungi on building materials *does not* necessitate that people will be excessively exposed or exhibit health effects.

Exposure is dependent on:

- ability of fungi to produce and release metabolites, spores, or fragments
- potential for these agents to be inhaled, physically contacted, or ingested.

Health effects are dependent on:

- type of fungi and its capability to cause fungal infection, hypersensitivity, or irritant effects
- amount and frequency of exposure
- susceptibility of exposed persons.

The most common effects of overexposure are irritation and allergies. The occurrence of significant health effects is rare, however, you should contact the EH&S Department if you have potential concerns.

**Fungal Contamination Assessment**

Potentially contaminated or water damaged areas are visually inspected by qualified EH&S personnel. Primary areas of concern may include:

- HVAC system (including air filters, cooling coils, drain pans, humidifiers, dehumidifiers, cooling towers, and ducting)
- ceiling tiles
- sheetrock
- cardboard
- carpet
- other materials known to promote biological growth.

Bulk or surface sampling is not part of routine assessment. Bulk sampling *may* be conducted when:

- evidence of growth is not observed during visual inspection and unexplained occupant complaints exist that are associated with fungal exposure
- visual assessment is not adequate (i.e. visible growth is not detected but significant water staining and or damage has occurred and conditions have been favorable for growth)
- identification of specific fungal contaminant(s) is required as part of a medical evaluation

Air sampling is not part of routine assessment. If necessary, air samples are collected in the area of concern and compared to un-contaminated area(s) within the facility and outdoors, preferably near the facility air intake. Air sampling *may* be conducted when:

- evidence from visual assessment and/or bulk sampling indicates contamination of HVAC/air handling systems
- presence of mold is suspected but cannot be confirmed through visual inspection or bulk sampling

Analysis of bulk/surface and air samples is conducted by a qualified lab specializing in microscopic analysis of microbial samples. The presence of trace fungal spores in samples is considered background. Although exposure criteria do not exist, large

differences in fungal types or levels as compared to outdoor air may indicate sources of indoor amplification or contamination.

## Prevention of Fungal Contamination

Sources of water infiltration including leaks, seepage, high humidity, and other underlying causes of fungal growth should be promptly rectified prior to commencement of remediation activities. Where high humidity is a contributing factor, humidity levels should be maintained below 60%.

Remediation response including clean up, drying, and removal of water damaged materials should be conducted within at least 24-48 hours. Remediation should be conducted in a manner to minimize emission of fungi and dust while preventing exposure to building occupants. The use of ozone or gaseous disinfectants has not shown to be an effective remediation measure and is not recommended.

Promptly repair water leaks and replace water damaged porous furnishings, carpets, upholstery, and ceiling tiles. Humidity should be maintained below 60% in all occupied areas and summer cooling coils should run below 56$^{o}$F to properly dehumidify conditioned air.

Proper maintenance of air handling units is critical. Drain pans and cooling coils should have continuous drainage and be cleaned/disinfected where moisture growth has caused microbial growth.

## HELP!!!

If you have questions about potential fungal contamination in your work area, please contact the Environmental Health & Safety Department.

Environmental Health & Safety Department - 327-5040
- Rich Stone, Industrial Hygienist - 327-5055
- David Lee, Safety Specialist – 784-6478
- Ben Owens, Chemical Hygiene Officer - 327-5196

## Other Resources

UNR Fungi Remediation Program
UNR Exhaust Ventilation System Policy
EPA IAQ Page
EPA/NIOSH Guide to Building Air Quality
OSHA Proposed IAQ Standard
California IAQ Program
American Lung Association IAQ Page