

BACKGROUND

Mold is one of nature's primary decomposers of organic materials. Various types of mold feed on grass, leaves, wood, deceased animals and other organic materials. The type and quantity of mold spores found in the air varies drastically based upon the availability of nutrients, weather conditions – especially precipitation/humidity, and by other conditions such as wind, temperature and snow cover.

Since mold spores are a normal part of the ecology of the air outdoors, they are also part of the ecology of indoor air. Mold spores enter buildings through open windows and doors, ventilation systems and we carry spores in from the outside on our clothes, hair and shoes.



INDOOR AIR QUALITY

Since mold spores are normally found in the air, it is important to maintain conditions indoors that are not hospitable for them to grow when they settle on a nutrient source. The key indoor condition that can be controlled is moisture. If building materials or contents become saturated, it is imperative to dry them as soon as possible, before the mold is given enough time to grow. A simple analogy is to think of plants in a garden. To grow plants, there must be seeds, a food source (soil) and moisture. Mold growth, is in many ways, similar. Spores are the seeds, the food source can be dust, food, paper, etc. and the source of moisture is primarily from leaks and condensation. If seeds are planted in the soil and no moisture is provided, the seeds will not grow. The same holds true with mold. Mold spores and food sources are typically present, but not the moisture needed for growth - that we can and must control.

HEALTH EFFECTS

For some individuals, mold may aggravate allergies or trigger asthma. Individuals with a pre-existing health condition, such as a severely compromised immune system, can suffer from more significant opportunistic infections. As with other allergens and asthma triggers, individual sensitivities vary. If you suspect that indoor mold exposure at Penn is adversely affecting your health, make an appointment with Occupational Medicine or Student Health Services, if you are student. Contact your Building Administrator, or in University College Houses, [Residential Services](#), to evaluate the facility and building systems and to coordinate with EHRS if a moisture, mold or indoor air quality assessment may be needed. EHRS can provide information about the indoor environmental conditions that can be shared with your health care provider to help facilitate a proper diagnosis.

WHAT ABOUT “TOXIC BLACK MOLD”?

You will not see scientifically-reputable entities use the term – “toxic black mold”. This is a term coined by the media or those in the mold industry looking for attention. The Centers for Disease Control (CDC) state that the term toxic mold is not accurate. Some molds are toxigenic, meaning they can produce toxins (specifically mycotoxins), however, molds themselves are not toxic or poisonous. Just because mold is black does not necessarily make it more toxic than mold of other colors. “Toxic black mold” usually refers to the genus of fungi called *Stachybotrys chartarum*. Unlike most of the other molds commonly found indoors, this one is not typically observed as often outdoors. When identified in an indoor environment, it is indicative of a longer-term moisture/dampness issue which is highly unusual in our occupied facilities. When conditions favorable for mold growth persist long enough to allow the growth of *Stachybotrys*, there is a greater potential for adverse health effects since the unfavorable air quality conditions persisted for a longer duration. There is no scientific evidence

that *Stachybotrys* itself is any more “toxic” than other molds. There are many genera of molds that are black, so a mold that is black does not automatically mean that it is *Stachybotrys*.

WHY DOES MOLD GROW INDOORS?

The most common source of mold growth indoors is from leaks that go un-reported. Leaks can originate from failures in building systems such as plumbing, mechanical systems, roofs and exterior masonry and sealants.

Another source of moisture that can lead to mold growth is from condensation that forms on the surfaces of building materials, furniture and personal effects. During the air conditioning season, if windows are left open on a humid day with the cool air conditioning running, condensation can form on cool surfaces in the room which provides adequate moisture for mold to grow. During the heating season, in older buildings that lack vapor retarders or have inadequate insulation, condensation can form on the cool wall surfaces, especially in confined areas like closets or in areas where materials are stored in close proximity to the walls, which impedes air circulation which would aid in preventing the formation of condensation.

PREVENTION OF INDOOR MOLD GROWTH

The most important action to prevent indoor mold growth is to report leaks as soon as possible and either aggressively dry the materials or remove and replace them. While a small area of surface mold can be simply wiped away, it is important to properly assess the impacted materials to make sure that they are dry. If not dry, the mold will grow back.



The photo at left shows surface mold growing where furniture was against the wall. This is typically observed when windows are left open during humid weather while the air conditioning is running. The air conditioning cools the walls and allows the humidity in the air to condense on the cool wall surfaces. Because air flow in the area is impeded by the furniture, the condensation can remain in liquid form long enough to support active mold growth. Maintaining good housekeeping is important. Reduce clutter as much as possible and clean surfaces including

floors and horizontal surfaces regularly to remove dust and other sources of nourishment. Routinely launder clothes, bedding and towels. Hang damp clothes and towels to help them dry more quickly.

Report visible mold, leaks or odors of dampness to your Building Administrator or [Residential Services](#) if you reside in the University College Houses. Building Administrators or Residential Services staff will coordinate with Facilities & Real Estate Services (FRES) and Environmental Health & Radiation Safety (EHRS) to investigate and remedy any identified issues.

GOT MOLD – NOW WHAT?

Mold growth inside buildings is not acceptable, no matter the scale. Conditions must be corrected to prevent mold from actively growing.

1. **Identify the Moisture Source** – Is the source of moisture known? If not, it is imperative to identify the source and correct it. This typically will involve a moisture assessment with infrared thermography to identify evaporative cooling



and using different types of moisture detection instruments to assess building materials.

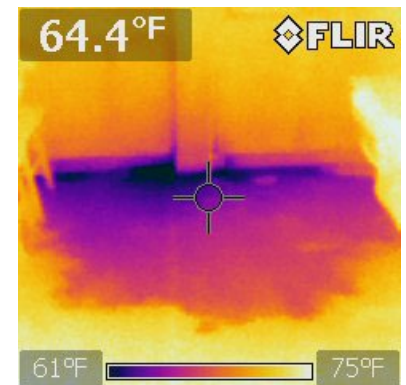
2. **Implement Drying** – Typically, this will involve installing dehumidifiers and fans. Sometimes areas will need to be tented with plastic sheeting to focus the drying on specific areas.
3. **Remove the Mold** – On hard surfaces such as plaster/wood, the mold may be simply wiped off in conjunction with drying the substrate. On porous surfaces such as paper-faced gypsum wall board, the mold and substrate may need to be removed and replaced. Clothing can be laundered. Other items capable of being wet cleaned can be cleaned using a mild soap and water solution and then aggressively dried. In most cases, chemicals such as anti-microbial solutions are not needed. If the materials remain dry, they will not be hospitable for mold growth, and if they get wet, with or without treatment, they will likely facilitate mold growth again. Controlling moisture is more important than chemical treatment.

MOLD SAMPLING?

Sampling for mold usually serves little value because mold spores are normally found in the air. The exact count is highly variable and is dependent on many factors. Conditions that allow the spore counts to exceed what would be considered a normal range are most often easily determined through a visual, odor and moisture assessment. Unlike many other contaminants, there are no standards to compare the sampling results to since individuals have different sensitivities to mold. Visible active growth and odors of dampness or microbial volatile organic compounds are usually enough to characterize if the spore counts would be expected to exceed the normal range found either indoors or outdoors. In some cases, if someone has a specific known sensitivity, sampling can be completed to help characterize the environment and assist the health care provider treating the patient.

EHRS SERVICES

EHRS is available to complete moisture/mold/indoor air quality assessments and to coordinate remediation if required. EHRS maintains the University's [Indoor Air Quality](#) and [Mold](#) policies.



REFERENCES

Centers for Disease Control - Mold - <https://www.cdc.gov/mold/default.htm>

American Industrial Hygiene Association – Mold Resource Center - <https://www.aiha.org/public-resources/consumer-resources/disaster-response-resource-center/mold-resource-center>

USEPA – Mold - <https://www.epa.gov/mold>

Penn EHRS Mold Remediation Procedure - <https://ehrs.upenn.edu/sites/default/files/2021-01/Mold%20Program%202021.pdf>