

# Lab Notes

July 2005

IUPUI ENVIRONMENTAL HEALTH AND SAFETY

## Mold in Indoor Workplaces

By: Rebecca Bratt

Concern about indoor exposure to mold has increased along with public awareness that exposure to mold can cause a variety of health effects and symptoms, including allergic reactions. Understanding how and where mold may be introduced into a building can help to prevent mold problems in your work area.

### What is Mold?

Molds are a type of fungi found in both the outdoor and indoor environments and are necessary for the recycling of organic building blocks that allow plants and animals to live. Molds reproduce by means of microscopic spores; the spores are invisible to the naked eye and float through the outdoor and indoor environments. Mold may begin growing indoors when spores land on surfaces that are wet or moist, or could be brought in from the outside by the air handling system, foot traffic or other means. While an individual mold spore is small in size, they can multiply rapidly to the point of creating a significant presence within an environment.

Molds can reproduce on many substrates and surfaces such as; drywall, leather, wood, cloth, paper, and leaves. Mold may be of brilliant colors or black and white, depending on the type. The factors that influence the survival of mold are nutrients (usually organic materials), moisture, and a surface to grow on.

Mold spores that become airborne can expose people indoors through inhalation or skin contact and could have an impact on human health. There is no practical way to eliminate all molds and mold spores in the indoor environment. However, the way to control indoor mold growth is by controlling moisture and dust build-up.

### Health Effects

Mold and mold spores primarily cause health problems when they enter the indoor environment and are inhaled by occupants. For the greater risk population, a relatively small number of mold spores can cause health problems. For the normal population, it may take many more. The following groups of people may be at a greater risk to experience symptoms from mold exposure:

- Infants and children
- The elderly population
- People with asthma, allergies, and other respiratory (breathing) conditions
- People with weakened immune systems (immuno-compromised) such as people with HIV infection,

cancer patients taking chemotherapy, and people who have received an organ transplant.

Hundreds of different species of mold have been identified. Most typical indoor air exposures to mold do not present a risk of adverse health effects. Molds can cause adverse health effects by producing allergens (substances that can cause allergic reactions). Potential health concerns are important reasons to prevent mold growth and to remediate existing problem areas. Most infections caused by mold are opportunistic, which means they affect people with a compromised immune system.

Certain species of mold can aggravate asthma symptoms and cause attacks in individuals who are allergic to mold. In addition, exposure to mold can irritate the eyes, skin, nose and throat in susceptible individuals. Symptoms other than allergic and irritant types are not typically reported as a result of inhaling mold in the indoor environment. The onset of allergic reactions to mold can be either immediate (acute) or delayed (chronic). Allergic responses that people experience from mold include:

- Respiratory problems, such as wheezing and difficulty breathing
- Nasal and sinus congestion
- Eyes-burning, watery, reddened, blurry vision, light sensitivity
- Dry, hacking cough
- Sore throat
- Nose and throat irritation
- Shortness of breath
- Skin irritation
- Aches and pains
- Possible fever

Molds may cause localized skin or mucosal infections but, in general, do not cause systemic infections in humans. Persons with impaired immunity, AIDS, uncontrolled diabetes, or those taking immune suppressive drugs all have the potential of experiencing systemic infections.

### Sources of Mold

Most molds require very simple things to grow and exist. They first require some type of moisture to be present. If there has been an on-going plumbing leak, window leak, or roof leak, there is a high probability that mold has begun to grow. Mold can grow on any surface that offers a nutrient to feed off of and if moisture is present. Removing the source of moisture, such as through repairs or de-

humidification is critical to preventing mold growth. Water damaged building materials and furnishings, if not appropriately handled, can become significant sources of mold contamination in building environments leading to potential health problems for occupants ranging from simple irritation to allergic responses and even hypersensitivity diseases.

In most cases, indoor mold growth may not be obvious. It is possible that mold may be growing on hidden surfaces such as: the backside of drywall, wallpaper, or paneling; the top of ceiling tiles; the underside of carpets and carpet pads; as well as in heating, ventilation, and air conditioning (HVAC) systems. Other possible locations of hidden mold can include pipe chases and utility tunnels with leaking or condensing pipes, walls behind furniture where condensation forms, condensate drain pans inside air handling units, on porous thermal or acoustic liners inside ductwork, on joists and decking of attics and crawl spaces and on roofing materials above ceiling tiles due to roof leaks or insufficient insulation.

## Preventing Mold Growth

There is no practical way to eliminate all mold and mold spores in the indoor environment. The main way to control indoor mold growth is to control moisture.

The following are steps used at IUPUI to control mold growth indoors:

- Address all water intrusion episodes by contacting Facilities at 278-1900
- Fix the source of the water problem or leak as soon as possible
- Reduce indoor Relative Humidity levels to between 30-60%. This may be achieved by venting bathrooms,

clothes dryers and other moisture-generating sources to the outside; using air conditioners and dehumidifiers; increasing ventilation; and using exhaust fans whenever cooking, dishwashing, and cleaning

- Clean and dry any damp or wet building materials and furnishings within 24-48 hours of becoming wet
- Clean and disinfect hard non-porous surfaces that mold is growing on, first using a mild detergent and water solution and secondly using a water solution consisting of 10% bleach (1.5 cups of bleach to 1 gallon of water), and then dry completely. Hard porous surfaces, and absorbent materials, such as ceiling tiles, contaminated with mold may need to be replaced
- Keep HVAC drip pans dry, clean, flowing properly, and unobstructed
- Prevent condensation by reducing the potential for condensation on cold surfaces (i.e., windows, piping, exterior walls, roofing, or floors) by adding insulation or improving air movement. In areas where there is a perpetual moisture problem, do not install carpeting (i.e., by drinking fountains, by classroom sinks, or on concrete floors with leaks or frequent condensation)
- Refrain from installing vinyl wall coverings on exterior walls

## Mold Remediation

In the event that mold contamination is suspected or when evidence of mold growth is present in your work area, a request for an investigation should be referred to the Industrial Hygiene Program of Environmental Health and Safety (EHS) by calling 274-2829. EHS personnel will investigate, in a timely manner, and report their findings to the originating party. EHS will coordinate the removal of mold contaminated materials from the work area.

## NEW EMPLOYEE TRAINING SCHEDULE

### Union Building, Room 372

**General Safety**-For all new employees. 10:00- 12:00 Noon

July 5, 12, 19, 25, 26, 2005  
 August 2, 9, 16, 23, 30 2005  
 September 6, 13, 20, 27, 2005  
 October 4, 11, 18, 25, 2005

### Union Building

**Bloodborne Pathogens**-For all employees who may be exposed to human blood, body fluids or tissue. Session held the 2nd & 4th Monday of every month from 8:30 - 9:30 A.M

July 11 & 25, 2005; UN 542  
 August 8 & 22, 2005; Hoosier Room  
 Sept 12, 2005; UN 452 & Sept 23, 2005 Hoosier Room  
 Oct 10, 2005; UN 452 & Oct 24, 2005 Hoosier Room

**Biosafety Training**-All employees who work with biohazardous materials are encouraged to attend. Session held the 4th Monday of every month from 9:30 - 10:30 .M.

July 25, 2005; UN 542  
 August 22, 2005; Hoosier Room  
 September 26, 2005; Hoosier Room  
 October 24, 2005; Hoosier Room

**Chemical Lab Safety**- For all employees who work with chemicals in laboratories. Sessions held the second Monday of every month from 9:30 - 11:30 A.M.

July 11, 2005; UN 542  
 August 8, 2005; Hoosier Room  
 September 12, 2005; UN 542  
 October 10, 2005; UN 542

## How to Prevent Mold Contamination in Your Walk-In Cooler

By: Lee Stone

Walk-in coolers are ideal environments for mold growth due to the high moisture levels and abundant food sources such as paper, cardboard, agars and medias, caulk etc. Additionally, mold growth in these walk-in units is exacerbated by temperature fluctuations and humidity infiltration resulting from frequent entries and exits.

Obvious visible mold includes the black/grayish growth that occurs around the sinks, on bench paper, cardboard or other materials, and on the walls, ceilings, floors and laboratory equipment (see photo below). There is also mold growth that takes the form of a white, powdery substance that is commonly found on surfaces of a cooler as well.



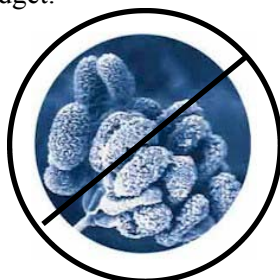
Mold growth on items stored in a walk-in cooler.

Tips to help slow or minimize mold growth in walk-in Coolers:

- Limit all cardboard, paper products, agars, medias in the unit -- these are excellent sources of food for mold
- Remove/dry any excess water from the unit to assist with moisture control
- Report moisture infiltration, such as water dripping from light fixtures, to CFS immediately
- For long term shut downs (greater than one day), thoroughly clean the unit with a mild detergent and keep the doors of the unit open to allow for complete drying of the unit. Do not close the doors until the unit is ready to be re-entered into service
- Limit entrance into the cooler
- Install barrier drapes

Remediation of a mold contaminated walk-in is costly. Please take the steps above to prevent mold from contaminating your walk-in and your budget.

**Say NO  
to  
MOLD**



## The Price of Unsafe Laboratory Practice

By: Lee Stone



The photo above is from a 3 alarm fire at a major university on April 8<sup>th</sup>, with total damage estimates from \$200,000 to \$300,000. The lab was, in fact, completely destroyed, including all of the research, lab notes, and other work by the PI and his students.

A student described the accident as follows: "I was loading solvent bottles to the top shelf" of a solvent storage cabinet, the first student explains. "I loaded 12 bottles, and as I put the 12th bottle up, the shelf collapsed. There were large amounts of hexane on the floor, and my jeans were soaked." The hexane on the floor was ignited by an unknown ignition source. The ignition source could be something as simple as static electricity or a refrigerator switching on the compressor.

Upon investigation it was discovered that the flammable storage cabinet had been modified by placing the wrong shelves in the cabinet. The cabinet was manufactured by Eagle, but the shelves were replaced with those made by Justrite. The laboratory staff was aware that the shelving did not fit properly and was unstable. Another statement by a student was "this isn't the first time the shelf tipped and containers of flammables fell to the floor and broke".

Please do not risk your life, your research or your property to save a few bucks. If you have an unsafe situation, such as the one described by the student above, correct it immediately.

## LOOK WHAT'S NEW

### New Lab Notes Online Edition

This will be the last printed version of Lab Notes. We are excited to announce that Lab Notes will now be available via email. Please visit our webpage at [www.ehs.iupui.edu](http://www.ehs.iupui.edu) and register for your free delivery of Lab Notes to your email address. If you do not have access to email and would like to receive a printed copy of Lab Notes, please contact Lee Stone at (317) 278-6150

## New Online Laboratory Signage Ordering Program

You can now order your laboratory signage online using our Hazard Assessment and Laboratory Signage (HALS) online program. The HALS program collects emergency contact information, employee information and laboratory hazard information from the Principal Investigator or his/her representative. After the information has been entered we will deliver and post a sign at the entrance to your laboratory that will contain all the required information. The cost of a new HALS sign is \$30.00. Any time there is a change in the laboratory hazards or Principal Investigator, a replacement sign can be generated at no cost. Please visit our website at [www.ehs.iupui.edu](http://www.ehs.iupui.edu) and view our new signage program. If you are in need of a sign because you currently do not have one or your current one is incorrect, then please order one today.

## 2004-2005 Laboratory Safety Survey Results

The Laboratory Safety Surveys have been completed for the 2004-2005 school year.

We inspected a total of 865 laboratories on campus. 346 (40%) labs received a perfect grade, 183 (21%) labs receive an A grade, 183 (21%) labs received a B grade, 74 (9%) labs received a C grade, 46 (5%) labs received a D grade and unfortunately we had 33 (4%) labs that received a failing grade.

Most labs that scored poorly have made the required corrections and have greatly improved their grade upon re-inspection.

I congratulate those of you with perfect labs and I thank all of you for correcting your deficiencies. If we work together we can maintain a safe environment for our faculty, staff, students and visitors.

## EHS STAFF

### Director

Rich Strong.....4-1388  
RISTRONG@IUPUI.EDU

### Hazardous & Infectious Waste

Kevin Mouser.....4-4351  
KMOUSER@IUPUI.EDU

### Asbestos Management

Jerry Bush.....4-5239  
JBUSH@IUPUI.EDU

### Biosafety Manager

Jim Klenner.....4-2830  
JKLENNER@IUPUI.EDU

### Lab Safety Manager

Lee Stone.....8-6150  
LEESTONE@IUPUI.EDU

### Fire Protection Services

Thomas Hulse.....4-8000  
THULSE@IUPUI.EDU

### Industrial Hygiene

Rebecca Bratt.....4-2829  
RBRATT@IUPUI.EDU

All Other Areas.....4-2005

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## Please Post or Circulate



Indiana University-Purdue University  
at Indianapolis  
Environmental Health & Safety  
620 Union Drive, Room 043  
Indianapolis, IN 46202-5167

## Be Alert for Safety - Expect the Unexpected