

# New Health Information and Assessment and Remediation Guidelines for Mold

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# Mold Topics

- Fungi and Mold Basics
- Medical: ACOEM, IOM
- New Guidelines on Assessment and Remediation
  - Canada, AIHA, FEMA, IICRC, Associations

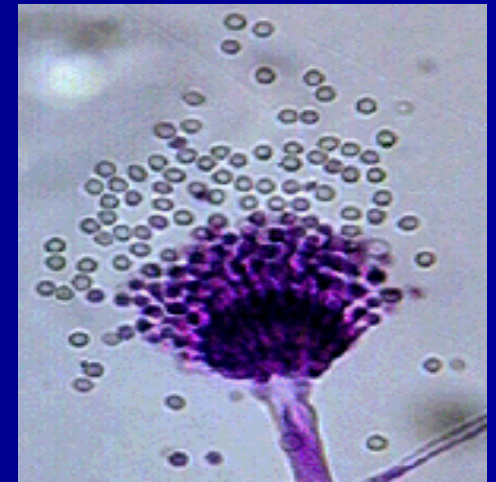
# Fungi – Wood Decay



- Dry rot (misnomer)
- Brown rot
  - Eat cellulose (pulpy sugars)
  - Leave brown “cubes”
- White rot
  - Eat lignin (framework)
  - Leave white stringy mass
- Soft rot – eat both

# What is mold?

- “Molds” are a kind of fungi
  - Surface dwellers
  - Not mushrooms
  - Not wood rot fungi
- Reproduce through spores
  - Cladosporium, Penicillium, Aspergillus, Alternaria
  - Basidiospores=mushrooms



# Construction Dilemma

- The carpenter said: "I can take out that rotten stud, but I need a mold remediation consultant for the sheetrock with mold on it..."
- Or what about the landscaper, rolling in fungi in soil, leaves, beautibark...

# Sources of indoor molds?

The most significant source of mold spores indoors is **outdoor air**<sup>1</sup>

## ■ Other Sources:

- Insects
- People, Pets
- Plants
- Food

<sup>1</sup> Solomon WR. 1975. Assessing fungus prevalence in domestic interiors. J Allergy Clin Immunol 56(3): 235-242.

# What are potential adverse health effects?

- 1) Infections
- 2) Allergies
- 3) Toxic responses

**American College of Occupational & Environmental Medicine (ACOEM)  
Evidence Based Statement (free at  
[www.acoem.org](http://www.acoem.org))**

- Except for persons with severely impaired immune systems, indoor mold is not a source of fungal infections

# ACOEM Evidence Based Statement ([www.acoem.org](http://www.acoem.org))

- Mold is likely to sensitize and produce allergic responses in allergic individuals (hay fever)
- Allergic persons also react to pollens, animal dander, dust mites, cockroaches

# ACOEM Evidence Based Statement ([www.acoem.org](http://www.acoem.org))

- Current scientific evidence does not support the proposition that human health has been adversely affected by inhaled mycotoxins in home, school, or office environments

# Toxic response? (mycotoxins)

- Metabolic byproducts of mold
- Non volatile
  - Different from MVOCs (musty odor)
- Info from massive exposures in past, primarily ingestion
  - Moldy hay, grain
- Various toxic effects
  - Tremors, indigestion, cancer

# No such thing as “Toxic Mold”

- The dose makes the poison.
  - Example: We eat salt everyday. About ¼ cup at one sitting can be deadly, yet we do not refer to it as “toxic salt.”
- AIHA
  - Toxic mold has no scientific meaning since the mold itself is not toxic. Metabolic byproducts of some mold may be toxic (mycotoxins).

# Toxic Response

- Presence of mold  $\neq$  Presence of mycotoxins
  - Some mold spores contain tiny amounts of mycotoxins some of the time<sup>1</sup>
- It is virtually impossible to inhale enough spores in residential and office settings to get toxicity<sup>2</sup>

1 Calculated based on data from Sorenson et al. 1987 and Burge 1996.

2 Burge H.A. 2001. Fungi: Toxic Killers or Unavoidable Nuisances? *Ann Allergy Asthma Immunol.* 87; p. 52-6.

2 Page E.H. and Trout D.B. 2001. The Role of *Stachybotrys* Mycotoxins in Building Related Illness. *Am. Ind Hyg. Assos. J.* 62: 644-8.

2 American College of Occupational and Environmental Medicine Council on Scientific Affairs. 2003. Evidence-Based Statement. Adverse Human Health Effects Associated with Molds in the Indoor Environment. *JOEM.* P. 470-8.

# Institute of Medicine (IOM) - Dampness and Mold Study<sup>1</sup>

- Committee of PhDs, MDs
- Extensive literature review
- Health outcomes vs. damp buildings, mold, mites, etc.
- Evidence of “causal relationship” or an “association?”

<sup>1</sup>Damp Indoor Spaces and Health, US National Academy of Sciences, Institute of Medicine, 2004, 355 pages.

# **Institute of Medicine (IOM) - Damp Indoor Spaces & Mold**

- **Sufficient Evidence of a Causal Relationship**
  - 0 of 21 health conditions evaluated
- **Sufficient Evidence of an Association**
  - 5 conditions: Asthma symptoms in asthmatics, wheeze, cough, nose and throat symptoms, hypersensitivity pneumonitis in susceptible persons

# IOM Dampness and Mold

- **Inadequate or Insufficient Evidence of an Association**
  - 15 conditions: Acute pulmonary hemorrhage in infants, asthma, fatigue, cancer, shortness of breath, immune diseases, neuropsychiatric symptoms, gastrointestinal problems, skin symptoms, lower respiratory tract illness in otherwise healthy adults

# Therefore, Health-based Goal = Protection from Allergenic Effects

- Control of airborne mold particles (+mites, dander, pollen)
- No limits
  - High individual variability
  - Asbestos OSHA limit is 100,000 fibers/cubic meter of air

# Mold Guidelines

- Response to growing public concern
- Gather individuals with expertise (NY)
- Regulators weigh in (EPA, OSHA Health Canada)
- Organizations (AIHA, IICRC)
- Formal lawmaking (Texas, Louisiana)

# Mold Guidelines

- Not much new, innovative
- Same personalities & biases
- Rehash of ideas & “urban myths”
- Disregard other exposures
- Do not allay public concern
- Empowers growth of “industry”

# Mold Guidelines Apply to:

- Indoor environments (not exteriors)
- Not hospitals
- Not pidgeon, bat guano (histoplasma)
- Not sapstain, rot fungi
- Not sewage

# Brief History

- NYC Guidelines-  
1993 (2000, 2002)
- AIHA Field Guide-  
1996 (2005)
- ACGIH Bioaerosol  
Assessment and  
Control-1999

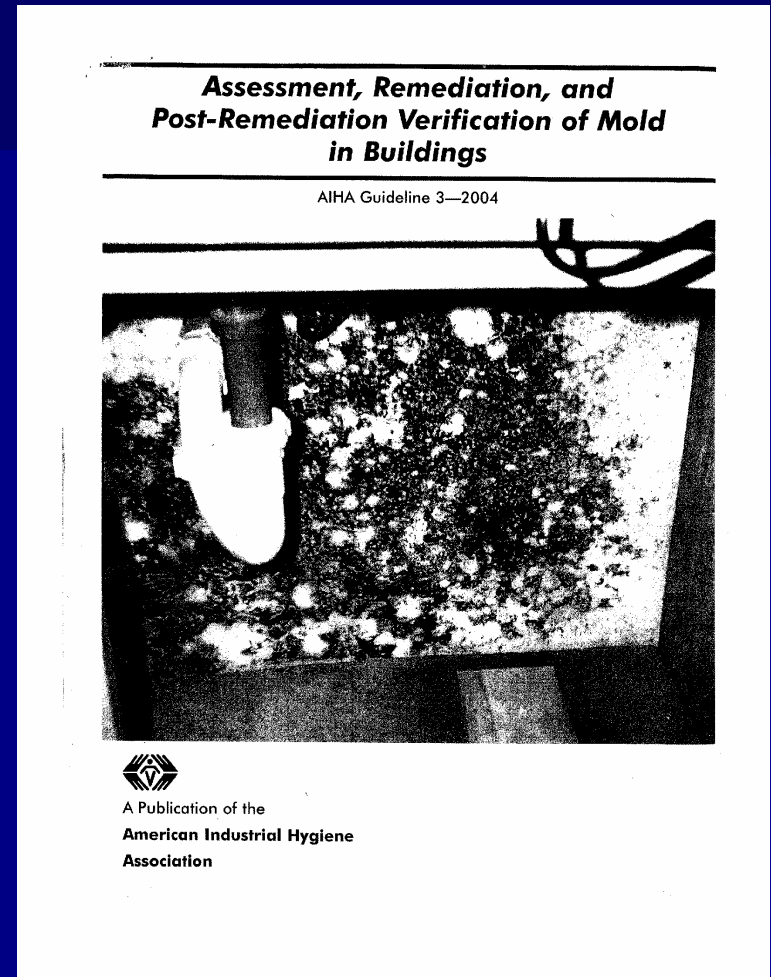


# Brief History

- EPA Mold Remediation in Schools and Commercial Buildings-2001
- Health Canada-Fungal Contamination in Public Buildings: Health Effects and Investigation Methods-2004

# AIHA 2004

- Assessment, Remediation, and Post-Remediation Verification of Mold in Buildings



# AIHA 2004

- Experts from 3 committees
- Guidance, "Not a standard"
- Cautions on air sampling
- "Competent Professional" = CIH or equivalent
- Allows cleaning, coating

# How to Assess the Need for Remediation?

- Visible mold?
- Musty odor?
- Settled spores v. actual growth
  - What is normal or background?
- Location of mold
  - Exterior
  - Wall cavities
  - Occupied spaces

# Sampling to Assess the Need for Remediation?

- Necessary? What are we trying to prove (hypothesis)?
- High variability
- Air samples
- Surface samples

# Sampling for....?

- New study: Hicks, et al, "Fungal Types and Concentrations from Settled Dust in Normal Residences," JOEH, Sept. 2005.
  - 26 non-leak homes
  - Up to 1 million CFU/g of settled dust may be normal (10 times common rule of thumb)
  - 20 fold variation in side by side samples

# Air samples

- “Snapshot” of conditions (3-5 min.)
- No exposure standards
- Highly variable results
  - Wide outdoor range
  - Comparison: 10 x rule of thumb
- Can't distinguish “safe” v. “unsafe”

# Surface Samples

- Confirm the presence/type of mold
  - Is this dirt or mold?
  - Water needy type, wood rot fungi?
- Normal fallout or growth?
  - Detection of spores  $\neq$  contamination
- **Cannot** be used to estimate exposure to airborne mold spores

# Remediation

- FIX THE LEAK
- Clean vs. remove materials
  - Structural integrity
  - Cost, feasibility
  - Aesthetics
- Protect remediation workers
- Protect occupants

# Objectives

- Remove visible mold
- Suppress & control dusts
- Remove waste without contaminating surroundings
- Leave areas clean and dry

# Containment of Dusts

- Mold is not asbestos
  - Plastic sheeting at doorways
  - Isolate HVAC
  - Drop cloths
  - Avoid positive pressure
  - Dust minimizing work practices

# Post-remediation Assessment

- Contractor is responsible
- Visual inspection
- Possible surface sampling
- When?
  - Post-remediation?
  - Post-putbacks?

# Post-remediation Assessment

- No “clearance” criteria like asbestos
- Air sampling questionable
  - Highly variable
  - “Conservative” specs (1 spore Stachy)
  - Open ceilings/walls?
  - Cultured samples 1 week
  - Who pays for failures?

# FEMA / EPA / CDC

- Hurricane Katrina
- FEMA: Mold & Mildew-Cleaning up Your Flood Damaged Home
  - Remove wallboard 1' over watermark
  - Dry, clean, disinfect (bleach)
  - “Highly toxic mold” *Stachybotrys*
  - >25 sq', consult a contractor

# Washington Tenant Notification Law

- Landlord to tenant “notification” about mold (2005)
- Handout or post:
  - WA Department of Health: Got Mold? ([www.doh.wa.gov/ehp/ts/IAQ/mold-notification](http://www.doh.wa.gov/ehp/ts/IAQ/mold-notification))

# IICRC S520

- Institute of Inspection, Cleaning, and Restoration (iicrc.org)
  - Contractor group
- Standard and Reference Guide for Professional Water Damage Restoration
  - Standard? Consensus?
    - Offloads liability
    - Generic recommendations
  - Largely references (overboard opinions)

# Association Guides

- Canadian Construction Association
  - Mould Guidelines for the Canadian Construction Industry-2002, (2004) ([cca-acc.com](http://cca-acc.com))
- Lumber mold
  - Western wood products
    - [wwpa.org](http://wwpa.org)
  - Forintek
    - [forintek.ca](http://forintek.ca)
- Wallboard
  - Northwest Wall and Ceiling Bureau
    - [nwcb.org](http://nwcb.org)

# Conclusions

- Mold spores are ubiquitous
- Mold is not toxic
- IH decisions driven by health effects
  - Allergy
  - Airborne potential
  - Exposure pathway
- Normal cleaning & construction dust controls work

# Thanks for the invite!

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