



State of Hawaii – Department of Health  
Noise, Radiation and Indoor Air Quality Branch

IAQ 101: An Intro to Indoor Air Quality  
Pollution Prevention Workshop for Healthcare  
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Jeff Eckerd, Environmental Health Specialist



## OBJECTIVES

- Understand the concern for indoor air quality and identify some of the common pollutants.
- Understand the Who, What, When, Where, Why and How of mold.
- Preventing mold growth in your home or facility.
- Problems that have occurred in various buildings in Hawaii.
- What to do if you suspect a problem.



EPA - Healthy Indoor Air  
for America's Homes  
Project

## Indoor Air Quality Concerns

- EPA studies of human exposure to air pollutants indicate that indoor air levels of many pollutants may be 2-5 times, and occasionally, more than 100 times higher than outdoor levels.
- These levels of indoor air pollutants are of particular concern because it is estimated that most people spend as much as 90% of their time indoors.
- People who may be exposed to indoor air pollutants for the longest periods of time are often those most susceptible to the effects of indoor air pollution. These groups include young children, the elderly and the chronically ill, especially those that suffer from respiratory or cardiovascular disease.



## Common Indoor Air Pollutants

- **Biological Contaminants** – Include bacteria, molds, viruses, animal dander, dust mites, cockroaches and pollen to name a few. Some may trigger allergic reactions and cause infection.
- **Volatile Organic Compounds (VOC)** – Organic chemicals are widely used in household products such as paints, wax, cleaning products and cosmetics. Symptoms of exposure may include respiratory irritation, headaches and dizziness.
- **Environmental Tobacco Smoke (ETS)** – Mixture of smoke that comes from the burning end of a cigarette, pipe or cigar and exhaled smoke that contains over 4000 compounds, 40 of which are known to be carcinogenic.
- **Combustion Products** – Stoves, heaters, fireplaces and chimneys can produce unhealthy levels of carbon monoxide, nitrogen dioxide and particulates if not ventilated properly.
- **Radon** – Colorless, odorless gas released from Uranium which may cause lung cancer when exposed to elevated levels.



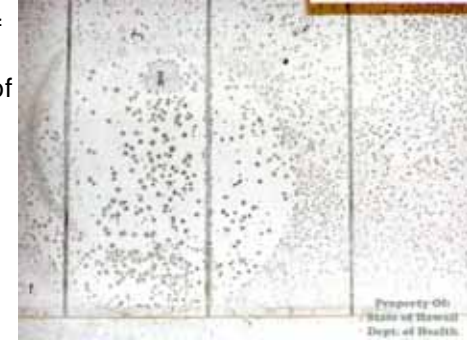
## What is Mold?

- Mold is a subset of fungi, which are necessary for the recycling of organic building blocks that allow plants and animals to live.
- Fungi includes yeasts, molds and mildews, large mushrooms, puffballs and bracket fungi.



## Why the Concern?

- In a closed, indoor environment, levels of contaminants may increase to the point of having a significant health impact upon occupants.
- Mold can also cause severe structural damage if left unchecked and may lead to a heavy financial burden on the building owner.



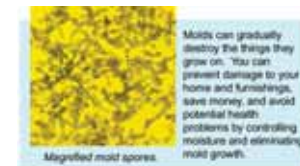
## Potential Health Effects of Mold Exposure

- Allergy - Most common response to mold exposure which can range from mild, transient responses to severe, chronic illnesses.
- Infection - Not very common, except in susceptible populations such as immunocompromised individuals.
- Irritation (mucous membrane and sensory) - Derived from volatile organic compounds produced through primary or secondary metabolism and released into indoor air.
- Toxicity - Secondary metabolites such as antibiotics and mycotoxins are produced.



## Some "Popular" Molds

- Cladosporium - Very common. Produces mainly allergic reactions.
- Penicillium - Fairly common indoors. Able to produce mycotoxins that are potentially cytotoxic and carcinogenic.
- Aspergillus - Most often associated with infectious disease, Aspergillosis. Some species may produce aflatoxins.
- Stachybotrys chartarum - Much discussed in popular press. Not readily measured or cultured. May produce macrocyclic trichothecenes.



## Mold - Indoor Air Guidelines

- EPA Mold Remediation in Schools and Commercial Buildings

<http://www.epa.gov/iaq>

- New York City, Department of Health – Guidelines on Assessment and Remediation of Fungi in Indoor Environments

[www.ci.nyc.ny.us/html/doh/html/epi/moldrpt1.html](http://www.ci.nyc.ny.us/html/doh/html/epi/moldrpt1.html)



## Mold Prevention Tips

- Fix leaky plumbing and leaks in the building envelope as soon as possible.
- Watch for condensation and wet spots. Fix sources of moisture problems ASAP.
- Prevent moisture due to condensation by increasing surface temperature or reducing humidity. Dehumidifiers may be necessary.
- Keep heating, ventilation and air conditioning (HVAC) drip pans clean, flowing properly, and unobstructed.
- Vent moisture-generating appliances, such as dryers, to the outside where possible.
- Maintain low indoor humidity, ideally between 40-60% relative humidity, if possible.
- Perform regular building/HVAC inspections and maintenance as scheduled.
- Clean and dry wet or damp spots within 48 hours.
- Don't let foundations stay wet. Provide drainage and slope the ground away from the foundation.

## Indoor Air Problems in Hawaii



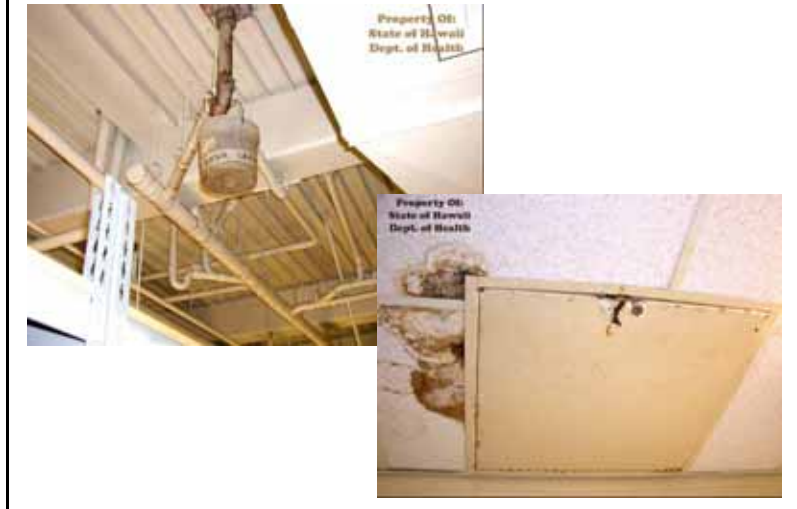
## Mold on A/C Equipment



### Mold Behind Wallpaper and in Ceiling



### Roof Leaks/Water Damage



### Excess Condensation



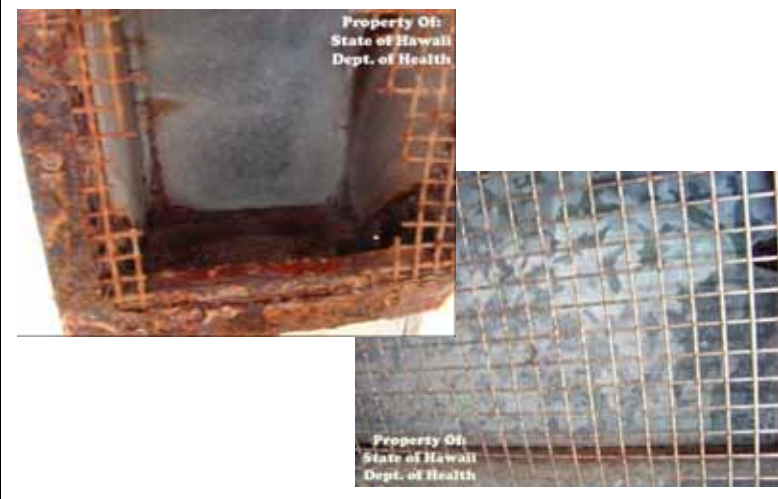
### Poor Maintenance



### Contaminated Ductwork & Diffusers



### Inadequate Amount of Outside Air



### Non-Compliant Systems



### Dust, Particulates and Other Biological Contaminants



## Volatile Organic Compounds and Improper Airing of New Buildings



## Improper Storage/Use of Chemicals



## Carbon Monoxide and Combustion Products



## Environmental Tobacco Smoke and Cooking Odors



## Other Contaminants



## News Articles on IAQ Problems



## Who To Call If You Suspect a Problem

**State of Hawaii - Department of Health  
Noise, Radiation and Indoor Air Quality Branch  
Phone: (808) 586-5800**

Jeff Eckerd, Environmental Health Specialist  
e-mail: jeckerd@ehs.dmail.health.state.hi.us

OR

environmental consultant

