

Welcome to the
California Association of Health Facilities
(CAHF)
2021 Annual Convention & Exposition!

We are in the San Jacinto Room
Runs from 3:00 pm to 4:50 pm (1 hour & 50 minutes)
Continuing Education Credits available for NHAAP, BRN/2



**CAHF 2021
ANNUAL
CONVENTION
& EXPO**
PALM SPRINGS • NOVEMBER 14-17

PREMIER PARTNERS
HEALTHPRO HERITAGE • LIPPA INSURANCE SERVICES • CARE AL

CAHF DISASTER PREPAREDNESS PROGRAM

You are in a breakout session..

**Focusing on
the "F"
in SNFs:
Hazards in the Built Environment
from an
Industrial Hygiene Perspective**

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Focus on the "Facility" in Skilled Nursing Facility (SNF)

- **"F"** in **SNF** stands for **"Facility"**
- **"SN"** or **"Skilled Nursing"** seems to get all the attention, the glory & blame.
- But, the **"F"** has to be on point (Ambient, Comfortable, Compliant, and Safe) or the **"SN"** cannot be effective.

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Summary of the Presentation

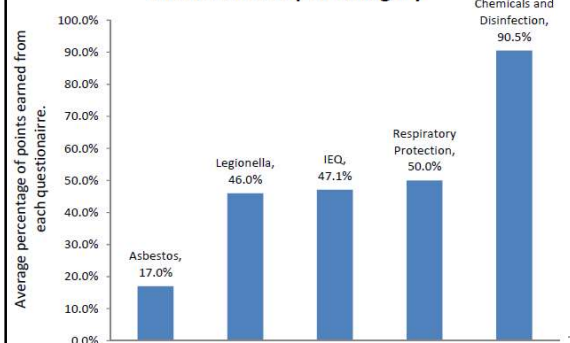
- A good indoor environment is everyone's responsibility and requires a holistic or layered approach.
- But, no matter how amazing your clinical, administrative, environmental services, or public relations teams may be, **if you ignore the facility, people are in danger.**
- Your facilities are complicated and require skill, though, effort and resources.

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CSC Compiled Recent Facility Audit Results

Overall Scores per Category



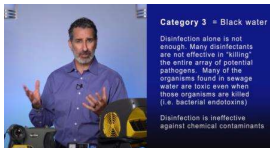
CAHF Virtual Classroom:

CAHF & DPP-sponsored videos you can watch today at

www.cahfdisasterprep.com

(Continuing education credits available)

- **Introduction to Respiratory Protection & N95 Fit-Testing** (~70 min.)
 - <https://youtu.be/Hulok1SVn8>
- **Legionella & Water Management** (~23 min.)
 - <https://youtu.be/VtiWwee2CUU>
- **Wildfire Smoke** (~16 min.)
 - <https://youtu.be/qifqc3G3d5e>
- **Water Incursion** (~21 min.)
 - <https://youtu.be/XC9JlmcGvk>
- **Mold** (~22 min.)
 - https://youtu.be/q_43Fq-K9ms
- **HVAC** (~25 min.)
 - <https://youtu.be/a938UQaGpTQ>
- **Airborne Infection Isolation Rooms (AIIR)** (~30 min.)
 - <https://youtu.be/QeopCD98Ksw>



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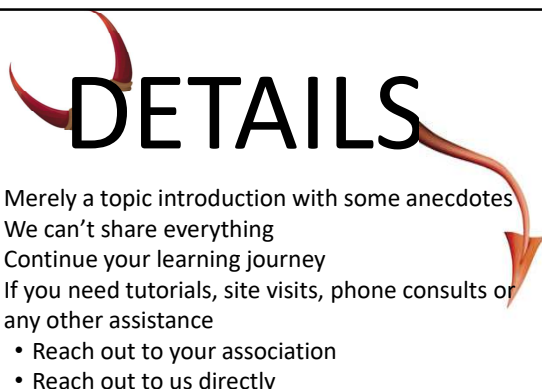


Prepare to learn...

- Tips and tricks to...
 - Keep you in compliance
 - Save time
 - Save money
 - Save lives
- by focusing efforts on...
 - Facility design
 - Facility operation (normal & emergency)
 - Facility preventative maintenance (PM)

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DETAILS

- Merely a topic introduction with some anecdotes
- We can't share everything
- Continue your learning journey
- If you need tutorials, site visits, phone consults or any other assistance
 - Reach out to your association
 - Reach out to us directly

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Focus on the "F" in SNF

- Presenters include:
 - Derrick A. Denis
 - Environmental Consultant & Industrial Hygienist
 - Clark Seif Clark, Inc. (www.csceng.com)
 - Sewer Gas Solutions (www.sewergassolutions.com)
 - derrickdenis@csceng.com
 - 480-460-8334
 - Jason Belden
 - Director of Emergency Preparedness and Physical Plant Services
 - California Association of Healthcare Facilities (CAHF)
 - jbelden@cahf.org
 - 916-432-5194
 - Stan Szytek
 - Life Safety Expert, Fire Life and Safety (FLS),
 - www.flisafety.org
 - 708-707-6363
 - firemarshal10@aol.com

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Building design, construction, maintenance and use can adversely and/or positively affect occupant health.

- Let's discuss
 - Terminology associated with good indoor environmental quality (IEQ)
 - How all building systems are interconnected
 - Common hazards in the built environment you should know (Legionella, Mold, Asbestos, Sewer Gas, etc.)
 - How the built environment & compliance (EPA & OSHA & CMS) are interconnected
 - (e.g. respiratory standards, regulated materials, chemical use & storage laws, etc.)

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What is Industrial Hygiene (IH)?

- Hazard
 - Anticipation,
 - Recognition,
 - Evaluation, &
 - Control

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IH in the Built Environment is often overlooked both in and outside healthcare settings.

- No Accident
 - Providing a good indoor environment for your staff and your residents does not happen accidentally.
- Saves time and money
 - Environmental noncompliance diverts important economic and staff capacity resources away from staff development and resident care.
 - Focusing efforts on facility design, use & preventative maintenance (PM) you can save time, save money and save lives by:
 - Heading off emergencies and reducing the need for rush fees and weekend work
 - Preventing injuries to
 - Reduce fees for litigation defense
 - Avoid loss of business from poor reviews
 - Reduce cost for onboarding new employees or paying OT to existing employees
- Saves lives
 - Addressing IH improves lives
 - Failure to address IH issues results in injuries, illness and death
- Feels good
 - If you are in this room, you have dedicated your life to protecting others

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It takes a village...

- Call it what you like...
 - Infection prevention (IP),
 - Good indoor environmental quality (IEQ), or
 - industrial hygiene (IH)
- By any name it requires...
 - a holistic or team approach, and
 - is everyone's responsibility.



Verticals in long term care, such as SNFS including, but are not limited to:

- | | |
|------------------------------------|------------------------------|
| • Administration | • Outside vendors |
| • Clinical | – general contractors, |
| • Building Engineering | – HVAC contractors, |
| • Occupational Therapy | – plumbers, |
| • Custodial | – cooling tower maintainers, |
| • Kitchen | – pool maintenance firms, |
| • Environmental Services (Laundry) | – etc. |
| • Infection Prevention | • Landscaping |
| | • Residents |
| | • Visitors |



But, other verticals have extremely important and often overlooked roles to play in LDB control (1)

- Administration –
 - Needs to promote a culture of safety, to make IEQ (including water quality and LDB control) an emphasis, and to provide budgets
- Clinical –
 - Needs to be tracking atypical pneumonia for patterns and should be recommending lab work for Legionellosis.
- Custodial –
 - Needs to be running bathroom faucets & showers, kitchen faucets and showers, custodial mop sinks, etc. for 3-5 minutes regularly in every unit
- Kitchen –
 - Needs to regularly change coffee maker filter, change ice maker filter, clean ice machines and verify sanitizer temps are 170 F.



But, other verticals have extremely important and often overlooked roles to play in LDB control (2)

- Infection Prevention –
 - Needs to be looking at all verticals and educating, cheerleading and verifying compliance
- Landscaping –
 - Needs to ensure the backflow preventer, where the irrigation system branches of the domestic supply, is serviced at least annually
- Public Relations (Executive Director or Administrator) –
 - Needs to develop resident, family and caregiver messaging for outbreak scenarios, to ensure all staff get some LDB education, to develop town hall meeting scripts
- Residents –
 - Need to use their water shower regularly and need to report illness
- Visitors –
 - Need to use hall bathrooms and drink from water fountains and need to report illness of loved ones



Everything is Connected...

- **Everyone** (every department/every vertical)
 - needs to consider and understand how their work affects others, and
 - needs to see the bigger picture of resident and staff health.



Verticals are often operated as islands or little fiefdoms, when in fact they are all part of a bigger picture.

- Infectious agents or environmental hazards are not limited to any single vertical.
- If fact, hazardous and infectious agents affect, and are affected by, all verticals.
- Often the points of failure are at the interface between verticals
 - Plumber/HVAC
 - Building Engineer/Custodian
 - Environmental Services/Clinical



Do no harm, Do know harm...

- IPs MUST understand building science.
- Building engineers MUST understand infection prevention.
- Custodians MUST understand aseptic techniques.
- Clinicians MUST understand Environmental Services
- Administrators MUST understand everything.

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Do no harm, Do know harm...

- “I didn’t know” or “It’s not my job” are not acceptable responses to HAIs (healthcare- associated infections)

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Legionella

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Examples of opportunities for improvement

- Common to find utility sinks called “hoppers” which failed to drain or are inoperable.
- This becomes a sanitary issue and a legionella issue because the fixture cannot be effectively flushed.



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When did you last flush, clean and/or disinfect your portable eye wash?



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Drainless emergency shower and eye washes do not make flushing easy



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Better Choice for preventing de facto dead legs



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Tan Water

- Does your cold or hot water supply look like hot chocolate?
- Off color does not mean LDB.
- Clear does not mean an absence of LDB.
- But, tan water is indicative of a lack of PM or a water supply problem.

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Tan Water



De facto Dead Leg.
Simply and unused or underused plumbing run or fixture.


Example:
15 Year old fixture.
Never even used once.



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Add a pandemic to the mix
and water quality suffers as the risk of infections skyrocket

Does the water in your water heater look like this? How would you know?



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Dental water is not immune to LDB or other microbes



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Point of Use (POU) Filters

(Remove LDB and allow time to address the plumbing system issues)



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Cooling towers must be maintained

(Redundant towers makes taking one off line easier in summer months)



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Evaporative (Swamp) Cooler Housing must be maintained



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Evaporative (Swamp) Cooler Wet Pads
towers must be maintained



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Evaporative (Swamp) Cooler Reservoir and
Autofill Float must be maintained with



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An unmaintained Evaporative (Swamp)
Cooler is a Live & Dead Bacteria Pump



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An unmaintained Evaporative (Swamp) Cooler with Heavy Biofilm



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What is Legionellosis

- Legionellosis refers to 2 disease presentations:
 - **Pontiac Fever**
 - Flu-like symptoms
 - Self-resolving
 - Affects healthy adults
 - **Legionnaire's Disease (LD)** Bacterial pneumonia
 - Can be fatal
 - 10% fatality rate general population
 - 40% fatality in healthcare settings
 - Affects vulnerable populations
 - Immunocompromised, elderly, smokers, people with lung disease, etc.
 - Healthcare Associated Legionnaires Disease (HCALD)

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What Causes Legionellosis

- Legionnaire's Disease & Pontiac Fever
 - Both caused by inhalation of water droplets (mist) containing viable common waterborne bacteria called *Legionella pneumophila*
 - Typically serogroup 1, but 2-14 and non-pneumophila species can cause the disease
 - Collectively these bacteria are commonly referred to as Legionella Disease Bacteria (LDB)

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A Disease of the Built Environment

- Naturally occurring LDB in freshwater LDB is at insufficient quantities to cause disease
- The water reaching your facility or your home IS NOT STERILE, municipalities merely control microbes at delivery
- Pool example:



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A Disease of the Built Environment

- Indoors factors in the built environment can promote amplification and colonization such as:
 - Large complex built water systems
 - Warm Temperature (77 to 108 °F)
 - Stagnation
 - Scale
 - Sediment
 - Biofilm
 - Protozoa
 - Absence of disinfectant
- You have some or complete control over all of these factors

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Legionnaire's Disease is Generally Preventable

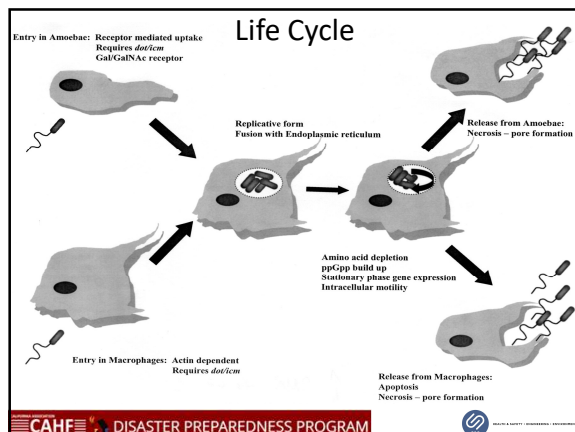
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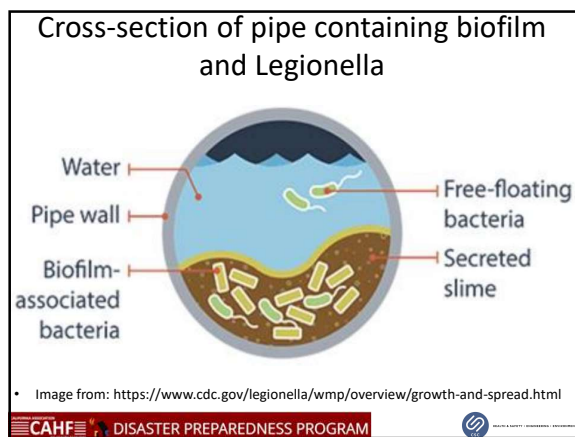
CDC investigations show almost all outbreaks were caused by problems preventable with more effective water management.



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How Much LDB is Too Much?

Table 1. Colony forming units (CFU) of LDB per milliliter

Action	Cooling tower/Evaporative Condenser	Potable water	Humidifiers and Mistifiers
1	100	10	1
2	1,000	100	10

The levels requiring action vary for the source of exposure, based on the assumption that some routes of exposure result in a greater dose to the lung.
For this reason humidifiers and similar devices (such as misters & evaporative condensers) produce aerosol mists and, therefore, need to be controlled to lower levels than cooling towers and domestic water supplies to minimize inhalation risk. Levels of LDB equal to or greater than the values in the table constitute a need for action, as described below:

Action 1

- Cleaning followed by biocide treatment of the system, if appropriate.

Action 2

- Cleaning and/or biocide treatment.
- Take immediate steps to prevent employee exposure.

****Remember that these numbers are only suggested guidelines, and the goal is zero detectable LDB in a water source.**
[Adapted from George K. Morris and Brian G. Shelton, PathCon Technical Bulletin 1.5, p-2, Legionella Bacteria in Environmental Samples: Hazard Analysis and Suggested Remedial Actions, June 1998, Pathogen Control Associates, 270 Scientific Dr., Suite 3, Norcross, GA 30092]

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Don't Just Test for LDB

- Presume
- Continuously Manage

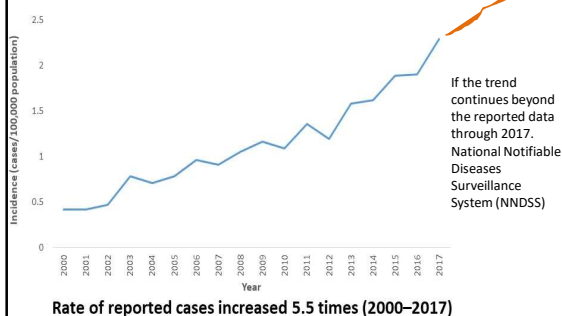


Legionnaires' Disease

- CDC says health departments reported ~ 10,000 cases of Legionnaires' disease in the US in 2018.
- But, Legionnaires' disease is likely underdiagnosed & therefore underestimated.
- A recent study estimated the true number of Legionnaires' disease cases may be 1.8–2.7 times higher than reported.
- Atypical pneumonia can often be Legionnaires' Disease



Reports of Legionnaire's disease on the Rise in the USA



Where are the exposures to LDB laden water droplets originating?

- Common sources:
 - Water Heater
 - Cooling Towers
 - Heated Spa
 - Evaporative Coolers (Swamp)
 - Mister Systems (common for outdoor patio cooling)
 - Humidifiers
 - Aerators
 - Nebulizers
 - Decorative water fountains
 - Commercial pass through dish washing machines
- The highest exposure potential to water mist for your vulnerable SNF population is during showers.

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Higher risk use & population combinations

- Examples
 - Healthcare settings
 - **Healthcare Associated Legionnaires Disease (HCLD)**
 - Hospitals
 - Senior living
 - Skilled Nursing
 - Institutions
 - Prisons,
 - Mental health facilities,
 - Boarding schools

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Higher risk use & population combinations

- Factors working against these facilities:
 - 24 hour occupancy
 - No break in exposure, &
 - No ability to shut down for maintenance
 - Immunocompromised occupants
 - More susceptible occupants
 - Limited water turn over facility wide.
 - Increased de facto dead legs from low use/no use of fixtures (vacant units, wings, etc.).
 - Lack of compliance as a priority

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Federal Compliance

42 CFR §483.80 Infection Control for Skilled Nursing Facilities & Nursing Facilities:

- “The facility must establish and maintain an infection prevention and control program designed to provide a safe, sanitary, and comfortable environment and to help prevent the development and transmission of communicable diseases and infections.”



CMS Compliance

- Facilities receiving Medicare & Medicaid funding are required to incorporate Legionella controls in a WMP
 - Per the CMS memo QSO-17-30-Hospitals/CAHs/NHs, released on June 2, 2017 (Updated July 6, 2018), titled, **“Requirement to Reduce Legionella Risk in Healthcare Facility Water Systems to Prevent Cases & Outbreaks of Legionnaires’ Disease (LD)”**,
 - “Facilities must develop and adhere to policies and procedures that inhibit microbial growth in building water systems that reduce the risk of growth and spread of Legionella and other opportunistic pathogens in water.”
 - This memo references the ASHRAE Standard 188-2015: *Legionellosis: Risk Management for Building Water Systems* June 26, 2015



LDB are ubiquitous, so what should we do?

- In LDB that causes Legionellosis is omnipresent in our water supply
- So, we must take proactive & recurring steps in line with the general infection control guidelines.
- Be in compliance with ASHRAE Standard 188-2015: *Legionellosis: Risk Management for Building Water Systems* June 26, 2015 (ASHRAE 188):
 - to manage incoming LDB,
 - to make plumbing systems less hospitable, &
 - to reduce the likelihood of LDB colonization



General IC Principles Apply to LDB Control

- Germs (bacteria, viruses & molds) are all around us. (LDB is with us)
- What are some ways to prevent exposure to germs?
 - You use disinfectants like hand sanitizer? (Maintain Chlorine Levels)
 - Using hand sanitizer does not make your hands sterile.
 - Hand sanitizers reduce the concentration of viable germs.
 - You wash your hands right? (Flush & clean lines & fixtures)
 - The washing your hands does not make them sterile.
 - Hand washing reduces concentration of germs on our hands, and thereby reduces the exposure potential.
 - We wash our food? (Replace filters)
 - The washing of food does not make it sterile.
 - Food washing reduces concentration of germs on the food (lettuce, celery, etc.) reduces the exposure potential.
 - We cook our food. (Maintain control temperatures in water heaters)
 - But cooking food does not make your food sterile either.
 - It reduces the number of germs that are viable and thereby reduces your risk of becoming ill.



Controlling Legionella pneumophila

- What is generally done to control Legionella pneumophila?
 - We add chlorine (hand sanitizer) to reduce the bacteria in our water supply.
 - Chlorination does not make water sterile.
 - Chlorine (or bromine, chlorine dioxide, etc.) reduces bacteria concentrations and inhibits bacterial growth in the water supply, which reduces potential for illness.
 - We purge (wash) our water supply to remove accumulated bacterial populations and to introduce water with higher free chlorine concentrations (chlorine gets used up in stagnant and hot pipes).
 - But flushing water supply lines and water heaters alone does not sterilize the water.
 - We cook our water to inhibit bacteria in our hot water supply.
 - We cook our water by using water heaters to heat the water to a temperature that inhibits or kills bacteria which reduces potential for illness.
 - But this cooking via water heater does not sterilize the water.



What Do You Need

- A **Water Management Plan (WMP)** for Legionella is a **risk assessment**.
- Most will follow **ANSI/ASHRAE Standard 188-2015 Legionellosis: Risk Management for Building Water Systems**
- It helps **control** LDB to protect clients and staff
- It keeps your facility in **compliance**.
- The Department of Health & Human Services Centers for Medicare & Medicaid Services (CMS) **now requires Medicare certified healthcare facilities have a water management plan (WMP)** to reduce risks associated with Legionella and other waterborne pathogens.



What Do You Need

- A Water Management Plan (WMP)
 - Designates a team (in-house & external members)
 - Identifies/Inventories
 - All water storage and distribution components
 - (pipes, tanks, etc.),
 - Treatment locations
 - (water heaters, filters, expansion tanks, etc.)
 - Flow control points
 - (shut off valves, mixing valves)
 - Distribution points
 - (faucets, shower heads, spigots, cooling towers, evaporative coolers, water fountains, etc.).



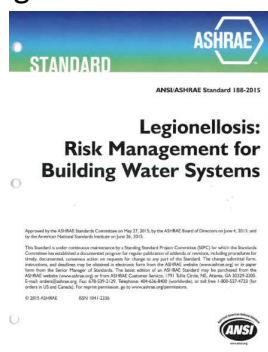
What Do You Need

- A Water Management Plan (WMP)
 - Assigns
 - Set points (temperature, chlorine concentration, bromine concentration, pH range, flow rates, flow times)
 - Maintenance schedules (flushing, cleaning, replacing)
 - Dictates accountability processes & schedule
 - Method and frequency of challenges to set points
 - Method and frequency to verify PM activities (filter changes, cleaning calendars, etc.)
 - Provides for testing (LDB, THB, temp, pH, Oxidizers, etc.)
 - LDB testing is a part of the WMP, but IS NOT the crux.
 - Creates a response plan for the various verification outcomes.
 - Has mechanisms to evaluate and update the WMP



The Program

- The purpose of this standard is to establish minimum Legionellosis risk management requirements for building water systems.



SCOPE of This Standard...

- Provides minimum Legionellosis risk management requirements for the:
 - design,
 - construction,
 - commissioning,
 - operation,
 - maintenance,
 - repair,
 - replacement, and
 - expansion
- of new and existing buildings & their associated (potable & nonpotable) water systems & components.

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SCOPE of This Standard...

- Applies to human-occupied commercial, institutional, multiunit residential, & industrial buildings.
- Does not include single-family residential buildings.
- Is intended for use by owners and managers of human-occupied buildings.
- Also intended for those involved in the design, construction, installation, commissioning, operation, maintenance, & service of centralized building water systems & components.

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8 Elements of a WMP



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8 Elements of a WMP

1. Program Team

- a) Identify persons responsible for Program development and implementation.

2. Describe Water System/Flow Diagrams

- a) Describe the potable and nonpotable water systems within the building and on the building site and develop water system schematics.



8 Elements of a WMP

3. Analysis of Building Water Systems

- a) Conduct a systematic evaluation of hazardous conditions in the building water systems and determine where control measures shall be applied.

4. Control Measures

- a) Determine locations where control measures shall be applied and maintained in order to stay within established control limits.

5. Monitoring/Corrective Actions

- a) Establish procedures for monitoring whether control measures are operating within established limits, and if not, take corrective actions.



8 Elements of a WMP

6. Confirmation

- a) Establish procedures to confirm that:
 - the Program is being implemented as designed
 - The Program controls the hazardous conditions throughout the building water systems - {validation}

7. Documentation

- a) Establish documentation and communication procedures for all activities of the Program.

8. Continuous Program Review & Management of Change



What can you start doing immediately to manage LBD risk?

- What can you do to help reduce the bacterial load?
 - 1. You can make sure you are using or flushing all of your water outlets on a regular basis.
 - That includes not only toilets and sinks and showers but also outdoor hose bibs, Whirlpool Spas, janitor mop sinks, vacant space, etc.
 - 2. You can line up a vendor to supply POU filters and/or buy enough to deploy to your facilities if/when needed?
 - 3. You can align yourself with an IH (like me, or others) to guide you on this important journey towards a viable WMP
 - 4. Show your team the CAHF video on Legionella

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The Carpet Conundrum

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The Porosity Problem:


- Cleanable Building Materials & Contents are Simply Better for Infection Control (IC) & Odor Control
- Let's move away from porous building materials and contents where possible during initial design and renovations
 - Porous flooring,
 - Porous drapes,
 - Porous wallpaper,
 - Porous furniture,
 - etc.


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The Porosity Problem:

- Yes, Carpet
 - Gives your facility a homey aesthetic,
 - Feels nice under foot,
 - Dampens noise.
- But, Carpet
 - Is not water tolerant
 - Is not easily cleaned or disinfected
 - (C. diff, Norovirus, E. coli, SARS-CoV2, MRSA, VRE, S. maltophilia, etc.)





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Vinyl-Backed Carpet Squares





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Slab Moisture



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Vinyl-Backed Carpet Squares

- Easier to maintain than rolled goods
- Less waste
- Can easily replace only damaged or contaminated carpet squares without an installer (permanently tacky adhesive).
- Water based glue is used to reduce odors and VOC emissions during installation.
- But this material yields some additional hurdles you should know.

Example of an acceptable area under glue applied carpet squares



What's going on here?



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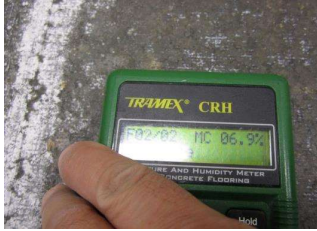
Pungent gym sock odor from moisture accumulation & bacterial growth



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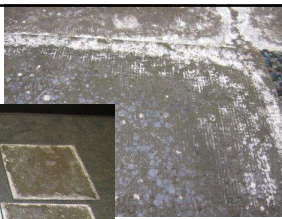
Pegs the moisture meter



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Efflorescence



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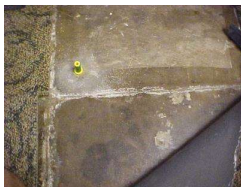
Magic Carpet Ride Slips and Falls



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If you must use VBC Squares, Don't void your floor manufacturer's warranty by:



- Failing to test slab moisture before installation (Test according to manufacturer's specifications or using appropriate ASTM standards)
- Modifying the specified installation process



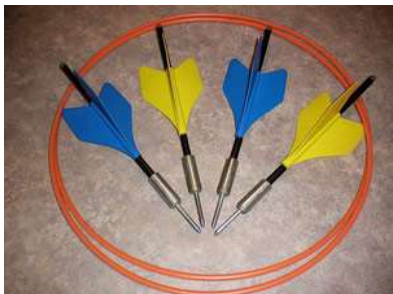
Possible standing policies for use of vinyl-backed carpet squares

- Not allowed period
- Not allowed over existing vinyl floor tile
- Allowed only on 2nd floor and above
- Allowed if 18"x18" or smaller
- Allowed if using corner tabs instead of glue
- Allowed only if backed with felt
- Allowed only with a vapor barrier
- Allowed only with independent slab moisture testing
- Request extended warranty from installer and manufacturer





Mercury is the lawn darts of hazardous materials



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We all played with them both as kids
And, in retrospect...
it was definitely unsafe



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Mercury


- Get mercury out of your buildings ASAP
- EPA has a special kind of hell for you if it is spilled at your facility
- Substitutes are inexpensive, reliable and readily available (barring COVID supply chain issues)

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Mercury (Hg)



- Heavy, shiny, silver-white, odorless, nonflammable liquid at room temperature
- Low vapor pressure (evaporates slowly), but produces significant vapor at room temperature.
- If you have a mercury amalgam filling your mouth will not pass the EPA clearance criteria
- EPA is taking mercury seriously.

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What items contain Mercury in SNFs?




- Sphygmomanometer (blood pressure cuffs)





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What items contain Mercury in SNFs?

- Thermostats



 **DISASTER PREPAREDNESS PROGRAM** 

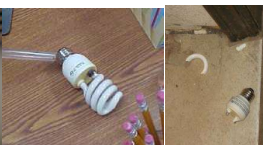
What items contain Mercury in SNFs?

- Thermometers



What items contain Mercury in SNFs?

- Compact fluorescent lamps (CFL)



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What items contain Mercury in SNFs?

- Fluorescent light tubes (T-5, T-8, T-12, etc.)



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Spills are a problem

- Spills require atypical cleanup procedures & specialty equipment
 - (high pressure mercury vacuum, mercury respirator cartridges, amalgamating powders, special vapor measuring equipment, specific & expensive disposal, etc.)
- The Reportable Quantity (RQ)
 - RQ for mercury is 1 pound
 - Because mercury is heavy, only two tablespoons of mercury weigh about one pound.
 - Any time one pound or more of mercury is released to the environment, it is mandatory to call the National Response Center (NRC).

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Take home lessons

- Remove mercury from your facilities where feasible.
- Store & dispose of CFLs and Fluorescent Lamps appropriately
- Have emergency release plan
- Have a mercury spill kit and remediation vendor



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Recycling is
Good Right?

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What Gets Taken Out Every Day?



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What Gets Taken Out When Full? What's the Difference?



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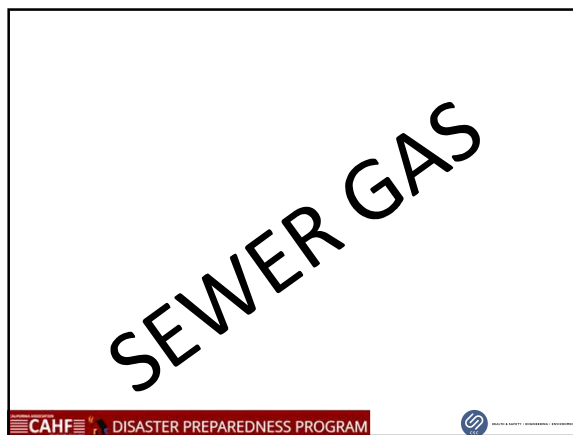
Recycling Blues

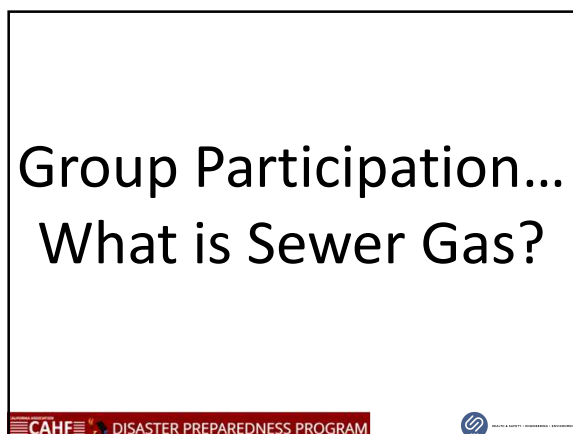
- Failure to empty recycle bins daily =
 - Unpleasant odors
 - Bacterial growth
 - Fungal growth
 - Pest infestations
 - Flying insects
 - Crawling bugs
 - Rodents of all types

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Sewer Gas 101

- Sewer gasses include, but are not limited to:
 - Hydrogen sulfide,
 - Ammonia,
 - Methane,
 - Methyl mercaptan,
 - Carbon dioxide,
 - Sulfur-dioxide
 - Water vapor
 - Etc.



SEWER GAS REALLY STINKS

- A problem for
 - hospitals,
 - SNFs,
 - property managers,
 - facility engineers,
 - Realtors,
 - sellers,
 - schools,
 - Snowbirds
 - business owners
 - Etc.

–because it:



Sewer Gas

- **Smells bad** (until you get olfactory fatigue),
 - Lost revenue
 - From failed sales, new leases & lease renewals
 - Due to bad social media reviews from customers
 - Wasting time fielding staff & client complaints
- **Hurts People**
 - Irritates mucosa of eyes, nose, throat & lungs
 - Lost revenue
 - From absenteeism & presentism due to infirm staff & clients with headaches, eye irritation, sneezing, coughing & general malaise
 - Recruiting hesitancy from bad social media reviews



Sewer Gas

- **Corrodes metal,**

- Destroys electronic components resulting in malfunctions of FLS equipment, such as smoke alarms & fire alarm panels
 - False alarms or failure to alarm
 - High cost of , component replacement
- Failures of plumbing supply lines (water leaks)
 - Cost of flood response
- Failures of HVAC system as coils corrode, burst and release refrigerant
 - Failure to cool
 - High cost of coil replacement and refrigerant replacement)
- Destroys finishes ruins aesthetics for building contents and structure (looks bad)



Sewer Gas

- **Smells like the additive to natural gas,**

- Methyl mercaptan from sewers in the living space = false claims of a natural gas leak,
 - Unnecessary building evacuations
 - Hospital evacuation at 3:00am
 - “Cry wolf” culture, where people will not take an actual natural gas leak seriously.
- It wastes the time and resources of public and private life and safety first responders.
 - Firefighters, police and gas company emergency response teams, who are called to respond to inadvertently false reports of natural gas leaks or toxic gas leaks.



Sewer Gas

- **Is combustible,**

- Build-up of combustible gasses can lead to fires and explosions and the associated loss of life and property.

- **Means there's unrestricted access for sewer critters,**

- Dry traps = unhindered access to the living space for cockroaches, sewer flies, etc.

- **and more.**



Causes of Sewer Gas Infiltration

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Cause is Simply a Dry Trap Most of the Time

- Primary cause of sewer gas infiltration indoors is the evaporation of the water in unused, underused or unserviced sewer drain traps (p-trap, u-trap, s-trap),
- This results in the creation of an air pathway between the living space & the sanitary sewer
 - (municipal system or local septic system).

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"It is almost absurd how often we find a simple dry trap is the cause of an IAQ complaint that has persisted and perplexed for months or years."

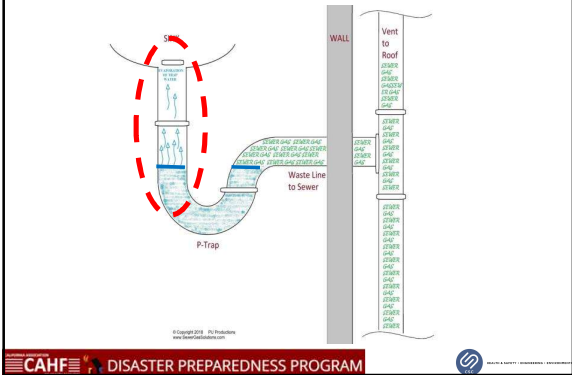
"This is precisely why my partner and I invented Sewer Gas Solutions™."



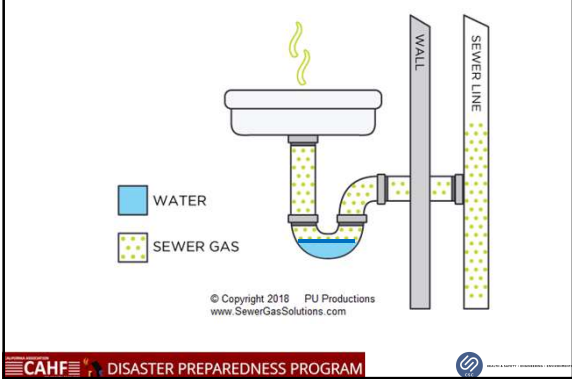
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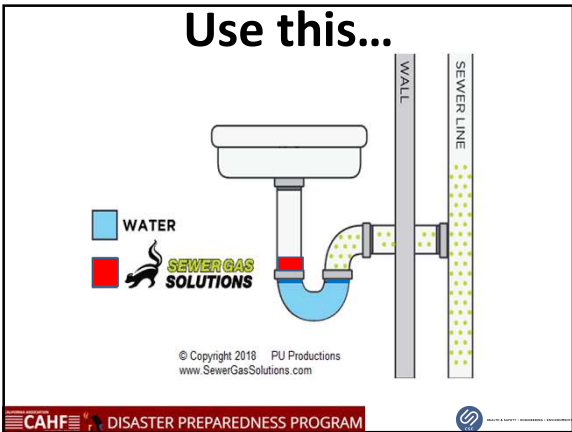
What's a plumbing trap and how does it work?



To Stop This...



Use this...



Fun With Flashlights (Visually Dry Trap)



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Fun With Flashlights (Visually Dry Trap)



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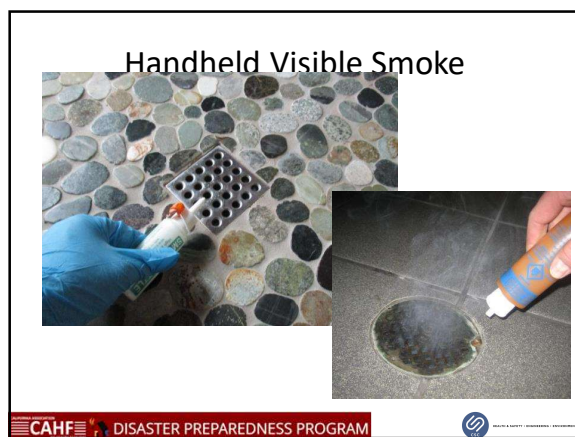
Fun With Flashlights (Visually Dry Trap + Critters)

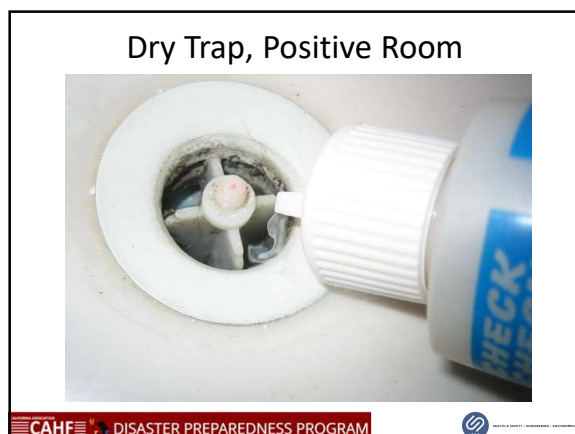


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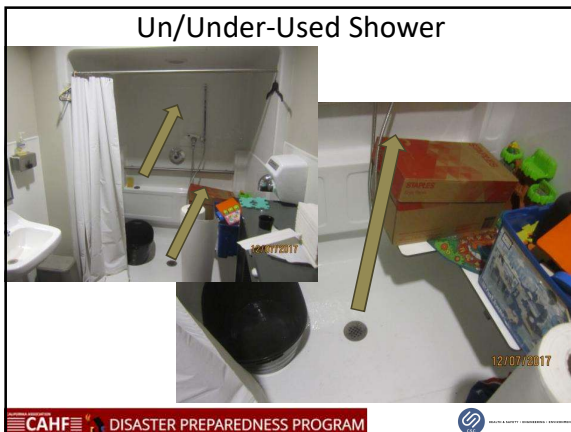
Smoke Generator



Outdoors



Un/Under-Used Shower



Un/Under-Used Sink



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Shower for Storage



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Unused Washing Machine Drain



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Oxidized Brass and Chrome



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Trap Primers, Prone to Failure? Commonly Overlooked by PM Programs?



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Trap Primer (Proper)



ESS PROGRAM



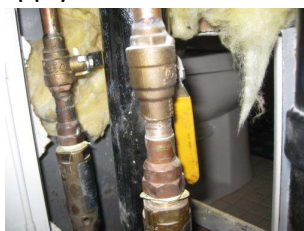
Trap Primer (Off)



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Warning: No air gap + potential to siphon sewage into domestic water supply



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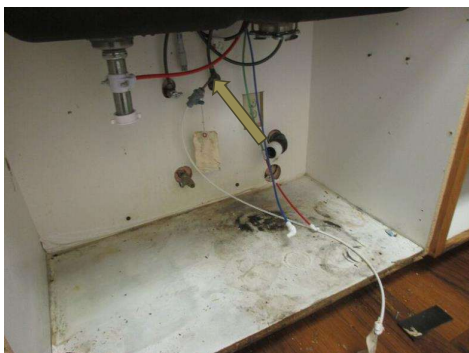
Vacant Suite or TI (Dry Trap), No Sinks (Unhindered Sewer Gas Pathway)



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Open Drain



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What you should use in lieu of the contractor's rag



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Why would we do this?



OR



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Which condensate drain is plumbed correctly?



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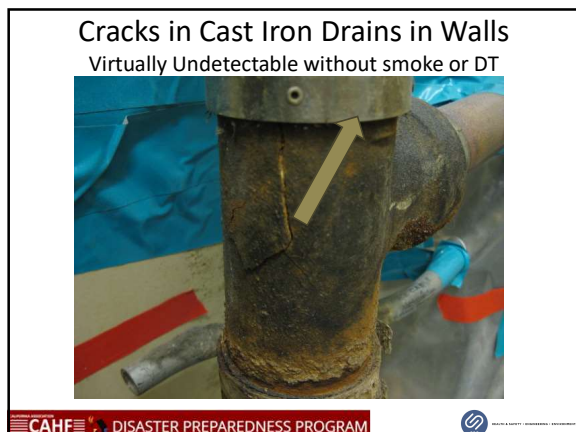


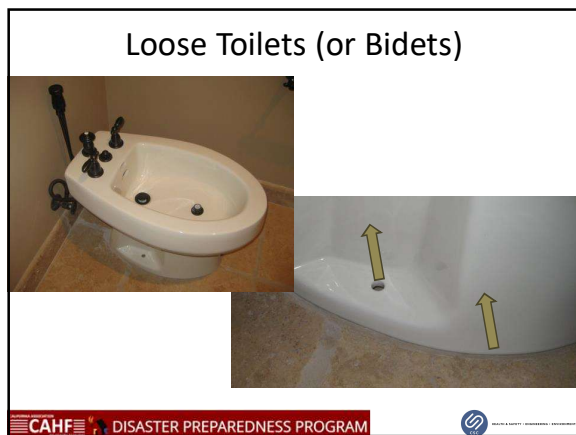
Cracks in Cast Iron Drains in Walls



PU









Don't forget to remove the drain plug before you reset and use the toilet



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Corroded Decorative Cover Screw.



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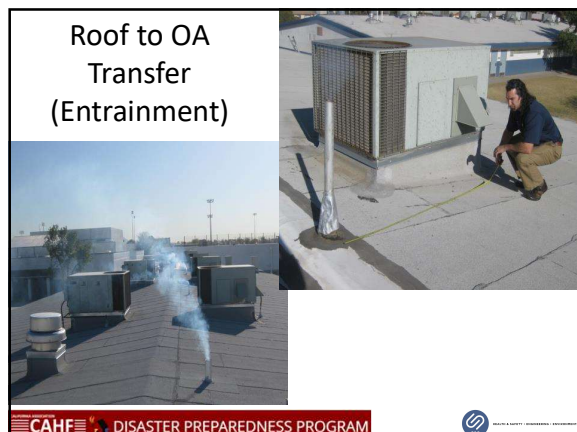


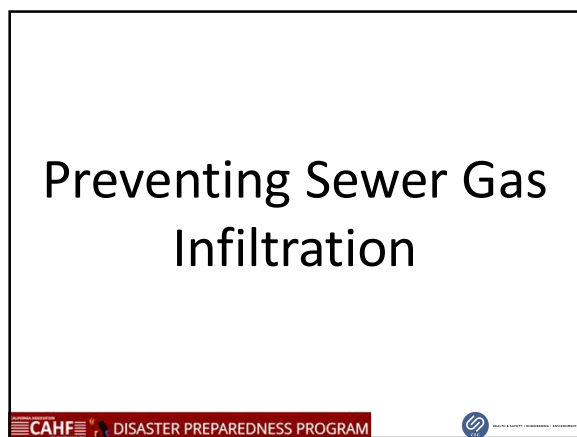
Tape for a clean out cap does not work



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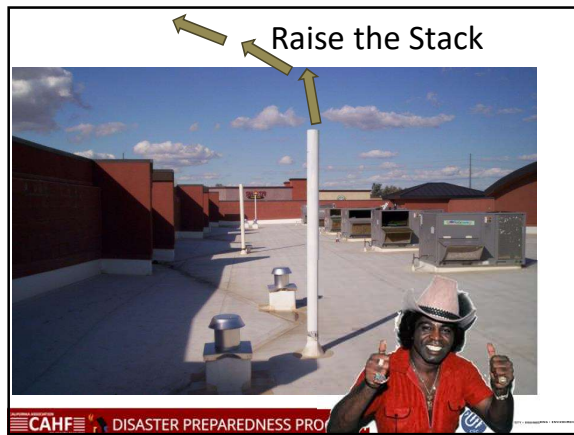




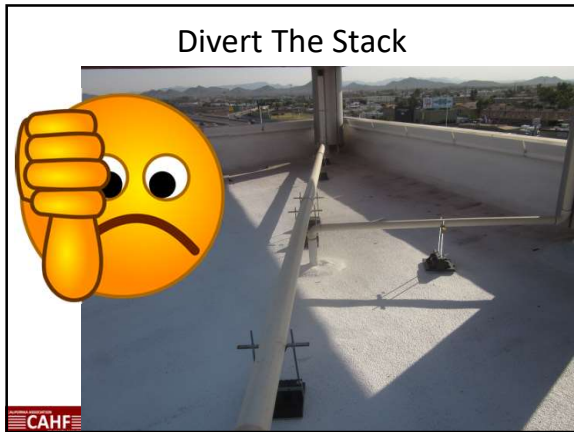


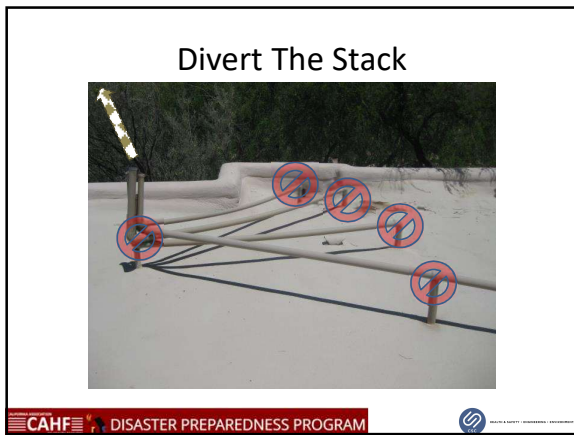


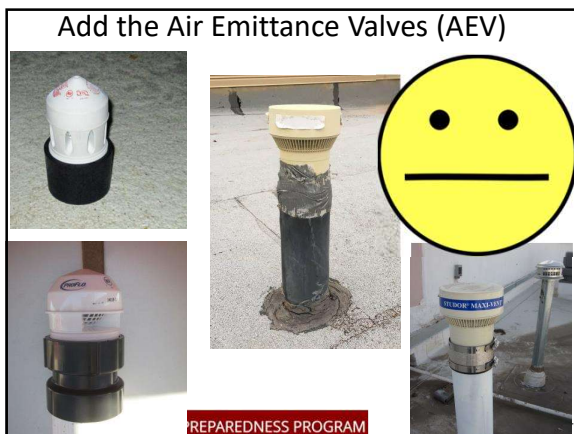












Sewer Gas, Vent too close to OA



Air Admittance Valves Indoors



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Add Activated Charcoal Filter Caps



Raise It & Add Activated Charcoal



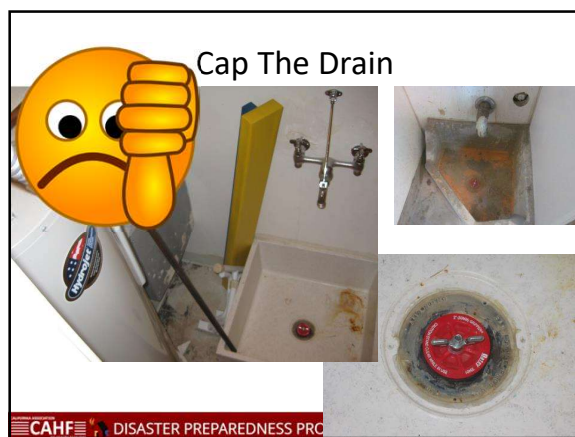
Add the Drain Party Favors



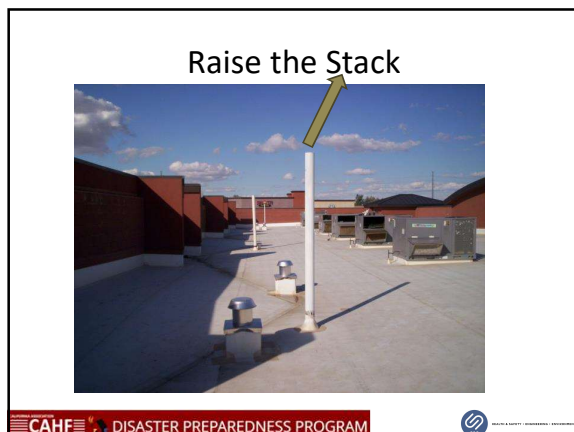
Cap The Stack

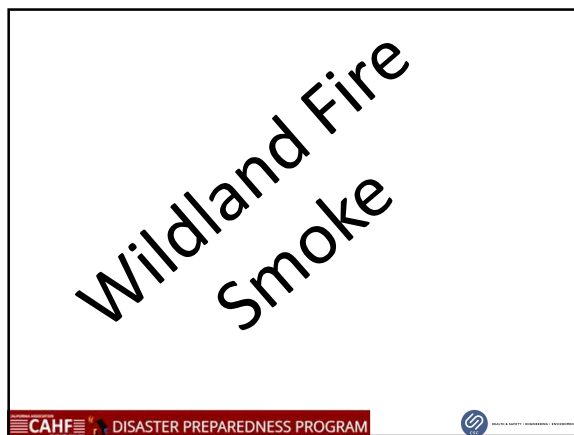














Wildfires impact communities



Photo by Karl Grobl

Not just rocks, streams & wildlife
But, homes, schools, hospitals, businesses & SNFs

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Wildland – Urban Interface



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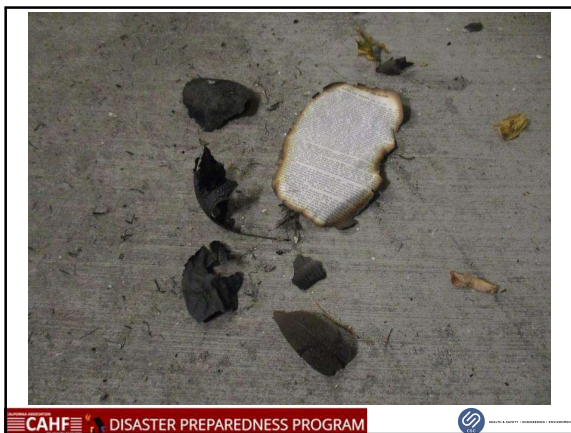


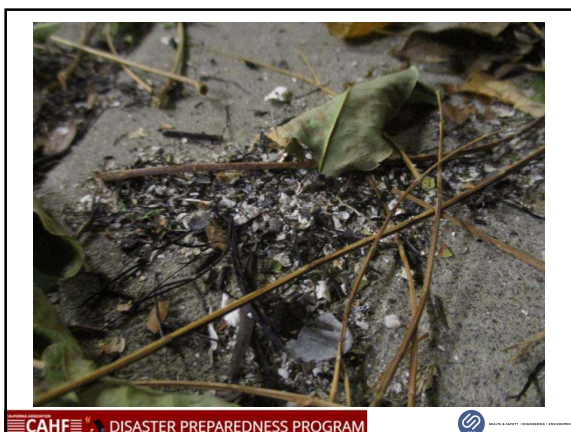


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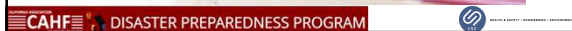




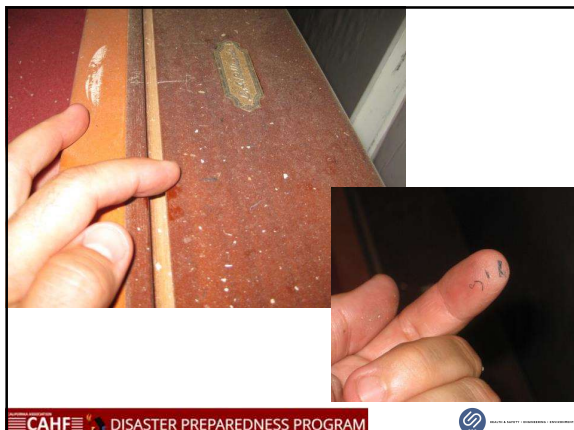
Wildfire smoke residue gets indoors

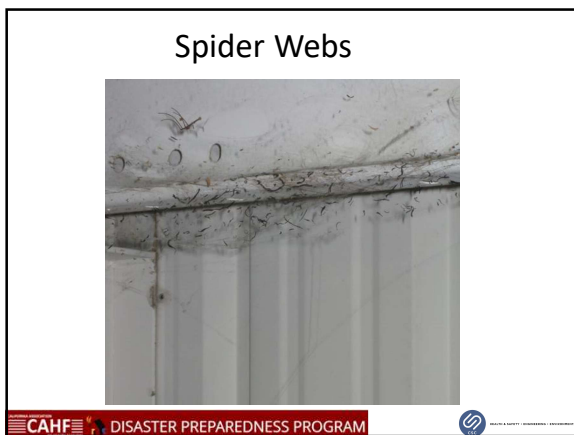


Penetration Points
Window Sills, Door Tracks, Gable Vents, Etc.









Wildfire Smoke (Combustion by-Product Residues)

- Wildfire smoke is a by-product of the combustion of forest fuels, as well as any homes/structures in the path of the wildfire.
- The type of materials burned and the temperature at which the materials burned generally determine the types of chemicals generated in smoke.

Wildfire Smoke (Combustion by-Product Residues)

- Smoke is a complex mixture of particles, liquids and gaseous compounds including, but not limited to:
 - Polynuclear aromatic hydrocarbons (PAHs)
 - Carbon monoxide
 - Aldehydes
 - Organic acids
 - Semi-volatile organic compounds (SVOC)
 - Volatile organic compounds (VOCs)
 - Free radicals
 - Ozone
 - Particulate matter (PM), including soot, ash & char
 - Inorganic fraction of particles



Wildfire Smoke

- Many of the wildfire smoke constituents are reactive or easily dispersed into the atmosphere.
 - Present for mere hours or days
 - (e.g. polynuclear aromatic hydrocarbons (PAHs), carbon monoxide, aldehydes, organic acids, semi-volatile and volatile organic compounds (VOCs), free radicals and ozone).
- Some wildfire smoke constituents are persistent
 - Weeks or months
 - (e.g. particulate matter (PM), including soot, ash and char and/or inorganic fraction of particles).



Smoke particulates eventually settle out of the air

- Deposit on horizontal surfaces
- Plate out on vertical surfaces,
- Penetrate upholstery, drapes, insulation
- Electrostatically adhere to electronic components or other charged surfaces,
- Impact on surfaces in the path of air currents



Deposited particulates can be re-entrained into the air

- Deposition and retention of smoke particles on surfaces inside homes, schools, businesses
 - Building ventilation systems
 - Unoccupied spaces such as duct chases and attics
- Indoor inhalation exposures are possible because of re-suspension from even small disturbances



In summary

- Wildfire smoke can degrade indoor air quality, even after the outdoor smoke has cleared
- Fine smoke particulates can penetrate homes and businesses, even when the buildings are closed and the HVAC is turned off.



Examples of Actions to Control Wildland Smoke Infiltration When Sheltering in Place



An ounce of prevention

- Limit exposure to the bulk of wildfire residues
- Temporarily changes can be made BUT DON'T FORGET to switch back after the smoke has cleared.

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An ounce of prevention

- Limit exposure to the bulk of wildfire residues
- Temporarily changes can be made BUT DON'T FORGET to switch back after the smoke has cleared.

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An ounce of prevention

- Keep windows shut
- Keep doors closed where possible (no propping)
- Get testing of the indoor air quality and indoor surface quality at your site.

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An ounce of prevention

- Close outdoor air inlets on HVAC systems
- Deactivate exhausts
 - (But, leave janitor's closets and biohazard room exhaust fans ON.)
- Avoid activities that depressurize building
 - Limit Kitchen exhaust hood use
 - Limit clothes dryer usage



An ounce of prevention

- Change HVAC filters to the highest MERV rating allowed by the manufacturer's specs
- Deploy free standing HEPA equipped air filtration devices(AFDs)



**WATER
INCURSION**
Not a matter of if, but a
matter of when



Appropriate Flood Response

- When to dry?
- When to remove & replace?
- Determining factors?
 - Severity of saturation
 - Time constraints
 - Internal capabilities
 - Cost effectiveness
 - Population (IL, SNF, Memory Care, Hospice, etc.)
 - Room type (office or resident room)
 - Category of water (Category 1, 2 or 3)



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3 Categories of Water

- Category 1
 - Clean water: should not pose harm to humans (no chemical or biological concerns)
 - i.e.
 - Break in domestic water supply line
 - Rainwater falling from the sky
 - Drying affected contents & structure is an option
 - As is removal...if economics, schedule or other factors warrant
- Category 2
- Category 3

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3 Categories of Water

- Category 1
- Category 2
 - Gray water: containing some degree of chemical, biological, and/or physical contamination
 - i.e.
 - Condensate pan overflow
 - Chiller pipe break
 - Toilet overflow with no waste contents
 - To be judged on a case-by-case basis
- Category 3

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3 Categories of Water

- Category 1
- Category 2
- Category 3
 - Previously called “Black Water”: considered grossly unsanitary water, presumed to contain pathogenic agents and/or chemicals of concern
 - i.e.
 - Sewage backflow
 - Water main break (Cat 1) that contacts soil & enters the structure
 - Disinfection is not enough to kill potential pathogens or neutralize chemical contaminants
 - Drying porous materials is not an option
 - Remove affected porous contents & structure



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What are moisture assessment tools & techniques?

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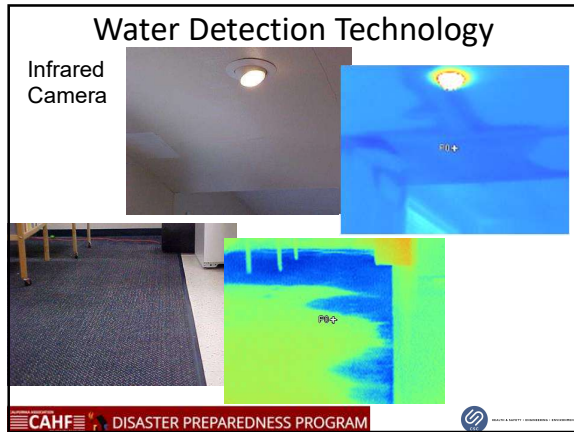


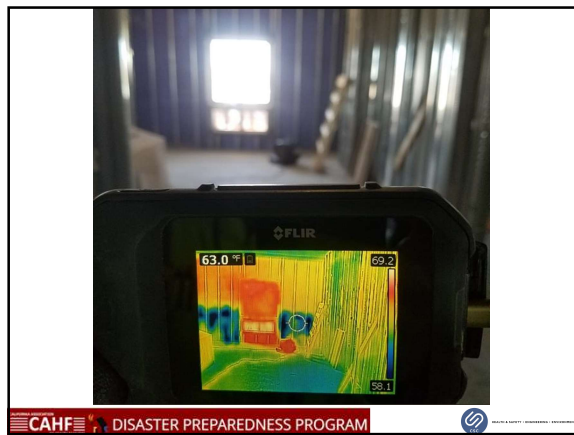
Dry to the touch is not enough.
Get a moisture meter.



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Hire a pro and/or become one.

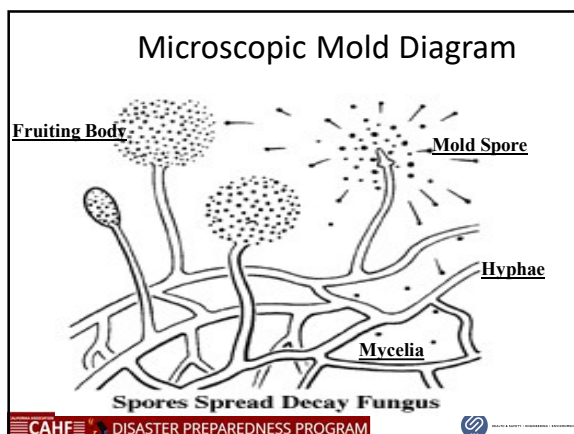


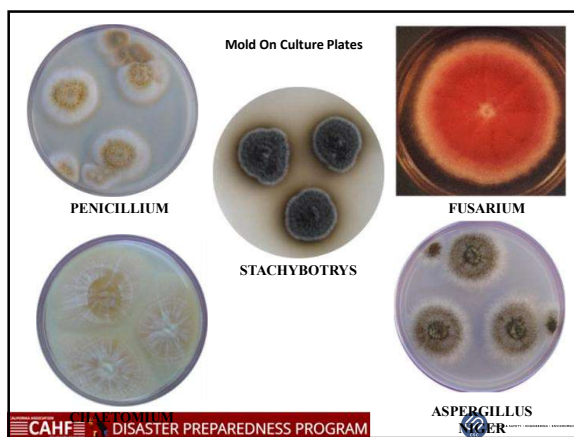
MOLD



•What is mold?

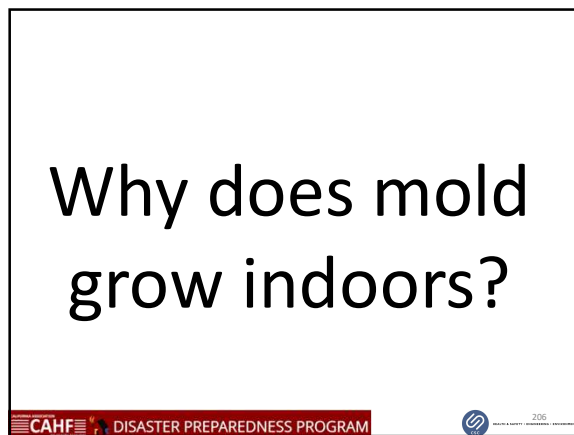


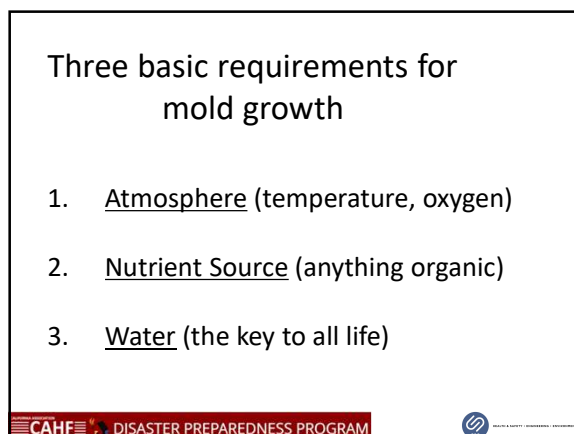












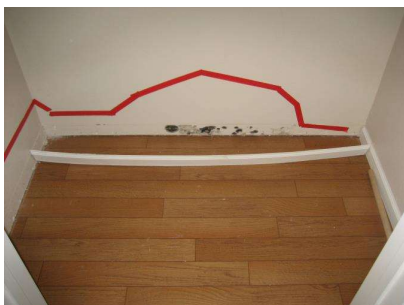
Mold Hides

- Shy mold
 - Dark and wet preferred
- Shy mold in the Southwest (e.g. Palm Springs)
 - AC on frequently, so exposed surfaces dry
 - Fans on frequently, so exposed surfaces dry
 - Low RH%, so exposed surfaces dry
 - Structure “prepped” for appearance
 - Contents obstruct visual assessment

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Be aware of the potential for preexisting conditions



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Lumberyard Mold: Visible mold growth on building materials before or during installation (Acceptable or Not?)

193 2"x8" wooden beams measuring 63" long = ~1,700 square feet of mold affected surface



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Greenboard Water Resistance?



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But, Mold Grows on Greenboard



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Mold CAN Grow on Growth Inhibiting Coatings (Lead, Arsenic, Etc.)



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To Air is Human

- Mold air samples are merely snapshots of airborne mold.
- They may indicate a hidden mold reservoir,
- But cannot be considered definitive on the presence or absence of mold in inaccessible areas
 - wall cavities,
 - cabinet bases,
 - ceiling cavities,
 - etc.



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Destructive Testing is the Most Definitive Investigative Tool



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Destructive Testing is the Most Definitive Investigative Tool



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HOW DO MOLD & MOLD BYPRODUCTS REACH YOUR BODY?

- Hand To Mouth
- Dermal Absorption
- Inhalation of Gasses
- Inhalation of Particulate

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What are the health effects of mold?

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WHAT HEALTH EFFECTS ARE ASSOCIATED WITH MOLD OVEREXPOSURE?

- **There are 4 basic fungi-related health effects...**
 - 2 are very common
 - 2 are sound spooky

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FUNGI HEALTH EFFECTS

Common:

- **Irritation**
 - (itchy eyes, sneezing)
- **Allergy**
 - (headache, asthma attack)



Attorney Favorites:

- **Infection**
 - Dermatophytes (superficial & subcutaneous)
 - (toenail fungus, ring worms, athletes foot, thrush, yeast infection)
 - **Systemic mycoses**
 - (Aspergillosis, Coccidioidomycosis, Blastomycosis, Histoplasmosis)
- **Toxicosis**
 - Mycotoxins
 - Poison Mushrooms, Alcoholic Beverages, Magic Mushrooms
 - Microbial Volatile Organic Compounds (MVOCs)

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Moldy Environments are Known Hazards

- U.S. Centers for Disease Control & Prevention (CDC), the Institute of Medicine of the U.S. National Academy of Sciences, the World Health Organization (WHO), Health Canada, IICRC, AIHA, IAQA, etc. all agree
 - Living or working in a building with mold damage results increases risk of respiratory disease.

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- What are the regulatory obligations for mold?

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What is an Acceptable Environment When it Comes to Mold?

- No international mold laws
- No Federal “mold” laws.
 - US OSH 1970 General Duty Clause
 - Case Law
- State “mold” laws CA
 - (but there are in some states like FL & TX)
- Some municipal mold ordinances (NYC)

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What's an Acceptable Environment When it Comes to Mold?

- There are many state-of-the-art guidelines & consensus standards:
 - EPA, IICRC, ACGIH, AIHA, CDC, WHO, etc.

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What is an Acceptable Environment When it Comes to Mold?

- All generally accepted guidelines essentially say the “same” thing
 - **Visible mold growth is unacceptable indoors in both accessible & inaccessible areas**
 - **Airborne mold concentrations indoors should be both qualitatively & quantitatively similar to outdoors**

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What are some important mold resources?



Examples of references you should know...

- OSH 1970 General Duty Clause
- US EPA "Mold Remediation in Schools and Commercial Building"
- IICRC "S500 Standard and Reference Guide for Professional Mold Remediation"
- AIHA "Recognition, Evaluation, and Control of Indoor Mold"



What are some common myths surrounding mold?



Mold Myths

- Mold free?
 - No such thing. Molds are ubiquitous.
- Dangerous mold/ Safe mold?
 - All molds can be allergens, so no molds are “safe”
- Black mold?
 - Color is not an indicator of potency or impotency.

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Mold Myths

- Dead mold vs. live mold
 - Why not just Heat, Desiccate, Bleach, etc.?
 - Dead molds are still allergens and toxic properties can still exist independent of a mold's viability.

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Mold Myths

- How long until visible mold develops?
 - 48 to 72 hours
 - But drying takes days and days, what gives...?)
- Growth inhibitors?
 - Only work at the surface.
 - Add chemicals (arsenic, cadmium, lead) to already sensitive (physically and/or emotionally) occupants

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What are some common mold prevention strategies?

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No matter how much you water your building, you don't get any additional square footage.



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Replace Leaky Stuff (Polybutylene Pipes)



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Indoor plants =
water incursion, water damage & mold



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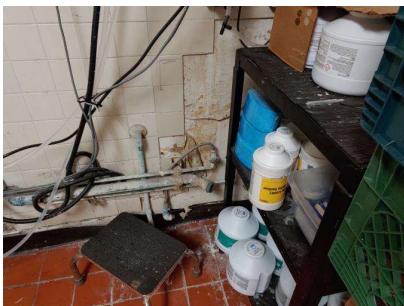
Mop sink with exposed drywall =
water incursion, water damage & mold



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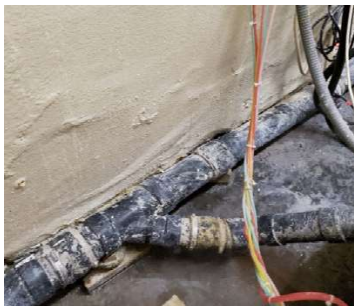
Kitchen activities (e.g. dishwashing) =
water incursion, water damage & mold



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Laundry activities (oversplash, leaks, etc.) =
water incursion, water damage & mold



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Planters against your building =
water incursion, water damage & mold



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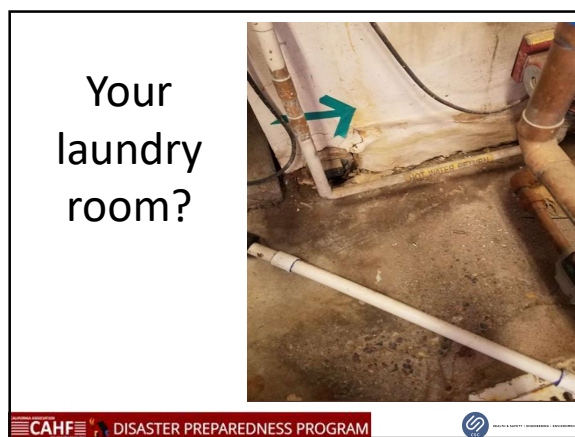
Planters Against You Building,
No Bueno



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Why do we allow drywall to be in contact with slab?
Why no moisture alarm?
Why no floor drain?



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Why do we allow drywall in custodial closets?



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Beware water incursion & layers



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Understand impermeable layers work both ways
(keep moisture out & keep moisture in)



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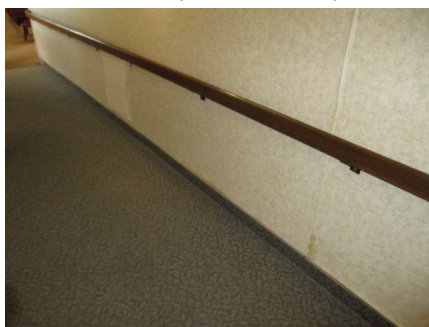
Vinyl Wallpaper

- Looks Fancy
- Protects drywall from abrasion
- Easy to clean since it prevents water from reaching the drywall
- But.....it also prevents water in the wall from escaping/drying.

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Vinyl Wallpaper.
It is an impermeable layer.



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Vinyl Cove Base Works the Same Way



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Understand Dew Point & Maintain HVAC



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New Water Tolerant Materials



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Get water heater off the floor.
Get a secondary containment.
Replace water heaters BEFORE they fail.



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Inspect & periodically clean air handlers



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Inspect & periodically clean air handlers



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Mold Growth in Supply Ducts



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Mold Response Tactics?



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Protect the Facility & Occupants After Mold is Discovered. Interim Controls.

- Restrict access
- Identify the water source and stop the water
- Isolate the damaged area
 - (cover the mold affected areas with plastic sheeting and tape OR close and cover the door to the room with plastic sheeting and tape)
- Isolate the HVAC
 - (turn local units off, close doors, seal supply registers, seal return grills, cover transfer vents, modify VAV box)
- Depressurize the room if possible
 - (turn on restroom exhaust fans, turn on exhaust hoods, etc.)
- Call a professional

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IICRC Mold Conditions

- **Condition 1**
 - Normal Fungal Ecology (settled & airborne mold-related dust with the normal concentration of mold particulate (BACKGROUND))
- **Condition 2**
 - Abnormal Fungal Ecology (settled & airborne mold-related dust with an elevated amount of mold particulate (ABOVE BACKGROUND REQUIRING A RETURN TO CONDITION 1 BY COMPATIBLE CLEANING))
- **Condition 3**
 - Visible Fungal Growth (Colonies of mold visible to the naked eye in exposed and obstructed areas) (CLEANING OR DEMOLITION REQUIRED AS SURFACE TYPES DICTATE TO RETURN TO CONDITION 1)

Mold Abatement Abridged

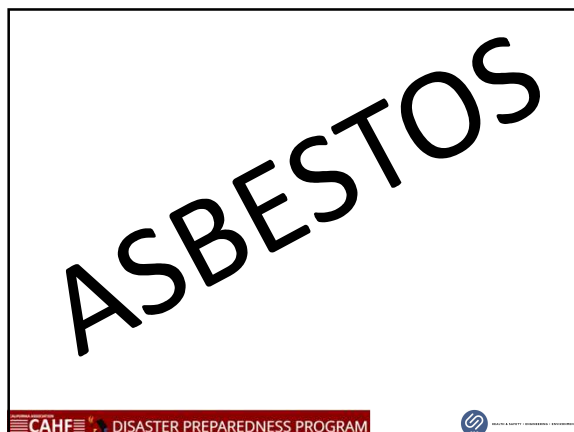
Is there VISIBLE mold growth on it?

Material Type	Amplification (Visible Mold Growth) (Condition 3)
Porous (DW, Millwork, Carpet, Upholstery)	Remove and discard
Semi-porous (Wood framing, OSB, Plywood)	Evaluate structural integrity. If sound, then abrade to mm. If unsound, replace.
Non-Porous (Glass, Metal, Porcelain)	HEPA vacuum and/or wet wipe clean

Mold Abatement Abridged

In proximity of visible mold growth

Material Type	Accumulation (Excessive Settled Mold Dust) (Condition 2)
Porous (DW, Millwork, Carpet, Upholstery)	HEPA vacuum and/or launder
Semi-porous (Wood framing, OSB, Plywood)	HEPA vacuum and wet wipe clean (can also opt to disinfect)
Non-Porous (Glass, Metal, Porcelain)	HEPA vacuum and/or wet wipe clean



Asbestos

- Group Participation Question:
 - When was asbestos banned for use in the USA?

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When was asbestos banned for use in U.S. buildings?



- A. 1907
- B. 1970
- C. 1979
- D. 1981
- E. Never

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Asbestos was never truly banned in the U.S.

- U.S. bans are not what you think
 - For more detail see www.epa.gov/asbestos/pubs/asbbans2.pdf
- Asbestos was & is used in building materials to this day
- Over 3,000 different asbestos-containing products are imported & used in the U.S. annually



Many Americans assume Asbestos is a problem of the past.

- PAST
 - Asbestos fibers are present in a majority of U.S. structures built before 1981, this is generally known
- PRESENT
 - What is not common knowledge is that asbestos can be found in many buildings constructed **AFTER** 1981
- FUTURE
 - By all indications, no changes in asbestos policy are forthcoming in the foreseeable future



Chinese Marketing Email One of many I receive each month

Dear Sir or Madam,

How are you! We are professional manufacturer of **asbestos jointing sheet** and non asbestos rubber sheet in China. We export these products with high quality and competitive price.

The main products list are as follows:

- Asbestos rubber sheet
- Asbestos jointing sheet
- Oil-resistance asbestos rubber sheets
- Acid- resistance asbestos rubber sheets
- Asbestos Rubber Sheet with wire net strengthening
- Asbestos latex sheet
- Asbestos rope, asbestos packing, asbestos cloth, tape.

If you are interest in our products, please tell me your detailed specification which you need, I will offer the best price to you.

I do hope that we can have a good cooperation!

Thanks and best regards,

Mr. Junming Wang

Tongfeng (HK) Industry Co., Ltd. Website: <http://www.asbestos-joint.com> <http://www.tongfengindustry.com>

Address: 1-1506 Fuyuan Building, Quanyechang, Hengshui, Hebei, China



Asbestos is highly regulated

- Compliance is Complicated
 - Federal US Laws
 - California State Laws
 - California Air Pollution Control Districts
 - California Cities
 - California Fire Departments



Why have humans used asbestos for thousands of years?



- Fire & heat resistant
- High tensile strength
- Poor electrical conductor
- Impervious to chemicals
- Not biodegradable
- U.V. Resistant
- Good acoustical insulator
- Weavable
- It's cheap & abundant
 - Dig it up, smash it & add it to your product



What are some examples of building materials in your buildings that are suspect for asbestos content?



Spray Applied Fireproofing...



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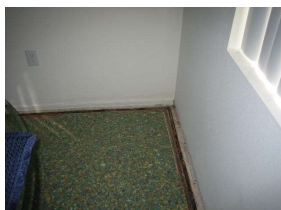
Spray applied acoustic (popcorn) ceiling, lay-in ceiling panels...



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Plaster, Drywall, Joint Compound, Wall texture, Paints...



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Vinyl floor sheeting, vinyl floor tile...



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Glues, Adhesives, Putties...



- Glue Dabs
- Floor Tile Mastic
- Cove Base Adhesive



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Thermal system insulation (TSI)...



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Vermiculite...

A presumed asbestos contaminated product



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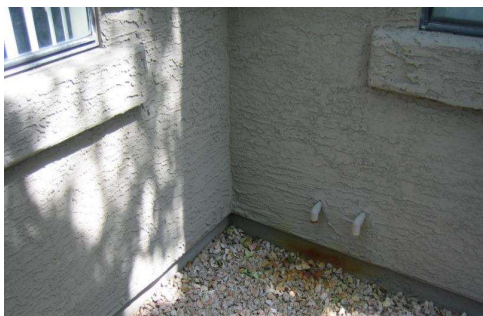
Roofing Penetration Mastics,
Composite Shingles, Rolled Goods,
Roof Felts, Roof Tar...



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Stucco



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Siding



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Cementitious exhaust flues, Water supply pipes...



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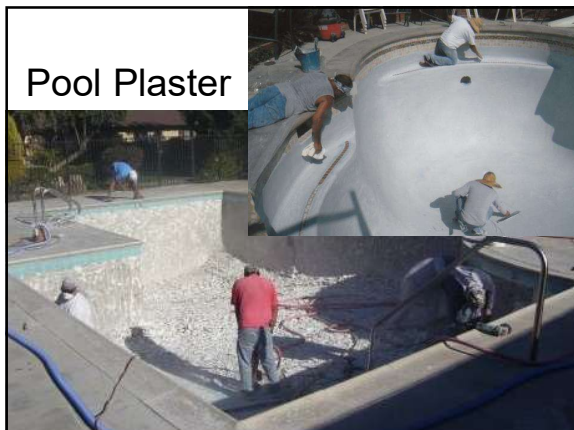
Concrete



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Pool Plaster



Duct tape, Duct seam mastic,
Vibration dampeners...



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What Contains Asbestos?

- The list is shorter when you ask “What building materials don’t contain asbestos”?
- Building materials are suspected to contain asbestos unless they are uncoated:
 - Glass
 - Metal
 - Wood

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Applicability of Federal Asbestos Regulations			
	OSHA (Any% Asb, <0.01 f/cc)	NESHAPS (≥1% Asb, Threshold Quantity)	AHERA
School	X	X	X
Public (Commercial, Industrial, 2 or more single family dwellings at same site, apartments of >4 units)	X	X	
Residential	X		

• OSHA always applies

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Violations Abound

- Asbestos violation costs ASU **\$96,000.00**
- Arizona General Contractor cited **\$28,000.00**
- Arizona Flooring Subcontractor cited **\$3,800.00**
- EPA Fines Five Phoenix Charter Schools for Asbestos Violations
- Asbestos Violations the **#1 OSHA Fine in Hospitals**
- Two Construction Contractors Cited By OSHA For Alleged Asbestos Violations At Brookville Campus Of C.W. Post College; **\$370,900** In Penalties Proposed Long Island University Also Cited
- Company pays **\$227,700** penalty for asbestos violations
- Asbestos Hazards Bring OSHA Citations and **\$115,500** Fine To Newark, N.J. Building Partnership
- New Hampshire man faces **felony charges** for illegal asbestos removal
- Washington Prison Fined Over Asbestos Violations
- DEQ Resolves Asbestos Violations with Aspen Square Mgt, Inc.

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Remove or Manage In Place?

- Leave it in place undisturbed and in good condition
- Asbestos is **not harmful** to your building's occupants **unless it can be ingested or inhaled**
- Asbestos **becomes a hazard** during and after a **disturbance** such as:
 - Tenant Improvement
 - Demolition/Renovation
 - Fire
 - Flood
 - Earthquake
 - Vandalism

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What should you do?

- Preemptively test materials you disturb during regular PM activities.
- Preemptively test materials you would likely impact in a flood, fire or vehicle strike.
- Sample the following materials at your site:
 - Drywall,
 - Spray Applied Acoustic Ceiling,
 - Lay-In Ceiling Panels
 - Cove Base & Adhesive
 - Flooring Finishes

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What should you do?

- Inventory all suspect materials on site.
- Presume all unsampled suspect materials.
- Sample these materials when an incident arises.
- Sample these materials in conjunction with the planning of any capital improvements

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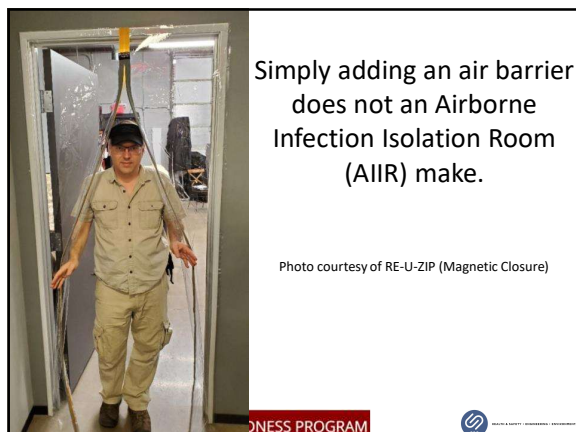


Isolating biohazard accumulation room

- Positive pressure in greater building
- Negative pressure in biohazard rooms, bathrooms, kitchens & janitors closets
- Consequences of Inadvertent depressurization of areas
- Tight buildings pros and cons



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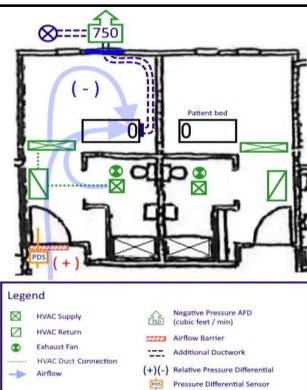


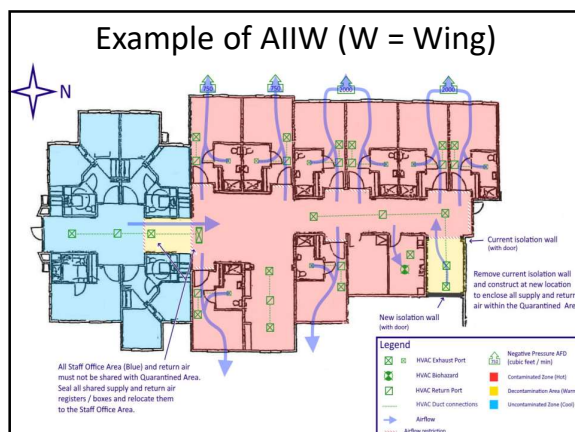
Building Pressures are not understood

- In comes the outside uncontrolled unfiltered air...



Example of Airborne Infection Isolation Room (AIIR)





Let's get personal for a moment



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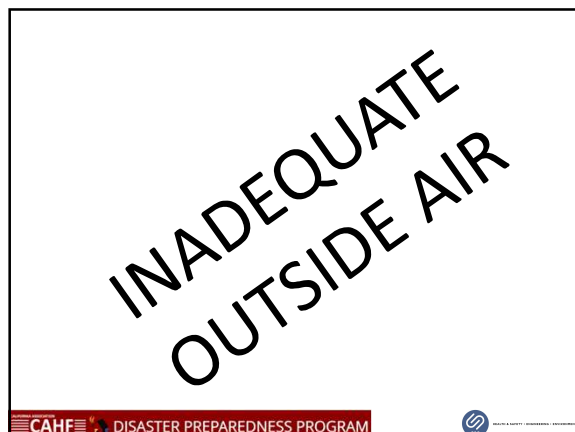


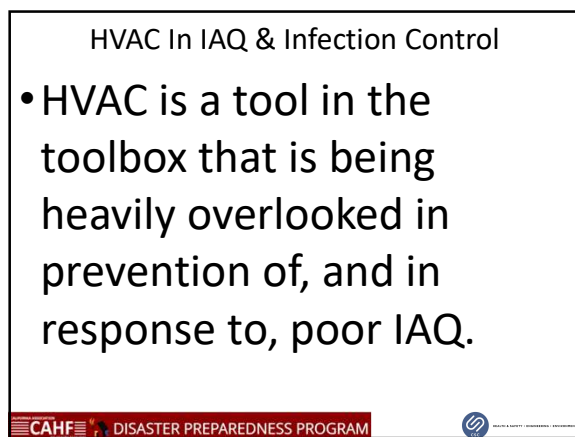
My recent hospital stay in an AIIR

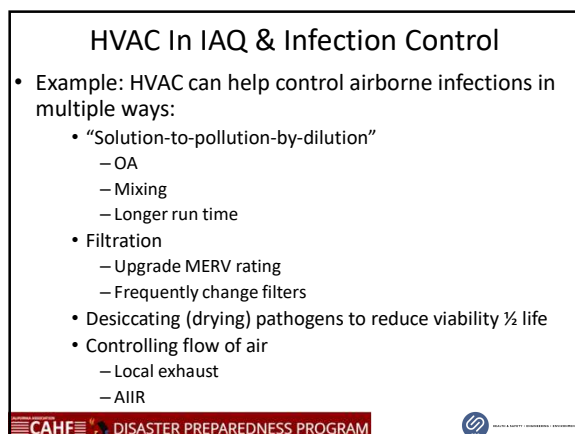
- Often these rooms are designed to function
- But these rooms require consideration beyond mere functionality:
 - **AFD woes**
 - Noisy HEPA-filtered AFDs running next to your head 24/7 prohibit rest
 - AFDs cause air movement (6 or 12 ACH) which dries the skin, dry's your eyes and makes you cold
 - **Isolation**
 - Being alone during medical care can trigger anxiety, loneliness and even despair that I have to believe from anecdotal experience can result in a degraded to come
 - Family cannot visit
 - Normal support mechanisms are severed
 - **Stigma**
 - Staff appears to avoid the normal healthcare worker compassion and kindness
 - Less check ins by custodians and nurses
 - **Faceless Minions**
 - Staff in PPE look like Darth Vader and seem impersonal and faceless
 - **Stagnation**
 - No exercise due to sequestration promoting atrophy and bedsores
- Whose job is mental and spiritual health? Who checks on emotional wellness? Does your AIIR design consider the resident experience?

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No OA = Poor IEQ & Increased Infection Rates



Not Getting Enough Outside Air?



Saving Money on Fan Belts



Saving Money on Fan Belts



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HVAC for IC (recognize the penalties)

- Energy penalty
- Comfort penalty
 - Site equipment may not be able to keep up with demands temperature and humidity demands in extreme weather (monsoon, summer, winter, etc.)

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Positive Pressure & Solution by Dilution

- Q: How do you prevent infiltration of undesirable gasses and particulates into your building from undesirable locations?
 - A1: Bring in OA at controlled filtered conditioned locations
 - A2: Pressurize the building and leak outwards
- How do you control non-point source pollutants such as body odor, paper dust, communicable airborne infections, humidity?
 - A1: Exhaust "used" air and bring in "fresh" air

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Filters 101

- HVAC filters do not directly improve indoor air quality, they protect the coils
- They catch grasshoppers and tumbleweeds before they reach the cooling coils or heating elements
- Junk that bypasses the filter indirectly degrades IAQ

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Saving \$ on Filter Replacement



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Dirty Fan

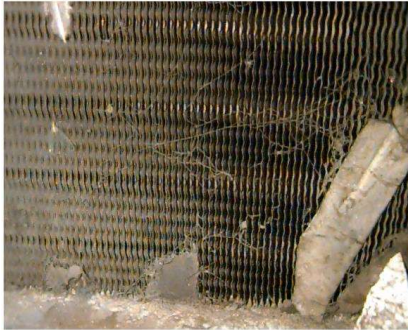
(Decreased efficiency, Imbalance vibrations)



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Dirty Coils?



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Brought Too Big of a Filter?



No problem. We'll make it fit.

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Filter Bypass?



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Filter By-pass

- Buy and install filters that fit



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Building Pressures

- If your building “sucks” in comes the uncontrolled, untempered, unfiltered outside air...



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Air Gaps Between Suites



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Nuisance Birds

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Nuisance Birds

- Over 60 diseases are attributed to birds
- Routes of exposure:
 - Food and water contaminated with feces.
 - Inhalation of contaminated dust.
 - Transference by parasites
 - Direct contact with feces.
- Over Hazards
 - Roof Collapse
 - Reduced Ventilation System Lifespan
 - Fire Hazard
 - Corrosion



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Nuisance Birds

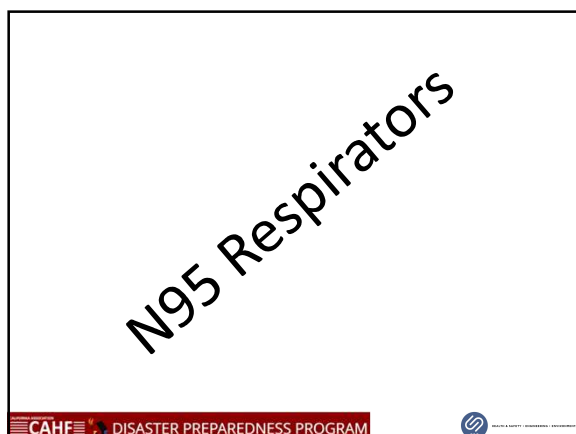


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- Misunderstanding of PPE capabilities and use requirements are prevalent



- Masks are merely “Coughy” Filters or Mobile Sneeze Guards

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The Purpose of Masks

like the ones you are required to wear for this event

- Are not respirators
- Do not filter out particles or gasses
- Generally designed to protect others from you.
- Help reduce/capture your spewed respiratory droplets at the source (your nose & mouth).
- Can keep large respiratory droplets emitted by others from landing directly on your covered/shielded face.

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An N95 **Tight Fitting Filtering Facepiece** is Subject to OSHA Respiratory Protection Standard 1910.134



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Compliance with U.S. Federal Respiratory Protection Standard 29 CFR 1910.134 is mandatory, even for the use of N95

- This Standard includes a variety of required tasks,
 - some are one-time,
 - some are annual, &
 - some are subject to policy or changes in the employee.



In brief you must have:

- RPP
 - A written Respiratory Protection Program (RPP)
- Medical Release
 - A completed OSHA Respirator Medical Evaluation Questionnaire for each employee who will wear a respirator (e.g. an N95)
 - Signed Medical Release from a Physician or Licensed Healthcare Professional (PLHCP), who reviewed the Questionnaire (and sometimes examined the employee)
- Fit Test (annual)
 - Annual Fit Testing of each employee on every make/model/size respirator they will wear
- Training (annual)
 - Annual Respirator Training for each employee with focus on the limitations, obligations, hazards, care and use of the respirator they will wear



Citations Are Common

- As of 2020, violations of the Respiratory Protection Standard violations were the #3 issued OSHA citation (#5 in 2019)
- >2,000 citations & >\$4 million in fines
- Avoid bad press, embarrassment, diversion of mission-critical funds and, of course, hazardous conditions to employees.
- Citations hurt by diverting important resources away from resident or occupant care
- Recent example: October 14, 2021, SNF in Bloomingdale, Illinois
 - OSHA proposes \$83,000 in fines.
 - SNF required employees to wear N95 filtering face piece respirators while entering the quarantine area and providing care to suspected coronavirus positive residents.
 - However, it failed to ensure proper use of respirators and fit test all employees to ensure an effective seal, as required.



Better have a clean shaven staff



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There is no “Fit Test Guru” Certification

- Federal respiratory protection standard (29 CFR 1910.134) standard requires:
 - Employer shall to provide effective, comprehensive & understandable training to employees, who are required to use respirators at least annually.
 - Implies individual conducting training must be competent in teaching the standards, use, care, limitations & other aspects of chosen respirators & use in their particular workplace

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N95 Qualitative Fit-Testing Solutions

- Saccharin
- Bitrex



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Broken Supply Chain



Austerity measures are a pandemic reality, but
no liability reduction is provided.
Reuse of disposable/single use PPE is risky & must end now.



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VOCs

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Smells like paint...



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"A chemical odor..."



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1.5 ppm & 56.4 ppm



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No. No. No.



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"Freshly Painted Elevator Doors Producing Disagreeable Odor & Headaches on Floor Below"



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Naphthalene



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Protecting occupants takes a village...

Everything is Connected...

- Everyone (every department, / every vertical) needs to:
 - Consider & understand how their work affects the indoor environment
 - See the bigger picture of occupant & staff health
 - Dedicate time & resources to IEQ



Hungry for more info?...

- There are resources developed by CAHF Emergency Preparedness and Physical Plant Services that are available at no cost to call participants
- And, there are plans to continue to deliver even more content and services



Websites

- [CAHF Disaster Preparedness Program | Sacramento, CA](https://www.cahfdisasterprep.com/)
- <https://www.cahfdisasterprep.com/>

or

- [California Association of Health Facilities \(CAHF\)](https://www.cahf.org/)
- <https://www.cahf.org/>



Live Events

- Attend CAHF's Really Ready! Disaster Preparedness Conference
–April 2022

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Publications

- Join our Really Ready! Newsletter
- <https://www.cahfdisasterprep.com/newsletter>

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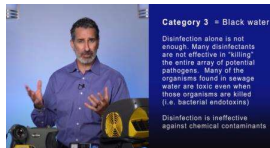
CAHF Virtual Classroom:

CAHF & DPP-sponsored videos you can watch today at

www.cahfdisasterprep.com

(Continuing education credits available)

- **Introduction to Respiratory Protection & N95 Fit-Testing** (~70 min.)
• <https://youtu.be/Hulok1SVq8>
- **Legionella & Water Management** (~23 min.)
• <https://youtu.be/VtiWwee2CUU>
- **Wildfire Smoke** (~16 min.)
• <https://youtu.be/qifqc3G3d5e>
- **Water Incursion** (~21 min.)
• <https://youtu.be/XC9JlmcGvk>
- **Mold** (~22 min.)
• https://youtu.be/q_43Fq-K9ms
- **HVAC** (~25 min.)
• <https://youtu.be/a938UQaGpTQ>
- **Airborne Infection Isolation Rooms (AIIR)** (~30 min.)
• <https://youtu.be/QeopCD98Ksw>



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Still Want More?...

- Ask, because the squeaky wheel gets the grease
 - How about private EH&S audits?
 - How about Fit Test Parties?
 - How about review of Water Management Plans?



Focus on the "F" in SNF

Direct post-class questions to:

- Derrick A. Denis
 - Environmental Consultant & Industrial Hygienist
 - Clark Seif Clark, Inc. (www.csceng.com)
 - Sewer Gas Solutions (www.sewergassolutions.com)
 - derrickdenis@csceng.com
 - 480-460-8334
- Jason Belden
 - Director of Emergency Preparedness and Physical Plant Services
 - California Association of Healthcare Facilities (CAHF)
 - jbelden@cahf.org
 - 916-432-5194
- Stan Szpytek
 - Life Safety Expert, Fire Life and Safety (FLS),
 - www.flsafety.org
 - 708-707-6363
 - firemarshal10@aol.com



Questions?



Every Day is A Gift

- Health and life are momentary.
- No tomorrow is promised to you.
- Whatever you think you need to do with the time you have been gifted, get busy doing it.
- Don't wait; do it now.
