



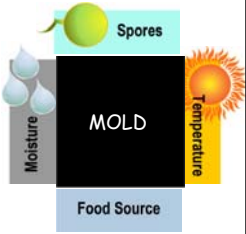
Water Damage Management in Healthcare

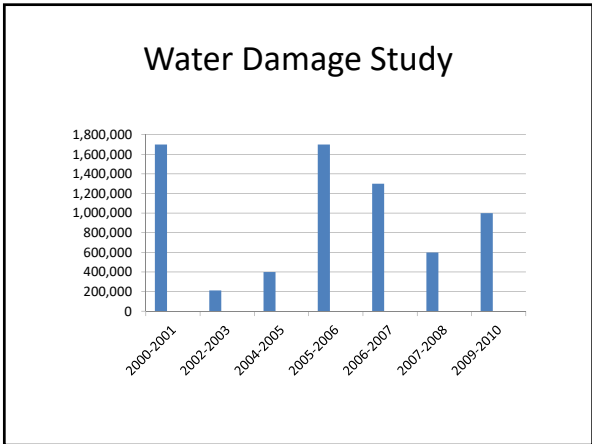
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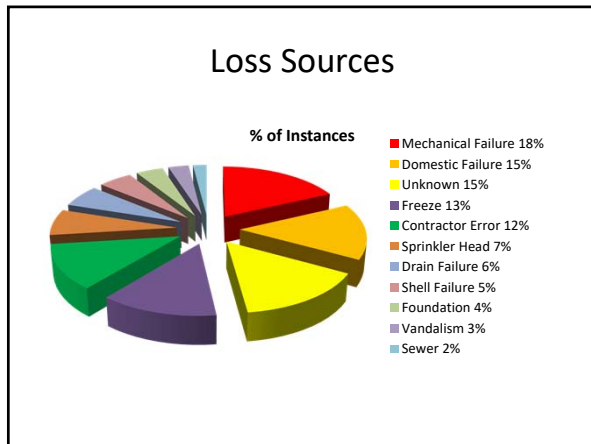


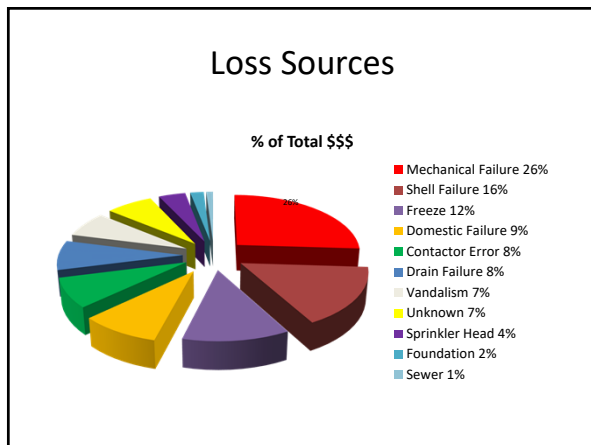
Water Damage Management

- Reactive
 - respond to water incident
 - determine extent of water damage
 - cut out or dry
- Proactive
 - water resistant material
 - preservative application
 - proper installation
 - Collect Data











Fungal source management

- Recognize fungal potential
 - Outward signs such as colonies on wall
 - Odors
 - Water damage
- Control methods –Source Control
 - Containment
 - HEPA filtration
 - Clean-up
 - Verification



Fungal Source Management



Interior HEPA Exhaust/IC Monitoring



Source Management ΔP /IC Monitoring



Airflow into the construction area

- Negative .02 to .03" water gauge
- Negative 5 to 7.5 Pascals
- 566-694 fpm

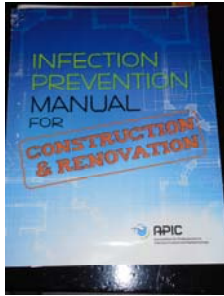
- Too much negative pressure? >1000 fpm

2014 Guidelines for Design and Construction of Hospitals and Outpatient Facilities

NYC guidelines for levels of mold contamination and PPE requirements

Level	Area type	Example	PPE requirements
1	Small isolated areas, 10 sq.ft. or less	Ceiling tiles, small areas on walls	N95 respirator, gloves, eye protection
2	Midsized isolated areas, 10-30 sq.ft.	Individual wallboard panels	N95 respirator, gloves, eye protection
3	Large isolated areas, 30-100 sq.ft.	Several wallboard panels	N95 respirator, gloves, eye protection
4	Extensive contamination, greater than 100 contiguous sq.ft. in an area	Faulty building designs, improper building material installation, condensation from high humidity environments, buildings affected by natural disaster	Full-face respirator with HEPA cartridges for mold, disposable protective clothing covering head, hands, and shoes

APIC IP Manual for Construction and Renovation



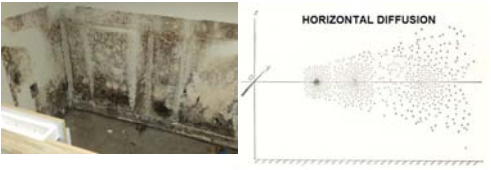
Process for Mold Remediation & Mitigation

- Recognize and identify mold by smell or sight
- Document the scope of the problem (How big is it?)
- Find and eliminate source of moisture (or control it)
- Dry and maintain an environment free of excess moisture
- Remove and replace saturated building materials (<72 hrs)
- Assess situation & evaluate if pesticide treatment is needed
- Wipe, scrape and clean visible mold from affected area
- Paint, coat or seal building material when conditions indicate
- Treat mold with labeled pesticide
- Consult an expert for best practice

Recognition, Evaluation, and Control of Indoor Mold
AIHA 2008


Asbestos Material Survey

Mold Management Requires Control of Spore Release



When the source is dry the spores fly!

Mold growth should be expected with RH >90%
with water content of material >25%



Moldy sink

SEM wood surface

In-Hospital Source of Airborne *Penicillium* Species Spores
ANDREW J. STREIFEL,¹ HOLLY P. STEVENSON,^{2*} and FRANK S. BRADY^{1,3*}
2 STREIFEL ET AL.
FIG. 1. Weekly mean total *Penicillium* airborne fungi.

Sink passive eruption of spores at 5.5×10^5 cfu/m³ per hour.

With protective isolation
1/109 nasal swab positive for fungal isolate

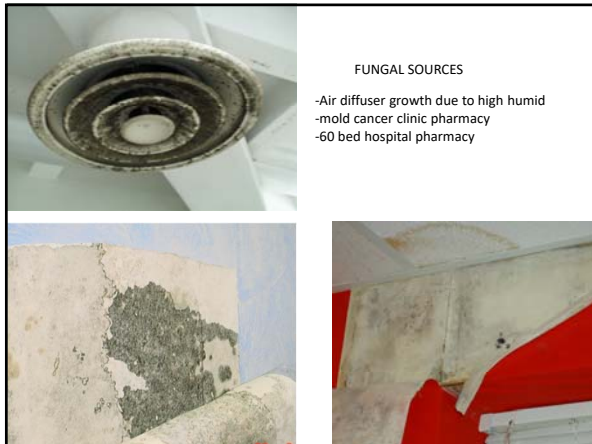


Incubator contamination

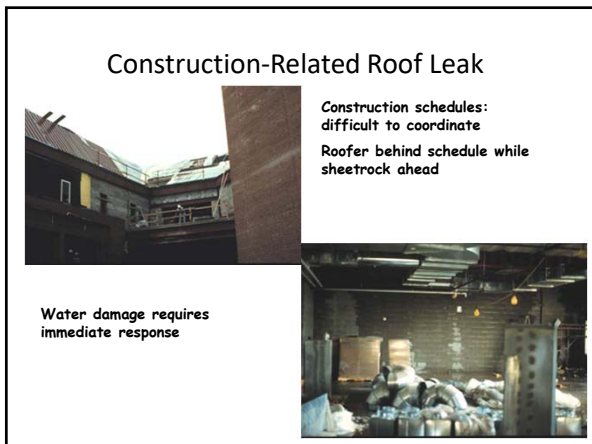
Humidification chamber

Condensation pan

Contamination from a mold source
condensation pan in tissue culture lab







Healthcare Construction: Case Studies in Medical Facilities

Temporary Drying Unit



Quick drying with warm dry air helps speed dry
 <20% water content
 <95% RH





Medical records dried the old fashioned way

Infection Prevention control issues

- What is your role?
 - Assist in damage assessment?
- Do you have equipment to make assessment?
 - ICRA for clean-up activities
- Attend Construction Meetings?
- Require Environmental Sampling prior to turning area back to staff

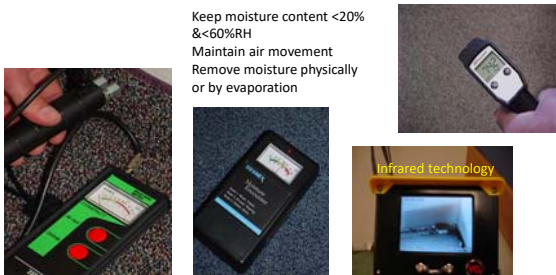
Water damage response for leaking fixtures in UMMC

IC CONSIDERATION EXAMPLES

Moisture detectors are useful decision makers for water detection & drying

Keep moisture content <20% & <60%RH
Maintain air movement
Remove moisture physically or by evaporation




Infrared technology

NICU Case Study of water management



NICU – Case Study



NICU – Case Study



NICU – Case Study



NICU – Case Study



NICU – Case Study



NICU – Case Study



NICU – Case Study



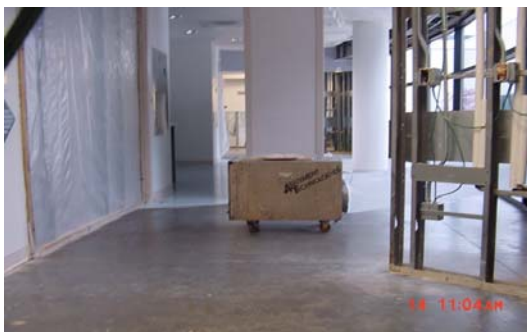
NICU-Case Study



NICU – Case Study



NICU –Case Study



NICU – Case Study



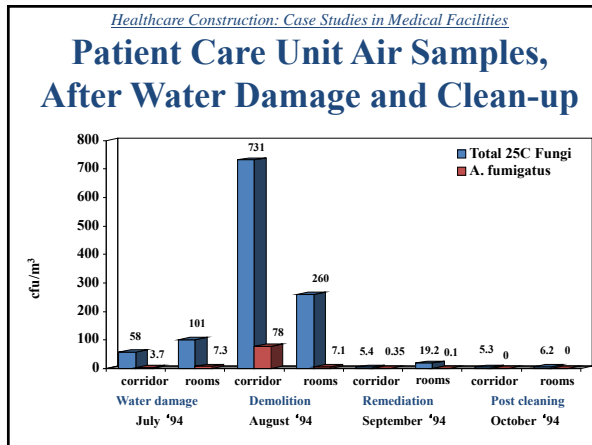
NICU – Case Study



NICU – Case Study











Key principal: get the water out of the building.

Flood day 72F RH 70%
2 days later 72F RH 30%

Mold grows quickly so removal is essential to minimize growth and sporulation.

- Germination in 4 hours
- Sporulation in 96 hours



When water intrusion occurs equipment must be gathered through contingencies to respond to drying.

Water content of surface <20% & ambient RH <95%.


Bracktherapy room



Response after flooding:

- Stop water
- remove wet material
 - 1) to dry
 - 2) water damaged
- turn up temperature
 - 1) for 23F increase
 - 2) air hold 50% more water vapor
- move air to decrease RH
- dehumidify
 - 1) depends on outside humidity
 - 2) inside humidity level
- reduce to RH 30%
 - 1) seasonal issues
 - 2) climate issues
- environmental conditions
 - 1) growth = surface <20% water content
 - 2) RH < 95%

Being Prepared for Floods in Prudent Best Practice




Tools for quick response Transport gurney plus vacuum
And extension cords in waiting Mold growth inhibitors

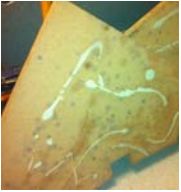
Mold Sources are Abundant!!



Ceiling tile



Sink removal in ICU





MRI table support



Mold even likes antiseptics in a drippy shower

Using pesticide to mitigate mold growth



- Water damage needs time to dry.
- Mold spores germinate in 4 hours under ideal conditions
- Applying a pesticide containing mold inhibiting chemicals will minimize growth
- This method provides mitigation without major disruption

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Questions?

THANK YOU!

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