

Water Damage Management in Healthcare
Michael Buck, University of Minnesota
A Webber Training Teleclass

Water Damage Management in Healthcare

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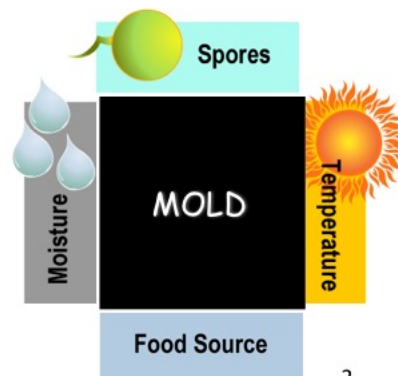
Hosted by Russell Olmstead
St Joseph Mercy Health System, Michigan

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July 19, 2018

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

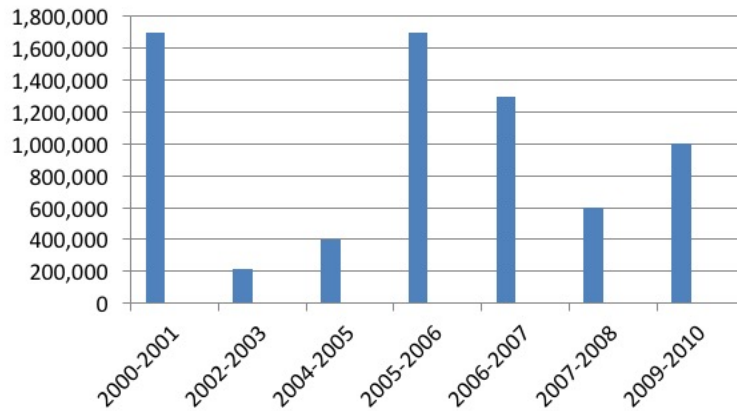


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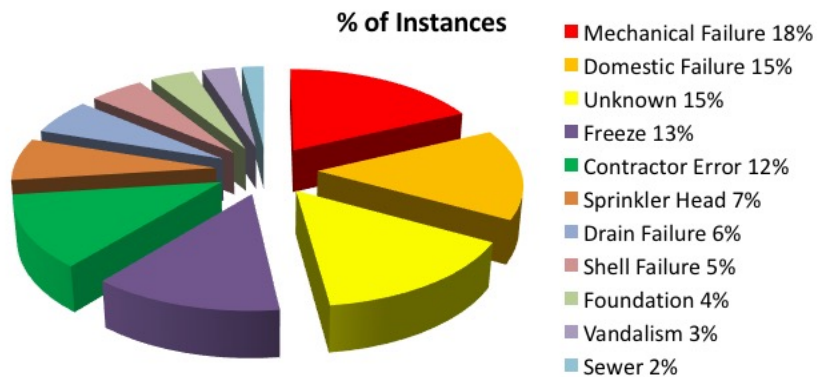
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Water Damage Study



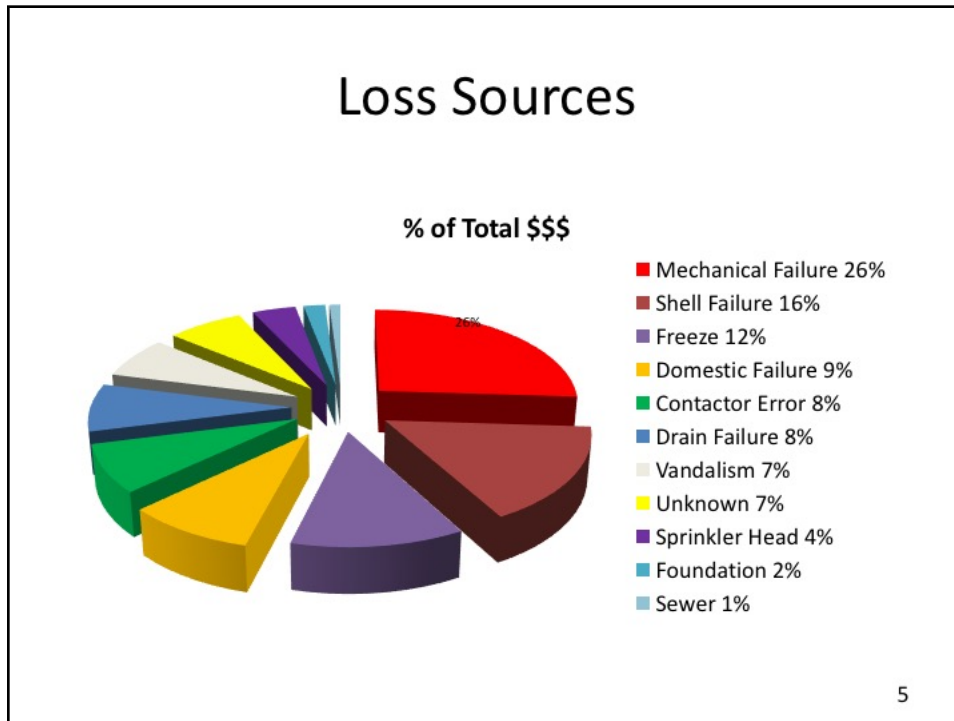
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Loss Sources



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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



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Fungal Source Management



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Interior HEPA Exhaust/IC Monitoring



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Source Management ΔP /IC Monitoring



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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

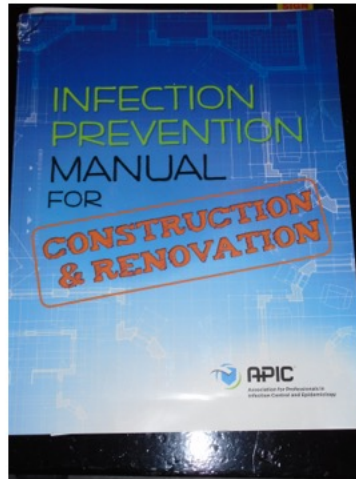
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NYC guidelines for levels of mold contamination and PPE requirements

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

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APIC IP Manual for Construction and Renovation



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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

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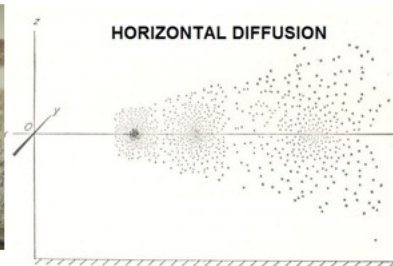
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Asbestos Material Survey

File	Location	Sample	Description	Code	N.S.	Pos	Quan	Unit	Flt	Card	Rate	Area	Chgs	Other
2	Room 224	36	concrete block mortar	M	ND			SP	F	N	0			
2	Room 224	40	interboard adhesive	M	ND			SP	F	N	0			
2	Room 224	41	12"X12" CT wall sheetrock	M	Pos	55		SP	N	N	1			10%
2	Room 224	41.5	flor tile adhesive (sample #1)	M	Pos	54		SP	F	N	1			10%
2	Room 224	124	wall plaster	M	ND			SP	F	N	0			
2	Room 225	1	1/4" white fibrous PI	T	Pos	130		LF	F	N	2			10%
2	Room 225	2	1/4" PI on white fibrous	T	Pos	75		DA	F	N	2			10%
2	Room 225	38	concrete block mortar	M	ND			SP	F	N	0			
2	Room 225	40	interboard adhesive	M	ND			LF	N	N	0			
2	Room 225	41	12"X12" CT wall sheetrock	M	Pos	210		SP	N	N	1			10%
2	Room 225	41.5	flor tile adhesive (sample #1)	M	Pos	210		SP	N	N	1			10%
2	Room 225	130	12"X12" CT white rough	M	ND			SP	F	N	0			
2	Room 225	134	wall plaster	M	ND			SP	F	N	0			
2	Room 225	203	bedded access above ceiling	S										
2	Room 243	33	spray-on fireproofing	S	Pos	85		SP	F	N	2			10%
2	Room 243	36	wall plaster	S	ND			SP	F	N	0			
2	Room 243	38	concrete block mortar	M	ND			SP	F	N	0			
2	Room 243	40	interboard adhesive	M	ND			LF	N	N	0			
2	Room 243	71	12"X12" CT wall sheetrock	M	Pos	210		SP	N	N	1			10%
2	Room 243	71.5	flor tile adhesive (sample #1)	M	Pos	210		SP	N	N	1			10%
2	Room 243	130	12"X12" CT white rough	M	ND			SP	F	N	0			10%
2	Room 243	134	wall plaster	M	ND			SP	F	N	0			
2	Room 243	136	spray-on debris on ceiling tile	T	Pos	20		SP	F	N	4			
2	Room 244	33	spray-on fireproofing	S	Pos	30		SP	F	N	2			10%
2	Room 244	36	wall plaster	S	ND			SP	F	N	0			
2	Room 244	38	concrete block mortar	M	ND			SP	F	N	0			
2	Room 244	40	interboard adhesive	M	ND			LF	N	N	0			
2	Room 244	71	12"X12" CT wall sheetrock	M	Pos	100		SP	N	N	1			10%
2	Room 244	71.5	flor tile adhesive (sample #1)	M	Pos	100		SP	N	N	1			10%
2	Room 244	130	12"X12" CT white rough	M	ND			SP	F	N	0			10%
2	Room 244	203	bedded access above ceiling	S										
2	Room 245	33	spray-on fireproofing	S	Pos	42		SP	F	N	2			10%
2	Room 245	36	wall plaster	S	ND			SP	F	N	0			
2	Room 245	38	concrete block mortar	M	ND			SP	F	N	0			
2	Room 245	40	interboard adhesive	M	ND			LF	N	N	0			
2	Room 245	71	12"X12" CT wall sheetrock	M	Pos	210		SP	N	N	1			10%
2	Room 245	71.5	flor tile adhesive (sample #1)	M	Pos	210		SP	N	N	1			10%

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Mold Management Requires Control of Spore Release




When the source is dry the spores fly!

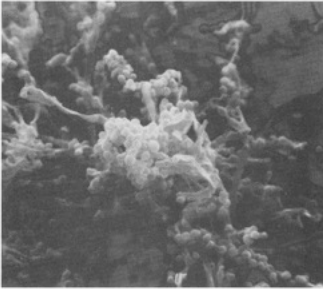
Mold growth should be expected with RH >90%
 with water content of material >25%

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Moldy sink



SEM wood surface

JOURNAL OF CLINICAL MICROBIOLOGY, Jan. 1987, p. 1-4
 0095-1137/87/010001-04\$02.00/0
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In-Hospital Source of Airborne *Penicillium* Species Spores
 ANDREW J. STREIFEL,¹ POLLY P. STEVENS,^{1*} AND FRANK S. RHAME^{1,2*}

2 STREIFEL ET AL.

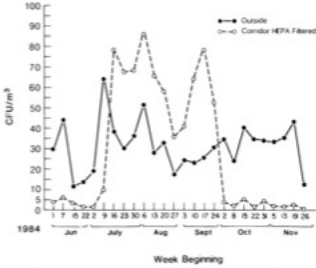


FIG. 1. Weekly mean total thermotolerant airborne fungi.

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

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Incubator contamination



Humidification chamber




Condensation pan

Contamination from a mold source
 condensation pan in tissue culture lab



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FUNGAL SOURCES

- Air diffuser growth due to high humid
- mold cancer clinic pharmacy
- 60 bed hospital pharmacy



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Construction-Related Roof Leak



Construction schedules:
difficult to coordinate
Roofer behind schedule while
sheetrock ahead

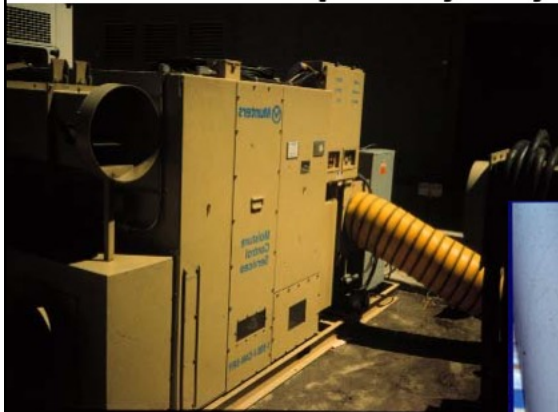
Water damage requires
immediate response



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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



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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

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Water damage response for leaking fixtures in UMMC



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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



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NICU Case Study of water management



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NICU – Case Study



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NICU – Case Study



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NICU – Case Study



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NICU – Case Study



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NICU – Case Study



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NICU – Case Study



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NICU – Case Study



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NICU-Case Study



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NICU – Case Study



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NICU – Case Study



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NICU – Case Study



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NICU – Case Study



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NICU – Case Study



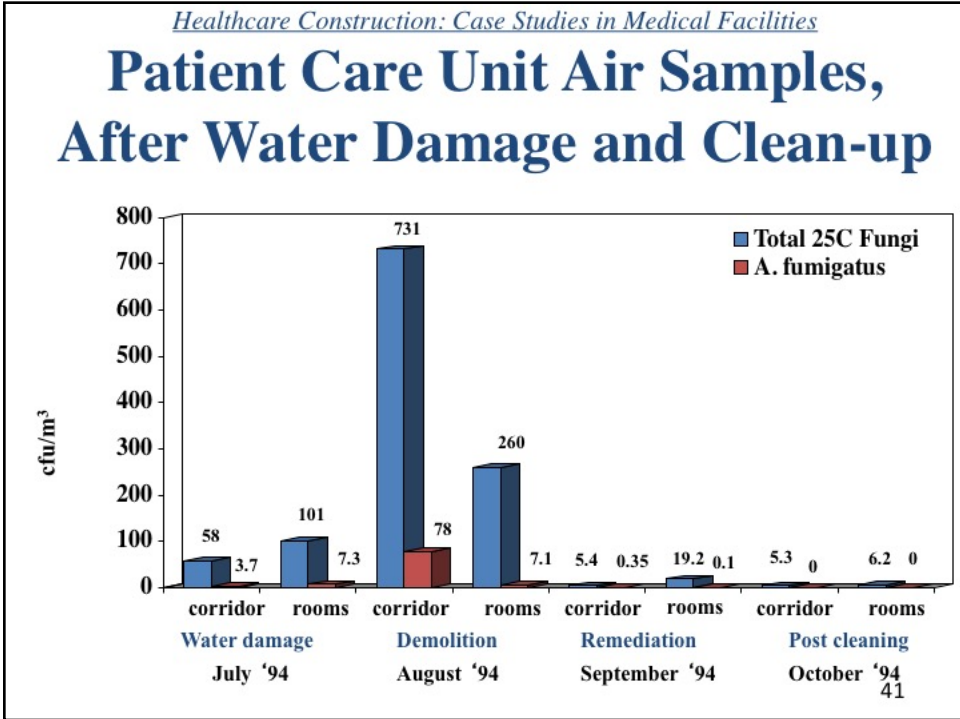
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NICU – Case Study




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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



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

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

Bracktherapy room



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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%

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Being Prepared for Floods in Prudent Best Practice



Tools for quick response

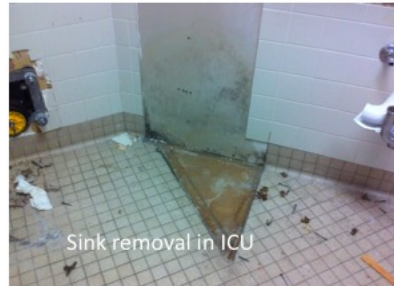
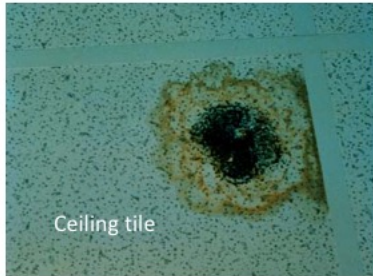
Transport gurney plus vacuum
And extension cords in waiting

Mold growth inhibitors

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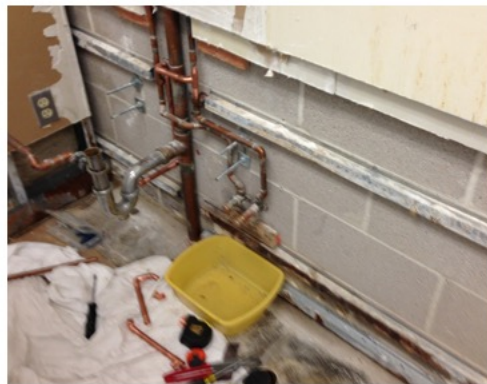
Mold Sources are Abundant!!



MRI table support

Mold even likes antiseptics in a drippy shower 47

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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Recognition, Evaluation, and Control of Indoor Mold
AIHA 2008

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Questions?

THANK YOU!

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www.webbertraining.com/schedulep1.php	
August 16, 2018	<p><i>(FREE Teleclass)</i> INTERPRETING RESEARCH EVIDENCE: A KEY SKILL FOR INFECTION CONTROL PROFESSIONALS Speaker: Prof. Donna Moralejo, Memorial University School of Nursing, Newfoundland</p>
September 6, 2018	<p>MOLECULAR DIAGNOSTICS AND ITS ROLE IN INFECTION PREVENTION Speaker: Sanchita Das, University of Chicago</p>
September 13, 2018	<p><i>(FREE Teleclass)</i> NEONATAL SEPSIS PREVENTION IN LOW-RESOURCE SETTINGS Speaker: Prof. Dr Angela Dramowski, Stellenbosch University, Cape Town</p>
September 20, 2018	<p>THE SILENT TSUNAMI OF AZOLE-RESISTANCE IN THE OPPORTUNISTIC FUNGUS ASPERGILLUS FUMIGATUS Speaker: Prof. Paul E. Verweij, Radboud University Center of Expertise in Mycology, The Netherlands</p>
September 27, 2018	<p>CHLORHEXIDINE USE AND BACTERIAL RESISTANCE Speaker: Prof. Jean Yves Maillard, Cardiff University, Wales</p>
September 30, 2018	<p><i>(FREE European Teleclass - Broadcast live from the 2018 IPS conference)</i> Cottrell Lecture ... SURVEILLANCE BY OBJECTIVES: USING MEASUREMENT IN THE PREVENTION OF HEALTHCARE ASSOCIATED INFECTIONS Speaker: Prof. Jennie Wilson, University of West London</p>

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