

Spotlight on the Environment and Equipment

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MHA IP Bootcamp 2024

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Disclosure of Conflicts of Interest

- Barbara DeBaun, MSN, RN, CIC is a clinical consultant to:
 - Magnolia Medical
 - SplashBlocker

Environment of Care

Safe care environment; heating, ventilation, air conditioning, water, construction

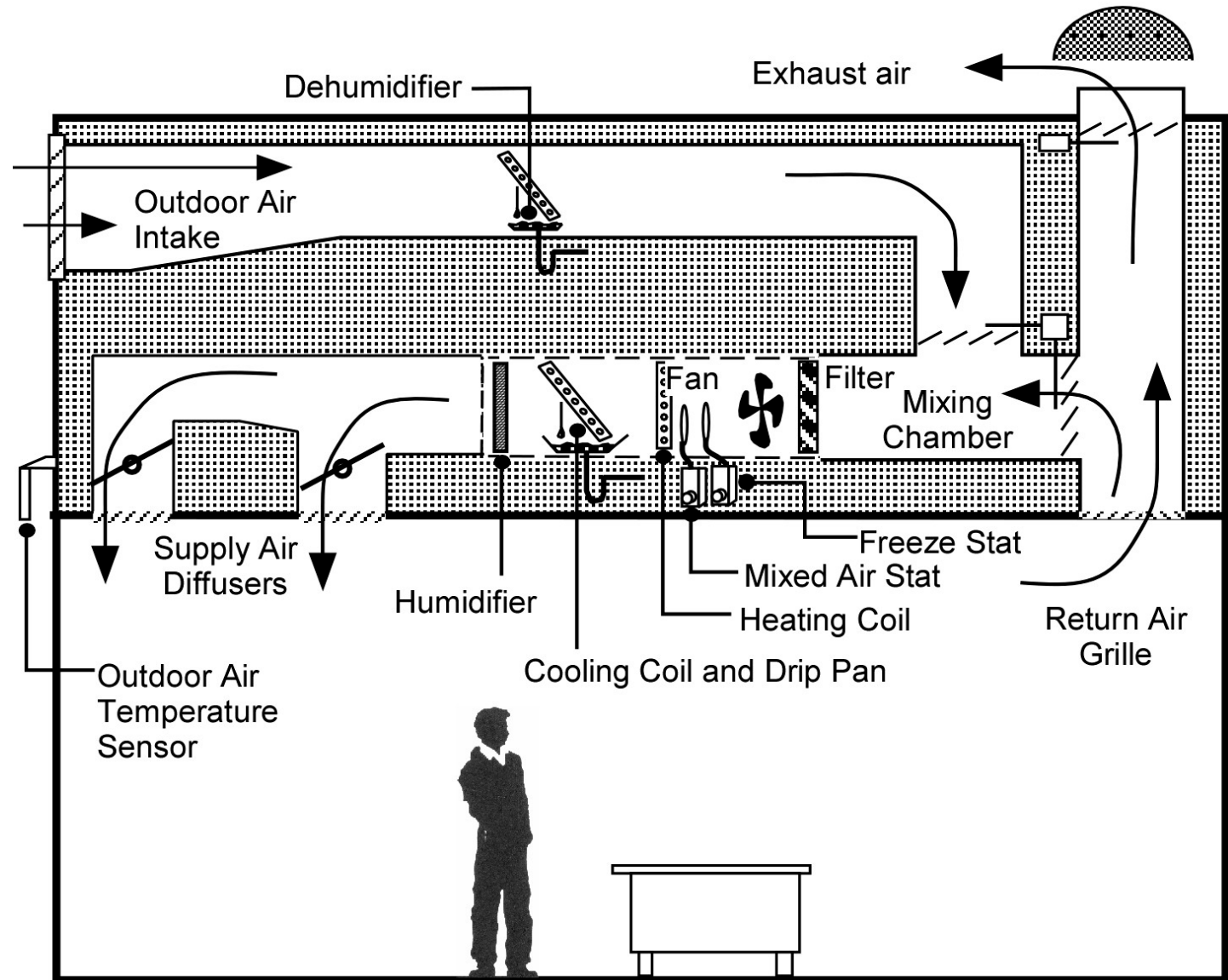
Infection risks of design, construction and renovation

Role of IP to reduce risk

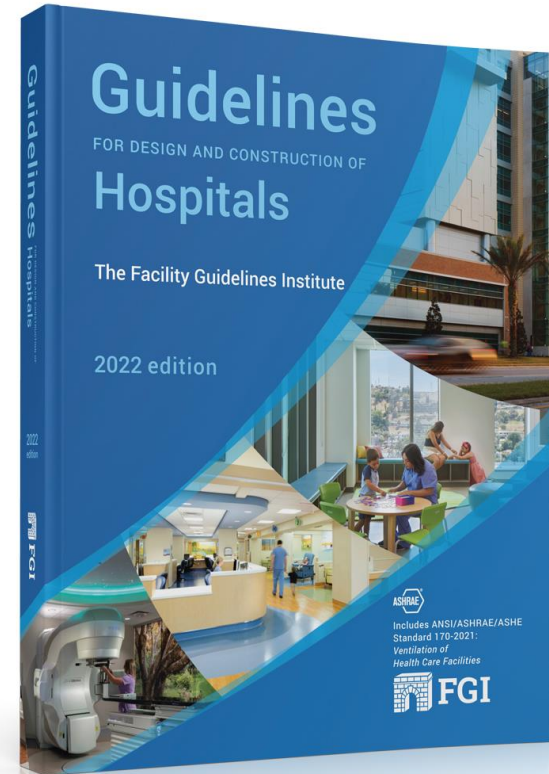
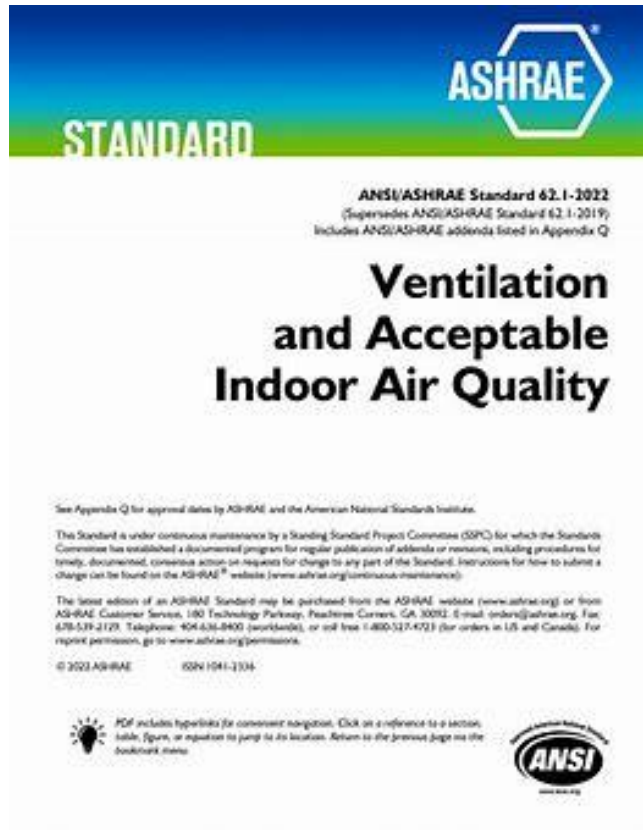
Evaluation and monitoring of environmental cleaning and disinfection

Collaborate with others to select and evaluate environment disinfectants

Heating, ventilation, and air conditioning (HVAC)



Resources



Accessible version: <https://www.cdc.gov/infectioncontrol/guidelines/environmental/index.html>



Guidelines for Environmental Infection Control in Health-Care Facilities

Recommendations of CDC and the Healthcare Infection Control
Practices Advisory Committee (HICPAC)

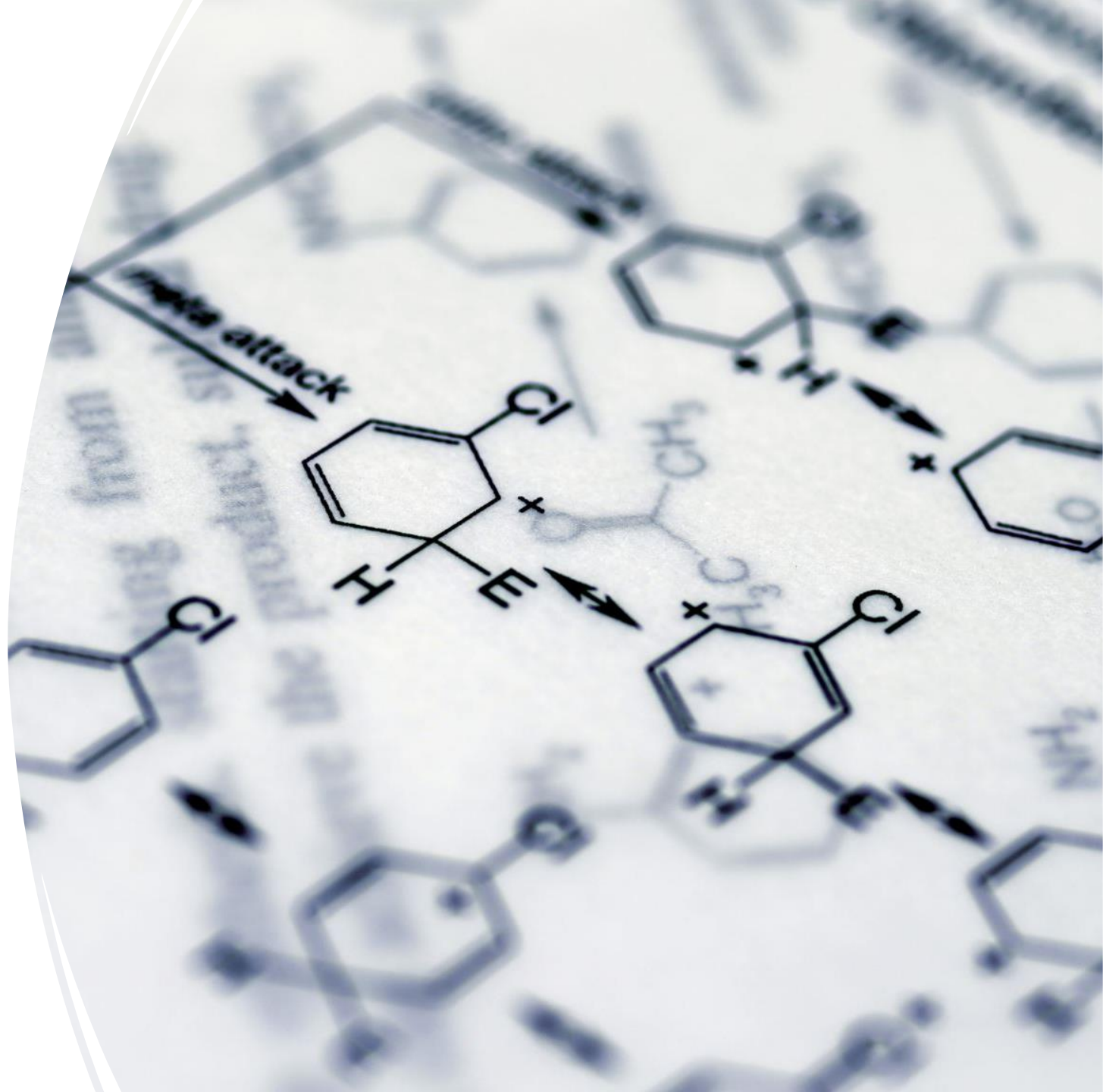
**U.S. Department of Health and Human Services
Centers for Disease Control and Prevention (CDC)
Atlanta, GA 30329**

2003

Updated: July 2019

Air Changes and Ventilation Rate

- Number of times the air volume of a given space is replaced in a one-hour period and includes sufficient changes of outside air to dilute microbial contamination and gases



Air Pressurization and Balancing

Positive Pressure: 'clean' is a positive word

- Operating rooms/bone marrow transplant/protective isolation

Negative Pressure: 'dirty' is a negative word

- Airborne isolation rooms, bronchoscopy room, triage, emergency department waiting rooms

Filtration



MERV (Minimum efficiency reporting values)

Percent efficiency filter	MERV or HEPA?
30%	MERV 8
80%	MERV 13
90-95%	MERV 14
95%	MERV 15
>95%	MERV 16
99.97% efficiency in removing particles 0.3 microns or >	HEPA filtration

Temperature

Most areas are 70-75° F

Operating rooms/surgical
cystoscopic
rooms/bronchoscopy are
68-73° F

Humidity





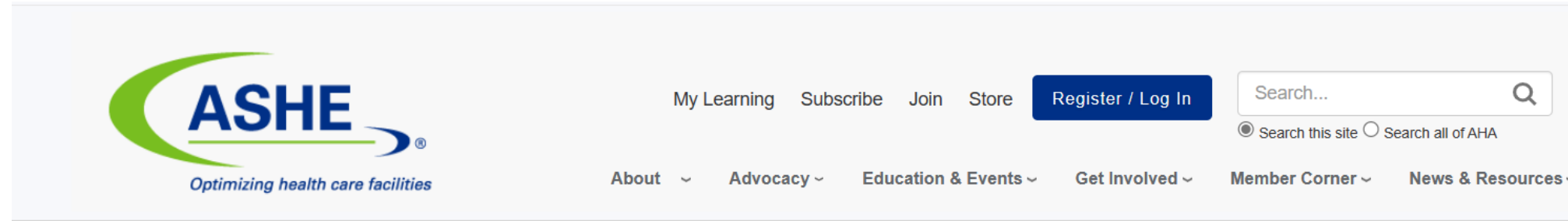
Where is a fungus most happy?

Relative humidity >70%

Monitoring Environment



Environmental Rounding Tool | ASHE



Environmental Rounding Tool



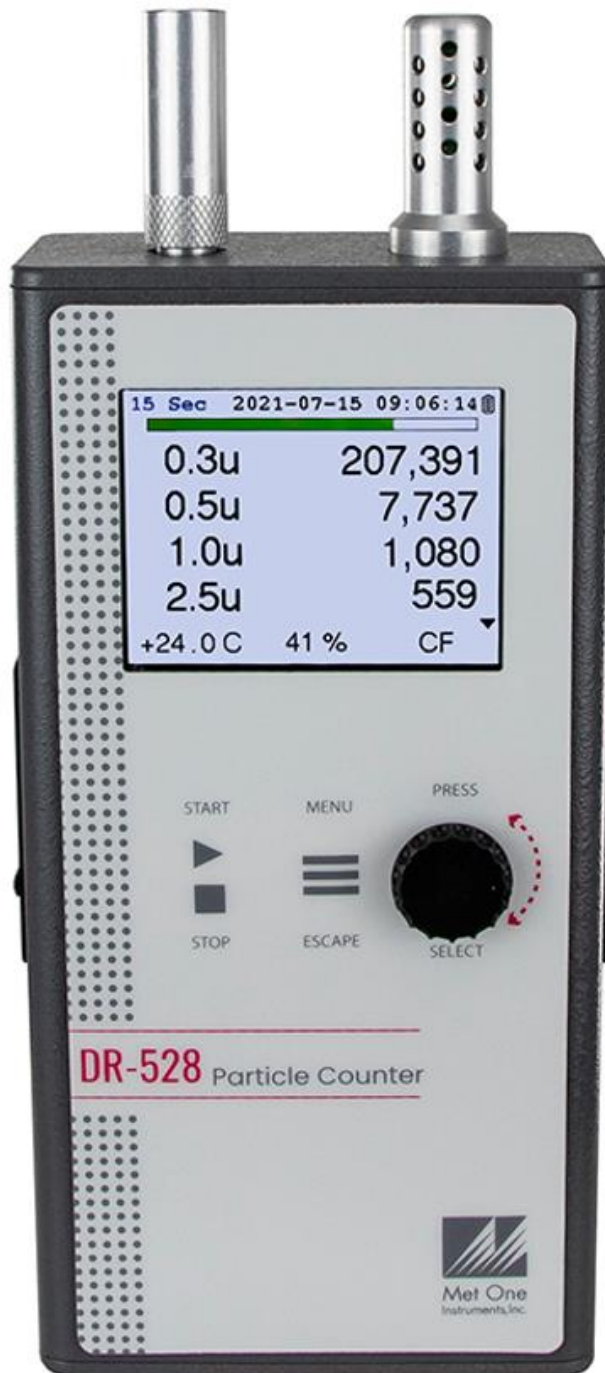
Facilities managers are experts at mitigating life and patient safety issues, but many struggle to control infection risks in the hospital environment during construction or while performing maintenance and repairs. What if we treated infection risk for facilities the same way we do with patients, where infection is defined as the "invasion and growth of germs in the building system"?

This tool helps facilities managers apply the tactics of building system maintenance to infection control by identifying opportunities for infection risk during rounding.

 [Download Tool](#)

Members download this tool. [Click here](#) to join ASHE!

Check out the related *HFM* magazine article, (coming soon)



Particle Counter

- Evaluate whether dust particles or mold spores are escaping when contractors enter or exit job site
- Verify that HEPA air machines are working properly
- First, measure the # of particles being drawn into the HEPA machine
- Then, measure the # coming out of the exhaust
- Calculate the percent reduction
$$\frac{(\text{Particle Count at Intake} - \text{Particle Count at Exhaust})}{\text{Particle Count at Intake}} \times 100$$

Differential Manometer

- Measure difference in pressure between two areas to confirm negative air on a construction site



Moisture Meter

Water leak or
plumbing issue
drywall
assessment



Checklists

ENVIRONMENTAL ROUNDS WORKSHEET FOR INFECTION PREVENTION

AREA INSPECTED:	DATE:	INSPECTOR:
------------------------	--------------	-------------------

Use separate sheet for each department or patient care unit. Check as follows:
 C = Compliant; NC = Not compliant; CAC = Corrective action completed; FU = Follow-up required; NA = Not applicable

Criteria	C	NC	Finding or Comment	CAC	FU	NA
Patient Rooms:						
Floors & walls clean						
Walls are free of breaks and penetrations						
Bathroom clean						
Sink clean						
Furniture clean and in good condition						
Windows and windowsills clean						
Irrigation & sterile solutions labeled as per policy						
Peripheral IVs, CVC, arterial lines labeled as per policy						

Who must be involved?



How to connect the dots
Mature Indian Wheat moth larvae pupating in corrugated
cardboard



Make Germs Visible

PYXIS KEYBOARD



MED ROOM DOOR HANDLE



**These germs might not hurt you,
but they can hurt your patients.**

Wash your hands with soap and water for at least 15 seconds or use the alcohol hand gel and rub hands until dry- before AND after you touch your patient OR their environment.

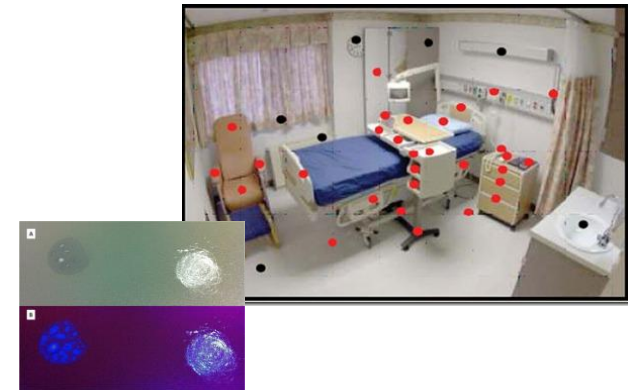
Your patients will thank you.

Assessing Environmental Cleanliness

- ATP Detection
 - Swab detection of ATP on surfaces (as marker of organism burden)



- Fluorescent tags
 - High touch surfaces
 - Place and return after cleaning to assess



High Touch Objects: What Are They?



WakeMed Hospital Example



Individual Performance Feedback

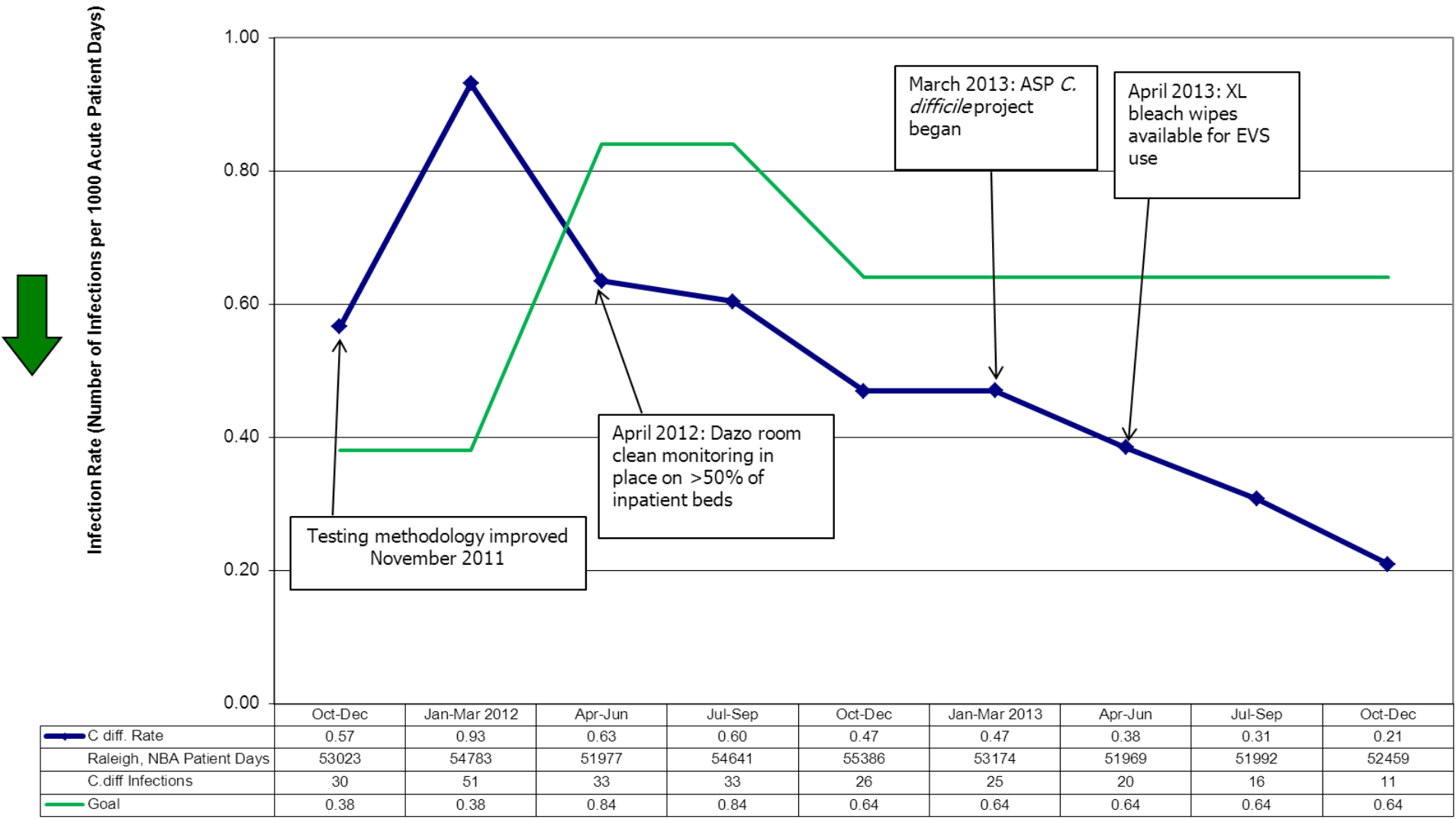
Date	Time	Unit	Room Number	EVS Tech	Patient Room	Bathroom	Overall
10/28/2011	16:28:55 (EDT)	6B	5	EVS Tech 1	11 %	67 %	➔ 33 %
11/04/2011	16:30:52 (EDT)	6B	9		44 %	100 %	67 %
11/11/2011	12:11:41 (EST)	6B	8		100 %	100 %	100 %
11/30/2011	12:17:01 (EST)	6B	7		100 %	100 %	100 %
12/21/2011	14:06:53 (EST)	6B	15		100 %	100 %	➔ 100 %

Date	Time	Unit	Room Number	EVS Tech	Patient Room	Bathroom	Overall
10/31/2011	14:56:36 (EDT)	6B	8	EVS Tech 2	11 %	17 %	➔ 13 %
11/03/2011	15:04:04 (EDT)	6B	6		44 %	50 %	47 %
11/04/2011	16:32:53 (EDT)	6B	20		67 %	83 %	73 %
11/15/2011	09:21:24 (EST)	6B	15		78 %	100 %	87 %
11/23/2011	15:23:08 (EST)	6B	8		78 %	100 %	87 %
11/29/2011	15:33:54 (EST)	6B	2		100 %	100 %	100 %
12/14/2011	13:57:26 (EST)	6B	12		100 %	83 %	94 %
12/19/2011	14:06:37 (EST)	6B	10		90 %	100 %	➔ 94 %

Saving Lives one Room at a Time



Healthcare-Associated *C. difficile* Infection Rate WakeMed Raleigh Campus



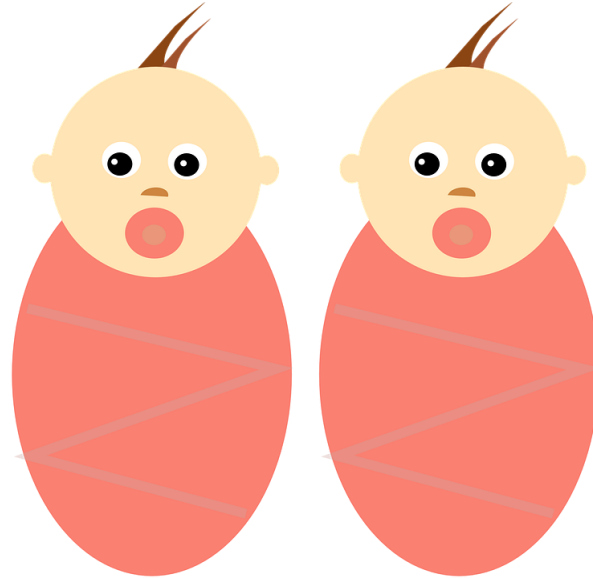
“No-touch” room disinfection devices

- Data on “no-touch” devices, such as germicidal UV irradiation and vaporized hydrogen peroxide, are limited, and the parameters required for effective disinfection are not yet well understood
 - Check with the manufacturer for efficacy information
- If these methods are used, they should be used only as a supplement to standard cleaning and disinfection methods





What does YOUR policy say?



Does your *practice* match your
policy?

Who
cleans it
and how?



The who, what, when and why of disinfection

#	Loc	Scope	Equipment	Responsible	Frequency	Disinfectant	Notes / Special instructions	Issues I see	Comments
1	CPMC	Facility wide	Chairs, Footstool, Television, Countertops	EVS	Daily	Hospital Germicide		EVS uses Oxycide per Lisa why don't we say it on this chart?	
2			All High Touch Points: Bed Rails, Telephone, Call Light, Over Bed Tray, TV Control, Door Knob/Handle, Over bed Table, Bathroom, Sink, Non-disposable pillows, traction/trapeze, call light, pillow speaker	EVS	Daily	Hospital Germicide		These rows do not make sense. The daily list is shorter than the DC list. Does this match the Standard work for EVS.	Room not equipment
3			Patient Bed, Bed Side Table, Cribs, Pillows, Lift Bars, Warming Tables, Seizure Pads, IV Poles	EVS	At Discharge	Hospital Germicide		See above	Room not equipment
4			Privacy Curtains	EVS	When C. Diff Patient Discharged or When Visibly Soiled, and Bi-Annually	Sent out to be Laundered			

How do
you know
it's been
cleaned?



Competencies



Review of Spaulding classification



Device Classification

Device enters or contacts sterile tissue or the bloodstream

CRITICAL



Device contacts mucous membranes or non-intact skin

SEMI-CRITICAL



Device only contacts intact, healthy skin

NON-CRITICAL



Disinfection Level Required

Sterilization

All viable microorganisms must be destroyed.

High Level Disinfection

All viable microorganisms must be destroyed, except bacterial spores.

Low Level Disinfection

Most vegetative bacteria and viruses destroyed, except bacterial spores, mycobacteria, fungi, or small non-lipid viruses.



Detergent vs Disinfectant? what's the difference?

- Detergents are **products that are used to remove soil, dirt, dust, organic matter, and germs (like bacteria, viruses, and fungi),**
- Disinfectants are chemical products that destroy or inactivate germs and prevent them from growing. Disinfectants have no effect on dirt, soil, or dust

Environmental Protection Agency (EPA) Label Claim for Disinfectant

- The EPA label claim states if the product is
 - Virucidal
 - Bactericidal [U.S. Environmental Protection Agency | US EPA](https://www.epa.gov/pesticide-registration/label-requirements-pesticide-products)
 - Tuberculocidal
 - Fungicidal
 - Sporocidal
- Includes the manufacturer's instructions for use (IFU), including wet or contact time required to achieve the desired degree of microbial killing



Equipment cleaning

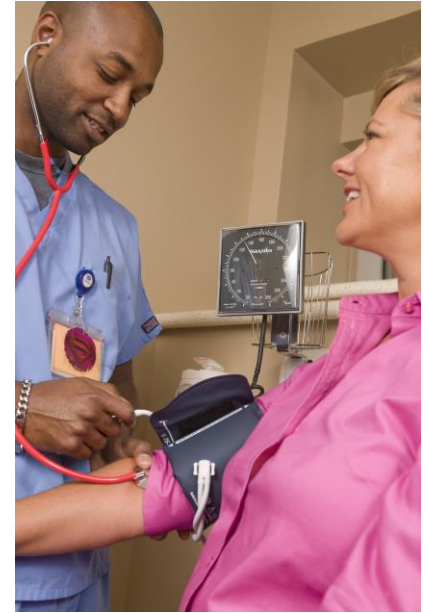
Product Selection



Instructions for Use (IFU)



Non-critical equipment



Make it an open book test



How to teach 'contact' or 'dwell' time

1

The Disinfectant must remain visibly WET on a pre-cleaned surface

2

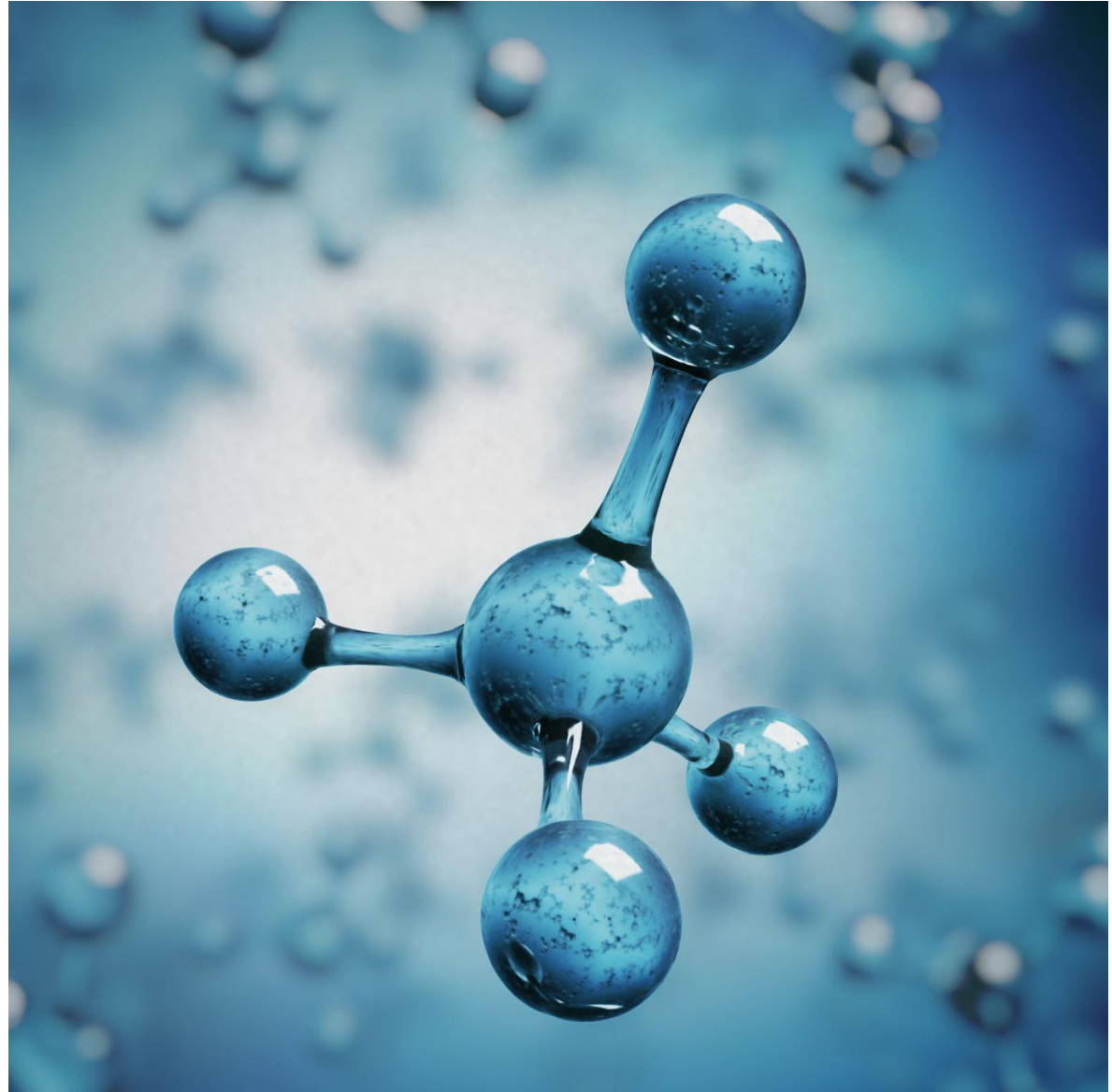
In CONTACT with the pre-cleaned surface

3

In order to KILL the organisms that the label claims to effectively do so

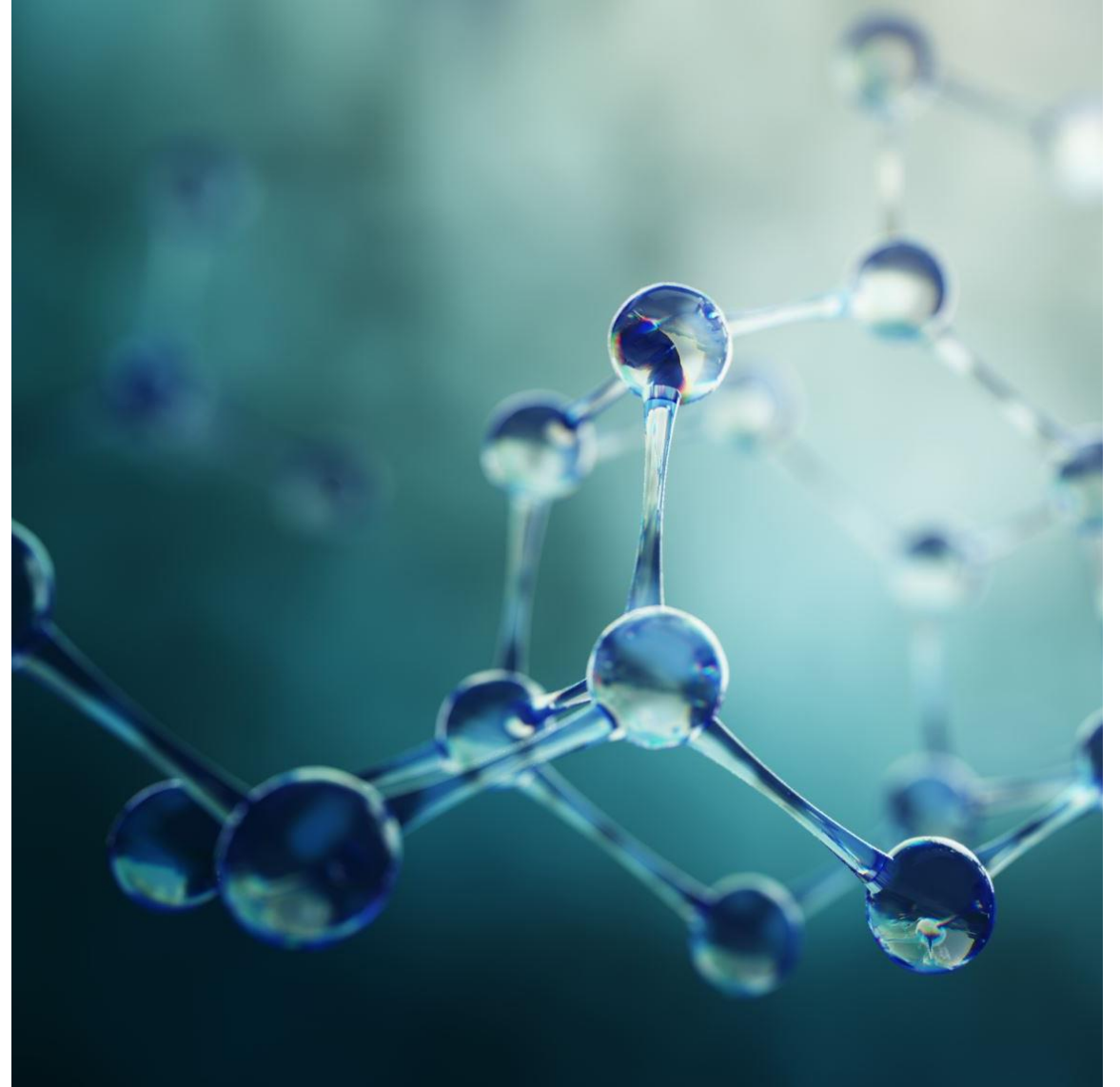
Low-level Disinfection

- EPA-registered hospital disinfectant with NO tuberculocidal claim
 - Chlorine-based
 - Phenolics
 - Improved hydrogen peroxide
 - Quaternary ammonium compounds
 - 70-90% alcohol



Intermediate-level Disinfection

- EPA-registered hospital disinfectant WITH a tuberculocidal label claim
 - Chlorine-based products
 - Phenolics
 - Improved hydrogen peroxide





Cleaning of Instruments: Basic Principles

- Removal of visible blood or debris on instruments/ devices is the *essential* first step in HLD or sterilization
- Dried or baked material can prevent the device from being appropriately disinfected or sterilized
- The process must flow from DIRTY TO CLEAN to avoid cross-contamination during processing
- Gloves/PPE must be worn when handling soiled instruments
- Contained system for processing and transport
- Use a designated sink for processing; if a handwashing sink is the *only* option, establish process to clean sink with bleach wipes *after each use*

High-level Disinfection



PASTEURIZATION

CHEMICAL STERILANTS

Visit all places that perform high
level disinfection (HLD)

PRIORITY

Use your
checklists



Use your
resources...
especially when
they are
free...but be
sure to vet them



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