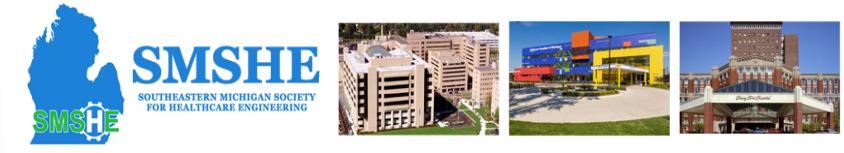
Infection Prevention

Effective Management of the Physical Environment

Jack Evans MBA, PMP, CHSP, CHFM
SMSHE President Elect
Director of Regulatory Compliance & Support, Medxcel



ASHE

American Hospital Association

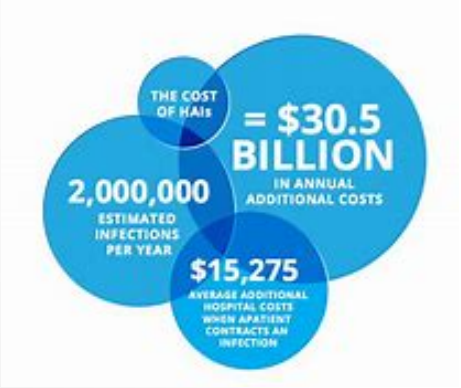
Presentation Objectives

- HVAC, impact on infection Prevention (IP)?
- Room pressure, Humidity, Filtration
- Evidence based compliance (HVAC)
- 3 part program to 100% compliance
- Building design & finish selection– eye on IP
- Patient safety: construction & Building maintenance
- Water Hygiene (waterborne pathogens)

The Impact of Hospital Acquired Infections (HAI's)…

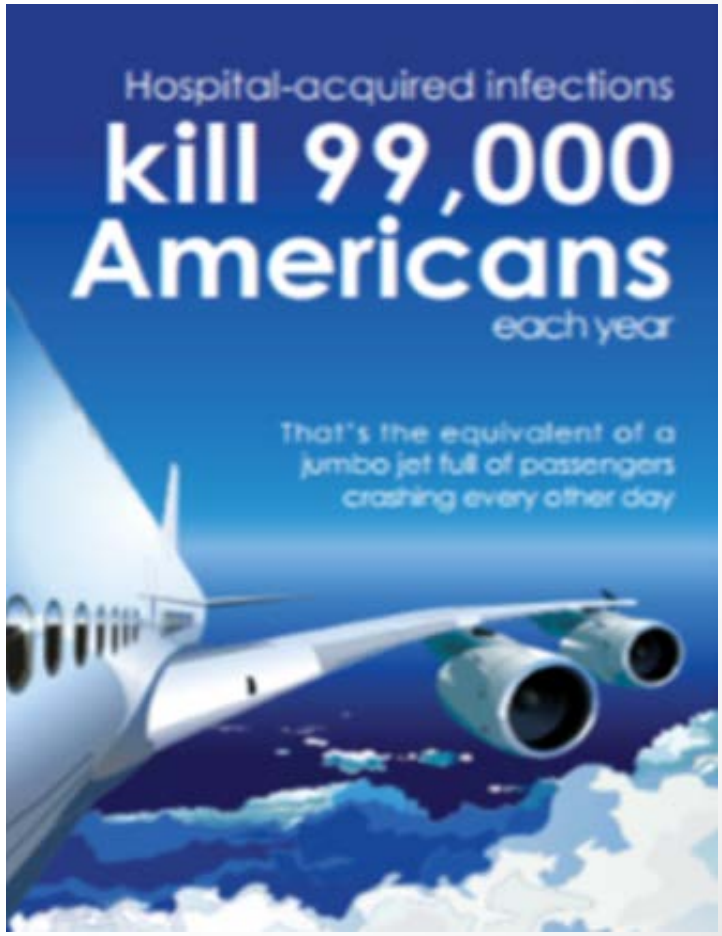
The Center for Disease and Prevention (CDC) estimates that 1.7 million people contract a hospital acquired infection annually, and nearly 99,000 of them die (Klevens et al., 2007).

HAI Patient Treatment Costs



Money does get spent…

- Proactive Spend vs Reactive Spend



IP Management-Clinical

Things "they" do Clinical environment

- Hospital Acquired Infections (HAI's)
  - Reducing the risk of HAI's
  - Hospitals focus attention on clinical procedures/treatment
  - Infection Control hospital program
    - Data analysis
    - Process Improvement
    - Infection Control leadership/program

- Central Line-Associated Bloodstream Infection (CLABSI)
- Catheter-associated Urinary Tract Infection (CAUTI)
- Surgical Site Infections (SSIs)
- Methicillin-resistant *Staphylococcus aureus* Bacteremia (MRSA Bacteremia)
- *Clostridium difficile* Infection (CDI)

CMS 5-Star Quality Rating process-includes Hospital-acquired infection rates

IP – Non Clinical

Things you can do (Non-clinical) The environment of care

- The Environment of Care-Who manages the physical building space?

  - HVCA (Heating, Ventilation & the Conditioning of Air)
  - Air quality-via air filtration & exhaust
  - Air pressurized rooms (creating an invisible barrier to airborne pathogens)
  - Air humidification / De-humidification
  - IP Cleaning (EVS)
  - ICRA, building maintenance
  - Building material selection
  - Water Hygiene
  - UV light technologies

Tools in the Facility Managers toolbox

Heating, Ventilation, Air Conditioning (HVAC)

- Cooling
- Heating
- Outside fresh air / recirculation
- Humidifying / dehumidifying air
- Creating positive pressure rooms

Roof Top Air handler

Roof Top Exhaust unit

- Removing micro-organisms
- Removing harmful gases
- Creating negatively pressured rooms
  - Isolation Rooms, dirty rooms, gas storage rooms, labs…

Humification, Filtration, UV Cleaning

- Humidification

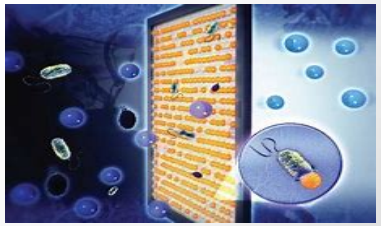
Humidification (in air handler)

- Air Filtration

Filters

Ultraviolet Light (UV) located in Air Handler

Ultraviolet light kills microorganisms by damaging their DNA. **UV** radiation disrupts the chemical bonds that hold the atoms of DNA together in the microorganism. If the damage is severe enough, the **bacteria** cannot repair the damage and the cells die.



Air/Air Quality Management

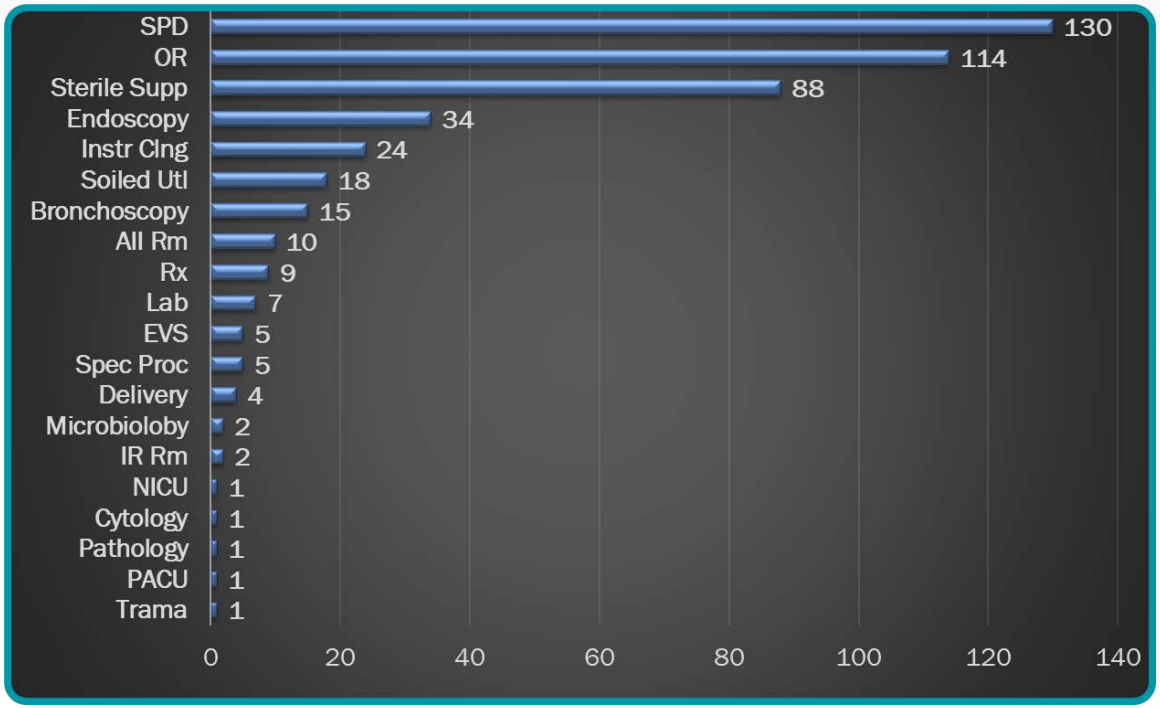
Regulatory Agencies

Accreditation Agencies

Standards/Guidelines Groups

Outside Eyes-Evidence Based Compliance

- TJC findings (~700 hospital surveys)



Highest risk to patient safety

Provided by American Society of Healthcare Engineers (ASHE)

The Joint Commission
EC.02.05.01

EP 15 In critical care areas designed to control airborne contaminants (such as biological agents, gases, fumes, dust), the ventilation system provides appropriate pressure relationships, air-exchange rates, filtration efficiencies, temperature and humidity.

Note: For more information about areas designed for control of airborne contaminants, the basis for design compliance is the Guidelines for Design and Construction of Health Care Facilities, based on the edition used at the time of design (if available).

EP 15:
31% non-compliance rate
(first 6-months of 2016)
From TJC's Consistent Interpretations letter

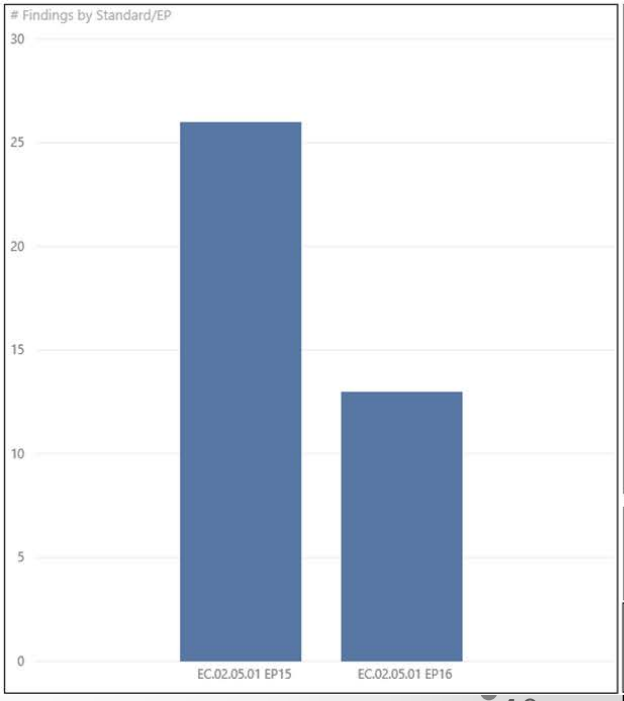
Outside Eyes-Evidence Based Compliance

Why HVAC compliance matters…

Joint Commission's December, 2018 EC News: Most frequently cited as "Likelihood to cause harm"

EC Chapter: *The second most Frequently cited EC finding in the realm of "high likelihood to do harm" was "Critical Area Pressure Relationships (EC.02.05.01, EP 15*

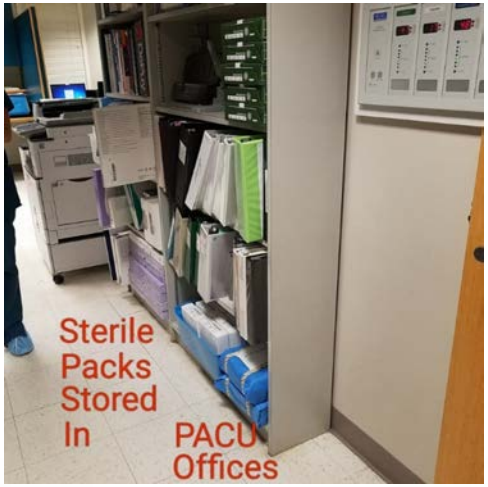
- My own survey experience
  - Focus on Infection Prevention, HVAC, physical environment



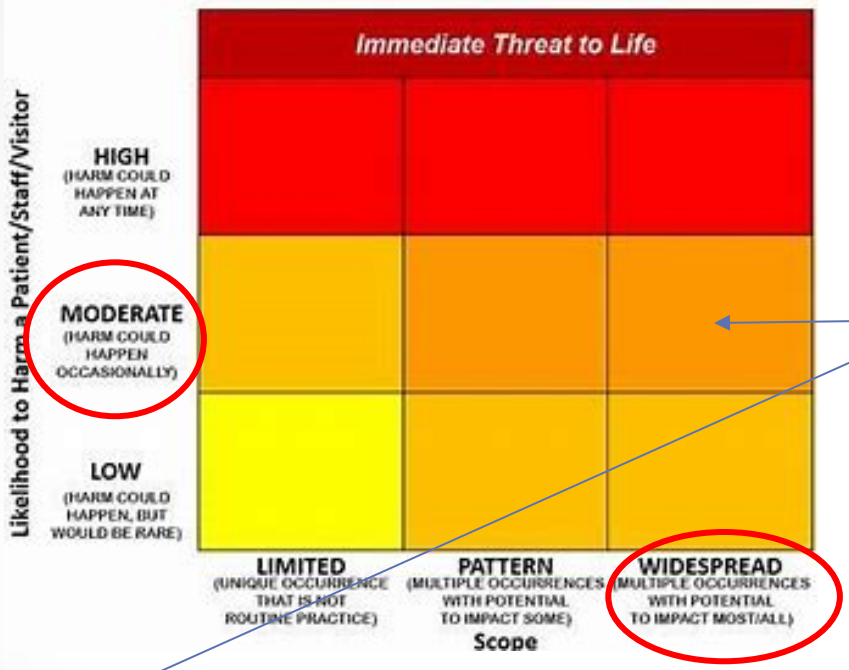
- 1 failed room pressure/humidity
- Patient safety risk that can be avoided

When Rooms Fail To Meet Air Management requirements

- Ramifications
  - No. 1: patient-safety (“High likelihood to do harm”)
  - Cost to healthcare organization
  - High impact findings
  - Executive Leadership cited
  - Ongoing evidence of compliance



The Joint Commission, Risk Based Model



Risk to patient:

Moderate/widespread

Typical, critical environment
Air Pressure/Humidity
finding found here

Environment of Care	EC.02.05.01	15	MW	In critical care areas designed to control airborne contaminants (such as biological agents, gases, fumes, dust), the ventilation system provides appropriate pressure relationships, air-exchange rates, filtration efficiencies, temperature and humidity. Note: Areas designed for control of airborne contaminants include spaces such as operating rooms (all classes), special procedure rooms that require a sterile field, Caesarean delivery rooms, rooms for patients diagnosed with or suspected of having airborne communicable diseases (for example, airborne infection isolation rooms, pulmonary or laryngeal tuberculosis, bronchoscopy), patients in "protective environment" rooms (for example, those receiving bone marrow transplants), laboratories, pharmacies, sterile supply/processing rooms, and other sterile spaces. The basis for design compliance is the Guidelines for Design and Construction of Health Care Facilities, based on the edition used at the time of design (if available).	§482.42 - A-0747	Condition of Participation: Infection Control	Condition	Observed in Building Tour at (Hospital name and address) site for the Hospital deemed service. An air flow test performed in the central sterile processing departments decontamination room showed the air flowed from the decontamination room into the exit egress stairwell number (5). During the survey the facility engineers removed the entry door into the stairwell as it was not a required route of egress for this room and sealed the opening with a 2-hour fire rated block construction barrier. This corrected the air pressure relationship. This observation was corrected during the survey.

The Joint Commission, Risk Based Model

Only a 25 bed hospital, 23 rooms checked

- 23 rooms checked for air pressure/Critical Access Hospital (CAH)
- Pharmacy “Suite” positive pressure to hospital corridor

The Joint Commission
Requirements for Improvement

Program: Critical Access Hospital

Standard	EP	SAFER™ Placement	EP Text	Observation
EC.02.05.01	15	Moderate Limited	In critical care areas designed to control airborne contaminants (such as biological agents, gases, fumes, dust), the ventilation system provides appropriate pressure relationships, air-exchange rates, filtration efficiencies, and temperature and humidity. Note: For more information about areas designed for control of airborne contaminants, the basis for design compliance is the Guidelines for Design and Construction of Health Care Facilities, based on the edition used at the time of design (if available).	1). Observed in Building Tour. In 1 of 9 critical pressure relationships, which were checked by means of hand-held vaneometer, the air flow was reverse of what is required. At the exit door from the OR clean corridor to the exterior of the building, the corridor was in a negative air pressure relationship to the outside at an indicated 150 feet per minute at the gap between the door and the door frame with the door in the fully closed position.
EC.02.05.01	16	Low Pattern	In non–critical care areas, the ventilation system provides required pressure relationships, temperature, and humidity. Note: Examples of non–critical care areas are general care nursing units; clean and soiled utility rooms in acute care areas; laboratories, pharmacies, diagnostic and treatment areas, food preparation areas, and other support departments.	In 3 of 14 pressure differential checks, which were performed by means of hand-held vaneometer, the air flows were reverse of what is required. The laboratory was in a positive air pressure relationship to the adjacent corridor at both doors at an indicated 100 feet per minute. The pharmacy was in a negative air pressure relationship to the adjacent corridor at an indicated 400 feet per minute. These three deficiencies were later observed to have been corrected prior to the end of survey.

Why Rooms Fail To Meet Air Management requirements

- Healthcare's Complex HVAC Systems
  - Large complex systems
  - Seasonal changes
  - Lack of clarity of air handler and exhaust area coverage
  - Lack of visibility into real-time conditions (lack of BAS controls)
  - Abusive environments
  - Lack of barriers, doors, door closers
  - Staff practices
  - Quick-fixes (robbing Peter to pay Paul)
  - Critical environment rooms not on FM's radar

- Number 1 reason rooms fail to meet requirements—We cannot see a rooms failed condition
  - We can't see air, humidity or air quality
  - We need monitors and sensors to show us the "Affects" of air movement and humidity

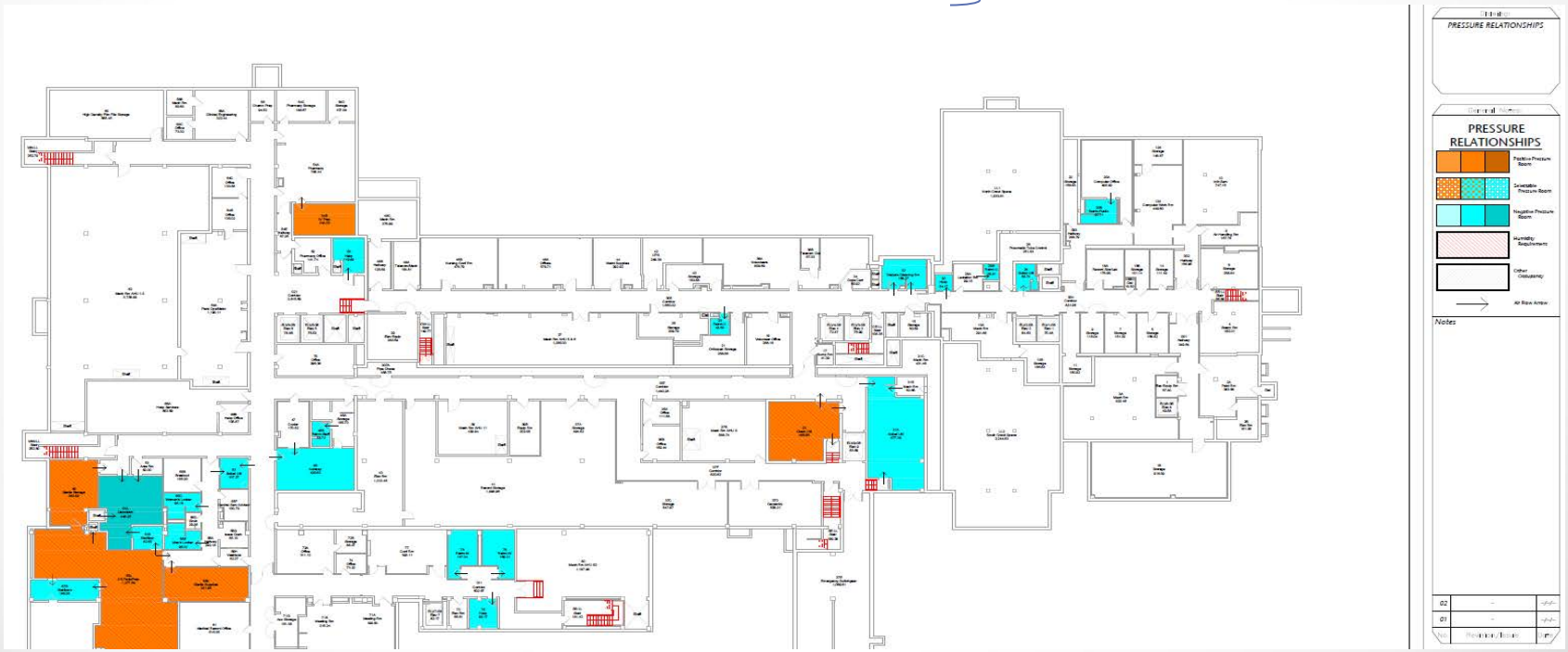
100% compliance - Solutions

- Making the invisible visible
- 3-Step Plan
  - Step 1: IP Floor Plan drawings
  - Step 2: ASHRAE Matrix by room type
  - Step 3: Add local room monitors, add to B.A.S.

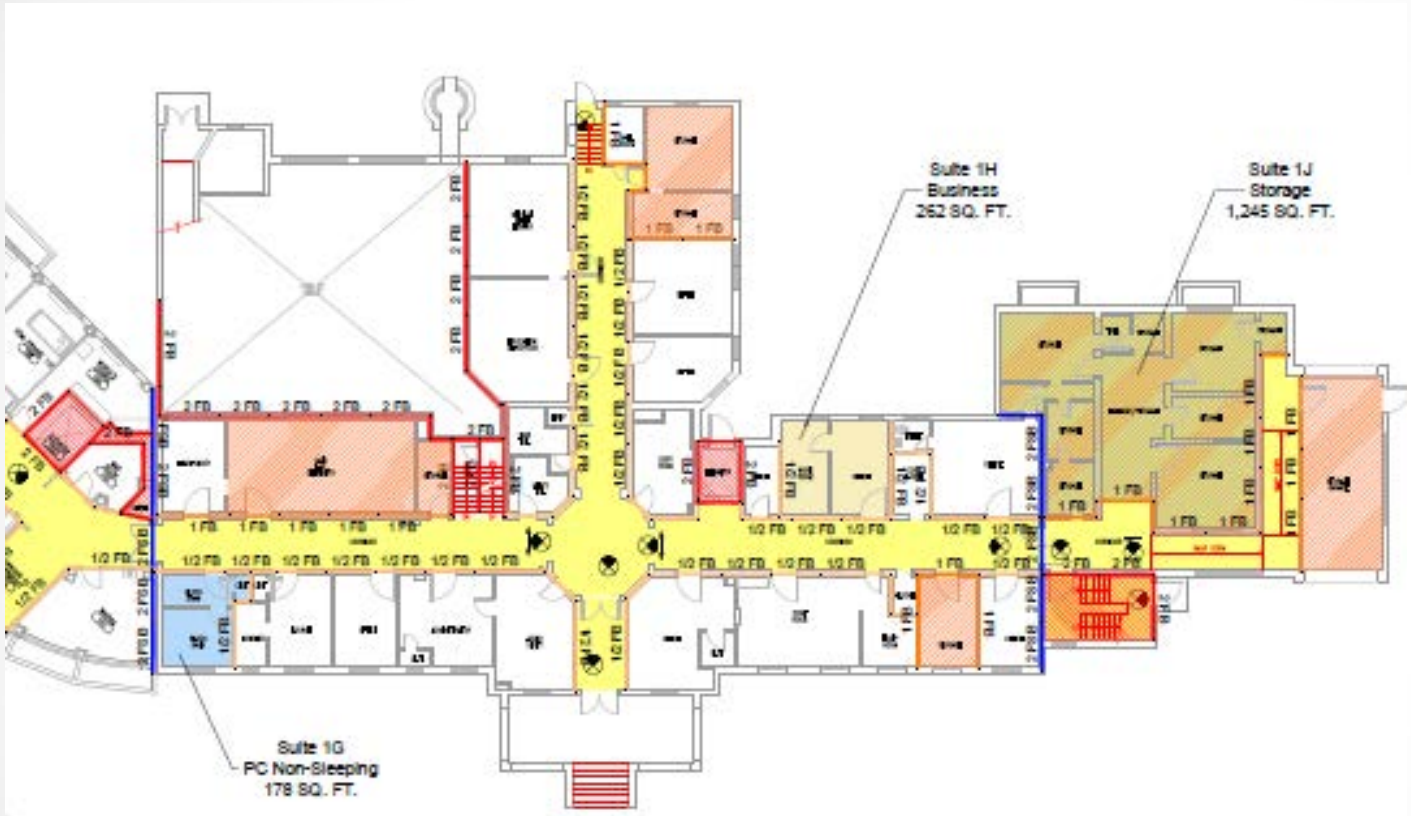
Visual Inventory of Rooms—2 Part process

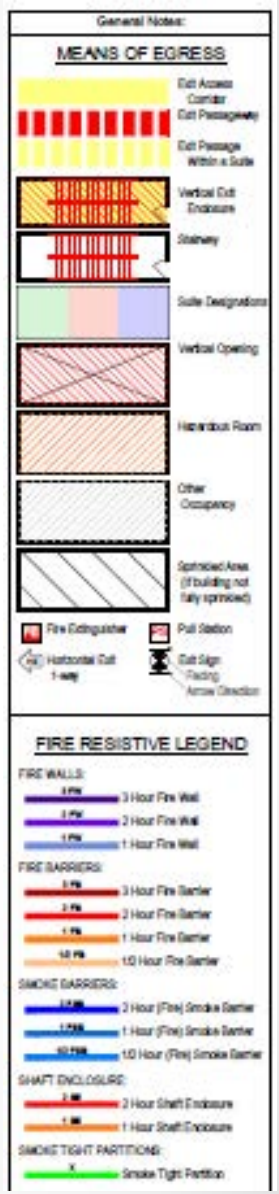
Step 1: Create IP Drawings

- Create IP floor plan drawings
  - Identify Critical and Non-Critical rooms by color
- Format
  - Ideally: Auto-CAD drawings (layers to existing)
  - Identify rooms with colored markers



What we can learn from the Life Safety Drawing Requirements





Step 2: Create IP Matrix by room type

Visual Inventory of Rooms—2 Part process

Creating an Inventory by Applying the ASHRAE Room Type Requirements

- Pressure, Temperature, Humidity, Air Changes

Infection Control of Building Systems - Room Inventory

IC Risk Category: A = 20 ACH, B = 15 ACH, C = 12 ACH, D = 10 ACH, E = 6 ACH, F = 4 ACH, G = 2 ACH

UPDATED: 06/22/17 JRE

		Area Designation	Room Numbers	This room monitored by BAS?	Name of BAS	Room monitored by local digital display?	Room monitored by Temp Trak?	Room monitored by department staff daily?	System alarms if set point is exceeded?	Preventive Maintenance Requirements: Air Movement	Air Changes	Temperature & Humidity	Air Movement (Smoke/Flutter)	Ventilation Requirements: Air Movement Relationship to Adjacent Space	Minimum Air Changes	RH Design	Temperature Design	HVAC EQUIPMENT: AHU #	Exhaust #
240			**Heart Hospital**																
241	A	Operating Rooms	OPSC OR 2				Yes			Semi-annual	Semi-annual	Daily or with BAS	Monthly	OUT	20	30-60	68-73		
242	A		OPSC OR 3				Yes			Semi-annual	Semi-annual	Daily or with BAS	Monthly	OUT	20	30-60	68-73		
243	A		OPSC OR 4				Yes			Semi-annual	Semi-annual	Daily or with BAS	Monthly	OUT	20	30-60	68-73		
244	A		OPSC OR 5				Yes			Semi-annual	Semi-annual	Daily or with BAS	Monthly	OUT	20	30-60	68-73		
245	A		OPSC OR 6				Yes			Semi-annual	Semi-annual	Daily or with BAS	Monthly	OUT	20	30-60	68-73		
246	A		OPSC OR 7				Yes			Semi-annual	Semi-annual	Daily or with BAS	Monthly	OUT	20	30-60	68-73		
247	A		OPSC OR 8				Yes			Semi-annual	Semi-annual	Daily or with BAS	Monthly	OUT	20	30-60	68-73		
248		Delivery Rooms	**Webber**																
249		**COUNT = 1 rooms**	ED room 1114							Semi-annual	Semi-annual	Daily or with BAS	Monthly	OUT	20	30-60	68-73		
250		Recovery Rooms	**Webber**																
251			3WS room 3417							Annual	Annual	--	--	-	6	30-60	70-75		
252		**COUNT = 2 rooms**	Post Op							Annual	Annual	--	--	-	6	30-60	70-75		
253		Trauma Rooms	ED room ____							Semi-annual	Semi-annual	Daily or with BAS	Monthly	OUT	15	30-60	70-75		
254		**COUNT = 2 rooms**	Cath Lab, room 11026							Semi-annual	Semi-annual	Daily or with BAS	Monthly	OUT	15	30-60	70-75		
255		Treatment Rooms	**Webber**																
256			KCC room 1020							Annual	Annual	--	--	-	6	30-60	70-75		
257		**COUNT = 2 rooms**	KCC room 1064							Annual	Annual	--	--	-	6	30-60	70-75		
258		Newborn Nursery	**Brush**																
259		**COUNT = 6 rooms**	2BC SCN - Pod 1							Annual	Annual	--	--	OUT	6	30-60	75		
260			2BC SCN - Pod 2							Annual	Annual	--	--	OUT	6	30-60	75		
261			2BC SCN - Pod 3							Annual	Annual	--	--	OUT	6	30-60	75		
262			3BC NICU - Pod 1							Annual	Annual	--	--	OUT	6	30-60	75		
263			3BC NICU - Pod 2							Annual	Annual	--	--	OUT	6	30-60	75		
264			3BC NICU - Pod 3							Annual	Annual	--	--	OUT	6	30-60	75		
265		Autopsy Room	NA							Annual	Annual	--	Monthly	IN	15	-	-		

Inventory | Monthly Flutter | Semi-Annual Flutter | Daily Temp Hum Monitoring

Ready

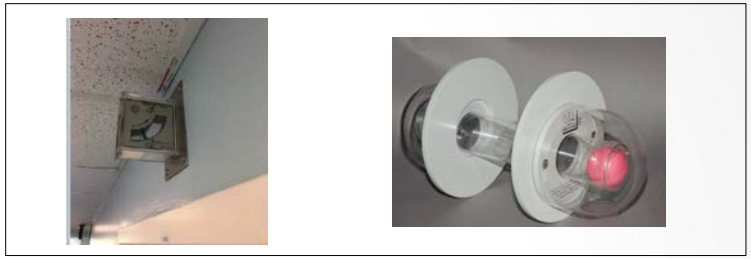
Room Inventory

HVAC Compliance Management Tools

Step 3: Install local room monitors, tie to B.A.S.

Electronic

Analog



Clinician Awareness-Provide a means to see "out-of-range" conditions at the room

Clinicians need to know that air pressure, temperature and humidity are safe for their patients

You contribute substantially to Infection Prevention

Be a patient safety partner

"Best Practice" making a failed condition visible to clinicians

Give them a voice into the solution

Air pressure monitor/alarm with signage


SEEING
THE
INVISIBLE


NEGATIVE AIR PRESSURE
POSITIVE AIR PRESSURE
POSITIVE AIR PRESSURE

Room Minimum Air Requirements-Detailed…

Visual "IP" Floor Plan-with requirement details

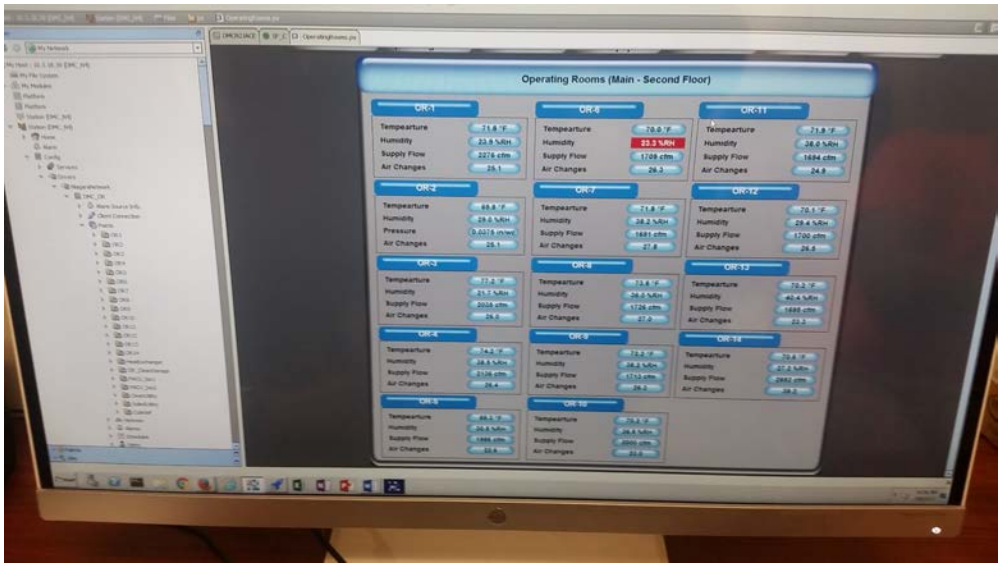
Step 3: Install local room monitors, tie to B.A.S.

SEEING THE INVISIBLE

Building Automation System

Setting control limits

i.e., the OR room alarms when Out Of Range…



- Advantages in managing HVAC systems via B.A.S
  - Historical Data History
  - Manage complex system from remote location
  - Auto-call or auto-page technician

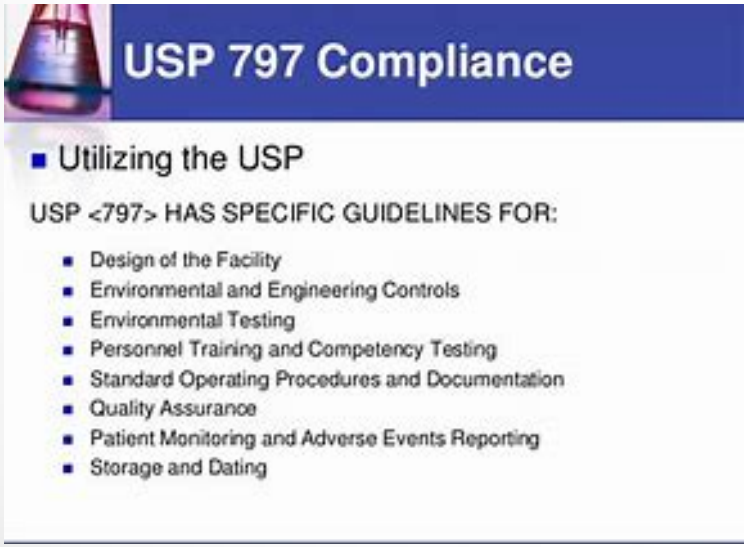
Expanding BAS coverage

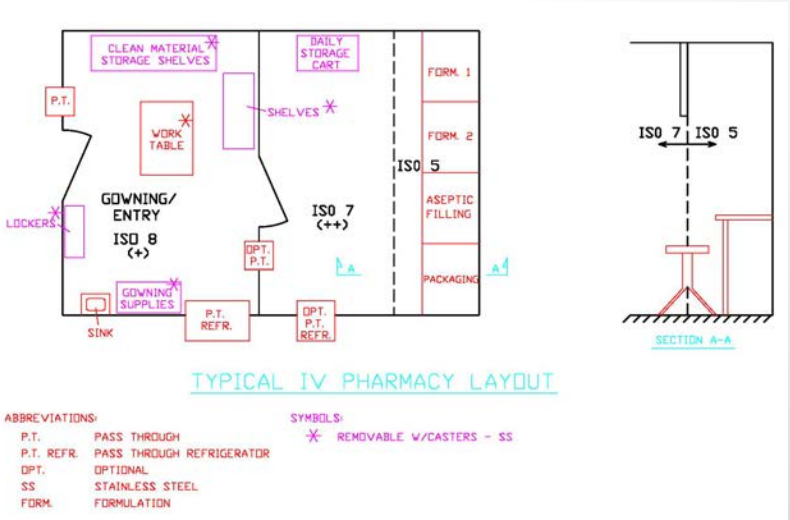
Infection Control in the Pharmacy

Environmental and Engineering Controls for Pharmacy Compounding

High demand area

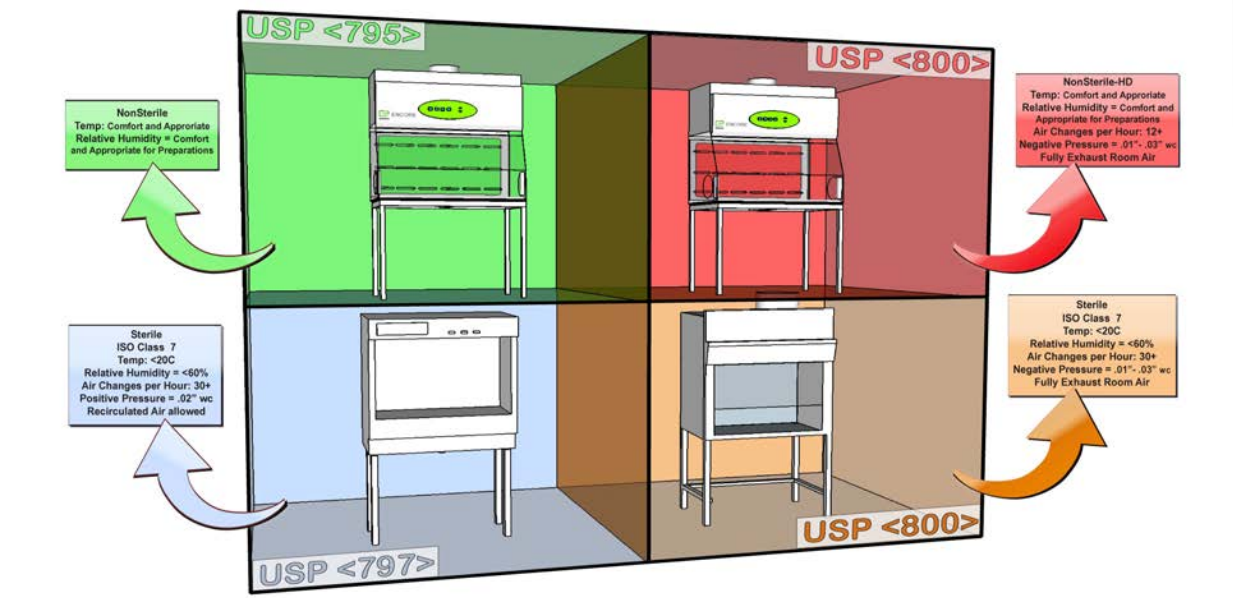
- Complex clean room (primary & secondary engineering controls)
- Air Pressure, Temperature, Humidity
- Suite/Room/Hood Air changes per hour
- HEPA air, prefilters, air returns
- Exhaust to roof for some Hazardous Drug areas
- Comprehensive semi-annual testing/certification
- Coming changes may require monthly testing





Pharmacy Compounding

- Hazardous Chemical Compounding
- Sterile Chemical Processing



4/9/2019 Agenda (33).html

The Team Leader will provide copies of the agenda in a Word format on arrival to the hospital. This will be easier to review and print than what appears below.

Please consider beginning to gather the following items/documents in advance of the team's arrival.

Lists/Documents of:

1. 1. The most recent moderate sedation patients in the Emergency Department including both adults and patients < 12 years of age.
2. 2. Patients determined to be at risk for suicide during the past 12 months (ED and inpatient).
3. 3. Patients who have been restrained (behavioral and non-behavioral) during the past 6 months.
4. 4. Autopsies performed for the past year.
5. 5. Inpatient grievances (not related to billing) for the past 6 months.
6. 6. Evidence of compliance for PI.01.01.01 and PI.02.01.01.
7. 7. Risk Assessment(s) performed for ligature/risk reduction in the Emergency Department.
8. 8. Final reports for the last three years of certification/testing for ALL primary and secondary engineering controls associated with sterile medication compounding (including any documentation of remediation/retesting conducted based on reported results).

HVAC Testing, Adjusting, Balancing to Design Parameters

Testing-How often is it required?
What rooms should be tested?

Company Name:

Air Balance Executive Summary

Testing Criteria:

Example: ASHRAE 170, 2008' Attached to report: ASHRAE 170, 2008' Table 7-1

Hospital Name: Technician Name: Testing Tech's Professional Credentials:

Date	Date Tested Last	Room/Area	Room Type	Required Air Changes	Actual Air Changes	Room Pressure P/N	Exhausted directly to outdoors (Y/N)	CFM Supply	CFM Exhaust	Req'd pressure Diff. (w.c.)	Actual pressure Diff. (w.c.)	AHU #	Exhaust Fan #	Pass/Fail P/F

Air Quality-Filtration

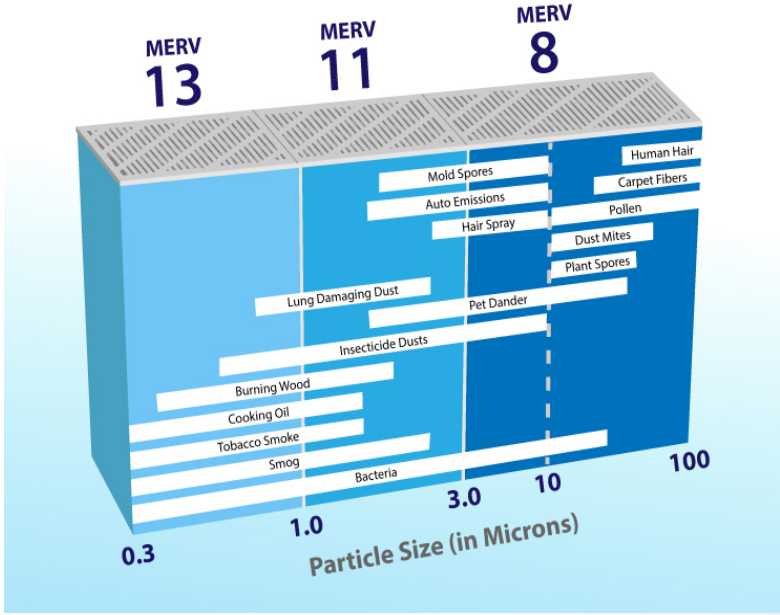
Minimum Filtration Efficiencies 2014 Guidelines

ASHRAE Standard 170-2013 Ventilation Healthcare Facilities

Space Designation (According to Function)	Filter Bank No. 1 (MERV)[a]	Filter Bank No. 2 (MERV)[a]
Operating rooms (Class B and C surgery); Impatient and ambulatory diagnostic and therapeutic radiology; inpatient delivery and recovery spaces	7	14
Inpatient care, treatment and diagnosis, and those spaces providing direct service or clean supplies and clean processing (except as noted below); All (rooms)	7	14
Protective environment (PE) rooms	7	HEPA[c,d]
Laboratories; Procedure rooms (Class A surgery), and associated semi restricted spaces	13[b]	NR
Administrative; bulk storage; soiled holding spaces; food preparation spaces; and laundries	7	NR
All other outpatient areas	7	NR
Nursing facilities	13	NR
Psychiatric hospitals	7	NR
Resident care, treatment and support areas in inpatient hospice facilities	13	NR
Resident care, treatment and support areas in assisted living facilities	7	NR

NR = not required

Notes:
a. The minimum efficiency reporting value (MERV) is based on the method of testing described in ANSI/ASHRAE Standard 52.2, Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size ([ASHRAE 2012] in Informative Appendix B).
b. Additional pre-filters may be used to reduce maintenance for filters with efficiencies higher than MERV 7.
c. As an alternative, MERV 14 filters may be used in Filter Bank No. 2 if a tertiary terminal HEPA filter is provided for these spaces.
d. High Efficiency Particulate Air (HEPA) filters are those filters that remove at least 99.97% of 0.3 micron sized particles at the rated flow in accordance with the testing methods of IEST-RP-CC001.3 (IEST [2005] in Informative Appendix B).



Facilities Management/Construction

Other IP/IC Opportunities

Antimicrobial Coatings

New products made to combat HAI's

- Latex paint
- Floor covering
- Medical equipment
- Furnishings

Antimicrobial Coating – A Lifesaver in the Healthcare Sector

Antimicrobial coating prevents infections & disease across the healthcare sector

In a world of touch screens and over-crowded hospitals, the demand for antimicrobial coating has never been higher. In the US, 100,000 people die a year as a result of a hospital acquired infection, despite all the measures in place to prevent it, and infections occur outside the hospital too; microorganisms cause problems in aged care facilities, research labs, schools, factories and construction, food processing and catering, leisure facilities and more. With resistant bacteria on the rise, we need to protect ourselves and others against the threat of infection and one way is with **antimicrobial coating which works by preventing microorganisms (bacteria, fungi, viruses) from adhering to a surface and destroying the microorganisms they come into contact with**.

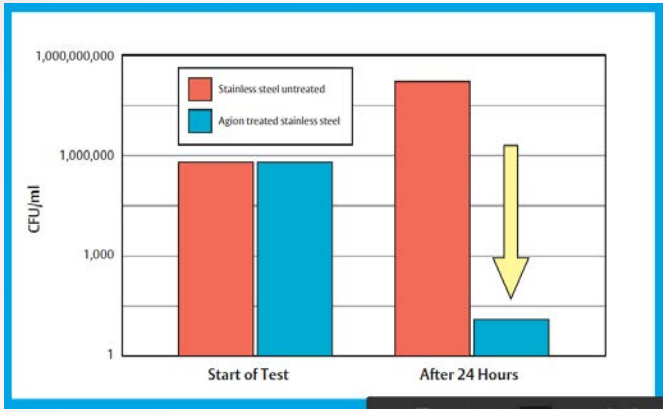
PCI
Paint & Coatings Industry

Recent food poisoning outbreaks and high rates of hospital-acquired infections[3] have also heightened people's awareness on how easily diseases can be transmitted. Antibacterial coatings will provide an extra line of defense and a complementary strategy for maintaining hygiene standards and public health. Antibacterial coatings will also reduce the risk of infected surfaces acting as a reservoir for transmission to food and humans. Other advantages in economical and environmental aspects are less frequency of repainting, labor and chemical cost reductions.

Protecting Patients-Products Made With Inherent Antimicrobial Properties

-Specifying Safer Products

-Purchasing Safer Finishes



Clean Bill of Health in a Demanding Environment

Infection control personnel at Tanner Medical Center in Carrollton, Georgia (part of the Southeast's Tanner Health System) tested MicroShield in their facility and found it to be effective.

The team of specialists conducted a series of tests to establish a benchmark within their hospital setting. They measured the number of colony forming units (CFUs) on the door handle of a high traffic doorway. The results showed 26 bacterial colonies. They then replaced the door handle with one coated with MicroShield. After two weeks, they repeated the test. The front of the MicroShield door handle had no growth and the underside had one colony of growth.

"This was amazing. I highly recommend this product to control the spread of bacteria within a healthcare facility," Laboratory Technical Director Suzanne Graham wrote in her review.

Based on this positive feedback, Tanner's facility managers have decided to phase in the MicroShield-coated hardware throughout all buildings in the Tanner Health System. The hardware coating will be included in Tanner's specification guide for all renovations and new construction.

MicroShield™

A new kind of safety solution from ASSA ABLOY Group door hardware manufacturers

CORBIN RUSSWIN | SARGENT | YALE

ASSA ABLOY

Construction/Renovations - Building Maintenance

Contractors/Vendors

- -Renovations
- -IT / Communications wiring
- -HVAC
- -Electricians
- -Plumbing
- -Fire alarm/suppression

In-house facility technicians

- -HVAC
- -Electricians
- -Plumbing
- -Carpenter

Protecting patients – Environment of care

"IP-EVS" Cleaning—The First Line of Defense

How much control do YOU have over IP Cleaning?

-EVS report structure

-IP Cleaning and process of your own FM staff

-FM Technician training

-Vendor staff training

-Hand washing

How good is your quality assurance program?

-Hands-on training-see one, do one, teach one

-Regular supervisor inspections (documented)

-Plan, Do, Check, Act (PDCA)

--Cleaning process, Create ordered practice

-Include checklists

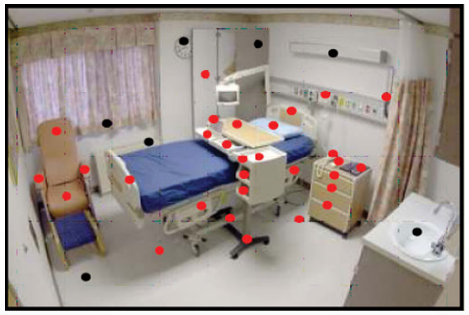
-Reward excellence

-Terminal Cleaning (Daily in OR's, between patients)

Levels of "CLEAN"

• Cleaning	Removal of Visible physical dirt and stains
•Disinfection	Removal of harmful bacteria / microbes
•Sanitation	Process in which most or nearly all micro organisms (whether or not pathogenic)
• Sterilization	Total Germ Kill live (including spores)

Process-Common touch areas



Terminal Cleaning-thorough process

Using new weapons in the war against HAI's

ASHE HEALTH FACILITIES MANAGEMENT

Search

DESIGN CENTER QUICKLINKS

Architecture Construction Engineering ES Interior Design Operations Products Regula

2017 TRENDS IN HEALTH CARE: INFECTION PREVENTION

Focus intensifies on UV disinfection research

Studies examine technology's impact on HAI fight

December 7, 2016 | Bob Kehoe

Research detailed how pulsed xenon UV technology from Xenex, San Antonio, was used to target *C. difficile* infections (CDI) in six units with bone marrow transplant patients and others at high risk for CDI.

Photo courtesy of Xenex

As much as hospitals have been seeking weapons beyond chemicals to kill multidrug-resistant organisms in patient care areas, infection prevention teams have been asking for more research on one of the more popular alternatives: ultraviolet (UV) light disinfection. Those requests are being answered.

Meanwhile, infectious disease and prevention professionals from the Mayo Clinic in Rochester, Minn., presented a poster of their findings at the Association for Professionals in Infection Control and Epidemiology Annual Conference in June. They detailed how pulsed xenon UV technology from Xenex, San Antonio, was used to target *C. difficile* infections (CDI) in six units with bone marrow transplant patients and others at high risk for CDI. During the six-month study, the hospital-acquired CDI rates in the intervention units dropped 39 percent, while there was a 42 percent increase in CDI in the control units that were not disinfected with pulsed xenon UV.

CMS Requires Water Management Plans (6-2-17)

- 286% increase in Legionellosis (2000'-2014')
- "CMS expects Medicare certified healthcare facilities to have water management policies and procedures to reduce the risk of growth and spread of *Legionella* and other opportunistic pathogens…"

The Joint Commission
EC.02.05.01

EP14 - The hospital minimizes pathogenic biological agents in cooling towers, domestic hot- and cold-water systems, and other aerosolizing water systems.

Clinical Leadership & Infection Control

3 patients die after contracting Legionnaires' disease in Wisconsin hospital

Ayla Ellison (Twitter | Google+) - Tuesday, December 18th, 2018 Print | Email

SHARE Tweet Share 8

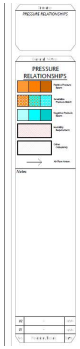
Fourteen patients contracted Legionnaires' disease during an outbreak linked to the water system at UW Health's University Hospital in Madison, Wis., and three of those patients have died, according to the *Wisconsin State Journal*.

HVCA, In Summary
3-Part plan toward 100% compliance

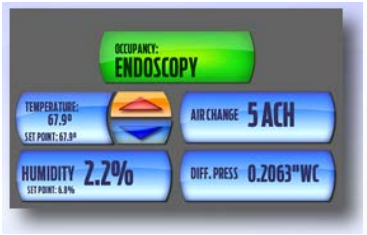
The Gold Standard Model

- Forge partnership with your Infection Control team
- Create 3-Part visual room inventory
  - Part 1: IP Floor Plans
  - Part 2: IP Room Matrix
  - Part 3: Add local monitoring, expand B.A.S. monitoring

Part 1



Part 3

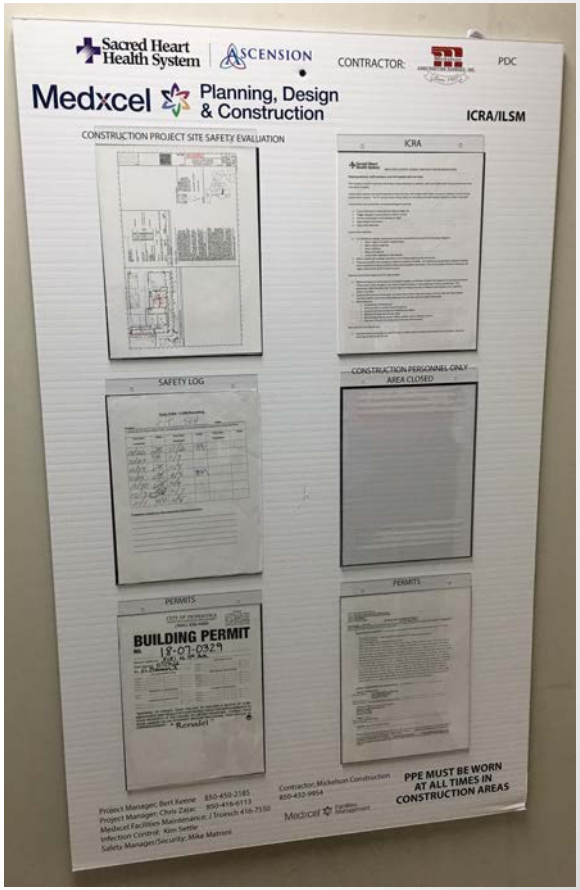


Part 2

Construction/Renovation Safety-Signs say a lot

Safety made visual

- Daily/weekly safety-walk checklist
- Daily filter change-air scrubber
- Negative pressure daily checklist
- Project Supervisor 24/7 contact
- Posting of ICRA
- Posting of ILSM's
- Visual monitor evidencing negative pressure
- Daily checklist of "tack" mat change



Q & A