James Hernandez

- Objectives
  - Describe the newest changes in the guidelines for disinfection in healthcare facilities.
  - Describe the newest innovation and technology for cleaning in healthcare facilities.
  - Describe some ways to validate the effectiveness of the cleaning procedures in healthcare facilities.

Introduction

Welcome to Healthcare

December 26, 1989

Here we are today October 2017

What do we know

- Increasing evidence the role of environment has on infection rates
- UV robotic technology
- New emerging technologies are proving to be effective
- Better tools
- Shrinking budgets

Fighting the daily battles

How many people enter a patient room throughout the day?

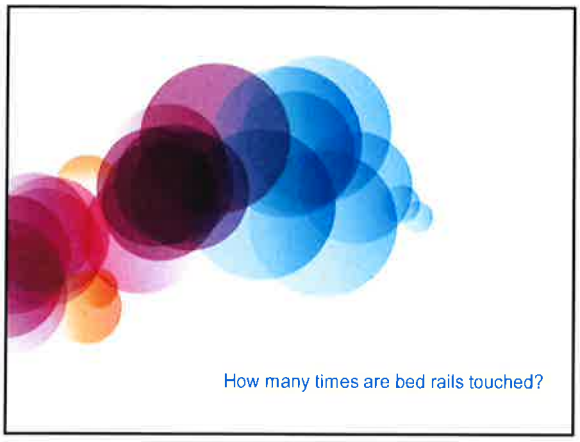
Potential Cross Contamination

Between 5 AM – 8 PM

- Number of room entries = 5.5/hour (28 max)
- Staff entering room = 3.5/hour (18 max)
- People in room during waking hours = 15 hrs. 5.5 /hr = 82.5 people

- Who came in room?
  - 45% = Nursing staff
  - 23% = Personal visitors
  - 17% = Medical staff
  - 8% = Nonclinical staff
  - 4% = Other clinical staff

Cohen, et. al. Frequency of patient contact with health care personnel and visitors: implications for infection prevention. Jt Comm J Qual Patient Safety. 2013; 39(12): 560-565.



Potential Cross Contamination

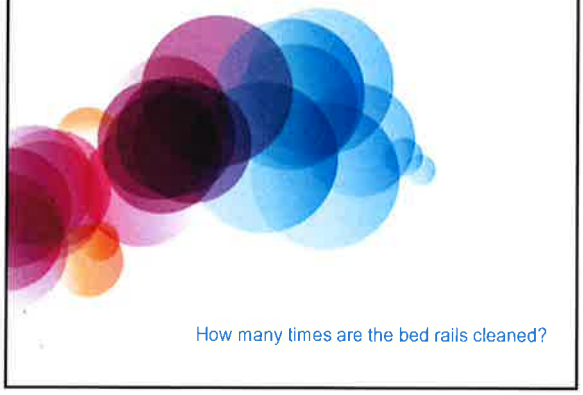
Grand Central Station

- 15 hrs. (5.5/hr.) = 82.5 people
- 68% nursing/medical staff
- 32% visitors/nonclinical staff

Cross Contamination

- Bedrail touches per day = 256

Cohen, et. al. "Frequency of patient contact with health care personnel and visitors: implications for infection prevention." Jt Comm J Qual Patient Safety. 2012 38 (12): 566-565



Typically disinfected once or twice daily

Frequently Touched Surfaces

Surface Contamination

Most Surfaces in Patients' Rooms are Contaminated

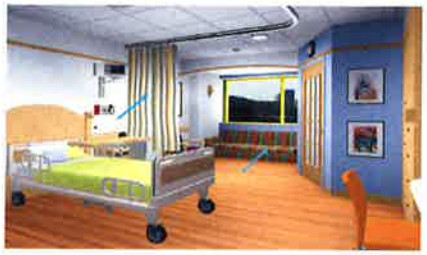
- Countertops
- Cabinets
- Bedrails
- Nurse call
- Computer key boards

Cross Contamination

- Once HCW touch surfaces their hands or gloves are contaminated
- Hand hygiene / glove compliance

The Joint Commission Journal on Quality and Patient Safety, January 15, 2015 volume 45 number 1

Cleaning Soft Surfaces



Soft Surface Cleaning

Can you disinfect curtains or fabrics?

- Fabrics can not be disinfected
- EPA has approved products with a sanitizing claim on soft surfaces
- Incorporate soft surface cleaning in key areas (Patient rooms, Recovery, ER, lobbies, waiting rooms)
- Use of disposable curtains is a growing trend

So what's the solution

Change the culture of the cleaning staff

Helping the staff understand our mission

- Give them a purpose
- We must clean to protect our patients
- Accountability, responsibility & taking ownership
- Provide our teams with the education, training, tools and support

Teaching "The Why"

Making a Difference – One Team with Common Goals

The Facts

- Proper disinfecting practices reduces microbial contamination and reduces risks
- Collaborative approach with key hospital leadership, IP's, Administration, Physicians, Nursing and EVS Leadership
- Zero HAI's by 2021

Should we seek out better or stronger disinfectants?

"We changed disinfectants and infection rates dropped"

Does the perfect disinfectant exist today?

Elements of the perfect Disinfectant

- Environmentally friendly
- Compatible with all surfaces
- Pleasant clean odor
- Non toxic
- Not an irritant
- Non flammable
- Requires no PPE
- Inexpensive
- Kills everything in 1 minute or less

Ideal Disinfectant

Broad Spectrum

— For the most prevalent healthcare pathogens

Dwell time

— How quickly does the product kill, and does it keep surfaces wet

Safety

— Toxicity, surface compatibility, PPE requirements

Ease of Use

— Odor, shelf life, water-soluble, simple directions, clean and disinfect in one step, and variety of applications

Rutala WA, Weber DJ. Infect Control Hosp Epidemiol 2014;35:855-865

Effects of Disinfectants on Microorganisms

Organism	Type	Examples
Bacterial Spores	Spore	*Bacillus anthracis, Clostridium difficile*
Mycobacteria	Bacteria	*M. tuberculosis*
Small non-enveloped virus	Virus	Poliovirus, Norovirus
Fungal spores	Fungus	Aspergillus, Penicillium, Trichophyton
Gram negative bacteria	Bacteria	*E. coli*, Klebsiella including CRE, Pseudomonas, Acinetobacter
Fungi (Vegetative)	Fungus	Candida
Large Virus (non-enveloped)	Virus	Adenovirus, Rotavirus
Gram positive bacteria	Bacteria	Staphylococcus including MRSA Enterococcus including VRE
Virus (enveloped)	Virus	HIV, HBV, HCV, Influenza

C. difficile

CDC Funded Study

- 500,000 C.difficile associated infections in US
- 29,000 patients died within 30 days after being diagnosed
- 8% percent decrease in C.difficile infections between 2011 - 2014
- Dangerous pathogen

Center for Disease Control and Prevention (Burden of Clostridium difficile Infection in the United States 2011)

Disinfectant types

High-level
- Kills all organisms, except high levels of bacterial spores

Intermediate-level
- Kills TB, most viruses, and bacteria

Low-level
- Kills some viruses and bacteria with a registered germicide hospital-grade disinfectant

Center for Disease Control and Prevention (Infection Control Guidelines / Disinfection

Surface Types

Critical (High Risk / High-level)
- Surgical devices, invasive instruments, enters sterile body cavities

Semi-Critical (High-level)
- Contacts mucous membranes endoscopes, respiratory equipment

Non-Critical (Low-level)
- Bed rails, bed pans, furniture, door knobs, light switches, floors

Center for Disease Control and Prevention - Infection Control Guidelines and Disinfection, Spaulding Classification Scheme

Effective cleaning

Cleaning & Disinfecting

We need better and more frequent cleaning and disinfecting practices

- Designed to reduce organic and inorganic material
- Top to bottom / Clean to dirty
- Utilize good friction
- Microfiber / disposable wipes
- P.O.C. (Point of Care)
- Avoid aerosol products

Our Primary Objective

Get patient care areas hygienically clean (not sterile) free of pathogens in sufficient numbers to prevent human disease

Use proper tools that enhance cleaning results

Microfiber Benefits

- Time & labor saving
- Reduces chemical use
- Prevents cross-contamination
- Four times more effective than cotton rags

Infection Control and Hospital Epidemiology Study 2012

Highlights of Study

- Effective cleaning reduces risks
- Cleaning with good friction
- Wiping with non-sporicidal <2.9 log reduction>
- Wiping with sporicidal <3.9 log reduction>

William A. Rutala PhD MPH, Maria F. Gergen MT(ASCP) and David J. Weber MD MPH
Infection Control and Hospital Epidemiology
Vol. 33, No. 12 (December 2012), pp. 1255-1258

Combating C. diff

Key points

- Utilize a documented checklist
- Sporicidal disinfectant (6 log kill 99.9999%)
- Remove bioburden first
- Double clean rooms
- Utilize supplemental devices
- Validate cleaning results

What do kill logs mean?

- A 1-log kill reduces the colony to 100,000 bacteria after a 90% reduction;
- A 2-log kill reduces to 10,000 bacteria after a 99% reduction;
- A 3-log kill reduces to 1,000 bacteria after a 99.9% reduction;
- A 4-log kill reduces to 100 bacteria after a 99.99% reduction;
- A 5-log kill reduces to 10 bacteria after a 99.999% reduction;
- A 6-log kill reduces to 1 CFU after a 99.9999% reduction.

Do floors contribute to increased risks?

Recent study published in American Journal of Infection Control (March 2017)

- Floor were frequently contaminated with healthcare associated pathogens
- High touch items often came in touch with floors
- C.diff spores were frequently found on floors
- Disinfectants should be used on patient room floors
- Additional review of proper cleaning of floors must be further studied

American Journal of Infection Control, Volume 45, Issue 3 (March 2017).

February 9, 2015

How really clean are those rooms?

Keeping an eye on things

Validating Cleaning Thoroughness

Only 50% of targeted room surfaces may be properly cleaned

- Ranges from 20 – 80%
- Visual Inspections
- Fluorescent monitoring
- ATP Monitors

Measure thoroughness of cleaning

ATP

- Only measures organic material on surface
- Provides measurable standards
- Customizable
- Data analysis/shows trends

Fluorescence Marking Devices

User friendly / cost effective

- Easily cleaned
- Environmentally stable
- Trending tool / statistics
- Applied by IP's

UV Technology Supplemental Procedures

Does it work

- Kills microorganisms left behind after surface disinfection
- 3-4 log kills
- Expensive ($90-$130k)
- Ongoing maintenance cost
- Utilize post terminal cleaning
- **Data has shown to decrease HAI's**

UV Technology Myths

Clarification Points

- Doesn't replace surface cleaning & disinfection
- Rooms must be cleaned first to remove bioburden
- It does not kill everything
- Distance of light impacts effectiveness
- Increased time required to kill C.diff spores
- Does not reduce labor cost

New Technology

UV Disinfecting Device

- Kills airborne contaminants
- 24 hours a day
- Compatible with HVAC systems
- Surgery, ICU, Isolations, ER
- *Recent study showed statistically significant decrease in fungal and bacterial viable air particles (62% -78%) in an inpatient Pharmacy

*Association for Professionals in Infection Control and Epidemiology, Inc. Published by Elsevier Inc. American Journal of Infection Control. Article Published July 2017

New Technology
Advantages & Disadvantages

- Continuous room disinfection (slow)
- Antimicrobial applied to surfaces (Has to be reapplied)
- Hydrogen Vaporized Systems (Rooms have to be closed down)

Wrapping it up

We have some work to do

- Combination of product, technology & practice results in proper disinfection and reduction of patient risks.

Our ultimate goal is zero HAIs

So what's the next step?

- Review your cleaning programs
- Give your cleaning teams a tune-up
- Evaluate your leadership teams

We need to make another round of cuts!

Just Say No

Get what you need

- Executive leadership support
- Staffing resources
- Capital budget approval for equipment
- Be demanding / non-negotiable

5 Key Elements to reducing HAI's

- Systems
- Training
- Validation
- Technology
- Leadership

Thank you

Questions