Cleaning To Save Our Tomorrows

Presented to
California State Hospital Acquired Infection Advisory Sub-Committee
Healthcare Facility Environmental Cleaning Standards Research Team

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Melinda Cooper BSN, RN, CIC Infection Prevention
and
Coleen Athey CLLM, Director, Environmental Services & Linen

With content adapted from "C. difficile: Strategies for Prevention"
by Vickie Brown, MPH, RN, CIC Director Infection Prevention)

WakeMed Health & Hospitals
Raleigh, North Carolina

Objective

- Identify strategies a healthcare organization might adopt to help reduce the incidence of healthcare associated C. difficile and other antibiotic resistant infections

Code Blue!

Think "Fountain"

"Patients colonized or infected w/ healthcare-associated pathogens often shed these organisms onto their skin and into the environment"

Eckstein, BC. et al.; *BMC Infect Dis*. 2007 Jun; 7:61

Think “Veneer”

- It is well recognized that environmental surfaces w/in the immediate vicinity of patients w/ MRSA, C-diff, and VRE become contaminated with these organisms
- It is just as easy to become contaminated by touching a patient's environment as it is by touching the patient

Environmental Reservoirs

Pathogen	Maximum	Median	Source
MRSA	>60 days	12 days	1
C-diff	5 months; spore	6 hours; vegetative	2,4
VRE	4 months	31 days	1, 3
Norovirus	7 days	8 hours	5
Acinetobacter	5 months	3 days	5

[1] Gastmeier et al., *Journal of Hospital Infection.* 2006 Feb; 62(2): 181-6
[2] Weber et al., *American Journal of Infection Control.* 2010 June; 38(s25-s33)
[3] Wendt et al., *Journal of Clinical Microbiology.* 1998 Dec; 36(12): 3734-6
[4] Jump et al., *Antimicrobial Agents and Chemotherapy*. 2007 Aug; 51(8): 2883-7
[5] Kramer et al., *BMC Infect Dis.* 2006 Aug; 6:130

Snapshot of C-diff

- Epidemic strains have developed resulting in increased incidence and severity
- 237% increase in C-diff hospitalizations between 2000-2009
- AJIC; Premier hospital database study [1]
  - 4.7 days increase LOS
  - $7,286 total attributable cost
- Estimated attributable cost to recurrent $8,937-$14, 588 [2]
- Up to 50% of antibiotics are prescribed inappropriately
  - microorganisms gain resistance to antibiotics
  - more superbugs
- There is mounting evidence to suggest acid suppression therapy for stress ulcer prophylaxis is over utilized and also contributes to C-diff

[1]Magee G, *Am J Infect Control* 2015:1148-53

[2]Dubberke ER. et al., *Infect Control Hosp Epidemiology* 2011:201-206

What has Science Told Us About Environmental Cleaning?

We are not very good at it!

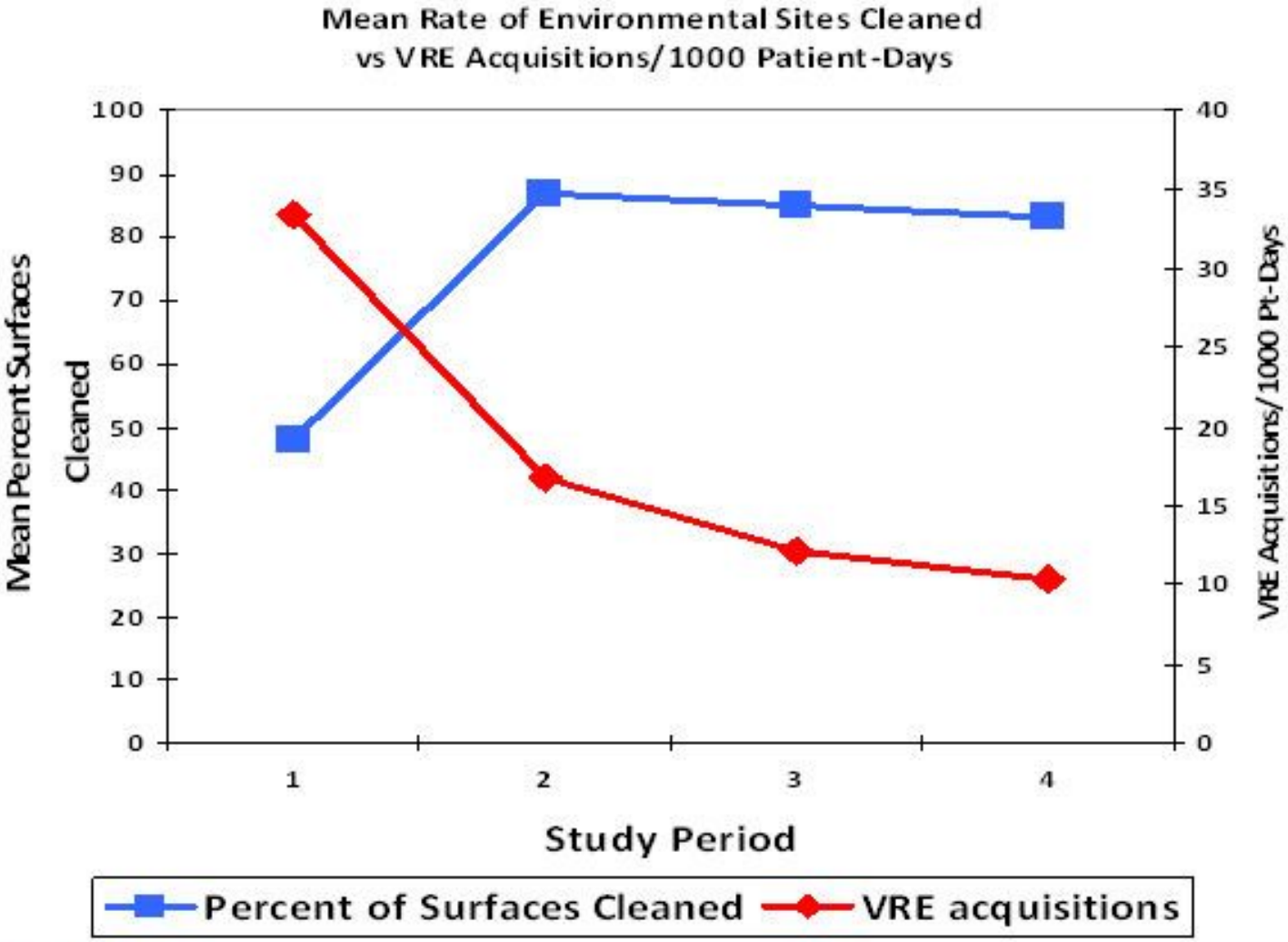
Studies have shown approximately 50% of high touch surfaces are not cleaned during terminal cleaning of a patient room.[1]

And those rooms are often highly contaminated with antibiotic resistant microorganisms. And manual cleaning methods are often ineffective in reducing the degree of contamination.[2]

% contaminated	MRSA	VRE	C-Diff
Pre-Cleaning	34.4	29.5	31.8
Post-Cleaning	27.9	29.5	22.7

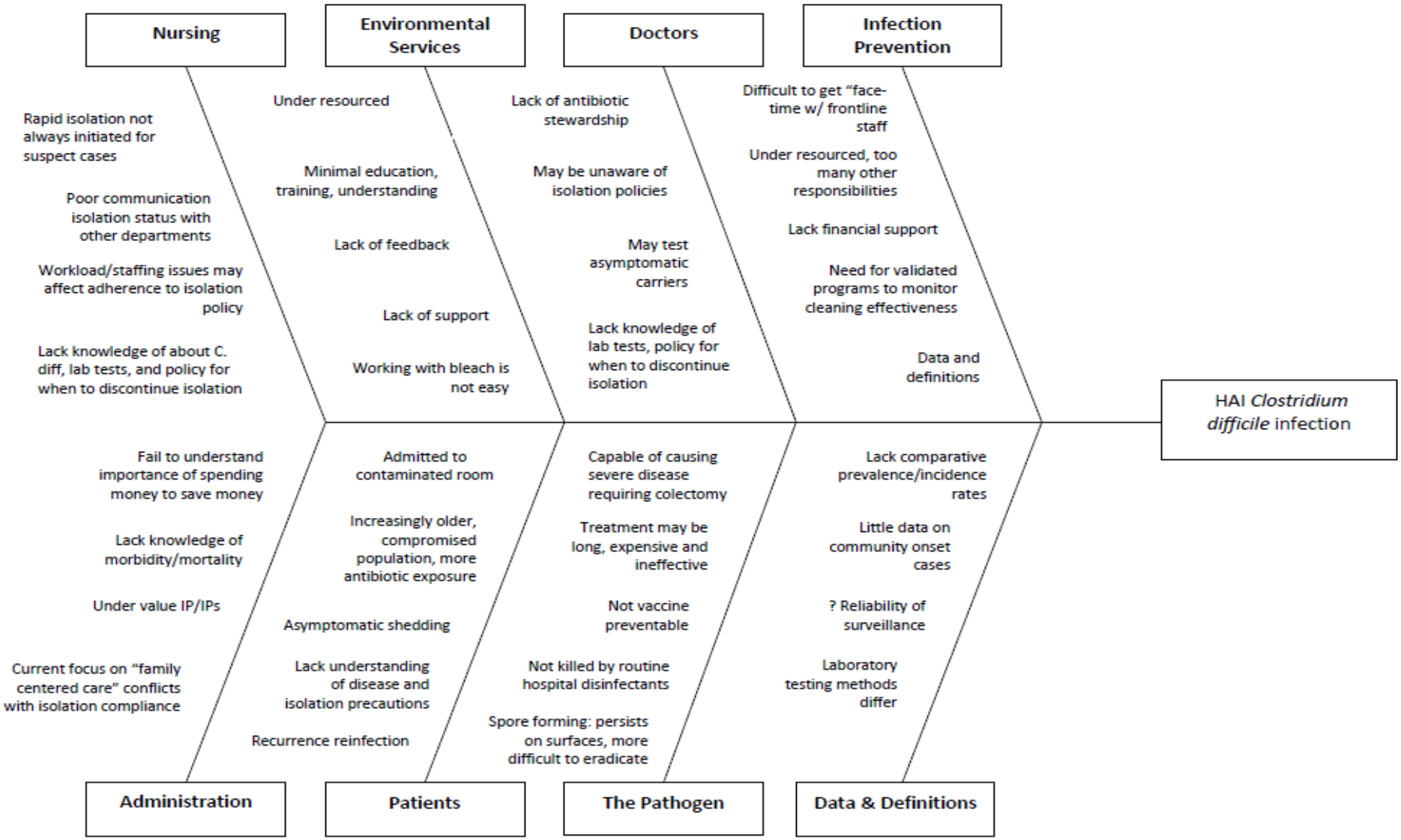
[1]Carling PC, Infect Control Hosp Epidemiology 2008:1035-1044
[1]Ragan K, Am J Infect Control 2012:284-286
[2]Wong T, et al, Am J Infect Control 2015:416-420

Higher % Surfaces Cleaned = Lower VRE Acquisition



Hayden, MK.et al. *Clin Infect Dis* 2006; 42(11): 1552-60

Factors Contributing to *C. difficile* Transmission



Strategies to Prevent Environmental Transmission of Antibiotic Resistant Infections

- Define cleaning responsibilities: Clinical staff or Environmental Services (EVS)
- Involve Environment of Care (EOC) team from the beginning
- Ensure adequate time is allowed for terminal room cleaning!
- Consider week long cleaning with sporicidal disinfectant when 2 cases of healthcare-associated CDI occur on an inpatient unit
- Audit terminal room cleaning and provide direct feedback to housekeeper
- Institute enhanced terminal cleaning using UV-C or vaporized hydrogen peroxide
- Ensure a robust communication system for isolation

Who Cleans What

Unit Staff Empties, Discards, or Removes	Unit Staff Cleans	EVS Discards, Removes	EVS Cleans (7 step method)
Empties: -Bedside commodes -Urinals -Urine hats -Suction canister liners, lids, and tubing Discards: -All IV fluids and medicines Discards or Removes: -All unused patient care supplies	-Telemetry boxes -CPU keyboard (without cover) -Portable pulse oximeter and cords -Scales -Blood glucometer -Dynamap -Sonosite -Lab draw carts	Discards: -Disposable blood pressure cuffs -Urinals -Urine Hats	All Horizontal Surfaces Spot clean walls Cabinet fronts All High Touch Objects: -Room door knob -CPU keyboard (covered) -Bed rail/controls -Call button -Telephone -Bedside table handle -Over bed table (tray table) -Chair -Room sink faucet handle -Bathroom door knob -Bathroom sink faucet handle -Bathroom handrail by toilet -Toilet flush handle -Bed Pan cleaner -Toilet seat
Removes: -Any patient personal belongings left in room -Any splints, boots, other OT/PT devices left in room -All unit owned equipment: refer to “Unit Staff Cleans” column		Removes to Soiled Utility: -IV pumps -SCDs -Fans -Wheelchairs -Walkers -Food trays (must be covered)	Additional items that may be in room: -Monitor and monitor cables (bleach wipes only) -In-room pulse oximeter and cords -Thermometer and cradle -In-room MAK scanner -White board -In-room refrigerator -Exterior of portable HEPA units -Flashlight -eICU call button

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Common Areas

Unit Staff Cleans:	EVS Cleans:	MPD Cleans:
CPU stations/WOWs	Staff and public bathrooms	Blue optiflex bins
Refrigerators (includes medication refrigerator)	Nursing station desks and counters	
Microwave	Foyer seating, Pyxis, supply room floors	
Family room refrigerator	Isolation stations	
Family room microwave	Conference rooms	
Crash carts		

Unit staff is responsible for ensuring reusable items not listed above are cleaned between patients. This process is standardized for all units and areas. The unit manager should confer with their EVS supervisor when additional cleaning assistance is needed.

What to Use?

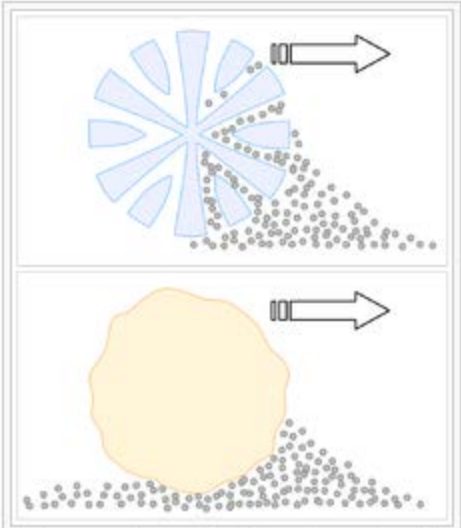
Partner with Medical Engineering!

Bleach Wipes	Quat Wipes (alcohol and quaternary ammonium chlorides)	Quat Spray Solution	Specialty Items That Cannot be Cleaned by Bleach or Quat
Wet Time: 4 minutes **After 4 minutes wet time has elapsed, wipe device screens with a clean cloth dampened with tap water to prevent chlorine residue from whitening the screen.**	**Wet Time: 2 minutes**	**Wet Time: 10 minutes**	**Wet Time: Follow directions on container when using a commercially prepared cleaner.**
Vital sign monitors	Computer keyboard and mouse	Computer keyboard (covered) and mouse	Defibrillators: Clean only with soap and water followed by an alcohol wipe
Telemetry boxes	Computer touch screens	Desktop phones (not on screen)	X Type Ultra Sound machine" Clean only with X spray.
Infusion pumps	WOWs	Beds and mattresses	
Medfusion syringe pumps	Bar scanners		
Ultrasound probes	Voalte phones		
Portable x-ray machines	Bladder scanner probes		
Ultrasound machines	Desktop phones (do not use on screen)		
Portable ECG monitors	Beds and mattresses		
Computer keyboard and mouse			
Computer touch screens			
ICU bedside and central monitor			
WOWs			
Bar scanners			
EKG machines			
Beds and mattresses			
EVS daily/terminal clean of Special Enteric Isolation room surfaces		*EVS daily/terminal clean of patient room surfaces EXCEPT for Special Enteric Isolation rooms*	

How To Use It – Ensure Proper Practices

- Chemical prep and use
- Expected number of cleaning cloths used per room (ballpark)
- Wet time/contact time for disinfectants used
- Separation of patient room and patient bathroom rags; common areas

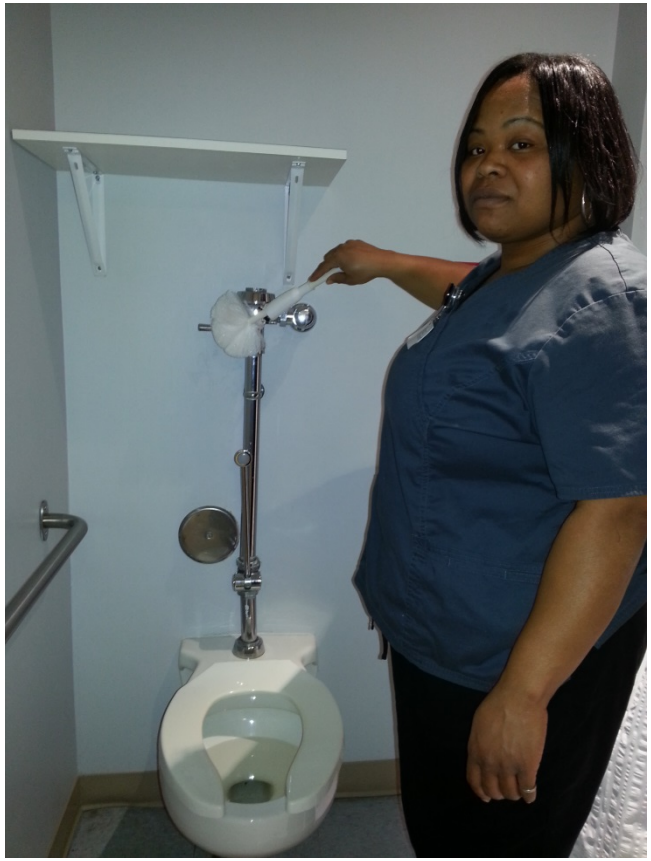
Microfiber is Best

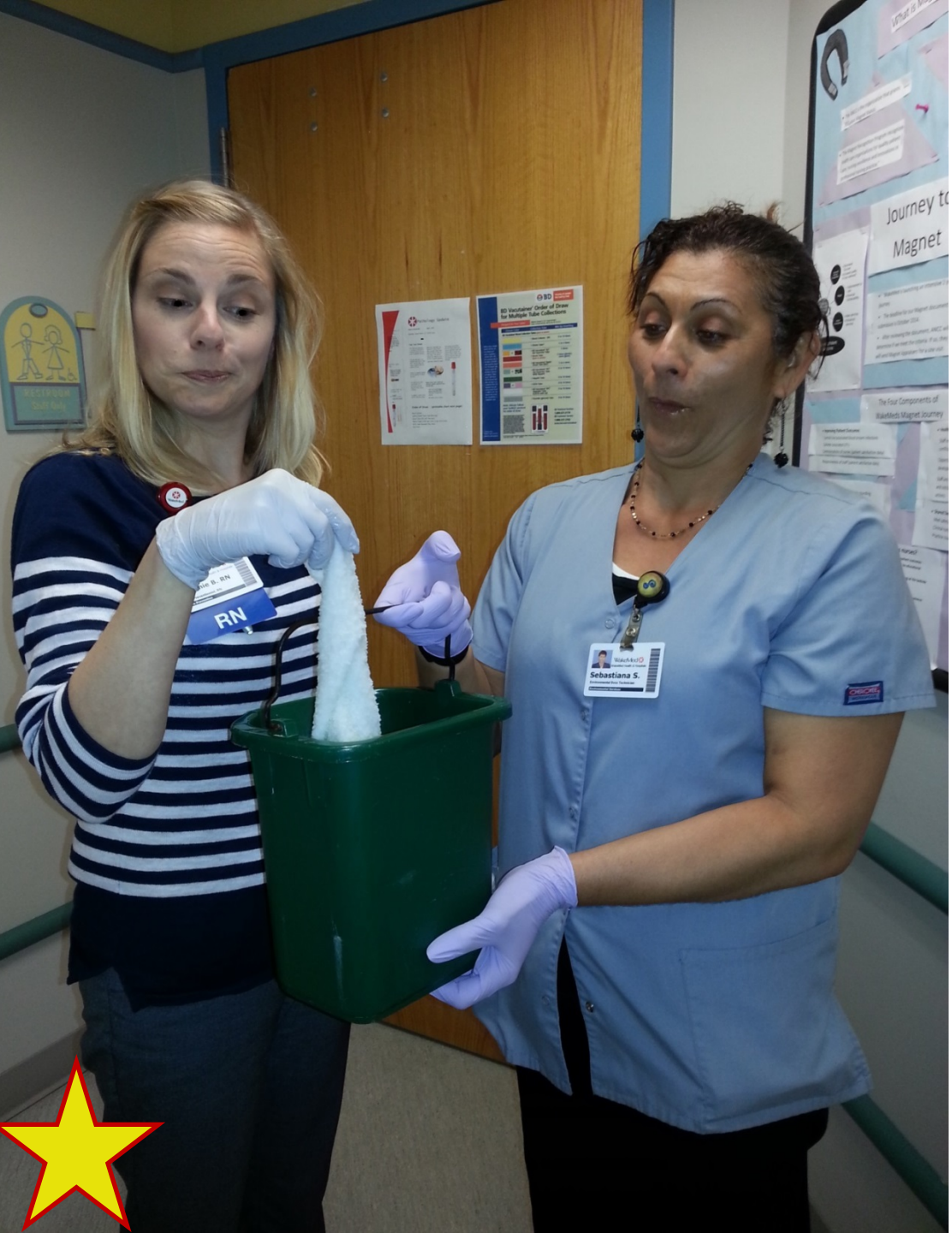


Cross sections: microfiber thread above, cotton thread below

- Blue and yellow cloths
  - Best for grabbing dirt
  - Best for patient rooms
- Mops
  - Microfiber mop heads get floors more clean than string mop heads

Would you want to sit on this commode????





PLEASE – Make Your Work Count!!!

Rags left to soak in quat absorb ALL the good stuff leaving NONE for later rags.
Do NOT leave rags soaking, they won’t kill germs.

Bleach Cleaning

SHEA/IDSA Practice Recommendation[1]

- Ensure cleaning and disinfection of equipment and the environment
  - Quality of evidence III
- Use EPA approved sporicidal disinfectant or diluted sodium hypochlorite for environmental cleaning and disinfection
  - Quality of evidence III

Suggested Strategies

- Bleach clean rooms of patients with CDI
- Consider bleach clean of entire unit when 2 or more cases of healthcare-associated CDI are on unit
  - NO guidance for how extensive or how long unit bleach cleaning should be done
- Ensure nursing staff are cleaning any shared equipment with bleach

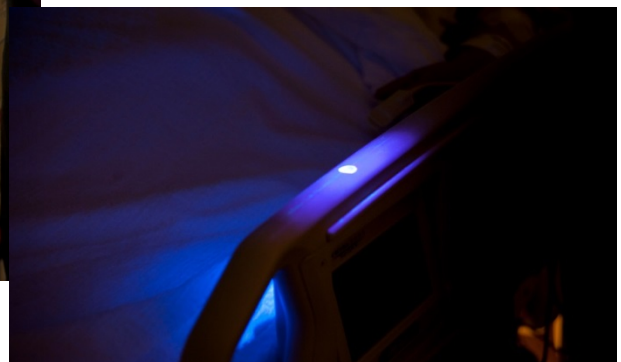
[1]Dubberke ER, et al. Strategies to prevent *Clostridium Difficile* infections in acute care hospitals: 2014 Update, *ICHE* June 2014: vol. 35, no. 6

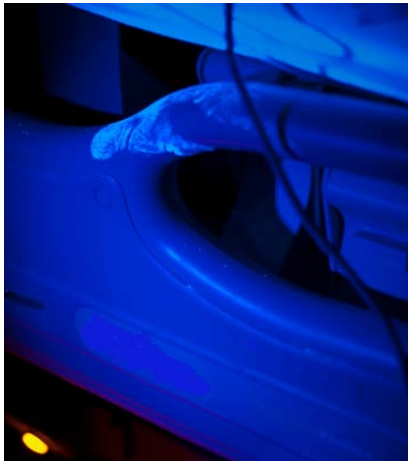
Building a Partnership with EVS

Factors that Lead to Poor Performance by Environmental Services

Room Cleaning Evaluation Methods

Method	Considerations
Visual Inspection Microbiology Testing ATP Testing Fluorescent gel and Blacklight	Measure of cleaning or measure of disinfection Ease of Use Objectivity Qualitative vs Quantitative or both Time Cost Training ◦ Ease of use plus meaningful tool for giving feedback

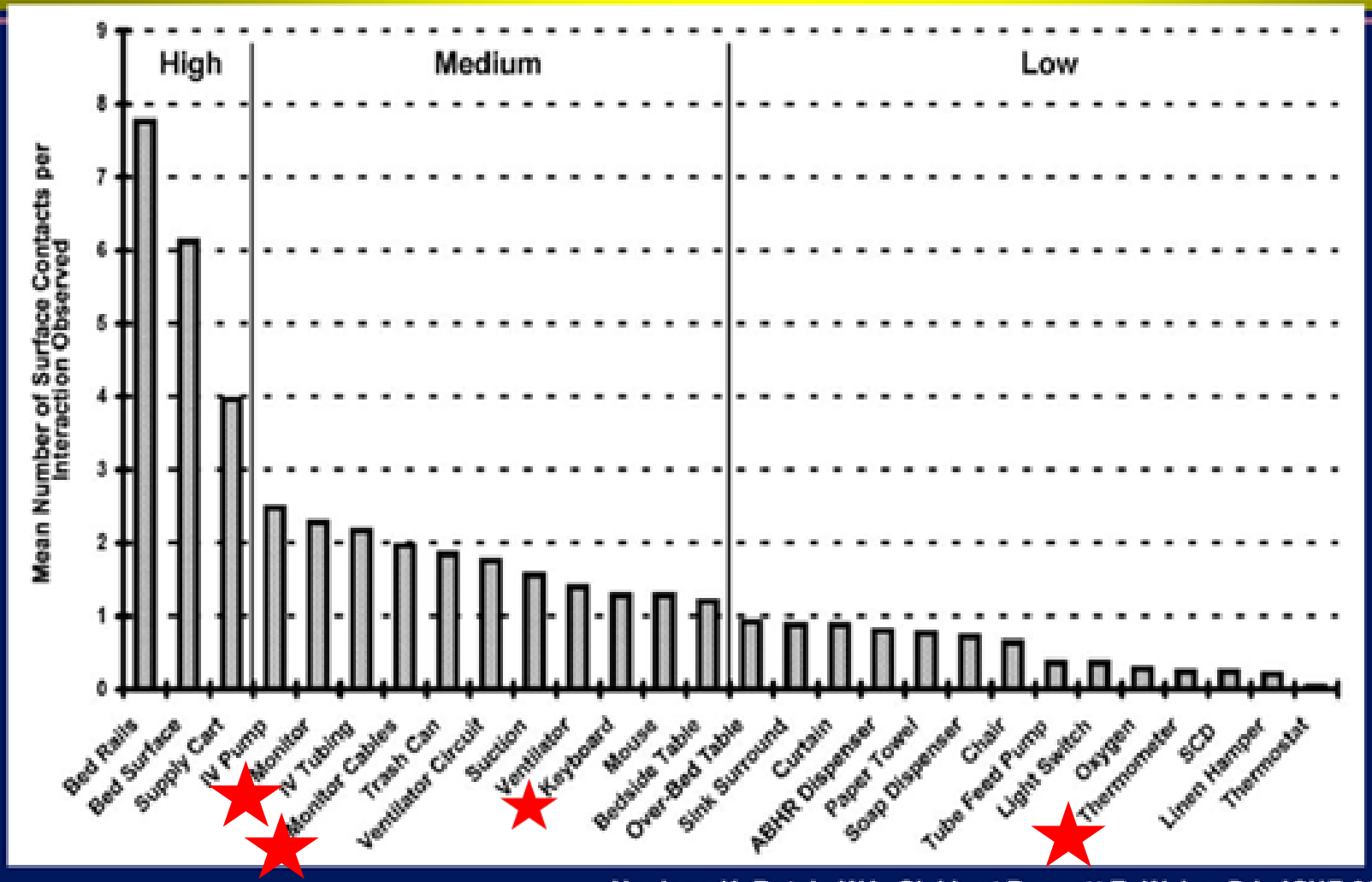




High Touch Objects: What Are They?

- **"Where the germs are"**
- Sites most frequently contaminated and touched by patients and healthcare workers
  - Germs get spread around by people touching these places
    - Patients get infections from these germs

What Do Healthcare Personnel Touch with High FREQUENCY? ICU Setting (N=28)



Huslage K, Rutala WA, Sickbert-Bennett E, Weber DJ. ICHE 2010;31:850-853

Room Cleaning Audit System: Implementation

- Impetuous
  - Joint Commission:
    - EC.04.01.01: The hospital collects information to monitor conditions in the environment
  - CDC, SHEA, CMS, APIC
  - C-diff infection rate
  - Increase collaboration btw/ IP and EVS dpts
- Target marking solution/Fluorescent gel
  - Objective, great training and feedback tool
- Cleaning can be programmatically improved

Getting Started

- Evaluate cost of program to audit effectiveness of terminal cleaning of patient rooms
  - Supplies
  - IP time
- Get buy-in from EVS leadership to implement program
- Make it a non-punitive educational/reward program

- EVS recognition program
  - EVS voted on name
- Receive certificate and pin when achieve 100% on a room audit
- Highlighted in facility newsletter
  - PR and Employee Relations
- EVS management
  - Call/email when 100%
  - Monthly list of names by time clock or department meeting
  - Pictures from pin ceremony by time clock
- Infection Prevention
  - Quarterly pin ceremony
    - Medical director and/or IP director shake their hand

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 %

Room Audit Results

High Touch Objects (16)	Baseline	Q4 2012	Q3 2013
Bathroom Handrail by toilet	68%	87%	73%
Bathroom Inner Door Knob	61%	84%	83%
Bathroom Light Switch	61%	*	
Bathroom Sink	100%	80%	83%
Bed Rails/Controls	43%	84%	75%
Bedside Table Handle	27%	67%	73%
Call Button	74%	88%	85%
Chair	65%	82%	83%
Room Inner Door Knob	43%	78%	81%
Room Light Switch	35%	*	*
Room Sink	68%	90%	92%
Telephone	65%	87%	84%
Toilet Bedpan Cleaner	57%	84%	84%
Toilet Flush Handle	91%	91%	88%
Toilet Seat	70%	89%	97%
Tray Table	70%	95%	94%
Total Patient Bathroom	69	85	85
Total Patient Room	56	84	83
Overall	61	84	84
Number Objects marked	336	1026	409

	<70%
	70-80%
	>80%

Environmental Services

Comments from EVS staff after room audit and feedback

"Patients are dying from infections."

"I didn't really know what was important before."

"Now I can know how to do my best even when I'm in a hurry."

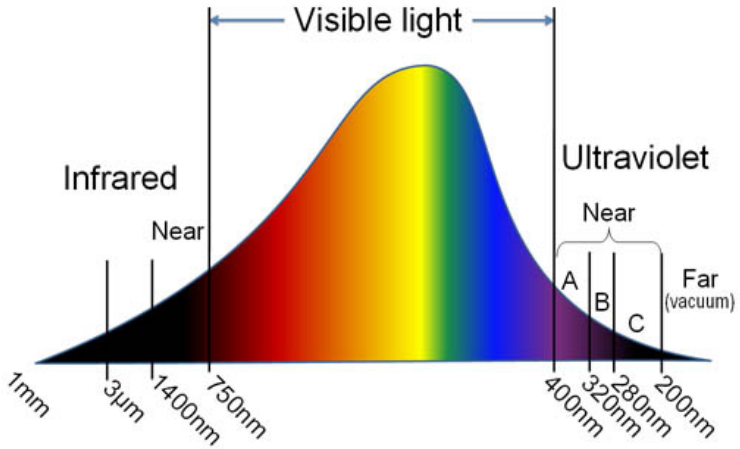
"We all need to clean these rooms like it's one of our own coming in here."

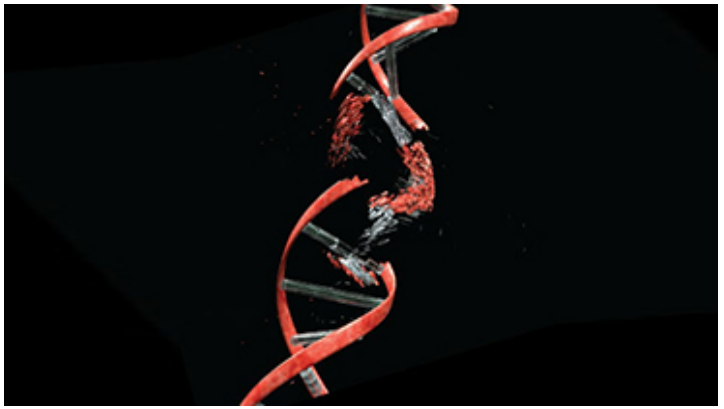
Disadvantages/Issues to Performing Room Audits Using Fluorescent Gel or ATP

- Difficult to target individual EVS staff members
- Difficult to know when room is awaiting cleaning
- Financial costs
  - Marking solution or swabs
  - Software for audit reports
  - Paid IP time
- Diverts IP time from other activities
- EVS learn what surfaces are marked/targeted and limit cleaning to those surfaces
- No validated model for a maintenance audit program

Enhanced Measures for Room Decontamination

- UV-C





- Hydrogen peroxide vapor

- In-room lights that use visible light to continuously kill bacteria

Please Do Not Open Door

UV Disinfection Unit in Use

This UV disinfection unit helps protect our patients and ensure a safe, clean environment:

- Ultraviolet light breaks down even the strongest bacteria and viruses
- The unit produces no ozone or contaminants but a slight "dusty" odor is normal
- The cycle stops when the sensors detect motion or heat

With any questions or concerns, contact Environmental Services at ext. 12345, option 1.

Thank you for your cooperation.

WakeMed

Challenges to Enhanced Measures

- Financial costs
  - Initial purchase and maintenance
- Employee training
  - How to operate and when to use
- Increased workload for EVS
  - May require multiple trips to the room
- Slows room turnover

Spending Money to Save Money: Building a Business Case

- Brief review of *C. difficile*
  - Epidemiology, morbidity/mortality
- National and facility CDI trend
- Brief review technology; literature summary on effectiveness
- Economic analysis
  - Cost of unit including service contract/replacement bulbs
  - Cost of *C. difficile* infection
  - Estimated cost savings by reducing incidence of *C. difficile*
- Survey of surrounding hospitals
- Conclusions/recommendations

Communicating Isolation: How do EVS and the clinical staff know when enhanced cleaning measures are indicated?

Use Your EMR to Embed Isolation Alert

Patient Name: [redacted]
Patient Age: [redacted]
MRN: [redacted]
CSN, Locat[redacted]
Admit Date, LOS: 1/12/2016, 28

Private: None
FYI: FYI
Isolation: Special Enteric
Code: FULL
Level of Care: Telemetry/monitor...
Patient Class: Inpatient

Bed: [redacted]
Attending: Intmed-Team-A, Wmp
Treatment Team: Wmp Intmed-T...
Primary Team: Internal Medicine A
PCP: [redacted]

Allergies
No Known Allergies

Current Weight: 50.4 kg...
Dosing Weight: None
BMI: 17.94 kg/m²
Clcr: 44.4 mL/min

Language, Interpreter: English,...
My Chart: Not Used
Password: None

Summary
Overview | Snapshot | Meds | FS | ED Clinical Summary | Antibiotic Summary
Report: Overview

Summary
Chart Review
Care Everywhere
Flowsheets
Notes
Education
View and edit patient education information
Orders

Fall Risk

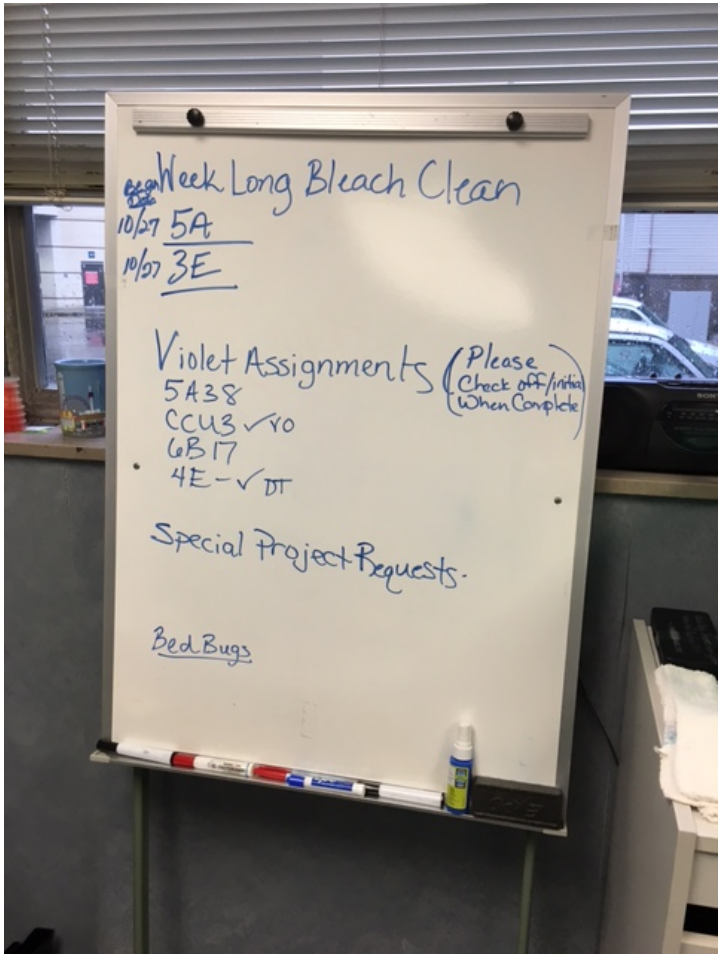
MDR Organisms Requiring Isolation

Infection Type	Encounter Level?	Added	Added By	Comment
C.Difficile	Yes	02/01/16 0801	Marc	2/7/16

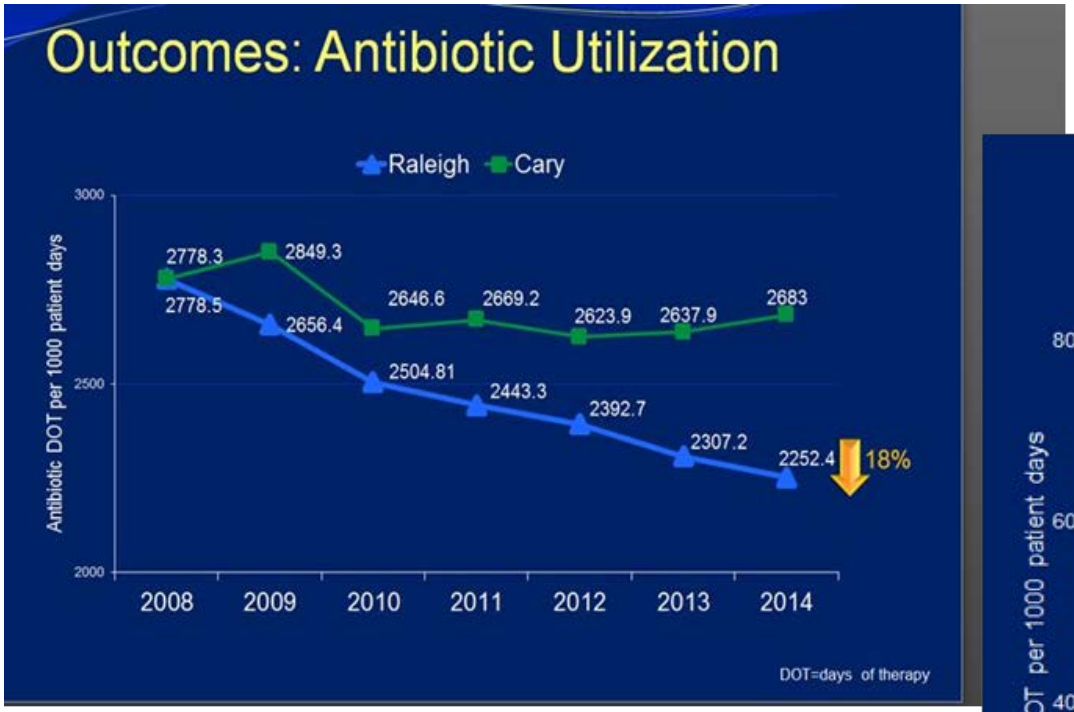
ADT Related Orders — Comment | Expand

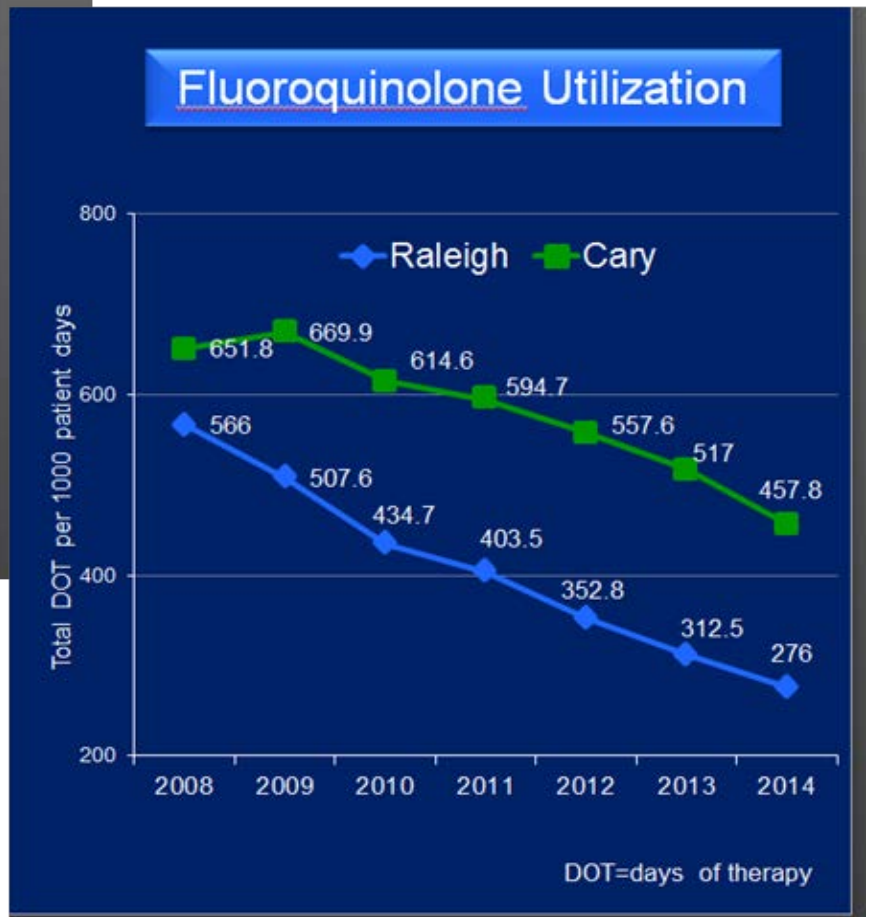
	Ordered
Update Level of Care Once	02/10/16 1029
Transfer Patient/Level of Care Once	01/14/16 1207
Transfer Patient/Level of Care Once	01/13/16 1426
Admit to Inpatient IP 2 or More Nights Once	01/13/16 0236

Low Tech Works Too!



Support Antibiotic Stewardship!





Trending Lately – Melinda's Brain

- Culture is key; Quality over Quantity
- Future development of faster enhanced measure methodologies
  - The efficacy of UV-C in the absence of manual disinfection
- Minnesota Hospital Association's "Environmental Service Cleaning Guidebook"
  - Concept of initial assessment of competency/certification and yearly training and recertification thereafter
- European sporicidals
  - Often not tested for compatibility on equipment and surfaces found in American hospitals
- EPA registered microbicidal paint is here!
  - Designed for HCFs
  - $85-70/gallon vs $25 regular
- Colonization pressure
  - SNFs and LTCs
- "I will REMOVE the toilet seat if you don't shut up!"

...if you could see the germs...

THANK YOU

- For all that you do
- For making us shine
- For being part of a great team
- For rolling with the punches and embracing change
- For making a difference
- For Saving Lives One Room at a Time!

Questions/Discussion

- Melinda Cooper BSN, RN, CIC Infection Prevention
- Coleen Athey CLLM, Director, Environmental Services & Linen

BUILDING A PARTNERSHIP TO REDUCE C. DIFFICILE

Melinda Cooper, RN, BSN, CIC and Vickie Brown, RN, MPH, CIC
WakeMed Health & Hospitals
Raleigh, North Carolina

Issue

There is increasing evidence that patients are at a higher risk of acquiring C. difficile infection (CDI) when admitted to a room that previously housed a patient with CDI. Environmental Services (EVS) staff often does not understand the importance of cleaning a room thoroughly and are often pressured to quickly clean discharge rooms. We aimed to educate EVS staff about their role in infection prevention and to provide a quantitative measure of their performance.

Project

At our two hospitals (total of 884 beds), infection preventionists (IPs) used a fluorescent gel marking system to provide feedback and education to housekeepers. Beginning October 2011, IPs marked 15 high touch objects (HTOs) prior to room cleaning and reviewed results with the housekeeper in a non-punitive manner. All inpatient areas were phased into the program during an 18-month period. IPs regularly attended EVS meetings to update and educate staff. A recognition program was instituted for housekeepers achieving 100%. They received a certificate and pin, and their name posted by the department time clock.

Results

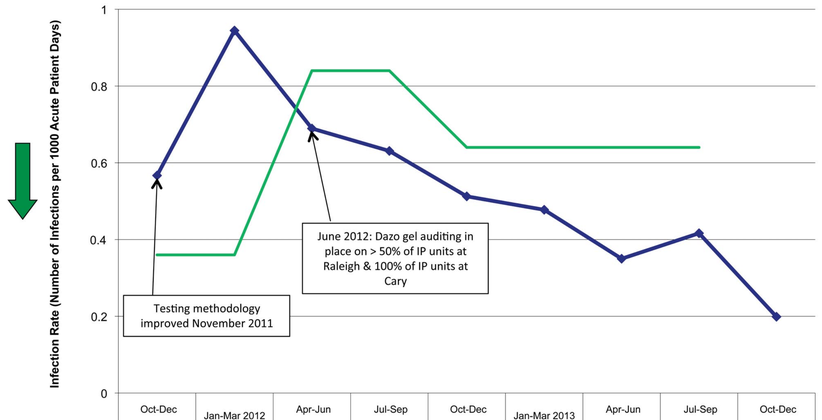
The baseline (October-December 2011) audit score was 54%. Since the initial baseline period, audit scores have averaged >80%, a sustained improvement for >2 years. Ninety-four housekeepers (68% of eligible staff) were audited at least once and 75 housekeepers achieved at least one 100% score. IPs averaged 25 room audits per month. Baseline (10/01/11-03/31/12) CDI was 0.76/1,000 patient days. By June 2012, >50% of inpatient units were included in the audit program. From 04/01/12 to 09/30/13 CDI rates by 6-month increments were 0.65, 0.49, and 0.38 per 1,000 patient days.

Lesson Learned

By partnering with EVS using a non-punitive educational approach, terminal room cleaning can be improved. Our declining CDI rate suggests improved cleaning reduces C. difficile contamination and subsequently cases of CDI. To achieve success, it is important to support EVS staff by providing them with appropriate supplies such as extra-large bleach wipes, teaching them disinfectant contact times, and creating a forum for open discussion and recognition of achievement.

No Disclosures

Healthcare-Associated *C. difficile* Infection Rate WakeMed Raleigh and Cary Campuses



	Oct-Dec	Jan-Mar 2012	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Mar 2013	Apr-Jun	Jul-Sep	Oct-Dec
C diff. Rate	0.566851142	0.944584383	0.689334792	0.630840779	0.512520135	0.477526413	0.349996196	0.416422468	0.198785877
R+C Patient Days	67037	69872	66731	68163	68290	67012	65715	64838	65397
C.diff Infections	38	66	46	43	35	32	23	27	13
Goal	0.36	0.36	0.84	0.84	0.64	0.64	0.64	0.64	

Acknowledgements

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Robert Bos, Director, Environmental Services
Lisa Schneider, RN, BSN, CIC
Tim Markijohn, Director, Facilities & Environmental Services

SAVING LIVES 100 PERCENT
ONE ROOM AT A TIME
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