

Environmental Cleaning in Healthcare: Is Monitoring of Cleaning Compliance Really Needed?
Dr. Michelle Alfa, Diagnostic Services of Manitoba
A Webber Training Teleclass

Environmental Cleaning in Healthcare:
 Is Monitoring of Cleaning Compliance Really Needed?



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Overview:

- **Importance of Environmental Cleaning/Disinfection**
 - Healthcare HAI transmission
- **Cleaning monitoring**
 - Guidelines; audit tools
 - Published data
- **Prospective Manitoba study**
- **Summary**


Evidence of HAI Transmission related to Environment

PIDAC 2012 has excellent literature review 

MRSA:



1. Patients in ICU who acquired MRSA had same strain as found in the ICU environment (Hardy et al Infect Control Hosp Epidemiol 2006)
2. 42% of 12 nurses contaminated gloves with MRSA by touching objects in room of patients with MRSA in wound or urine (Boyce J Environmental contamination makes an important contribution to hospital infection J Hosp Infect 2007;65:50-54.)
3. Contact with items from the environment just as likely to contaminate caregiver hands with MRSA as direct contact with the Patient's skin. (Steitel U et al ICHC 2011;32:185-7)

Evidence of HAI Transmission related to Environment

PIDAC 2012 has excellent literature review 

MRSA & VRE:
Patients admitted to room previously occupied by patient with MRSA or VRE have significantly higher risk of acquiring these AROs
 (Drees et al Clin Infect Dis 2008, Huang et al Arch Int Med 2006)

Best Practices for Environmental Cleaning for Prevention and Control of Infections: In All Health Care Settings
 (PIDAC 2009, revised 2012 – free from website)

- **"Hotel Clean":**
Non-patient care areas
 - cleaning only 
- **"Hospital Clean":**
Patient-care areas:
 - cleaning & disinfection
 - high-touch surfaces
 - frequency: risk stratification 

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Hospital-approved Liquid Disinfectants for Environmental Cleaning

[PIDAC 2012]

- Alcohols: 70-90%
- Chlorines: sodium hypochlorite or bleach
- Hydrogen peroxides: (enhanced action formulations)
- Quaternary ammonium compounds: QUATS [limited bacterial killing ability]
- Phenolics: not to be used in nurseries
- Iodophors: non-antiseptic formulations

Be sure to ensure microbial killing claims are effective in ≤ 3 minutes


Environmental Cleaning Monitoring

PIDAC Recommendations:

- Process in place to assess quality of cleaning
- In addition to visual inspection use of an Audit tool
- Regular feedback to housekeeping staff
- Action plans when inadequate compliance detected




Audit Tools:

- UV-visible Marker
- ATP
- Culture



Novel Methods for Environment Disinfection:

- Fogging:
 - VHP,
 - Ozone gas,
 - super-oxidized water,
- UV irradiation:
- Steam:

Regardless of Disinfection method used, monitoring cleaning compliance is still needed

Cleaning criteria:	Compliance of Monitoring Method with cleaning criteria			
	UV-Marker	ATP	Culture	Visual Inspection
Surface was wiped	+	+*	+/-	-
Low Organic residuals	-	+	-	-
Low Microbial residuals	-	-**	+	-
No residual AROs	-	-	+	-
Low labour	+	+	-	+
Results available for immediate feedback	+	+	-	+

* Cutoff for adequate cleaning not yet defined (250 RLU/site suggested)
** ATP lacks sensitivity to detect < 100 cfu/test

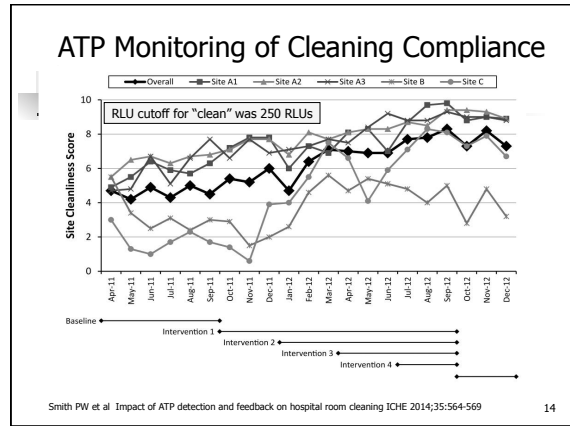
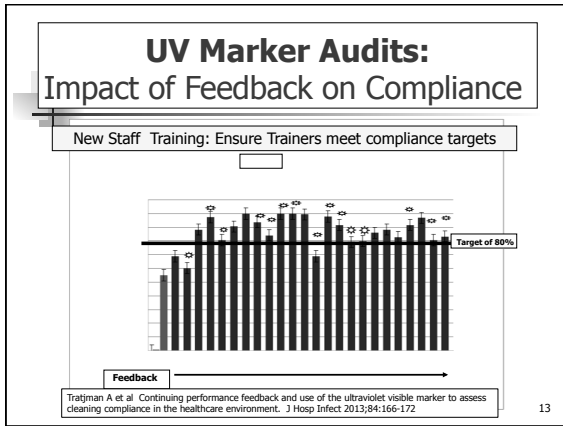
ATP levels (RLUs) do NOT correlate with viable count

- Sciortino C et al *Validation and comparison of three ATP luminometers for monitoring hospital surface sanitization: A Rosetta Stone for ATP testing.* AJIC 2012;40:233-9
- Shama G, Malik DJ. *The uses and abuses of rapid bioluminescence-based ATP assays.* Int.J.Hyg. Environ. Health 2013;216:115-25
- Boyce JM et al *Comparison of fluorescent marker systems with 2 quantitative methods of assessing terminal cleaning practices.* ICHE 2011;32:1187-93.

Viable count versus RLUs for microbes dried onto a surface

Days dried:	<i>E. faecalis</i> 7.02 Log ₁₀ /site		<i>P. aeruginosa</i> 6.41 Log ₁₀ /site		<i>C. albicans</i> 6.55 Log ₁₀ /site	
	RLUs/site (Median)	Log ₁₀ CFU/site	RLUs/site (Median)	Log ₁₀ CFU/site	RLUs/site (Median)	Log ₁₀ CFU/site
1	119,593	7.43	281,666	3.42	825,313	4.06
14	81,799	5.51	154,462	< LD	815,736	< LD
29	82,405	4.08	182,144	< LD	795,052	< LD

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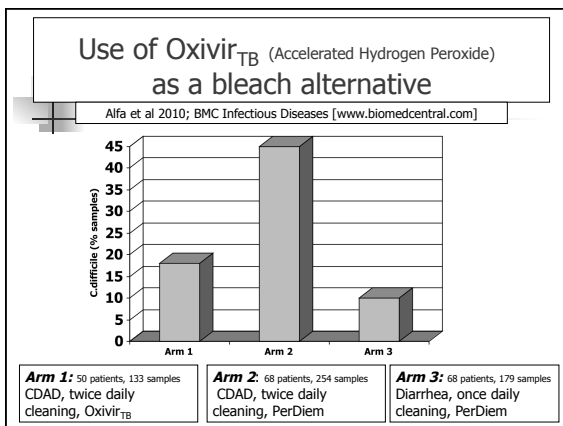
Can use of a disinfectant-cleaner combined with monitoring and feedback of cleaning compliance reduce HAIs?

Risk of ARO transmission is highest prior to ARO diagnosis when patient is not yet on isolation precautions

Important that daily cleaning-disinfection is effective

Key Study Parameters

- **Select a hospital grade disinfectant-cleaner that could be used daily** (bleach alternative) that kills all AROs
- **Use this disinfectant-cleaner for routine daily disinfection of all high-touch areas** (including curtains) for both isolation rooms and non-isolation rooms
- **Ensure compliance with surface application** (monitor, feedback, re-clean)



Study Protocol: Nov 2012- Oct 2013

TARGET: General Daily Cleaning/Disinfection

ALL Patient-care areas hospital-wide:

- use Oxivir_{TB} *wipes* for ALL High-touch surfaces (NOTE: Company alternate name: "Accel Intervention")
- All staff trained in use of container/wipes

UV-Marker: Audit housekeeping compliance

- 2 rooms/study ward/week
- 10-15 sites/room (bathroom & patient room)
- ≥ 80% compliance considered acceptable
- re-clean sites that have residual marker

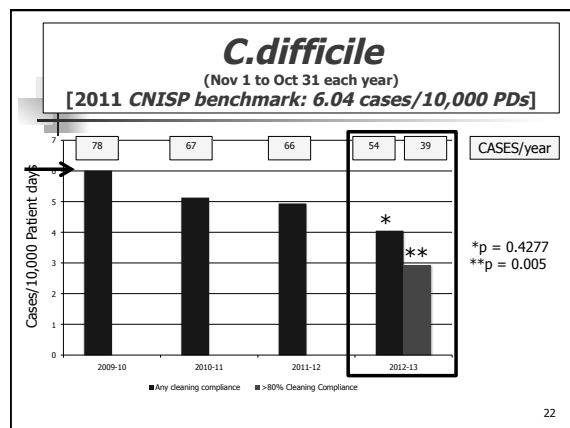
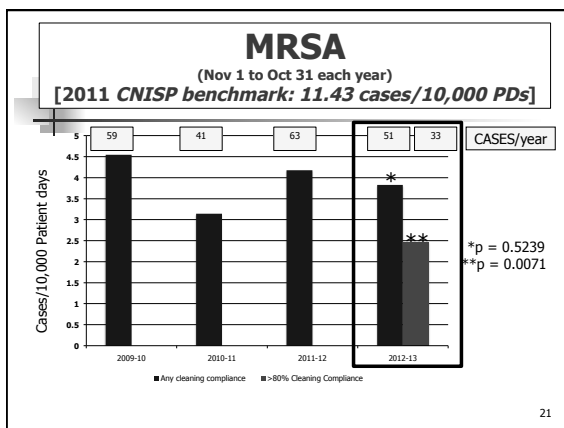
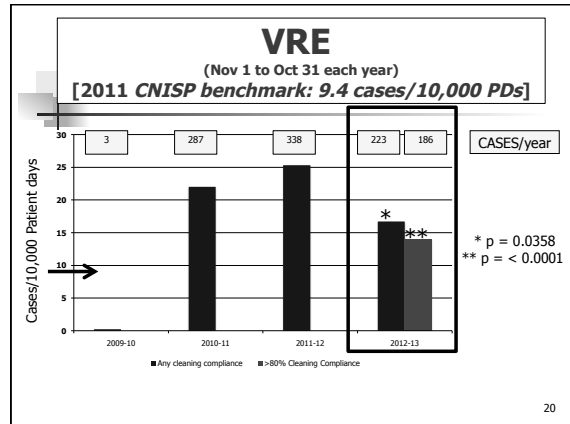
Document impact on HAI rates

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Wards included in Study

Program/wards Included in Study:	Areas that also use Oxivir [®] but not included in study of HAIs																																								
Cardiac Program: - ASCM - CR4C - ICCS - ICMS	<table border="1"> <thead> <tr> <th>Outpatient Area Name:</th> <th>Outpatient Area Usage:</th> </tr> </thead> <tbody> <tr><td>Emergency</td><td>Emergency</td></tr> <tr><td>42W Dialysis</td><td>Dialysis</td></tr> <tr><td>ACF Womens</td><td>Women's Health</td></tr> <tr><td>ACF Peds</td><td>Pediatric Health</td></tr> <tr><td>ACF Med/Surg</td><td>Medicine/Surgery</td></tr> <tr><td>Fetal Assessment (V1)</td><td>Fetal Assessment</td></tr> <tr><td>NFA</td><td>Not For Admission (Day Surgery/Endoscopy)</td></tr> <tr><td>O Block (Ground, 1st, 2nd)</td><td>Cancer Care</td></tr> <tr><td>X-Ray (2A)</td><td>X-Ray</td></tr> <tr><td>Cardiac (Y2)</td><td>Heart Catheter, Pacemaker and Electrophysiology (EP) Labs</td></tr> <tr><td>FMC</td><td>Family Medicine Center</td></tr> <tr><td>MRI</td><td>Magnetic Resonance Imaging</td></tr> <tr><td>Asper 1st</td><td>Outpatient</td></tr> <tr><td>3C</td><td>Nuclear Medicine/Stress Lab</td></tr> <tr><td>SC (1 room)</td><td>Used by Endocrinology Nurses</td></tr> <tr><td>Rehab</td><td>Physiotherapy, Occupational Therapy, Speech Therapy, Audiology</td></tr> <tr><td>Centre de Sante</td><td>French Family Medicine Centre</td></tr> <tr><td>L1010 Dialysis</td><td>Peritoneal Dialysis (moved to 4AW)</td></tr> <tr><td>Day Hospital</td><td>Located at the Dominion Centre Shopping Mall</td></tr> </tbody> </table>	Outpatient Area Name:	Outpatient Area Usage:	Emergency	Emergency	42W Dialysis	Dialysis	ACF Womens	Women's Health	ACF Peds	Pediatric Health	ACF Med/Surg	Medicine/Surgery	Fetal Assessment (V1)	Fetal Assessment	NFA	Not For Admission (Day Surgery/Endoscopy)	O Block (Ground, 1 st , 2 nd)	Cancer Care	X-Ray (2A)	X-Ray	Cardiac (Y2)	Heart Catheter, Pacemaker and Electrophysiology (EP) Labs	FMC	Family Medicine Center	MRI	Magnetic Resonance Imaging	Asper 1 st	Outpatient	3C	Nuclear Medicine/Stress Lab	SC (1 room)	Used by Endocrinology Nurses	Rehab	Physiotherapy, Occupational Therapy, Speech Therapy, Audiology	Centre de Sante	French Family Medicine Centre	L1010 Dialysis	Peritoneal Dialysis (moved to 4AW)	Day Hospital	Located at the Dominion Centre Shopping Mall
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Medicine Program: - AGME - BSME - E4GM - E6ME - ESME																																									
Women & Child - B3MC - B4GY - LDRP - NICU																																									



Fluid transfer for Wipes versus Rags as cleaning cloths

Overbed table & bedrail wiped (5 replicates):	Cloths tested	
	Accel Wipes	Cotton Rags
Liquid absorbed: Avg. grams (SD)	15.34 (0.86)	60.22 (18.05)
Liquid released: Avg. grams (SD)	3.46 (0.38)	2.46 (0.36)
Dry time: Table Avg. mins (SD)	8.78 (2.23)	3.13 (1.12)
Dry time: Bedrail Avg. mins (SD)	1.95 (0.21)	1.21 (0.31)

- ### Key Study Conclusions:
- HAI rates reduced for VRE, MRSA & C.difficile**
- Three key components:**
- **Training of Housekeepers:** - required to demonstrate competency
 - **Monitoring cleaning compliance:** - minimal acceptable compliance of 80% - same-day feedback (re-clean required)
 - **Effective disinfectant agent:** - wide range of kill in ≤ 1min - container-wipe application system


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BATTLEFRONT: INFECTION

HOUSEKEEPING IS THE FRONT LINE IN THE "BATTLE OF THE BUGS"!

BE SURE YOU HAVE OPTIMIZED YOUR DEFENCES!

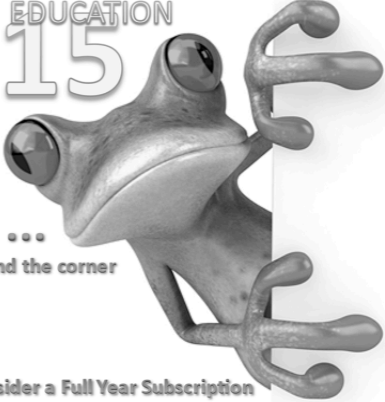
TRAINING
OPTIMAL KILLING AGENT
FEEDBACK ON COMPLIANCE



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