Surface Disinfection

Strategies for Cleaning & Disinfection

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Author of “Infection Prevention for Dummies”
What is the cost of not providing a safe clean environment for your patients?

It could be millions of dollars. A court awarded $13.5 to the family of a patient who died of flesh-eating bacteria that she contracted during chemotherapy therapy in a facility.
What is the cost of not providing a safe clean environment for your patients? (continued)

- In a separate case, a patient was awarded $2.58 million because he contracted MRSA in a hospital.
- Although cleaning and hygiene issues may not always be the subject of such dramatic litigation, there is little doubt that poorly cleaned facilities are contributing factors to serious disease transmission.
Strategies for Cleaning & Disinfecting

• Are we cleaning and disinfecting environmental surfaces the right way?
• Are we able to validate the effectiveness of our cleaning processes, methods, training?
• Is there a gap between Science, Regulation and Practice? If not, why does that gap still exist?
Factors affecting acceptable cleaning and disinfection

- Proper procedures/best practices
- The wide range of surfaces needing cleaned/disinfected
- Bio-burden/organic soil present on environmental surfaces
- Housekeeping’s role and Nursing’s part in maintaining the patient’s environment in a clean & sanitary condition 24/7
- The proliferation of multi-drug resistant organisms
- Lack of collaboration between Environmental Services and Infection Control Practitioners
- Lack of education and easily understood training for housekeepers who’s first language is not English
Factors affecting acceptable cleaning and disinfection (continued)

• Contact time of disinfectant
• Wrong disinfectant being used
• Method of applying disinfectant (spray bottle v. bucket; mop & bucket v. microfiber mop)
• Not enough time allowed for thorough cleaning
• Cleaners using the wrong tools (cotton rags vs. microfiber)
• No formal program for testing cleaning efficacy
Let’s dive a little deeper

- The chicken and the egg—do we place too much emphasis on handwashing and too little emphasis on maintaining clean environmental surfaces?

- The guiding principle is always to **remove** germs if possible rather than **kill** them, and then, when necessary, use the least amount of the mildest chemical that will do the job, because stronger often means more toxic to people and the environment.

- Quat binding problems
Factors Influencing Cleaning and Disinfecting

Contact Time for Disinfectants—beware of the following:

EPA testing methodology (AOAC) in a lab

v.

Precleaned surfaces free of organic soil—the real world
## Time to Kill Organisms on Surfaces

<table>
<thead>
<tr>
<th>Product</th>
<th>Log₁₀ Reduction</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>S. aureus</td>
<td>P. aeruginosa</td>
</tr>
<tr>
<td>Product</td>
<td>30 sec. 5 min.</td>
<td>30 sec. 5 min.</td>
</tr>
<tr>
<td>Phenolic</td>
<td>&gt;8.2  &gt;8.2</td>
<td>&gt;6.7  &gt;6.7</td>
</tr>
<tr>
<td>Quat</td>
<td>&gt;6.4  &gt;6.4</td>
<td>&gt;6.9  &gt;6.2</td>
</tr>
<tr>
<td>Clorox</td>
<td>&gt;5.8  &gt;5.8</td>
<td>&gt;5.3  &gt;5.3</td>
</tr>
</tbody>
</table>

Contact Time on Non-Critical Surfaces

- Contact time is rarely per label instructions: exposure time 1-1.5 minutes (ie., surface remains wet)
- 10 minute contact time would require 6 applications in order to meet 10 minute contact time
- 6 log reduction can occur in 30 seconds

Rutala, W.-APIC 2003
Contact Time on Non-Critical Surfaces

- Low-level disinfection (LLD) for at least 30-60 seconds is supported by at least 14 scientific studies.
- 10 minute contact time is meant for EPA registration, *NOT* the time it takes to kill microorganisms on pre-cleaned surfaces.

Rutala, W. APIC Annual Ed. Conference, 2005
QUAT Binding

Quaternary Ammonium Chloride—Probably your hospital-approved disinfectant!

Some fabrics (e.g., Cotton) and materials have a strong attraction for the active ingredients in QUATS

- QUAT preferentially attaches or exhausts to fabric
- QUAT-available p/p/m in solution is reduced when cotton is introduced into the bucket
- Efficacy of the disinfectant RAPIDLY decreases (< 5 minutes)
- Disinfectants are registered with the EPA and efficacy claims are approved at a specific level of active ingredients.
- When the QUAT level is less than the level approved by the EPA, the efficacy claims are no longer valid.
QUAT Binding

**QUAT disinfectants:**
- How is your hospital using them?
- How are you testing the efficacy of your disinfectant? Do you or ES have a QUAT test kit?
- QUAT test kit-LaMotte QAC Test Kit-www.lamotte.com

**Available Parts Per Million (ppm)**
- Testing should be done to meet EPA requirements for the disinfectant claim
- If it falls below the ppm, your disinfectant is out of spec and no longer a disinfectant; you might as well be using water.
Cleaning Methods: Which are best practice?

How is disinfectant being dispersed? Spray bottle, squirt bottle with flip top or in a bucket? Is one method better than the other?
Bringing Down the Curtain on HAI’s

In a study published in the Nov. 08 issue of “Infection Control and Hospital Epidemiology”, it was discovered that 42% of hospital privacy curtains were contaminated with vancomycin-resistant enterococci (VRE), 22% were contaminated with Methicillin Resistant Staphylococcus aureus (MRSA) and 4% with Clostridium difficile (C-diff).

Then the clean hands of hospital workers were cultured after they opened/closed the curtains, and it was found that the organisms had transferred to the clean hands or gloves.
Bringing Down the Curtain on HAI’s

• The conclusion: Dangerous pathogens left on curtains are transferred to hands and could potentially lead to HAIs.
• The best solution in reducing HAIs due to contaminated privacy curtains is to change the curtains following each contact isolation.
• You should have a strategy for changing privacy curtains; do you?
• Discussion of Simply 66 and ICP Medical’s $R^2$ Rapid Refresh Curtain System as viable solutions.
A surface may appear be “Clean” but, is it really disinfected?

- October 2010, CDC published “Options for Evaluating Environmental Cleaning”, prepared by Alice Guh, MD, MPH, and Philip Carling, MD.

- Does your infection prevention plan include collaboration between ICP and management level Env. Svcs.? If you don’t, you might consider using Healthy Measures™

- Does your ICP plan insure that the cleaning of near-patient surfaces and equipment is being performed by competent, trained and motivated housekeepers? You might consider using Infection Prevention for Dummies for your housekeeping managers, intermediate staff and front-line workers.

- Does your ICP plan insure that patient care equipment is being thoroughly cleaned when DC’d? You might consider STAT Medical Systems BRS/100 (Bioburden Reduction System) automated washer and sanitation system for large scale hospital equipment; including stretchers, wheelchairs, back boards, IV poles, tray tables, etc.
Objective Methods for Evaluating Environmental Hygiene

- Direct Practice Observation
- Swab cultures
- Agar Slide Cultures
- Fluorescent Markers- “Dr. Carling’s Goo” or Glow Germ
- ATP Bioluminescence (ATP)

- A more detailed and fully referenced discussion of evaluating environmental hygiene may be found in Evaluating Hygienic Cleaning in Healthcare Settings: What You Don’t Know Can Harm Your Patients by P.C. Carling and J.M. Bartley in the June, 2010 supplement to the American Journal of Infection Control
# CDC Environmental Checklist for Monitoring Terminal Cleaning

<table>
<thead>
<tr>
<th>Date:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit:</td>
<td></td>
</tr>
<tr>
<td>Room Number:</td>
<td></td>
</tr>
<tr>
<td>Initials of ES staff (optional):</td>
<td></td>
</tr>
</tbody>
</table>

**Evaluate the following priority sites for each patient room:**

<table>
<thead>
<tr>
<th>High-touch Room Surfaces</th>
<th>Cleaned</th>
<th>Not Cleaned</th>
<th>Not Present in Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bed rails / controls</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV pole / (grab area)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Call box / button</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Telephone</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bedside table handle</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chair</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Room sink</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Room light switch</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Room inner door knob</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bathroom inner door knob / plate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bathroom light switch</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bathroom handrails by toilet</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bathroom sink</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toilet seat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toilet flush handle</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toilet bedpan cleaner</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Evaluate the following additional sites if these equipment are present in the room:**

<table>
<thead>
<tr>
<th>High-touch Room Surfaces</th>
<th>Cleaned</th>
<th>Not Cleaned</th>
<th>Not Present in Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>TV pump control</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multi-module monitor controls</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multi-module monitor touch screen</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multi-module monitor cables</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ventilator control panel</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Mark the monitoring method used:**

- [ ] Direct observation
- [ ] Fluorescent gel
- [ ] ATP system
- [ ] Agar slide cultures

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1 Selection of detergents and disinfectants should be according to institutional policies and procedures.
2 Hospitals may choose to include identifiers of individual environmental services staff for feedback purposes.
3 Sites most frequently contaminated and touched by patients and/or healthcare workers.
TERMINAL CLEANING

Record results of evaluation for each surface on the check list for every room monitored. Use the following symbols for marking:
O = NOT CLEAN,  X = CLEAN,  LEAVE BLANK = NOT EVALUABLE   NOTE - USE CAP LETTERS "X" AND "O"
The percentage of individual surfaces cleaned will be automatically calculated in Sheet 2 (Aggregate Score Sheet).

Please report aggregate scores calculated for each category highlighted in Sheet 2 (Aggregate Score Sheet).

| Unit | RN No. | Date of Marking (if applicable) | Date of Evaluation | Bed rails | Tray table | IV pole | Call box / button | Telephone | Bedside table | handle | Chair | RN sink | RN light switch | RN inner doornob | BR inner doornob
|------|--------|---------------------------------|-------------------|-----------|------------|---------|-----------------|-----------|----------------|--------|-------|---------|----------------|------------------|--------------------|


Some Resources

• Healthy Measures™ - Kevin Rudd, Executive Director, Marketing, 224-361-2105 or krudd@nsconline.com
• Phoenix Textiles (Simply 66 Curtains) - Bob Gatheman
• ICP Medical (R², Rapid Refresh Disposable Curtains) - Tom Huling, V.P. Sales, thuling@icp-med.com, 1800-405-3044
• STAT Medical Systems, Basil Mays, CEO, 888-498-STAT (7828), www.statmedicalsystems.com
J. Darrel Hicks

For more information or booking, go to www.darrelhicks.com or call 314-956-1177

Email Darrel at: darrel@darrelhicks.com