Environmental Hygiene

Fundamentals & Technology Overview

Infection Prevention and Control - Manitoba

Provincial Education Conference

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Chair, Environmental Hygiene Interest Group

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Disclaimers & Caveats

I am not a certified Infection Control Professional
I am not a certified Financial Professional
I am an environmental hygiene Operations Professional

I make my living consulting for healthcare organizations and hygiene technology providers, across North America, to improve patient safety and financial performance through improvements in clinical environmental hygiene

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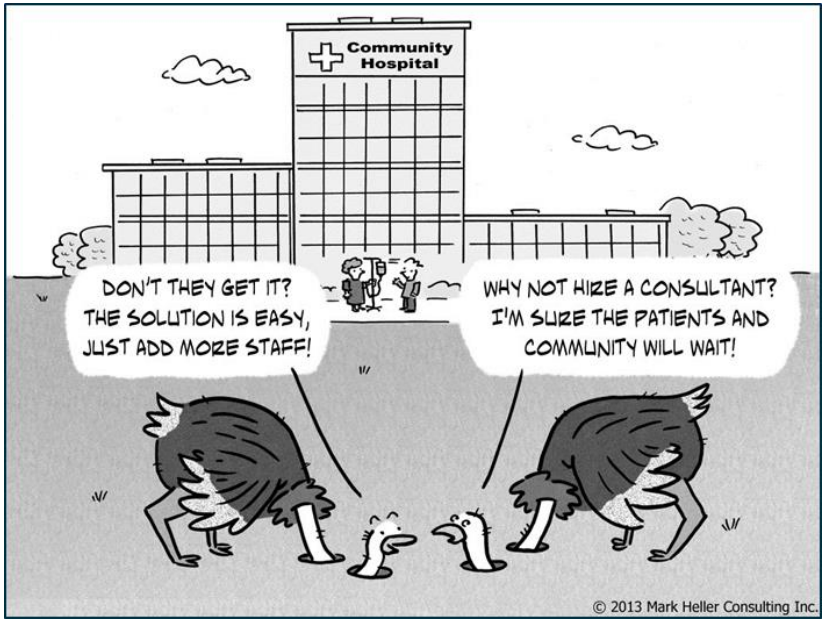
Agenda

- Environmental Cleaning – A Critical Component of Patient Safety
- Environmental Hygiene Performance Framework
- Hand Hygiene
- Cleaning for Health
- Point of Clean℠ Assessment Skills
- Handling of Blood & Body Fluids
- Cleaning Chemicals, Equipment & Supplies
- Environmental Technology Landscape



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Why the Importance of Environmental Hygiene?

Cleaning

- Visual
  - Perception

- Microscopic
  - Health

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What do the clinical experts say?

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Department of M
stephanie.danc

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Directorate of Infection, St Thomas' Hospital and King's Coll

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[] ENVIRONMENTAL HYGIENE Vol. 16, No. 9 September 2012

Environmental Hygiene: What We Know from Scientific Studies

By Kelly M. Pyrek

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Role of hospital surfaces in the transmission of emerging health care-associated pathogens: Norovirus, *Clostridium difficile*, and *Acinetobacter* species

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Chapel Hill, North Carolina

AD Russell Memorial Teleclass

Does Improving Surface Cleaning and Disinfection Reduce Healthcare-Associated Infections?

William A. Rutala, PhD, MPH

Director, Hospital Epidemiology, Occupational Health and Safety; Professor of Medicine and Director, Statewide Program for Infection Control and Epidemiology

University of North Carolina at Chapel Hill and UNC Health Care, Chapel Hill, NC

Hosted by Prof. Jean-Yves Maillard

Cardiff University, Wales

www.webbertraining.com

April 25, 2013

ENVIRONMENTAL CONTAMINATION LEADS TO HAIs

- Frequent environmental contamination
- Microbial persistence in the environment
- HCW hand contamination
- Relationship between level of environmental contamination and hand contamination
- Transmission directly or on hands of HCPs
- Housing in a room previously occupied by a patient with the pathogen of interest is a risk factor for disease
- Improved surface cleaning/disinfection reduces disease incidence

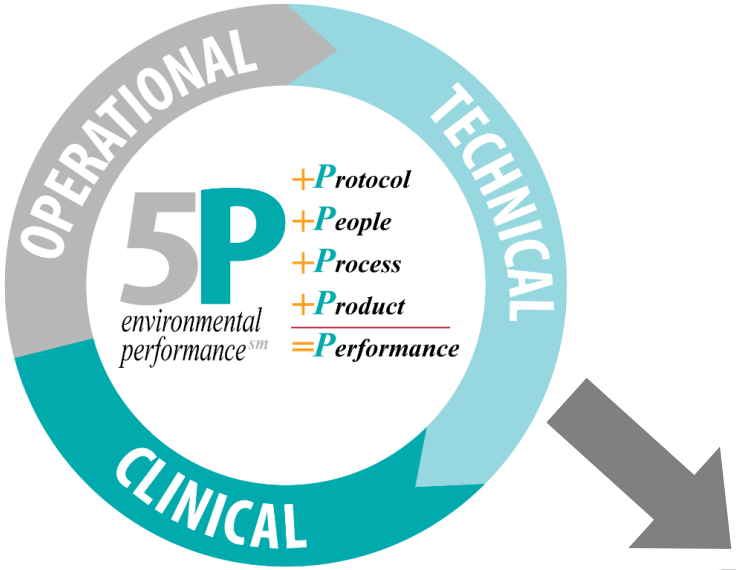
ENVIRONMENTAL SURVIVAL OF KEY PATHOGENS ON HOSPITAL SURFACES

Pathogen	Survival Time
S. aureus (including MRSA)	7 days to >12 months
Enterococcus spp. (including VRE)	5 days to >46 months
Acinetobacter spp.	3 days to 11 months
Clostridium difficile (spores)	>5 months
Norovirus (and feline calicivirus)	8 hours to >2 weeks
Pseudomonas aeruginosa	6 hours to 16 months
Klebsiella spp.	2 hours to >30 months

Adapted from Hota B, et al. Clin Infect Dis 2004;39:1182-9 and Kramer A, et al. BMC Infectious Diseases 2006;6:130

Environmental Hygiene Performance Framework

Environmental Hygiene Performance Framework℠



CLINICAL = Medical, Clinical, Infection Prevention & Control

TECHNICAL = Hygiene Supply & Technology Industries

OPERATIONAL= Environmental Services, Supply Chain, Finance

Hygiene Outcomes = Clinical Impact = Patient & Economic Value

Protocol: the science of cleaning and disinfection) integrated clinical, professional & technical, evidence-based, practice guidance

People: motivated and independent thinking workforce) competent & engaged human resources, organized and aligned to patient-safety

Process: scalable & replicable output) consistent execution of standard work, effectively integrated with clinical practice

Product: products, equipment, systems) strategic & effective utilization of hygiene technology enablers

Performance: what "good" looks like) continuous improvement informed by measurable key performance indicators

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Hand Hygiene

When to Wash/Sanitize

Hand Hygiene utilizing a traditional wash is indicated for visibly soiled hands

How Often?

- Before coffee/meal breaks
- After coffee/meal breaks
- After washroom breaks
- After sneeze
- If spores are suspected
- Before gloves
- After gloves

REMEMBER:
THE BEST CROSS CONTAMINATION CONTROL
IS HAND WASHING

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Gloves – Why?

Why Gloves?

- To reduce the risk of contamination of health-care workers hands with blood and other body fluids
- To reduce the risk of germ dissemination to the environment and of transmission from the health-care worker to the patient and vice versa, as well as from one patient to another
- To protect you from the chemicals that you use
- To protect against exposure when handling and transporting waste

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Gloves – Why?

When to use

- When filling chemicals
- When performing daily cleaning tasks involving contact with chemicals and the physical environment
- When handling waste
- When there is a risk of coming into contact with bodily fluids

When not to use

- Moving through the common areas of the facility
- Dust mopping
- Stocking supplies

RISK

Improper use can increase risk of exposure to pathogens to both the user and to the general population within a facility

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Stocking of Supplies

- Supplies are to be checked on a daily basis
- When stocking supplies, remove gloves and wash/sanitize hands

Picture of the towel dispenser

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Cleaning for Health (Routine Practices)

Key Words & Phrases

- **Cross contamination -** transfer micro-organisms from one person/object to another
- **High Touch Surfaces (frequent contact points) –** Surfaces that are frequently touched by the occupants of a facility/building
- **Micro-organism -** is an organism that is visible by a microscope (too small to be visible to the naked eye)
- **Pathogenic** - disease producing
- **HAI (Nosocomial)** – Healthcare Associated Infection
- **CAI (Nosocomial)** – Community Associated Infection
- **Clean –** To remove soil from a surface, make visibly appealing
- **Sanitize –** To reduce bacteria on a surface to what is considered a safe level – Food Safe
- **Disinfect** - to kill bacteria and pathogenic organisms as listed on product label
- **Sterilize –** To make a surface free of living organisms

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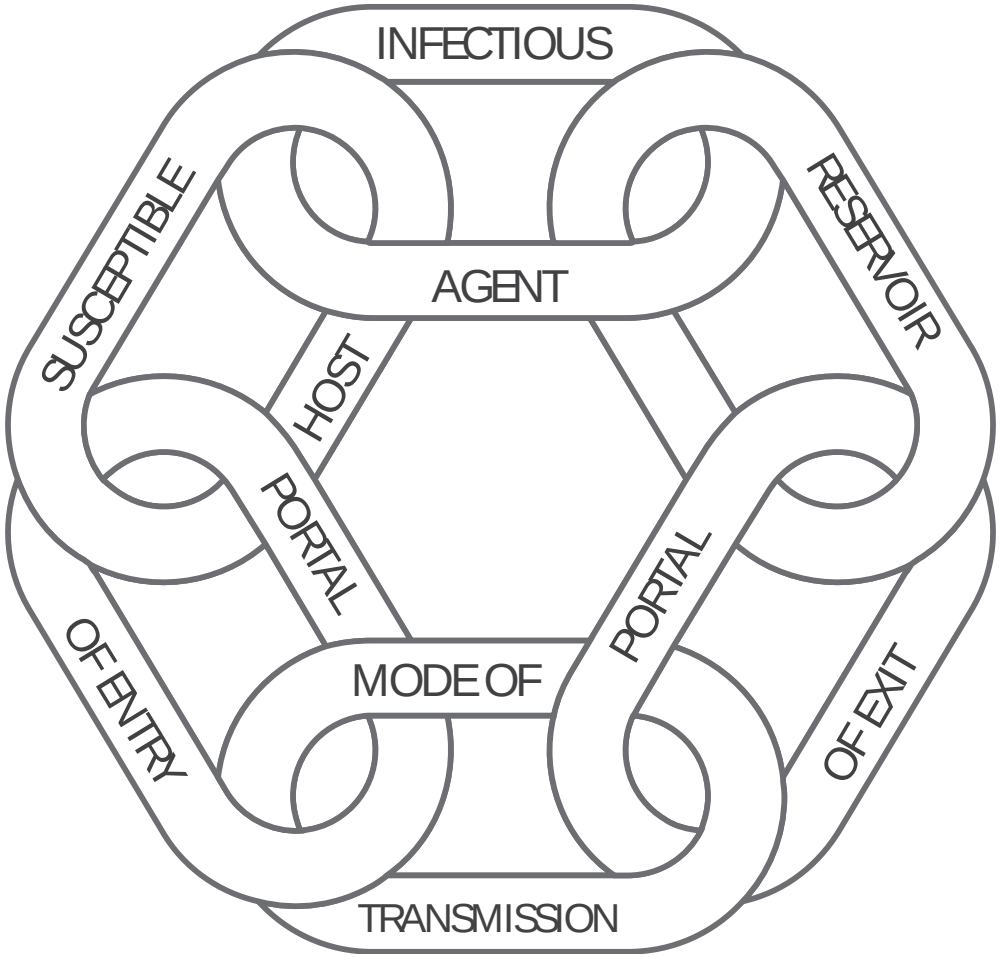
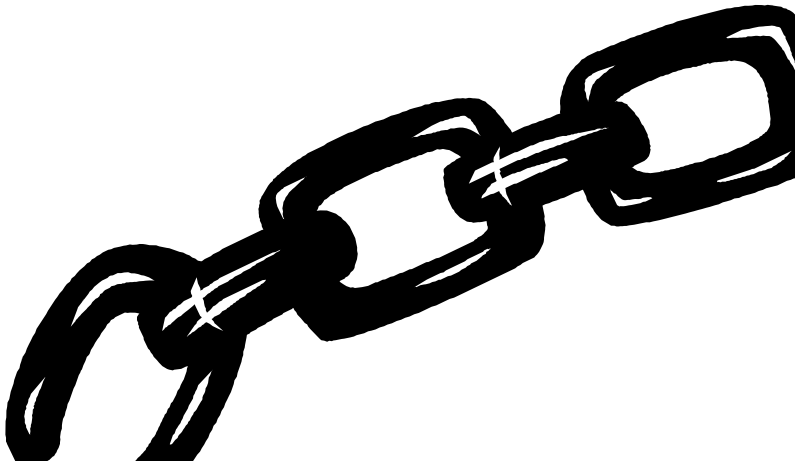
The Chain of Infection





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Preventing the Spread of Infection

The best thing we can do to prevent the spread of infection …

The next best thing we can do …

Environmental Services Saves Lives!

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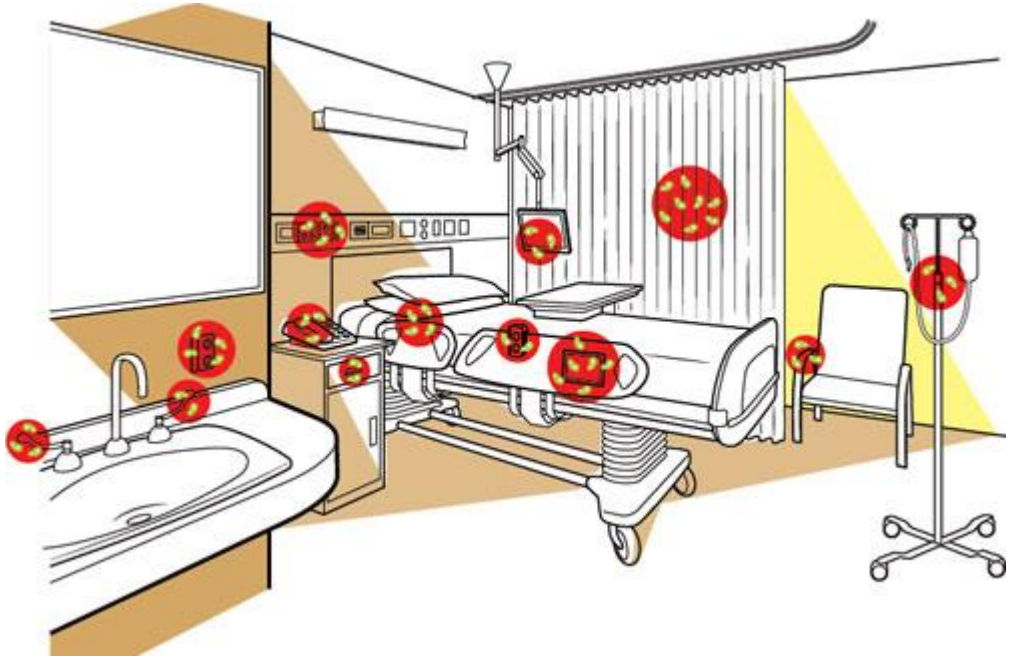
High Touch Surfaces

- Door handles
- Light switches
- Bed rails
- Medical equipment
- Telephone
- Pagers
- Over bed light
- Call bells
- Hallway hand rails



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Patient vs. Visitor Environments

Patient Environment

- Patient room, bathroom
- Tub room
- Treatment room
- OR

Visitor environment

- Entrances, lobby, elevator
- Corridors
- Lounges

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Disinfecting High Touch Surfaces

High-touch Surfaces

- The more frequently a surface is touched, the higher the risk of infection
- High-touch surface are surfaces that are frequently touched
  - Bed rails, over-bed-tables, light switches, call bells, chairs, door handles, faucets, etc.
- High touch surfaces require more frequent cleaning and disinfecting than other surfaces
- The frequency of cleaning depends on
  - Types of surfaces
  - How frequently surfaces are touched
  - How sick patients/clients/residents are

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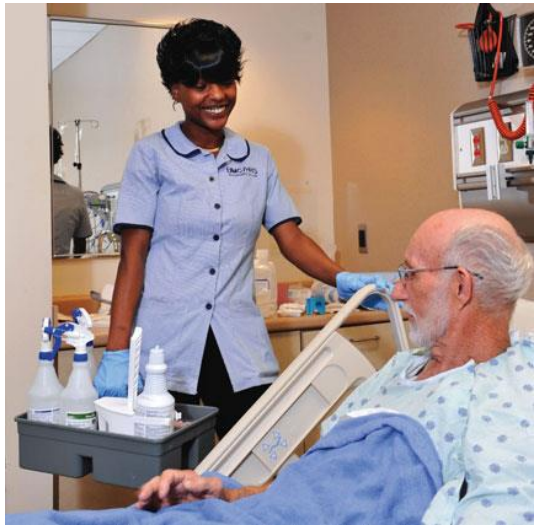
Cleaning in the Patient – Resident Care Unit

Patient Room Cleaning



- Daily, routine cleaning:
  - Everyday cleaning of a room that is occupied by a patient
- Discharge/terminal cleaning:
  - Cleaning of the room when a patient goes home and the room is prepared for the next patient/client/resident
- Proper cleaning is required to:
  - Keep the room clean and tidy
  - Remove germs and prevent the spread of infection
  - Prevent cross contamination
- Some cleaning jobs are only done every once in a while, this is called "periodic" cleaning and may include:
  - High dusting
  - Cleaning of baseboards and corners
  - Bed curtains, window curtains cleaning and replacement
  - Polishing and waxing floors
  - Fixing things that are broken

NOTE: Follow schedule and written procedures at your facility

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Additional Precautions

- Additional Precautions
  - Contact Precautions
  - Droplet Precautions
  - Airborne Precautions
  - Combination of Additional Precautions
- Personal Protective Equipment
- Cleaning Requirements

"It's really cleaning and disinfecting each day that keeps the doctor away. But apples are catchier."

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Additional Precautions Signs

How to effectively assess additional precautions required:

- Read all Signs
- Observe for the isolation precaution cart
- Wear appropriate PPE as per instructions and for the cleaning job
- Observe immediate patient area for anything unusual
- Prepare and use required cleaning supplies
- Use Cleaning Chemicals as approved by ES and IPC

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The Order of Cleaning & Disinfecting

When you clean, always follow a pattern:

- Clean-to-Dirty
  - Start from cleanest area and work towards dirtiest area
  - Room first, then washroom
- Top-to-Bottom
  - Dirt from higher surfaces will fall to lower surfaces where it can be cleaned properly

Cloths

- Change cloths frequently
- Use different cloths for different areas
- Never double dip

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Cleaning and Disinfecting in Patient Area

- Equipment that requires frequent cleaning
  - Toilets
  - Sinks
  - Tubs/Showers
  - Beds/Stretchers
- Follow a written cleaning schedule
- Use proper cleaning methods for each piece of equipment

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Toilets

- Not all surfaces of a toilet are equally contaminated, nor do all surfaces come in contact with human skin
- Important to clean toilet surfaces in the proper order to avoid cross contamination, from cleanest to most soiled
- Never re-wipe a clean surface with the cloth from a contaminated surface
- Cloths used to clean toilets must never be used to clean other items or fixtures – they must be immediately transferred to the laundry
- Toilet mops used for the inside of the bowl (only), toilet mops should be dedicated to one toilet; store them in a dry container and discard them when they become soiled or after isolation precautions
- Always removed gloves and perform hand hygiene after cleaning a toilet
- For routine cleaning of a toilet, use the approved cleaner-disinfectant. A bowl cleaner product can assist with the removal of stains, however should be used sparingly

Order of Clean

1. Tank / Lid
2. Flush Handle & Pipes
3. Seat
4. Inside Bowl (with bowl mop)
5. Bowl Rim & Exterior
6. Toilet Base (discard cloth)

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Sinks

- Not all surfaces of a sink are equally contaminated, all surfaces do not come in contact with human skin
- Important to clean sinks surfaces in the proper order to avoid cross contamination, from cleanest to most soiled
- Never re-wipe a clean surface with the cloth from a contaminated surface
- Drain traps can be a reservoir of bacteria, ensure these are carefully cleaned
- For routine cleaning of a sink, use the approved cleaner-disinfectant. A crème cleaners can assist with the removal of stains

Order of Clean

1. Faucets and Controls
2. Sink Edge
3. Sink Bowl
4. Exterior Surfaces & Exposed Pipes
5. Drain Trap (discard cloth)

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Beds & Stretchers

- There are many different types of beds and stretchers, generally they all follow the same cleaning procedure, however some may have special instructions.
- Not all surfaces of a beds and stretchers are equally contaminated, all surfaces do not come in contact with human skin
- Important to clean bed and stretcher surfaces in the proper order to avoid cross contamination, from cleanest to most soiled
- Never re-wipe a clean surface with the cloth from a contaminated surface
- A mattress core can become a reservoir of germs and can aerate to the next patient; inspect the mattress cover for rips or tears and report damage to the ES supervisor
- Tape residue must be fully removed from bed rails and exposed surfaces
- For routine cleaning of beds-stretchers, use the approved cleaner-disinfectant. A crème cleaners can assist with the removal of stains

Order of Clean

1. Strip and Reposition
2. Bed Side Rails
3. Head Board
4. Top half of mattress/deck
5. Foot Board
6. Bottom half of mattress/deck
7. Foot Board
8. Base & Frame
9. Wheels and Cord (discard cloth)

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Point of Clean℠ Assessment Skills

Concept: Point of Clean

Point of Clean Assessment℠ Skills

- Must be conducted at the start of each interaction with the patient/environment
- Assessment of the area/situation
  - What are the conditions in the area you enter
  - Is there anything unusual; what do you do; whom do you call
  - Is there a likelihood of exposure to germs ; how do you address it
  - If Additional Precautions must be taken, are there tools in place, is everyone following the precautions
- Choose the appropriate action
  - Hand Hygiene
  - Use of additional precautions as required
  - Environmental/equipment cleaning
- Personal Protective equipment appropriate for the area
  - Gloves
  - Gowns
  - Masks/Respirators
  - Eye/Face protection

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Risk Management

Common Job Hazards in Environmental Cleaning

- Exposure to bodily fluids and potential pathogenic organisms
- Cross contamination
- Sharps injuries
- Slips and falls
- Repetitive strain injuries
- Exposure to chemicals
- Work related stress
- Electric shock
- Waste management
- Alarms (Panic Moments)

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Risk Assessment Skills

- Observation
- Visual Assessment
- Situational Assessment
- Safety Assessment
  - Infection Prevention and Control
  - Occupational Health and Safety
- Read instructions
- Take appropriate action
- Always wear Personal Protective Equipment suitable for the situation and the job function

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Assessment of Surface Integrity

Furniture and Surfaces

- Healthcare furniture is different than furniture in your home:
  - Designed to meet patient safety, infection prevention and control specifications and is cleanable
- All furniture surfaces should:
  - Be easy to clean, maintain, repair
  - Be made of materials that do not hold moisture
  - Be durable and inflammable
- When performing furniture cleaning:
  - Report any damaged, torn, chipped or worn furniture to person in charge

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Handling of Blood and Body Fluids

Staff Responsibilities
for dealing with blood & body fluid spills

- Respond quickly
- Isolate the area
- Follow safety precautions to protect you and all around you
- Use personal protective equipment effectively and properly
  - Gloves (always)
  - Gowns (when there is a risk of splashing)
- Follow guidelines for safe handling of the waste from clean up of the spill
- Break the chain of infection through proper hand hygiene

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Cleaning Chemicals, Equipment & Supplies

Why Microfibre?

- Ergonomics and Safety
  - Musculoskeletal effort
  - Reduce contact with chemical
- Cleaner
  - Visible – improve mechanical action
  - Invisible – less risk of cross contamination
- Environment
  - Less waster use
  - Less chemical use
- Efficiency
  - Improved organization
  - No bucket changes

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The System

Above the Floor

On the Floor

Organization

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Organization

Key Words and Phrases

- **Acid**: a chemical that registers less than “7” (neutral) on the PH scale
- **Alkali:** a chemical that register greater than “7” (neutral) on the PH scale
- **Disinfectant**: A chemical that destroys harmful microorganisms
  - Bleach (Sodium Hypochlorite)
  - Hydrogen Peroxide
  - Quaternary Compound
  - Others
- **Pathogen:** a micro-organism (germ) that causes illness
- **Bactericide:** Something that kills bacteria (TB, Streptococcus, Pseudomonas)
- **Virocide:** Something that kills or inactivates viruses (HIV, Norwalk)
- **Sporicide:** Something that kills or inactivates spores (C-Diff)
- **PPE:** Personal Protective Equipment

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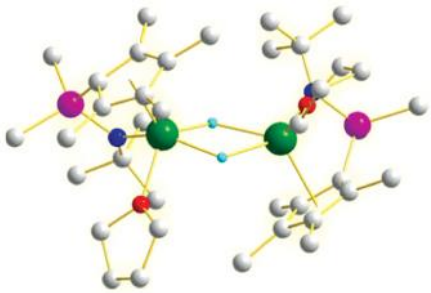
Chemistry of Cleaning



Time
Contact Time

Agitation
Mechanical Action

Concentration
Chemical Action

Temperature

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Environmental Hygiene Technology Landscape

Environmental Hygiene Technology Landscape

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Environmental Hygiene Technology Assessment Framework

1. Does It Work?

1.1 Objective, Peer-Reviewed, Performance Research (i.e. log reductions)
1.2 Supported by Protocols, Processes guidance etc.

2. Will It Make A Difference?

2.1 Evidence-Based Clinical and/or Quality (positive) Impact
2.2 Return on Investment (ROI)

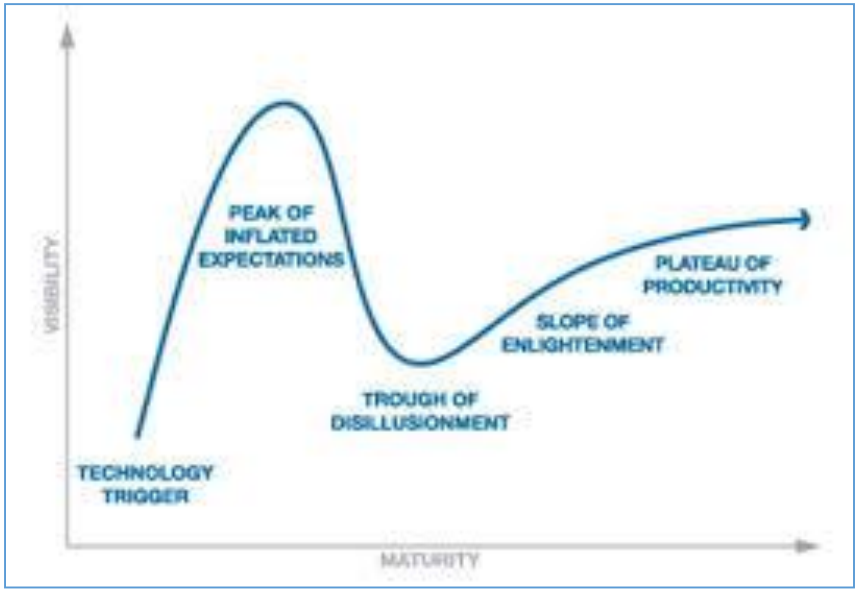
3. Is It a Solution?

3.1 (ES) Management Acceptance
- 3.1.1. In-Use Cost (Product / Labor)
- 3.1.2. Start Up Costs (Dispensers, Training etc.)
- 3.1.3. Ease of Purchase
- 3.1.4 Safety/Regulatory Approval

3.2 Clinical (ICP) Acceptance
- 3.2.1. Clear & Compelling Evidence
- 3.2.2. Attributable Clinical Benefit
- 3.2.3. Consistent & Sustainable Execution

3.3 Worker Acceptance
- 3.3.1. Performance
- 3.3.2. Odor / Reactivity / Safety
- 3.3.3. Ease of Use

3.4 Customer (Internal / Patient / Visitor) Acceptance
- 3.4.1. Impact on Surfaces / Equipment / Operational & Clinical Processes
- 3.4.2. Noticeable Odor / Film / Residue
- 3.4.3. Brand or Process Inspire Patient / Visitor Confidence



The Technology Hype Cycle; 2013; **GARTNER**

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Chemical-Based Surface Disinfectants & Disposable Wipes

Cleaning & Disinfection

What:

- Traditional providers changing technology spectrum
- Upstart companies entering the market

So What:

- Increasingly narrow band of differentiating features
- Industry marketing hype & product literature is confusing

The Big Deal:

- ICPs are becoming confused by the (active ingredient) nuances; less inclined to intervene with supply chain & environmental services

One to Watch:

- Does it work?
- Will it make a difference?
- Is it a solution?

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UVD / Fogging / Misting Machines

Secondary Disinfection

What:

- Use of the “robot-like devices” to reset the microbial load on surfaces at the point of terminal clean

So What:

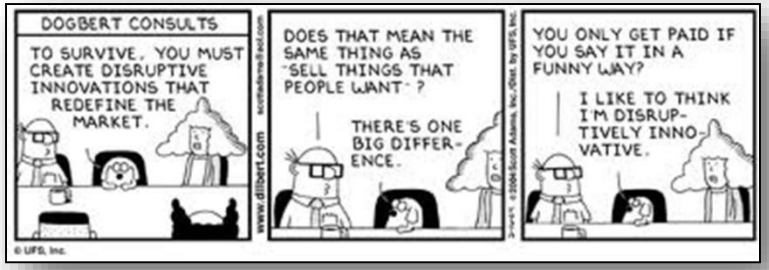
- Strong marketing & technology appeal (the hospital is “seen” to be doing the right thing)
- Positioned as “fool proof” technology, consistent, reliable (vs. human error – 40% surfaces never wiped)

The Big Deal:

- Hospital cleaning doesn’t require a premium performing disinfectant; allows Quats to remain
- Not the solution for everyone/everywhere, but is something “innovative” so will get attention (see: the technology hype cycle) **$ 60K -$ 150K**

One to Watch:

- Does it work?
- Will it make a difference?
- Is it a solution?



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Coatings, Infusions, Surface Repair and Treatments

Surface Renewal & Regeneration

What:

- New generation of patient furniture, cubicle drapes, paints, after-market surface treatments
- Copper, silver, anti-microbial agents

So What:

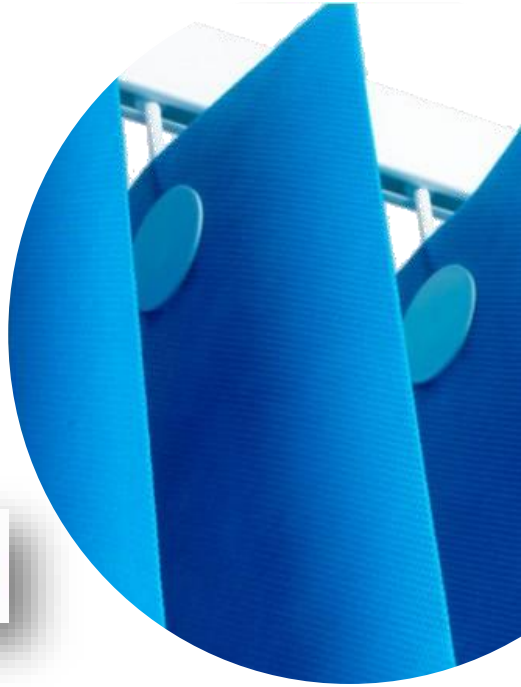
- Positioned as “added assurance” technology, consistent, reliable (vs. human error – 40% surfaces never wiped)
- Innovative “ecologically sustainable” approach to environmental hygiene vs. (harmful) chemicals

The Big Deal:

- Will be marketed as a strong (premium) differentiator at the time of purchase; off-set by reduced need/cost for cleaning
- Analogy: no-finish flooring substrates

One to Watch:

- Does it work?
- Will it make a difference?
- Is it a solution?



CLEANPatch

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Environmental Monitoring

Environmental Monitoring

What:
- Environmental Sampling, ATP, Microbial Simulations, Visual Monitoring systems and technologies
- Performed post-cleaning (with lag time) by someone other than environmental services

So What:
- Lagging, non-standard indicators, with no correlation to clinical outcomes
- Inconsistent with LEAN (stop-the-line?), Positive Deviance (outcomes?)
- ATP is seen as innovative and is being hyped and touted as "best-of-the-lot" solution, however is fallible & costly, therefore adoption will not become mainstream

The Big Deal:
- ICP community requires a mechanism to ensure cleaning and disinfection is working that is objective, empirical, standardized and informed by evidence
- No ability to separate product efficacy from human performance
- Product satisfaction is tied to a weak evaluation process (with compatibility challenges)

One to Watch:
- Does it work?
- Will it make a difference?
- Is it a solution?

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The emerging **Value Proposition of Environmental Hygiene**, represents a paradigm shift for the everyone…Are you ready?

"I realize you had an appointment, however the housekeeper has been detained on patient rounds. You'll just have to wait."

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Thank You

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