

Deep Roots in Surface Disinfection 



here... there everywhere

"Bleach has saved more lives than any other substance made by man"

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Agenda 

Presenter: Mike Kintz – Zone Manager Healthcare.
The Clorox Company

- Infections and the Environment
- The Rise of Clostridium difficile
- Keys to Successful Surface Disinfection
- Discussion –Questions?



CONTRIBUTORS TO HAIs

Failure of healthcare workers to wash their hands between patients and before procedures
Failure of visitors to wash their hands before and after a visit
Revolving door hospital visits
Poor nutrition/Weak Immune System
Overuse of antibiotics
Inadequate Disinfection of surfaces





Breaking the Chain of Infection




Microorganisms can easily exit the source and infect a host via:

- Coughing/Sneezing
- Blood and body fluids
- Emesis (vomit)
- Diarrhea

Microorganisms enter the body easily through various portals of entry such as:

- Open wounds
- Mouth
- Nose & Eyes
- Non-intact Skin



Can You Spot The Germs In This Clean Room?




Clean Looking Does Not Mean Disinfected



Representation of Patient Environment. Hayden M, ICAAC, 2001



STUDIES DEMONSTRATE THE EVIDENCE TO ALWAYS DISINFECT



Study	Result
Zhou Q (2008):	21% of roommates of patients colonized with VRE acquired VRE
Moore C (2008):	13% of roommates of patients colonized with MRSA acquired MRSA
Gerding DN (2008):	Environmental samples were positive in 59% of rooms occupied by c. diff positive patients
Morgan DJ (2010):	Gowns, gloves, and unwashed hands of HCWs were frequently contaminated with MDR A. baumannii.
Green J (1998)	31% of swabbed surfaces of Symptomatic Norovirus Patient's room were positive for Norovirus.
Koll B (2011)	33% of rooms not occupied by a c. diff positive patient cultured positive for c. diff.




How long can bacteria and viruses live on surfaces?

Methicillin-resistant *Staphylococcus aureus* (MRSA) - Up To 7 Months

Acinetobacter spp. - 3 days to 5 months

Vancomycin-resistant *Enterococcus* (VRE) – 5 Days to 4 Months

Clostridium difficile - 9 Months

Respiratory Viruses: **Coronavirus, Coxsackie virus, Influenzavirus, SARS, Rhinovirus** (common cold), **Adenovirus** – 2 to 3 days

Gastrointestinal Tract Viruses: **HAV, Polio Virus, Rotavirus, Norovirus** – 2 months

Blood Borne Viruses: **HIV, HBV** – 1 week

<http://www.biomedcentral.com/1471-2334/6/130>



Healthcare Facility HAI Reporting to CMS via NHSN – Current and Proposed Requirements (8/1/2011)

CLABSI	Acute Care Hospitals Adult, Pediatric, and Neonatal ICUs	January 2011
CAUTI	Acute Care Hospitals Adult and Pediatric ICUs	January 2012
SSI	Acute Care Hospitals Colon and abdominal hysterectomy procedures	January 2012
I.V. antimicrobial start (proposed)	Dialysis Facilities	January 2012
Positive blood culture (proposed)	Dialysis Facilities	January 2012
Signs of vascular access infection (proposed)	Dialysis Facilities	January 2012
CAUTI	Inpatient Rehabilitation Facilities	October 2012
CLABSI (proposed)	Long Term Care Hospitals	October 2012
CAUTI (proposed)	Long Term Care Hospitals	October 2012
MRSA Bacteremia	Acute Care Hospitals Facility-wide	January 2013
C. difficile LabID Event	Acute Care Hospitals Facility-wide	January 2013
HCW Influenza Vaccination	Acute Care Hospitals, OP Surgery, ASCs	January 2013





CLOROX

Clostridium Difficile (C. diff)



Clostridium Difficile (C. diff)

Hospital-onset healthcare-facility associated Clostridium difficile infections (CDI) have increased in incidence and have surpassed MRSA infections.






- Nosocomial CDI occurred 25% more frequent than MRSA
- Since 2007 – MRSA nosocomial rates have decreased while CDI rates have increased.

Becky Miller MD. – Duke University. SHEA conference 2010

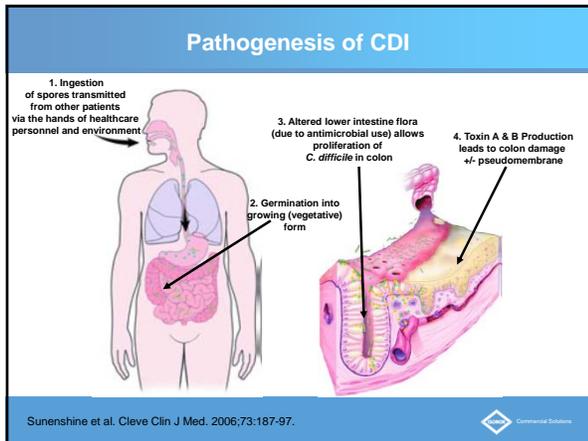


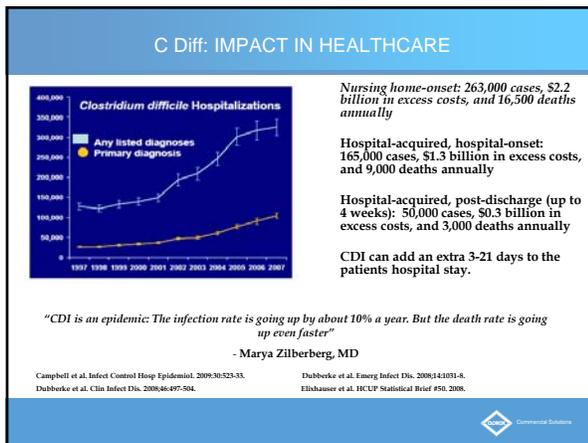
Clostridium Difficile – C. diff

C. diff Spores vs. C. diff Vegetative – what is the difference?

Form	Characteristics	Modes of Transmission	Incubation Periods/ Special Concerns
	Dormant, highly resistant to disinfectants Quat Disinfectants can cause hypersporulation	Transmission by touch of items or surfaces contaminated. Infection through ingestion of spores	Can live up to 9 months on hard surfaces, up to 2 years in dirt or open air
	Actively growing cells, susceptible to and easily killed by heat, drying, and many disinfectants	Transmission by touch of items or surfaces contaminated. Infection through ingestion.	Can only live for a few hours on surfaces due to inability to tolerate oxygen. Can convert to spore form if exposed to a hostile environment







C-diff Room

CDC Department of Health and Human Services
Centers for Disease Control and Prevention

Implement an environmental cleaning and disinfection strategy:

- Ensure adequate cleaning and disinfection of environmental surfaces and reusable devices, especially items likely to be contaminated with feces and surfaces that are touched frequently.
- Use an Environmental Protection Agency (EPA)-registered hypochlorite-based disinfectant for environmental surface disinfection after cleaning in accordance with label instructions; generic sources of hypochlorite (e.g., household chlorine bleach) also may be appropriately diluted and used. (Note: alcohol-based disinfectants are not effective against *C. difficile* and should not be used to disinfect environmental surfaces.)
- Infection control practices in long term care and home health settings are similar to those practices taken in traditional health-care settings.

Date last modified: 2009
Content source: Division of Healthcare Quality Promotion (DHQP)
National Center for Preparedness, Detection, and Control of Infectious Diseases

Reinforcing Institutional Collaboration

MAKE IT A TEAM APPROACH!

- 1) Alignment across functions on the common problem
- 2) Gain administration approval on priority setting
- 3) Assign a project manager & establish project plan
- 4) Measure baseline data
- 5) Set common goals to focus on being successful
- 6) Work as a team to drive results





Prevention Strategies: Hand Hygiene Methods

Since spores may be difficult to remove from hands even with hand washing, adherence to glove use, and Contact Precautions in general, should be emphasized for preventing *C. difficile* transmission via the hands of healthcare personnel

Johnson et al. Am J Med 1990;88:137-40.



Prevention Strategies: Environmental Cleaning

Assess Adequacy of Cleaning

Ensure that environmental cleaning is adequate and high-touch surfaces are not being overlooked

One study using a fluorescent environmental marker to assess cleaning showed:

- only 47% of high-touch surfaces in 3 hospitals were cleaned
- sustained improvement in cleaning of all objects, especially in previously poorly cleaned objects, following educational interventions with the environmental services staff

The use of environmental markers is a promising method to improve cleaning in hospitals.

Carling et al. Clin Infect Dis 2006;42:385-8.



Critical Variable Analysis - Hospital



Environmental Services Disinfection In Patient Rooms

Checklist - High Touch Surfaces

Environmental Services

The Front Line of Infection Prevention

Hospital Education Resource – High Touch Surfaces

When disinfecting daily occupied, discharge and enhanced patient rooms pay particular attention to the following surfaces:

- Door handles both bathroom & room entrance
- Light switches
- Hand sanitizer bottle
- Bed buttons and hand rails
- Keyboard & mouse
- Telephone
- Tray Table
- TV remote
- Bathroom sink handles
- Bathroom flush handle
- Bathroom hand rail
- Bathroom toilet seat (disinfect top first)

* Change disinfecting wiper when unable to achieve appropriate wet contact time and when visibly soiled

Approved - EH Educator & Infection Prevention and Control



**Keep It Simple
Keep it Consistent**



Clinical Disinfection of Patient Rooms

CLINICAL – Responsibilities include the following High Touch Surfaces (key areas)

- IV POLES
- ELECTRICAL CORDS
- EXTERNAL SURFACES OF MEDICAL EQUIPMENT
- EXTERNAL ULTRASOUND TRANSDUCERS OR PROBES
- BED PANS
- CARTS
- BP MONITORS
- GLUCOMETERS



CMS
CENTERS FOR MEDICARE & MEDICAID SERVICES

F-TAG 441 SEPTEMBER 2009

Surveyors will Observe for cleaning and disinfecting to determine;

- Equipment in transmission based precaution rooms is either dedicated to that resident and appropriately cleaned or is thoroughly cleaned and disinfected between residents using appropriate agents and procedures;
- High touch surfaces in the environment are visibly soiled (i.e., contaminated) or have been cleaned and disinfected;
- Small non-disposable equipment such as glucose meters, scissors, and thermometers are cleaned and appropriately disinfected after each use for individual resident care;
- Single-use items (e.g., blood glucose lancet, other sharps) are properly disposed of after one use;
- Single resident use items (e.g., basins, bed pans) are maintained to be visibly clean for use, and are disposed of after use by a single resident;
- Multiple use items (e.g., shower chairs, bedside scales, resident lifts, commodes, tubs) are properly cleaned/disinfected between each resident use.



Norovirus Evidence To Disinfect

Hospitals – 11/36 31% environmental swabs were positive for Norovirus. Positive swabs from lockers, curtains and commodes & confined to immediate environment of symptomatic patients.

J Hospital Infect 1998



Longterm Care Facility - 5/10 50% of Environmental samples were positive for norovirus in immediate environment of symptomatic patients.

ICHE 2005



SELECTING THE RIGHT DISINFECTANTS




CDC

CDC TERMINOLOGY

LOW LEVEL
Disinfectant

- EPA-registered hospital disinfectant
- Effective for vegetative bacteria, most fungi, and most viruses
- Typical active ingredients: quats, phenols

INTERMEDIATE
Disinfectant

- EPA registered hospital disinfectant
- Effective for TB, vegetative bacteria, fungi and viruses
- Typical active ingredients: 70-90% alcohol, hypochlorite, hydrogen peroxide, phenols, some quats

HIGH LEVEL
Disinfectant

- May be EPA registered hospital disinfectant or FDA-approved product
- Effective for TB and spores (to some degree), as well as bacteria, fungi, and viruses
- Typical active ingredients: glutaraldehyde, OPA, hydrogen peroxide, peracetic acid

Commercial Solutions

How Disinfectants Kill Microorganisms

Sodium Hypochlorite

Destroys cell membrane and disrupts metabolism. No resistance can be developed.

Quaternary Ammonium Compounds

Disruption of cell membranes resulting in cell rupture. Some resistance has been noted.

Alcohols

60-90% alcohol modifies protein structure so it can no longer function (denaturing). No resistance can be developed.

Soaps and Detergents

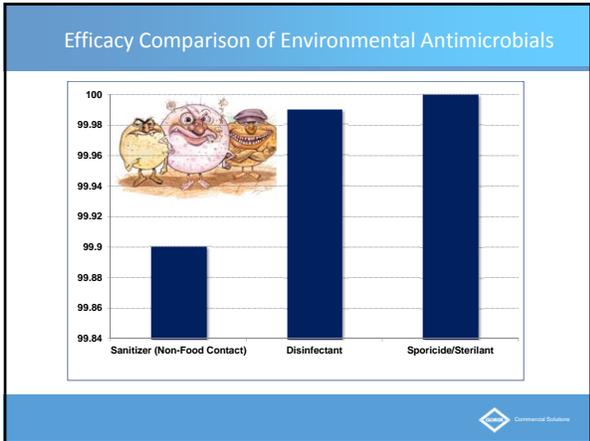
Mainly mechanical removal of microbes and surface debris through scrubbing and rinsing, with little disruption of cell membranes

Commercial Solutions

CURRENT DISINFECTING OPTIONS

Active Ingredient	Action	Pro	Con
Sodium Hypochlorite (bleach)	Oxidizer	Highly effective- quick activity Broad Kill Claims including C-diff spore	May be corrosive if and/or contact agent is not added. Residue on some surfaces.
Alcohol	Denatures protein, fragments DNA/RNA strands	Quick efficacy in high concentrations	Can evaporate prior to contact time Leaches plasticizers out of rubber and vinyl
Phenol	Enters and inactivates cell	Effective against many organisms	Not effective on C. diff spores Typically long contact times (10 minutes)
Quaternary Ammonium Chloride	Disrupts the cell wall and breaks itself in the cell to inactivate	Typically inexpensive	Degrades plasticizers in rubber and vinyl, may become sticky Typically long contact times (10 minutes)
Accelerated Hydrogen Peroxide	Oxidizers	Broad Kill Claims, Quick activity	Not effective against spores or Hep. A.
Combination: Quat + Alcohol	Denatures protein & inactivates from within	Alcohol speeds long contact times	Can evaporate prior to contact time. Leaches plasticizers out of rubber and vinyl

Commercial Solutions



WHY RTU BLEACH?

	Fastest Kill Times	Broadest Kill Spectrum	
Effective against the following and other organisms	Clorox® Germicidal Wipes	Dispatch® Hospital Cleaner Disinfectant with Bleach	Dispatch® Hospital Cleaner Disinfectant Towels with Bleach
Bacteria	30 seconds	1 minute	1 minute
Viruses	1 minute	1 minute	1 minute
C. Diff spores	5 minutes	5 minutes	5 minutes

** Except NY and HI

READY TO USE CLOROX / DISPATCH BLEACH PRODUCTS

- MEETS CDC RECOMMENDATIONS FOR CLEANING SPILLS OF BLOOD AND BODY SUBSTANCES.
- Includes Odor Masking Agent
- Includes Corrosion Inhibitor
- Contains Surfactants To Aid In Cleaning
- Clorox Wipes Good For 1 Year From Date of MFG
- Dispatch Liquids Good For 2 Years From Date of MFG
