



Cleaning and Disinfection



Abridged from Basics of Infection
Prevention 2-Day Mini-Course
2014

Objectives

- Describe basic principles of cleaning and disinfection
- Identify when to use cleaning versus disinfection
- Describe how to monitor cleaning and disinfection processes

Terminology

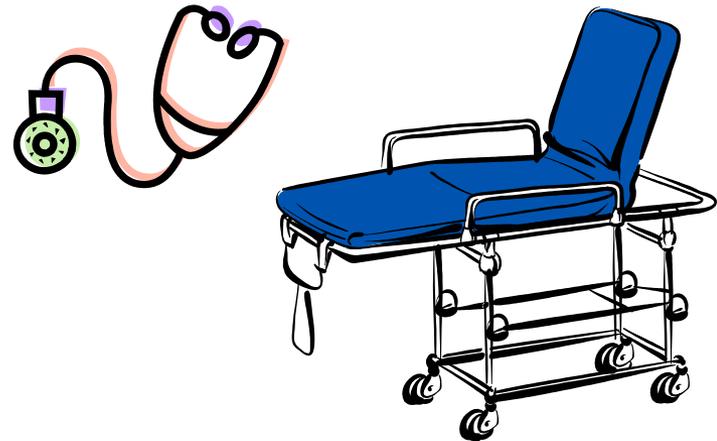
- Cleaning
 - general removal of debris (dirt, food, and other body secretions)
 - reduces amount of organic matter that contributes to proliferation of bacteria and viruses
- Disinfection
 - removes most organisms present on surfaces that can cause infection or disease
- Sterilization
 - the killing or removal of all organisms
 - not covered here; full slide set is available at http://www.cdph.ca.gov/programs/hai/Documents/18_Cleaning_and_Disinfection_Updated%20FINAL%203.31.14.pdf

Semi-Critical Items

- Require minimum high level disinfection (or sterilization)
- Includes items in contact with **non-intact skin or mucous membranes**
- Examples include respiratory therapy equipment, anesthesia equipment, flexible and laryngoscopes, bronchoscopes, GI endoscopes, cystoscopes, vaginal ultrasonic probes
- Cleaning process must precede high-level disinfection

Non-Critical Items

- Require intermediate-level or low-level disinfection
- Includes items in contact only with **intact skin**
- Examples include BP cuffs, stethoscopes, durable mobile patient equipment

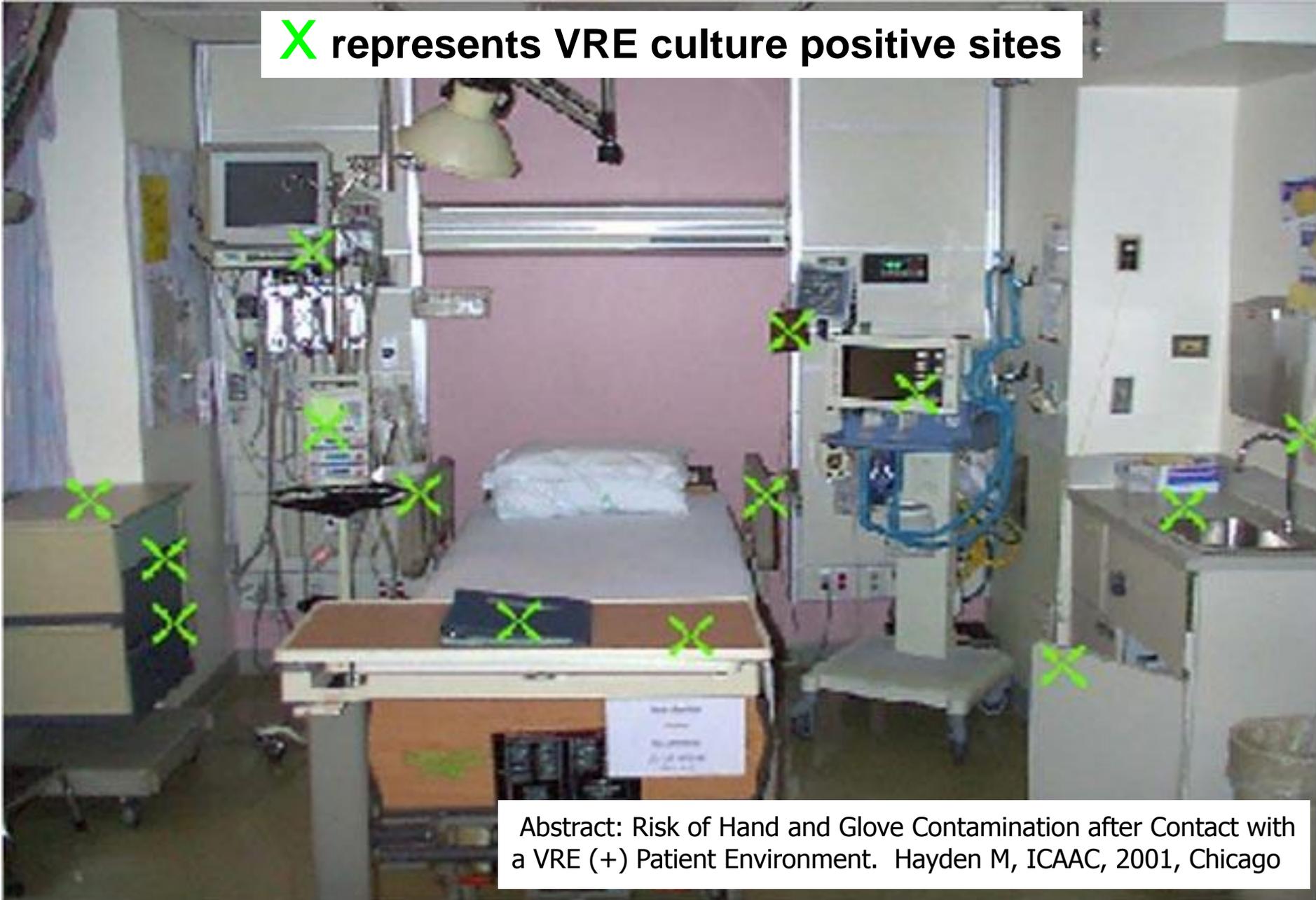


Environmental Cleaning



- Patient environment can facilitate transmission of bacteria and viruses
 - By direct contact
 - On hands of healthcare personnel
- Contaminated surfaces increase potential for transmission of bacteria and viruses between patients
- Items categorized as non-critical (intermediate or low disinfection) or require cleaning only

X represents VRE culture positive sites



Abstract: Risk of Hand and Glove Contamination after Contact with a VRE (+) Patient Environment. Hayden M, ICAAC, 2001, Chicago

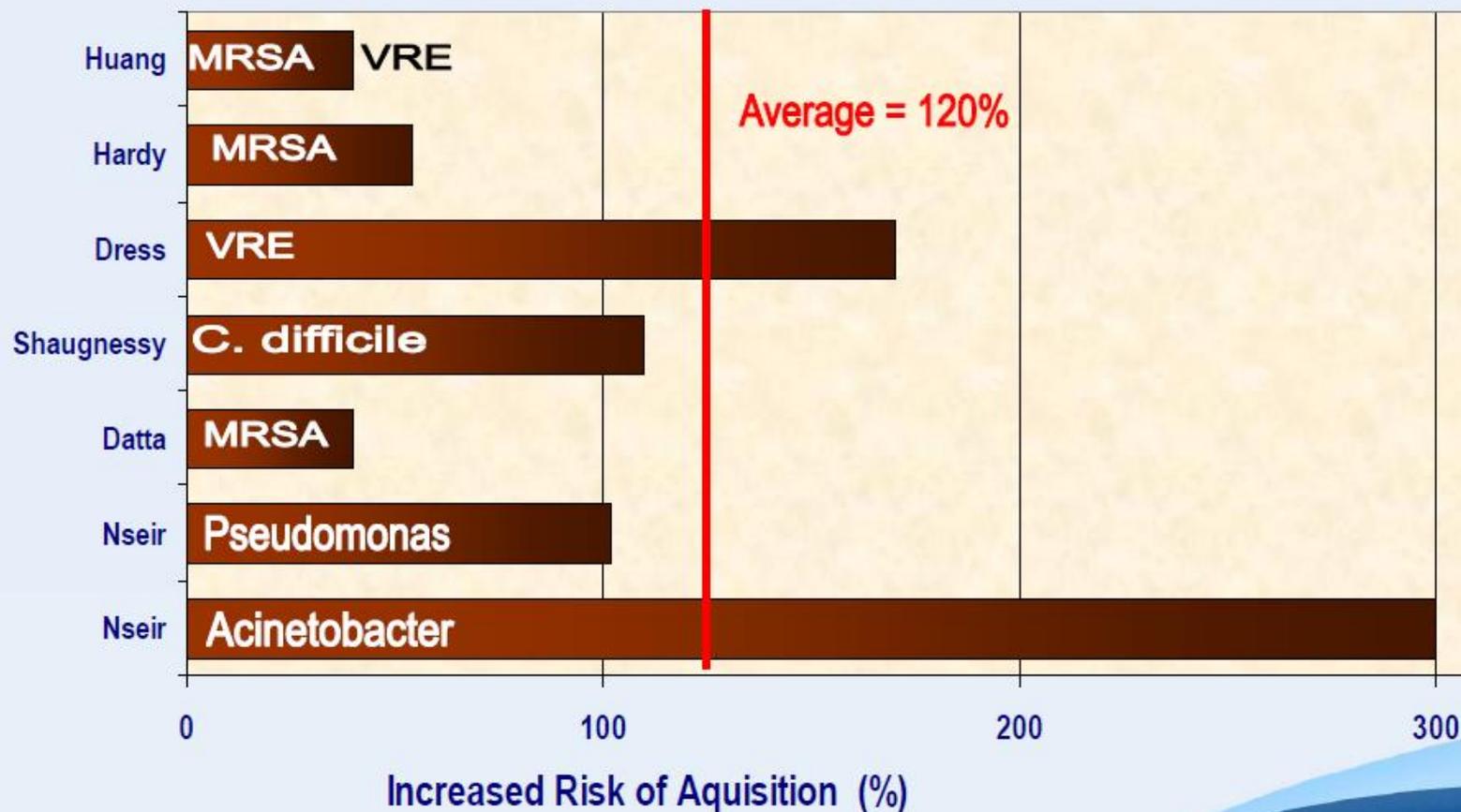
Policy Considerations

- Include in policy all surfaces and equipment that can reasonably be expected to be contaminated by bacteria (high touch surfaces)
- Define responsibility and frequency for cleaning and disinfecting patient care equipment and surfaces
- Monitor compliance with policy
- Staff should be able to answer question “How do you know whether this item has been cleaned and/or disinfected?”
- Cleaned/disinfected items should be labeled (date/time) prior to use on the next patient

High Touch Surfaces in Patient Rooms

- Considered non-critical
- Must be cleaned *then* disinfected on a regular basis
- Examples include:
 - Bedrails
 - Call bell
 - Telephones
 - TV remote
 - IV pump
 - IV poles
 - Toilet, commode chair
 - Over bed table
 - Light switches
 - Doorknobs
 - Respiratory and other bedside equipment
 - Computer keyboard
 - Chairs

Increased acquisition risk from prior room occupant 6 studies as of January 2011



-Carling PC, Bartley JM. Am J Infect Control 2010;38 S41-50.

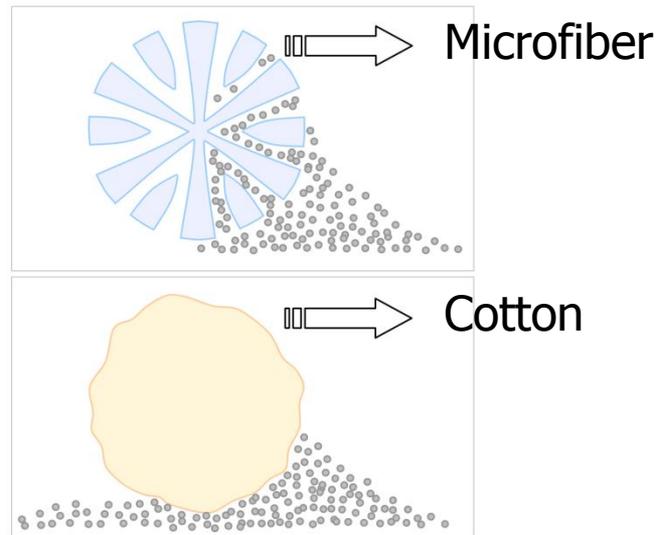
Items Requiring *only* Cleaning

- Floors, walls, and windows
- Chairs and other furniture used by individuals who are clothed
- Private offices and other non-public, non-patient care areas
- Bed curtains should be changed when soiled and w/ terminal cleaning

Clarify in policy what needs to be cleaned and not necessarily disinfected

Use Microfiber Cloths for Cleaning

- Densely constructed synthetic strands $\sim 1/16^{\text{th}}$ the diameter of a human hair
- Attracts dust, cleans $\sim 50\%$ better than comparable cotton especially when damp
- Easier to use, lighter, designed for repeat usage



HICPAC Disinfection &
Sterilization Guideline
2008, Rutala

Monitor Environmental Cleaning Processes



- Bioluminescence (outcome measure)
 - Monitors for light emissions produced if organism present
 - Results difficult to interpret because it is unknown whether organism remains viable and thus transmissible
 - Expensive
- Fluorescence (process measure)
 - Monitors for chemical markers that fluoresce with ultraviolet (black) light if not removed during cleaning
- Culturing
 - Should *not* be done except during some outbreak investigations
- Visual inspection
 - Make routine rounds and provide feedback to frontline staff

Linens

- All linen handled as if contaminated with blood or body fluids (Standard Precautions)
 - Bag linen at point of use
 - Wear PPE when sorting and agitate minimally
- Laundry equipment must be maintained to prevent microbial contamination*
- New laundry technologies allow linen washing without requirements for hot water and chlorine
 - Hot water - 160° F x 25 min
 - Cold water - 71-77° F with 125 ppm chlorine bleach rinse or equivalent detergent
 - Detergents not required to have stated anti-microbial claims*



*Manufacturer's instructions for use must be followed

Disinfection

- Eliminates or kills most bacteria, many virus types, some fungi (not prions)
- Cannot be accomplished without first cleaning
- Time-dependent process
- Levels of disinfection - high, intermediate, or low
- Hospitals must use EPA-approved product for desired level of disinfection
 - Has minimally a tuberculocidal label claim

Disinfection - continued

- Follow manufacturer's recommendations to achieve disinfection and to avoid medical device damage method
 - Use correct dilution – more is not better!
 - Use correct contact time
 - Use correct temperature
- Understand employee and environmental safety issues
 - Do not exceed exposure limits
 - Know permissible exposure levels
 - Assess compatibility with gloves, basins, other products

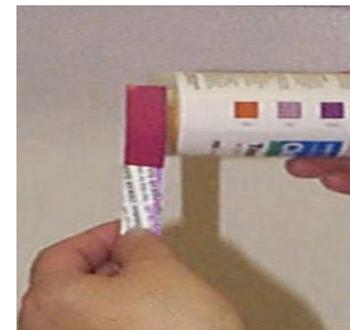
EPA Registration of Disinfectants

- Labeled as high level vs. intermediate vs. low level
- May include degrees of approval
 - Limited approval, e.g. kills Hepatitis B and HIV but not approved for spores
- Select disinfectant based on what you are trying to accomplish
 - Environmental vs. medical device disinfection
- Search EPA website by product name

www.epa.gov/oppad001/chemregindex.htm

High-level Disinfection

- EPA approved products include gluteraldehyde, ortho-phthaldehyde(OPA), peracetic acid & hydrogen peroxide
- Ensure achievement of temperature requirements
- Test product prior to each use
 - Can get diluted with frequent use
 - Follow facility policy
 - Test strips expire; monitor dates
- Change product as indicated by test and as manufacturer requires
- Maintain log records
- Ensure competency of staff



Environmental Disinfectants

- Phenolics
 - “Gold Standard” in healthcare
 - Toxicity concerns prohibit use in nurseries, NICU
 - Does not kill spores
- Quaternary ammonium compounds
 - Approved for specific pathogens (read the label!)
 - Affected by water hardness
 - Affected by bioburden
 - PPE use required (estrogen-like effect with contact, use gloves) <https://www.federalregister.gov/articles/2007/09/06/E7-17634/residues-of-quaternary-ammonium-compounds-di-n-alkyl-c8#h-23>



Correct dilution is critical to effectiveness.

Environmental Disinfectants - continued

- Iodophors
 - Can be used in food preparation areas
 - Inactivated by organic materials, e.g. blood
 - Can stain surfaces
- Chlorine (bleach)
 - Inactivated by organic materials, e.g. blood
 - Kills spores, e.g. *C. difficile*
 - Corrosive
 - Highly toxic (deadly) if combined with ammonia

Environmental Disinfectants - continued

- Disinfectant spray-fog techniques for antimicrobial control in hospital rooms
 - Unsatisfactory method of decontaminating air and surfaces
 - Not recommended for general infection control in routine patient-care areas
- Ultraviolet Radiation
 - Dependent on strength and duration of exposure to light, 'line of sight', how well microorganism can withstand UV
 - Limited to destruction of airborne organisms, inactivation of microorganisms on surfaces, and water purification



IP Role in Cleaning and Disinfection

- Know the processes; update the policies
- Know directors of environmental services, sterile processing, operating room, endoscope services
- Know where all sterilization and disinfection is being done
 - May include
 - Radiology
 - GI dept
 - Cardiac cath lab
 - Wound care center
 - Outpatient clinics
 - Emergency room
 - Same day procedures
 - Ambulatory surgery
- Ensure staff know and follow contact times for products per manufacturer guidelines; on labels

Questions?

For more information, please contact any
HAI Liaison Team member or
HAIProgram@cdph.ca.gov

Thank you

