

Module F

PRINCIPLES OF DISINFECTION AND STERILIZATION

Statewide Program for Infection Control and Epidemiology
(SPICE)

UNC School of Medicine

OBJECTIVES

- Describe the principles of disinfection and sterilization
- Provide an overview of current methods for disinfection and sterilization
- Discuss training and quality control methods and required documentation

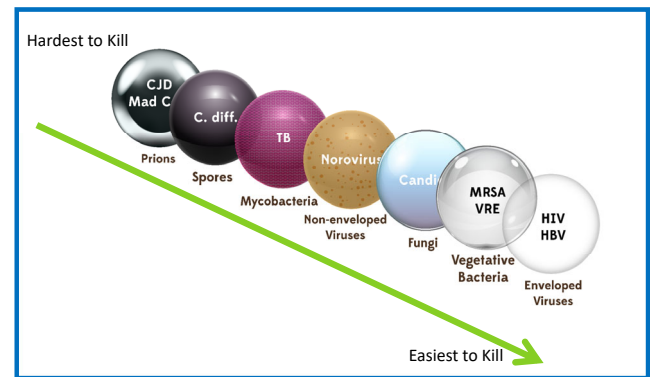
PRINCIPLES

• Factors influencing the efficacy of disinfection and sterilization

- How well the object is cleaned
- Type and amount of material
- Solution concentration
- Exposure time
- Design of object
- Temperature and pH of disinfectant



PRINCIPLES



PRINCIPLES

• Management of reusable contaminated items:

- Handle as little as possible
- Use appropriate PPE
- Remove gross soil or debris at the point of use (gauze sponge moistened with water/disinfectant wipe for example)






PRINCIPLES



- Transport of contaminated items:
 - Must be contained. The type of container depends on the item being transported:
 - Puncture-resistant, leak-proof, closable containers must be used for devices with edges or points capable of penetrating container or skin
 - Must have a bio-hazard label or be red in color (never via gloved hands alone)
 - Items should be kept moist during transport by adding a towel moistened with water (not saline) or a foam, spray or gel product specifically intended for this use
 - Avoid transporting contaminated items in a liquid
- Reusable collection containers for holding contaminated items should be made of material that can be effectively decontaminated
- Use separate collection containers for contaminated versus re-processed or clean items

SPAULDING CLASSIFICATION

Spaulding Classification of Surfaces:

-  **Critical** – Objects which enter normally sterile tissue or the vascular system and require sterilization
-  **Semi-critical** – Objects that contact mucous membranes or non-intact skin and require high-level disinfection, which kills all but high-levels of bacterial spores
-  **Non-critical** – Objects that contact intact skin but not mucous membranes, and require low-level disinfection



PROCESSING CRITICAL INSTRUMENTS

• Critical Items:

- Penetrate or enter normally sterile tissue or spaces, including the vascular system (Surgical instruments, cardiac catheters, IV devices, urinary catheters)
- High risk of transmitting infection if handled improperly
- Must be sterilized between uses or used as single-use disposable devices

Goal: Sterility = devoid of all microbial life

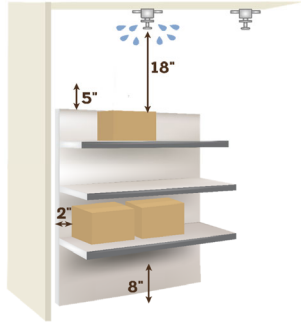
critical



STORAGE OF STERILE ITEMS



- Ensure the sterile storage area is a well-ventilated area that provides protection against dust, moisture, and temperature and humidity extremes.
- Sterile items should be stored so that packaging is not compromised.
- Label sterilized items with a load number that indicates the sterilizer used, the cycle or load number, the date of sterilization, and if applicable the expiration date.



STORAGE

GENERAL GUIDELINES






- All patient care items must be stored at least 8" off the floor
- Open rack storage should have a bottom shelf (plexi-glass for example)
- Stored at least 18" below the ceiling or the sprinkler head (according to fire code)
- Stored at least 2" inches from outside wall
- Items should be stored in areas of limited traffic
- Stored in an area with controlled temperature and humidity
- Outside shipping containers and corrugated cartons should not be used as storage containers
- Items should not be stored under sinks or exposed water/sewer pipes
- Windowsills should be avoided
- Closed or covered cabinets are preferred



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SEMI-CRITICAL INSTRUMENTS

• Semi-Critical Items:

- Contact mucous membranes or non-intact skin (for example respiratory therapy equipment etc.,)
- Risk of transmitting infection if handled improperly
- Must be high-level disinfected between uses or used as single-use disposable devices




Goal: High-level disinfection = free of all microorganisms except high numbers of bacterial spores

Semi-critical



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NON-CRITICAL INSTRUMENTS

Non-critical

• Non-Critical Items:

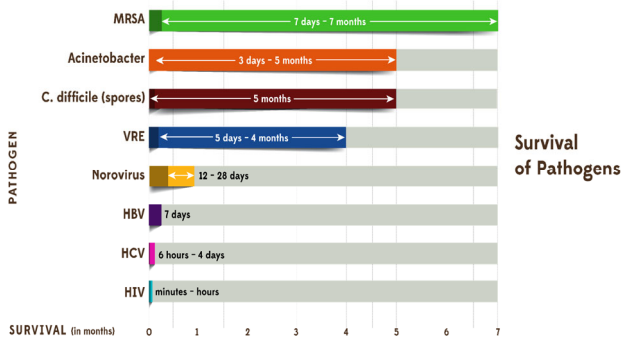
- Objects that contact intact skin but not mucous membranes (BP cuffs, stethoscopes, scales)
- Minimal risk of transmitting infection if handled improperly
- Must be low-level disinfected on a routine basis



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ROLE OF THE ENVIRONMENT

Non-critical



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LIQUID DISINFECTANTS

Non-critical

Disinfectant Agent	Use Concentration
Ethyl or isopropyl alcohol	70% - 90%
Chlorine (bleach)	100 ppm
Phenolic	UD
Iodophor	UD
Quaternary ammonium compound (QUAT)	UD
Improved/Accelerated hydrogen peroxide	0.5%, 1.4%

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PROPERTIES OF AN IDEAL DISINFECTANT

Non-critical

- Broad Spectrum
- Fast Acting
- Non Toxic
- Surface Compatibility
- Easy to Use
- Acceptable odor
- Economical



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OTHER ENVIRONMENTAL ISSUES

OSHA

Blood and Body Fluid Spills

- Promptly clean and decontaminate
- Use appropriate PPE
- Clean spills with dilute bleach solution (1:10 or 1:100) or an EPA-registered hospital disinfectant with a TB or HIV/HBV kill claim.



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KNOWLEDGE CHECK

Which of the following would be considered non-critical items

Select correct one

1. Central venous catheters
 2. Surgical instruments
 3. Blood pressure cuffs
 4. Foley catheters
- a. 1 and 3
b. 3 and 4
✓ c. 3 only
d. 1, 2, 3, 4



KNOWLEDGE CHECK

Patient care equipment and devices should be disinfected/sterilized based on:

Select correct one

1. Items intended use
 2. What the item is going to come in contact with (mucous membranes, non-intact skin i.e.,)
 3. The number of patients you have scheduled for the day
 4. What the physician tells you to do
- ✓ a. 1 and 2
b. 3 and 4
c. 3 only
d. 1, 2, 3, 4



TRAINING AND QUALITY CONTROL



- Provide comprehensive and intensive training for all staff assigned to reprocess medical/surgical instruments
- To achieve and maintain competency:
 - Staff receive hands-on training
 - Work with supervision until competency is documented
 - Competency testing should be conducted at commencement of employment and no less than annually
 - Training and competencies should be documented



QUESTIONS?

