Module F

PRINCIPLES OF DISINFECTION AND STERILIZATION

Statewide Program for Infection Control and Epidemiology (SPICE)

UNC School of Medicine

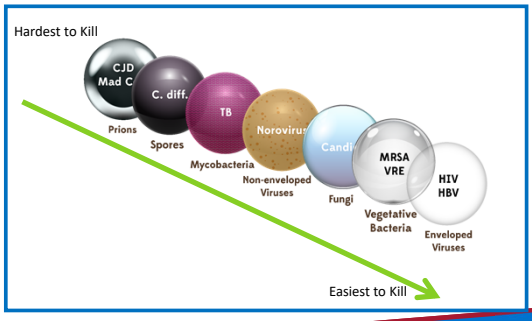
OBJECTIVES

- 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

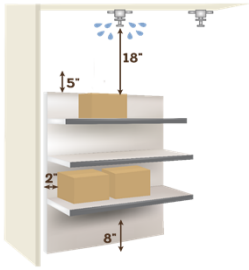
critical

- 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

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

- **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

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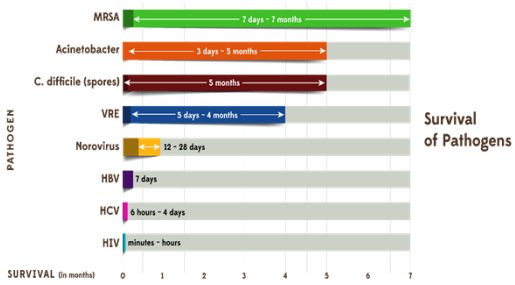
NON-CRITICAL INSTRUMENTS

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

ROLE OF THE ENVIRONMENT

Non-critical



Survival of Pathogens

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%

PROPERTIES OF AN IDEAL DISINFECTANT

Non-critical

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

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.

KNOWLEDGE CHECK

Which of the following would be considered non-critical items

1. Central venous catheters
2. Surgical instruments
3. Blood pressure cuffs
4. Foley catheters

Select correct one

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:

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

Select correct one

✓ 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?