

CLEANING, DISINFECTION, AND STERILIZATION

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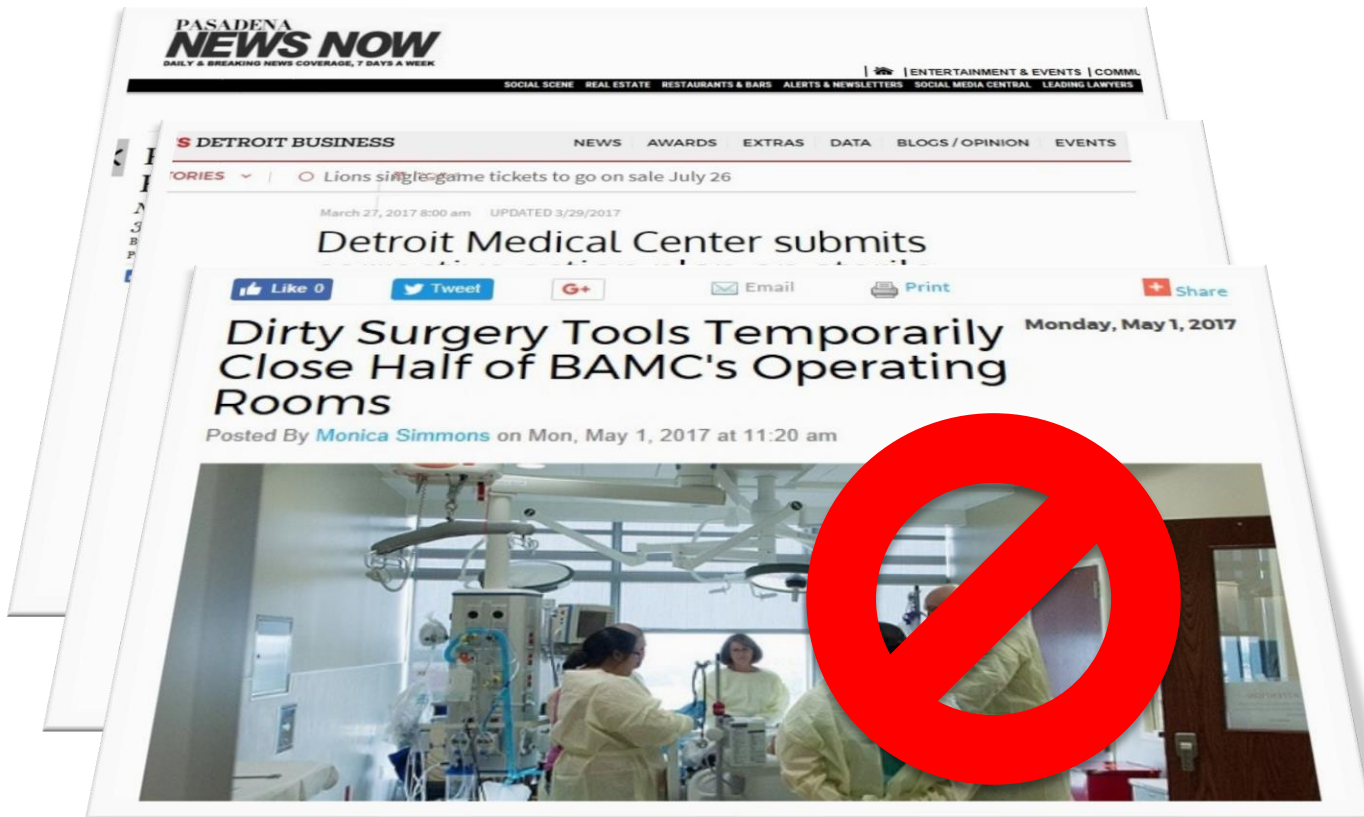
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Disclaimer:

**This presentation represents my own opinion
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with.**

WHY SHOULD INFECTION CONTROL PARTNER WITH SPD?



OBJECTIVES

At the end of this lecture, participants will be able to:



ENVIRONMENTAL CONCERNS

Discuss environmental best practices for instrument reprocessing.



POINT OF USE CLEANING AND DECONTAMINATION

Discuss point of use cleaning and decontamination best practices for surgical instrument reprocessing.



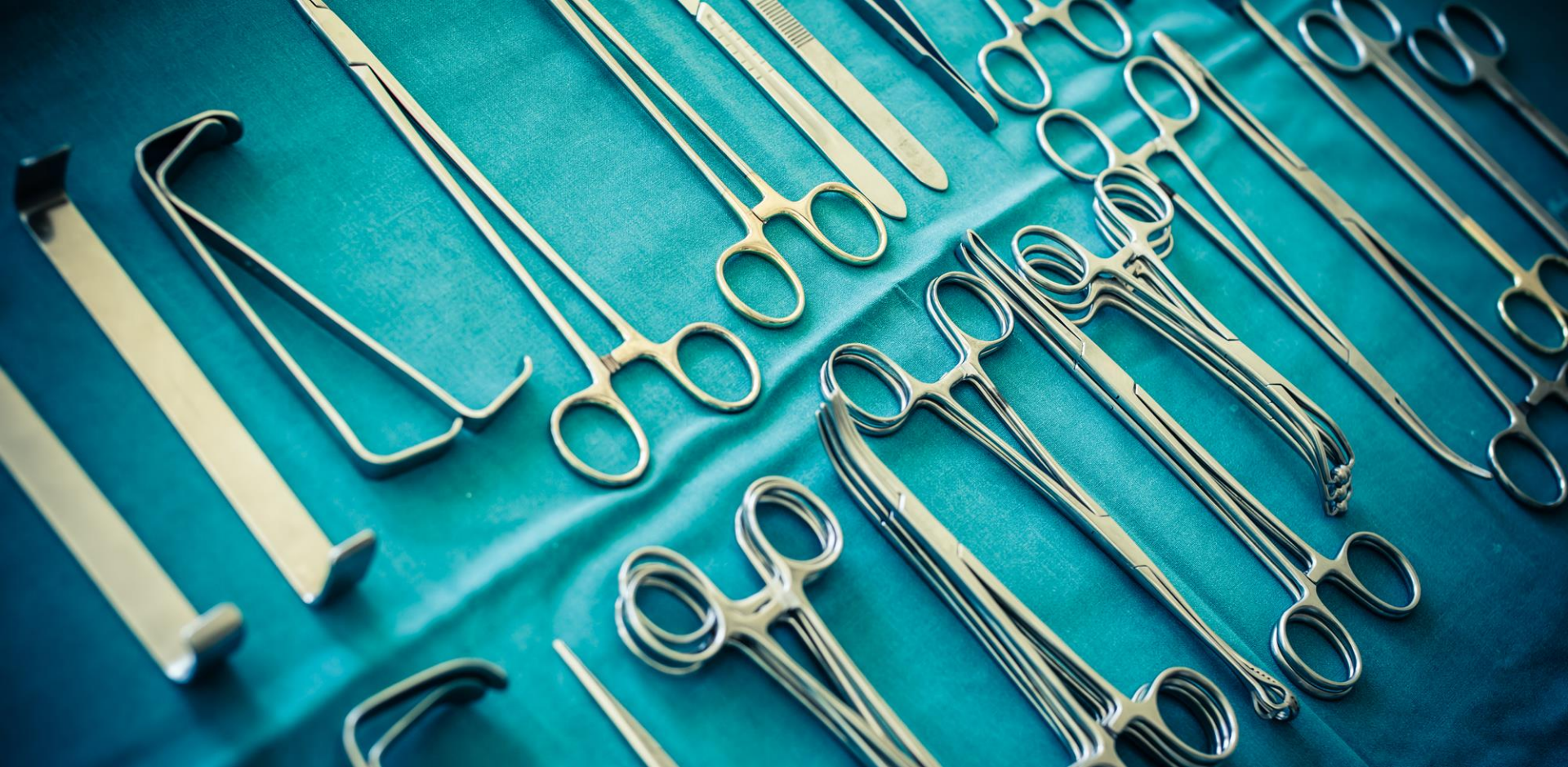
INSPECTION, ASSEMBLY, AND STERILIZATION

Explain instrument preparation, sterilization and sterile storage best practices.



ENDOSCOPE AND HIGH LEVEL DISINFECTION

Identify basic steps for high-level disinfection of flexible gastrointestinal endoscopes.



FOCUS 01

STANDARDS/ENVIRONMENTAL CONCERNS

Discuss environmental best practices for instrument reprocessing.

Guideline for Disinfection and Sterilization in Healthcare Facilities, 2008

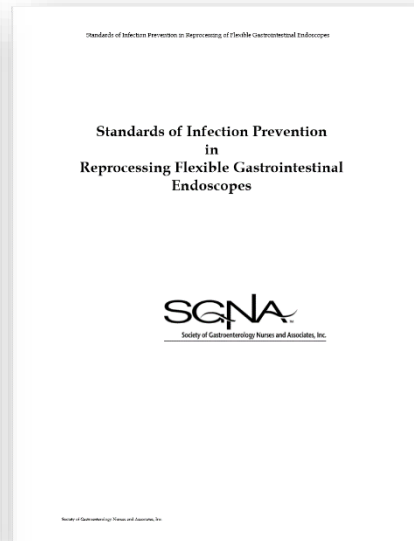
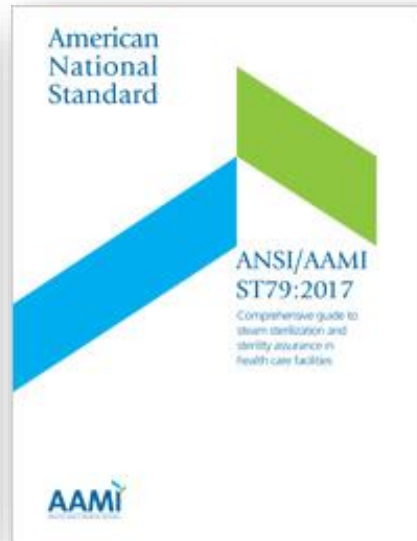


Guideline for Disinfection and Sterilization in Healthcare Facilities, 2008

William A. Rutala, Ph.D., M.P.H.^{1,2}, David J. Weber, M.D., M.P.H.^{1,2}, and the Healthcare Infection Control Practices Advisory Committee (HICPAC)³

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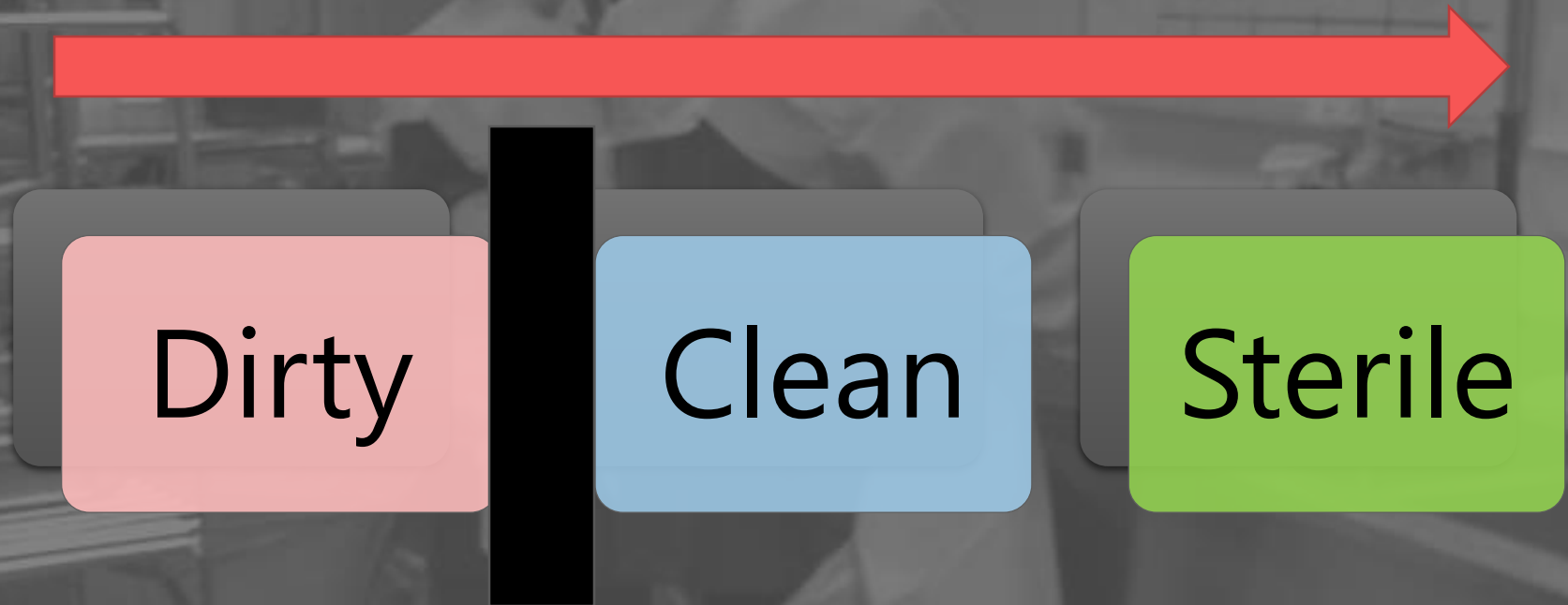
STANDARDS

ASHRAE 170 SPD FACILITY REQUIREMENTS

*AAMI and AORN now defer to ASHRAE Standards. Organization is held to the ASHRAE standard at the time of installation or last major remodel.

Functional Area	Airflow	Air Exchanges	Exhausted Outdoors	Temperature	Relative Humidity
Soiled/Decontaminated	Negative	10	Yes	60-65F	20%-60%
Sterilizer Equipment Access	Negative	10	Yes	75-85F	20%-60%
Sterilizer Loading/ Unloading	Positive	10	Yes	68-73F	20%-60%
Restrooms/Housekeeping	Negative	10	Yes	68-73F	20%-60%
Preparation and Packaging	Positive	10	No	68-73F	20%-60%
Textile Packaging Room	Positive	10	No	68-73F	20%-60%
Clean/Sterile Storage	Positive	4	No	≤75F	≤70%

FACILITY DESIGN



- Clean and Dirty Areas must be physically separated or 36" apart.
- People flow must move from clean to dirty.
- Equipment flow must move from dirty to clean.

ENVIRONMENTAL CONSIDERATION

- Floors and horizontal work surfaces
- Clean and disinfect daily
- Floor should be seamless, not grout
- Walls and storage shelves should be cleaned regularly on a scheduled basis.
- Ceilings and walls should be made of non-shedding and non-porous materials.



SURGICAL INSTRUMENTATION FLOW





FOCUS 02

POINT OF USE CLEANING AND DECONTAMINATION

Discuss point of use cleaning and decontamination best practices for surgical instrument reprocessing.

IMPORTANCE OF PRECLEANING

- **Effective Cleaning CANNOT Take Place Without Effective Pre-cleaning**
- Precleaning prevents formation of BIOFILM.
- Biofilm is “a group of microorganisms that form on a solid surface that comes in contact with water.”
- Biofilm can harbor resistant microorganisms reducing the effectiveness of high level disinfection or sterilization.





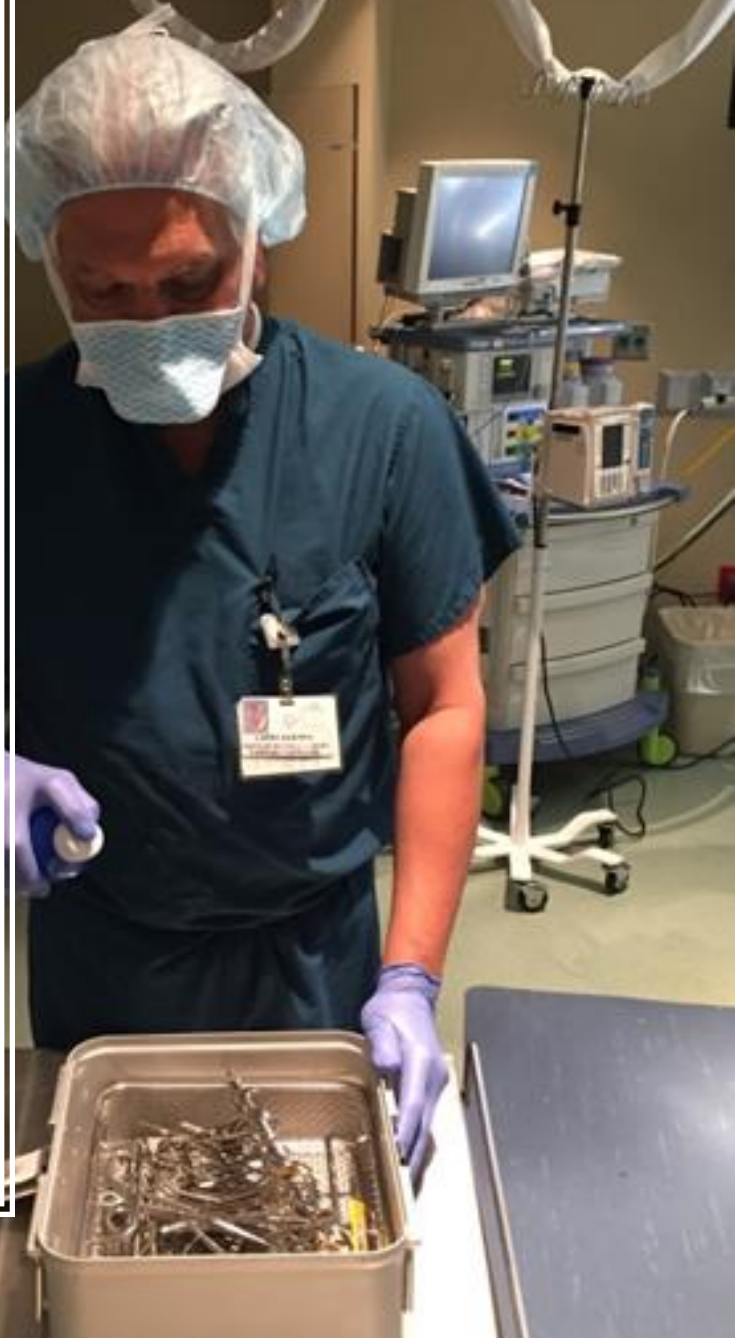
CLEANING STARTS ON THE PROCEDURAL FIELD

Wipe instruments using a sterile, water moistened sponge. Instruments with lumens should be flushed with sterile water. Saline, bleach, or other solutions should NEVER be used.

POINT OF USE CLEANING

2

- Pre-cleaning prevents damage of instrumentation and equipment.
- Dried blood is corrosive and causes pitting, rusting, and metal fatigue.
- Damaged instruments and equipment is unsafe to use on patients and can harbor microorganisms.



BIOHAZARDOUS TRANSPORT OSHA BLOODBORNE PATHOGENS 1910.103

- Immediately or as soon as possible after use, contaminated reusable sharps shall be placed in appropriate containers until properly reprocessed.
- These containers shall be:
 - Puncture resistant
 - Labeled or color-coded in accordance with this standard
 - Leak proof on the sides and bottom

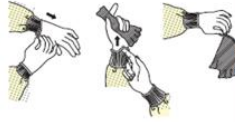


SEQUENCE FOR REMOVING PERSONAL PROTECTIVE EQUIPMENT (PPE)

Except for respirator, remove PPE at doorway or in anteroom. Remove respirator after leaving patient room and closing door.

1. GLOVES

- Outside of gloves is contaminated!
- Grasp outside of glove with opposite gloved hand; peel off
- Hold removed glove in gloved hand
- Slide fingers of ungloved hand under remaining glove at wrist
- Peel glove off over first glovet
- Discard gloves in waste container



2. GOGGLES OR FACE SHIELD

- Outside of goggles or face shield is contaminated!
- To remove, handle by head band or ear pieces
- Place in designated receptacle for reprocessing or in waste container



3. GOWN

- Gown front and sleeves are contaminated!
- Unfasten ties
- Pull away from neck and shoulders, touching inside of gown only
- Turn gown inside out
- Fold or roll into a bundle and discard



4. MASK OR RESPIRATOR

- Front of mask/respirator is contaminated – DO NOT TOUCH!
- Grasp bottom, then top ties or elastics and remove
- Discard in waste container



PERFORM HAND HYGIENE BETWEEN STEPS IF HANDS BECOME CONTAMINATED AND IMMEDIATELY AFTER REMOVING ALL PPE



SEQUENCE FOR PUTTING ON PERSONAL PROTECTIVE EQUIPMENT (PPE)

The type of PPE used will vary based on the level of precautions required, such as standard and contact, droplet or airborne infection isolation precautions. The procedure for putting on and removing PPE should be tailored to the specific type of PPE.

1. GOWN

- Fully cover torso from neck to knees, arms to end of wrists, and wrap around the back
- Fasten in back of neck and waist



2. MASK OR RESPIRATOR

- Secure ties or elastic bands at middle of head and neck
- Fit flexible band to nose bridge
- Fit snug to face and below chin
- Fit-check respirator



3. GOGGLES OR FACE SHIELD

- Place over face and eyes and adjust to fit



4. GLOVES

- Extend to cover wrist of isolation gown



USE SAFE WORK PRACTICES TO PROTECT YOURSELF AND LIMIT THE SPREAD OF CONTAMINATION

- Keep hands away from face
- Limit surfaces touched
- Change gloves when torn or heavily contaminated
- Perform hand hygiene



DECONTAMINATION PPE



Enzymatic
Validate dosing accuracy
Validate NOT expired
Validate approved by OEM
No topping off

DECONTAMINATION CHEMICALS

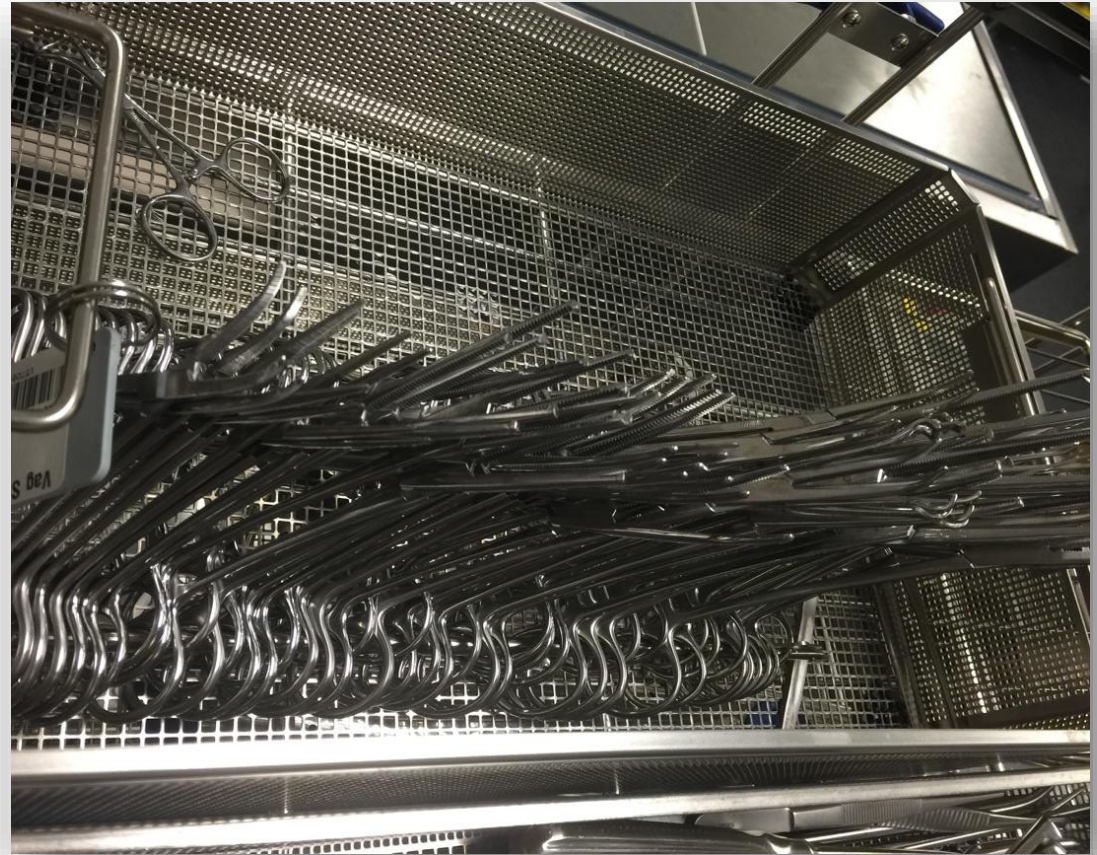
MANUAL CLEANING

- Brushing of Instruments
- Nylon brushes are used to remove debris from instruments.
- Brushing should occur as follows:
 - Under water line to prevent aerosolization.
 - Brush all serrations
 - Brush all hinges.
 - Brush all lumens



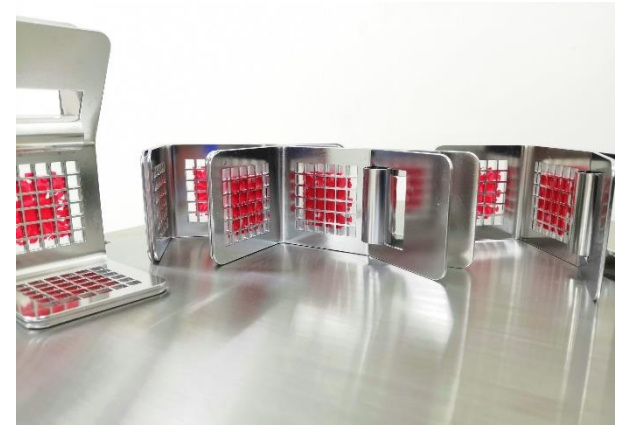
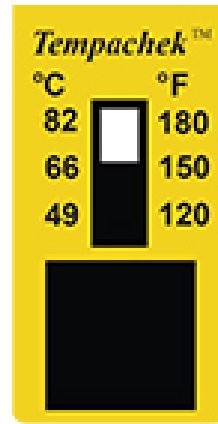
ULTRASONIC CLEANING





AUTOMATED CLEANING

- Place instruments in a position ensuring maximum exposed surface area through the automated wash process.
- Stringer should be placed so that hinged instruments are held in the open position.



DECONTAMINATION QA TESTING



FOCUS 03

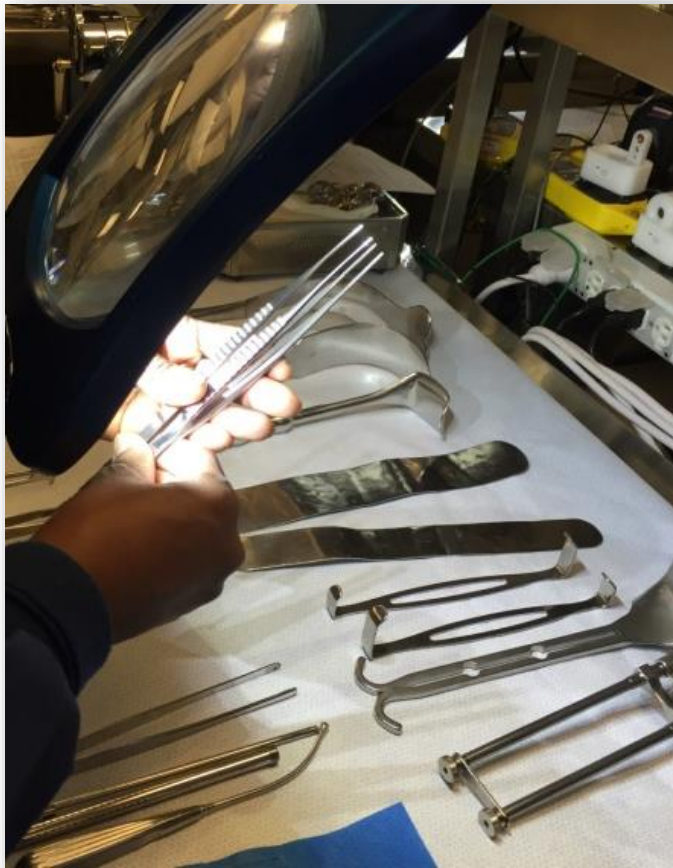
INSPECTION, ASSEMBLY, AND STERILIZATION

Explain instrument preparation, sterilization and sterile storage best practices.





ASSEMBLY INSPECTION



- Check each instrument for the following:
 - Corrosion
 - Rust
 - Pitting
 - Cracks
 - Burrs
 - Sign of wear
- If any of the above are found, remove the instrument from service.

ASSEMBLY INSPECTION

- Check each instrument for functionality:
- Scopes
 - Visual inspect lens for cracks or water penetration
 - Verify optics not damaged
- Cameras
 - Verify prisms not cracked or wet internally
 - Check for damaged cords
- Light Sources
 - Verify fiber optics not damaged





ASSEMBLY STAINS

Stain Color	Probable Cause
Brown/Orange Stains	High pH - improper soaps, baked on blood, soaking in saline or using laundry soap (usually is not rust)
Bluish-Black Stains	Exposure to saline, blood or potassium chloride Reverse plating if two types of metals are placed in ultrasonic together
Light and Dark Spots	Water spots from allowing instrument to air dry
Dark Brown/Black Stains	Low pH acid stain - detergents or dried blood
Multi-Color Stains	Excessive heat - "hot spots" in autoclave
Bluish-Gray Stains	Cold sterilization solution used outside manufacturer guidelines



ASSEMBLY CHEMICAL INDICATORS

PEEL POUCHES

- Size of peel pouch: 1" around instrument.
- Handle located by chevron.
- Chemical integrator included.
- Tip protector if appropriate.
- Double peel pack only if validated.
- Do not overload with too many instruments.
- Do not use inside trays.
- Sterilize paper to plastic on side.



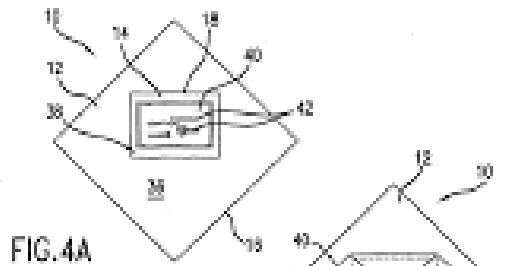


FIG. 4A

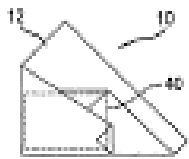


FIG. 4B

FIG. 4C

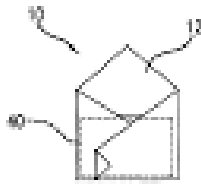


FIG. 4D

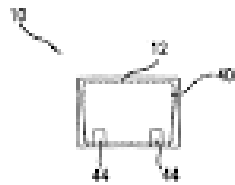


FIG. 4E



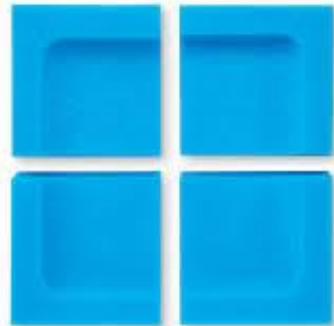
SteriProtect

Instrument Tray Corner Protector



Reusable

Please return to SPD for processing



POLYPROPYLENE WRAP

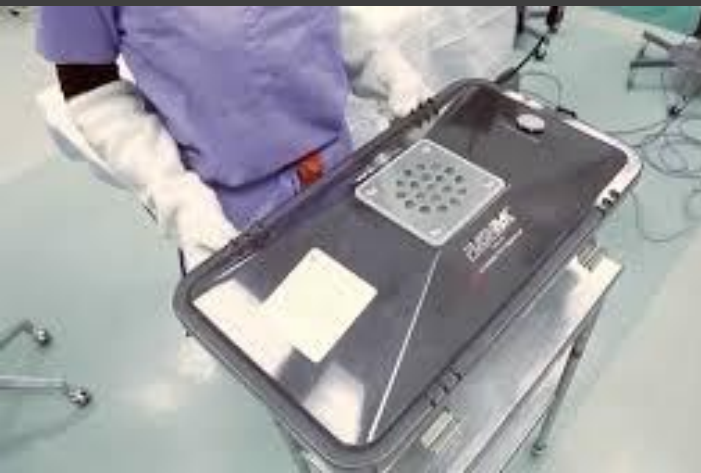


RIGID CONTAINERS



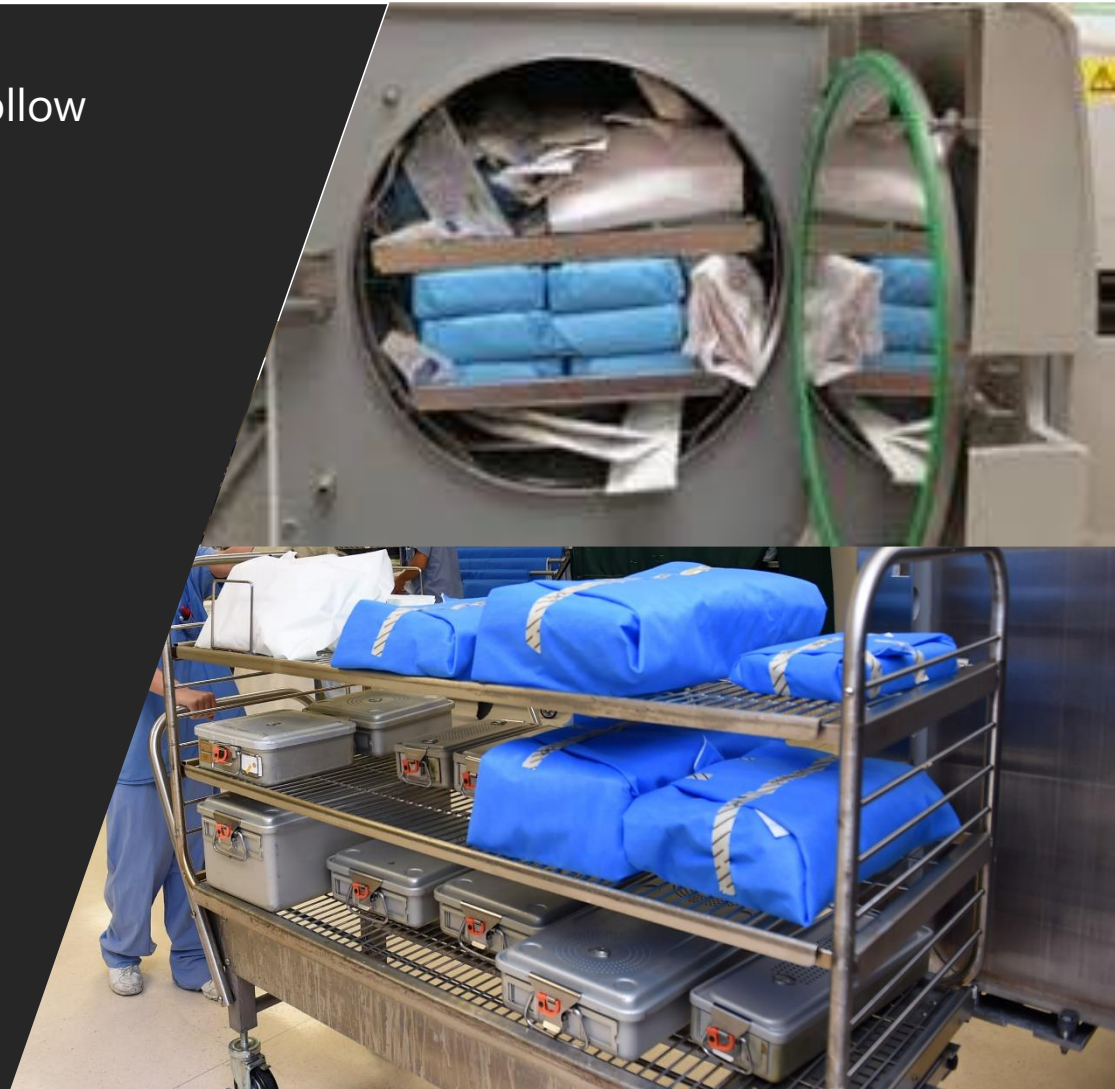
IUSS STERILIZATION

- Rapid sterilization process for emergency use
- Instruments must be validated by OEM
- Implants should not be IUSS'd
- Transport in a closed container
- Can be wet
- Tray cannot be stored for another patient



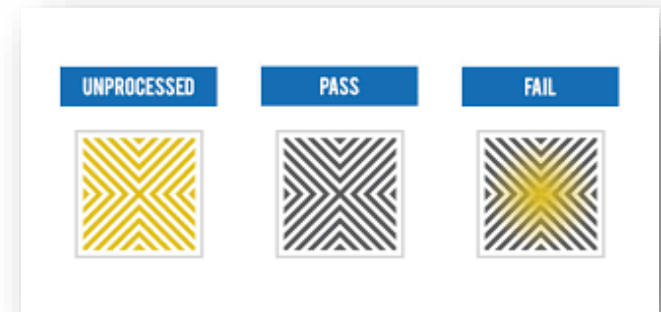
PREVAC STEAM STERILIZATION

- AAMI removed parameters, follow instrument manufacturer's instructions for use/validated sterilization parameters.
- Must not be wet.
- Load Configuration:
 - Linen
 - Peel pouches
 - Wrapped items
 - Rigid containers



PREVAC STEAM STERILIZATION QA

- Required Testing:
 - Bowie Dick Test 1st load daily
 - Biological for weakest cycle weekly
 - Biological in every implant load
- Sterilizer Qualification Testing
 - 3 consecutive Biological Tests
 - 3 consecutive Bowie Dick Tests
- Document lot number and expiration date
- Start a new control daily or when lot number changes



LOW TEMPERATURE STERILIZATION

- H2O2 based technology
 - Plasma or Vaporized
- Used for heat sensitive items
- Only items validated for cycle can be ran
- Weight restrictions on loads
- No porous or absorbent materials
- Only use validated chemical integrators and tape.



STERILE INTEGRITY

- Items should be stored as not to crush, compress, puncture or compromise sterility of contents.
- Whenever there is a question as to whether the package is sterile or not, it is considered unsterile.



STERILE STORAGE

- Configure so wrapped Trays are not stacked
- Items are stored ergonomically correct



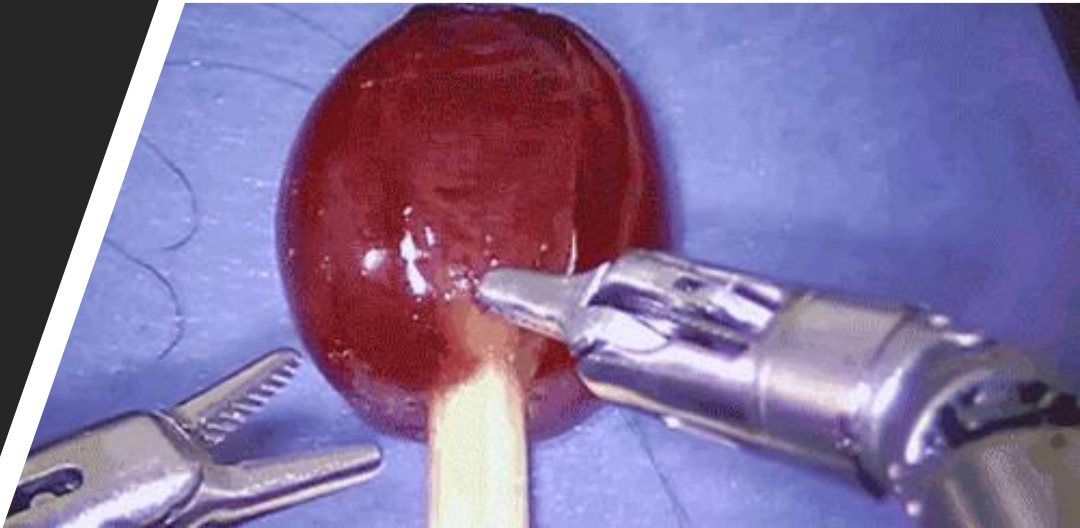
STERILE TRANSPORT

- Sterile trays should be covered during transport to protect from contamination.
- Trays should be handled minimally to prevent damage to packaging.



ROBOTIC INSTRUMENT CONSIDERATIONS

- Davinci Robotic Instruments require special processes to clean and sterilize.
- Routine direct observation competencies
- FDA now requires 510K for validating automated processes.
 - Currently no validated manufacture on the market in USA





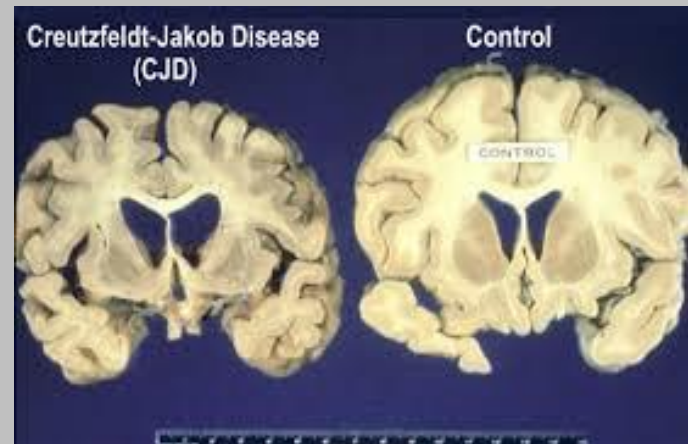
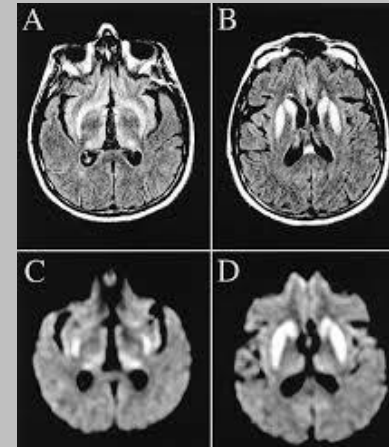
TASS CONSIDERATIONS

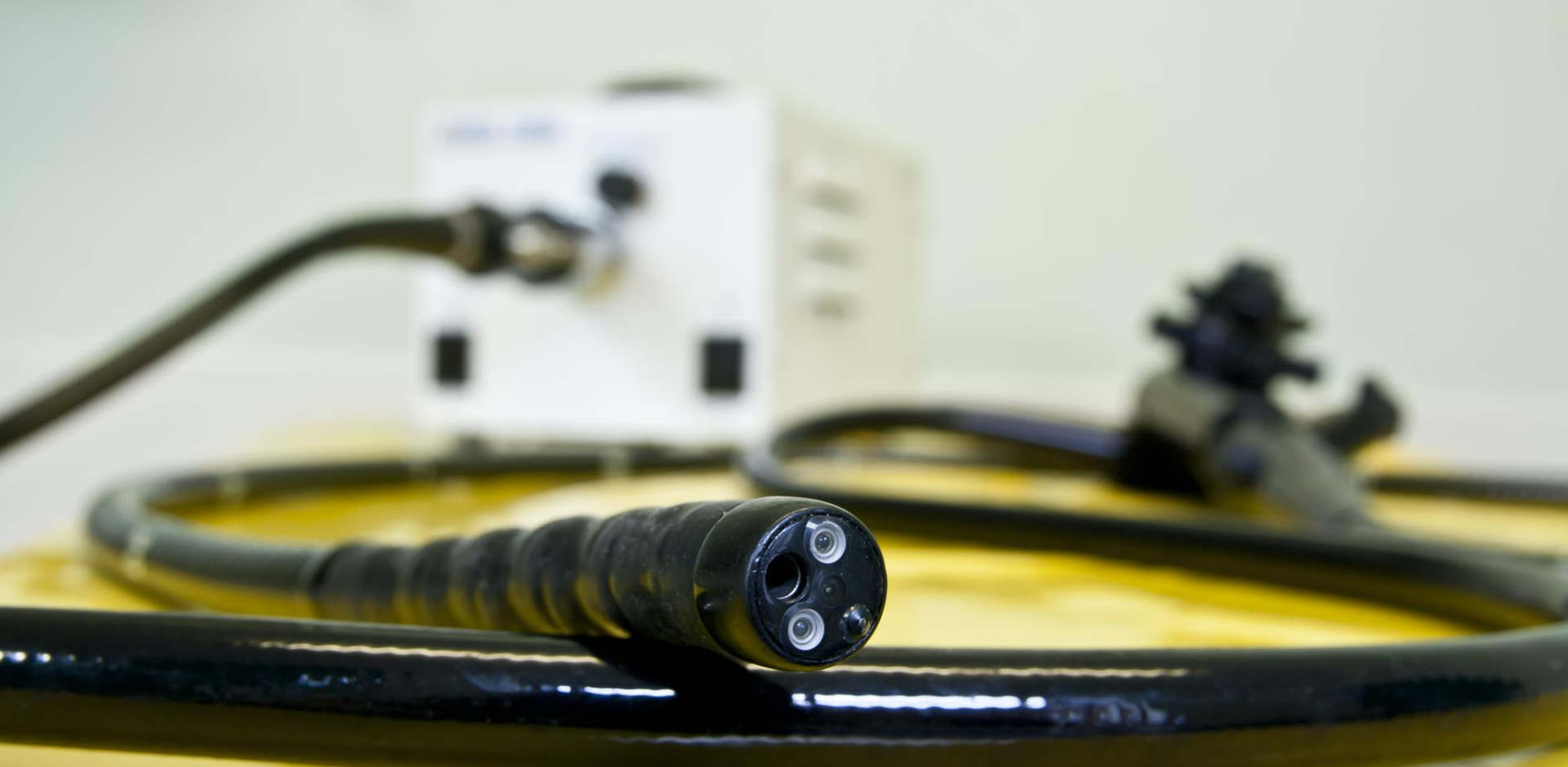
- Multiple outbreaks
- RCA completed
- Enzymatic detergents
- Eye Instruments **MUST** go through a full rinse, preferably with deionized water.
- Lumens must be flushed with water profusely prior to sterilization



CJD CONSIDERATIONS

- CJD Risk for any procedures involving dura matter, spinal fluid, back of eye
- If unknown, treat as CJD.
- Process required for surgery to communicate to SPD
- Internal risk assessment for how to handle trays
- Single Use Instruments?
- CJD Cycle: 134C for 18 minutes

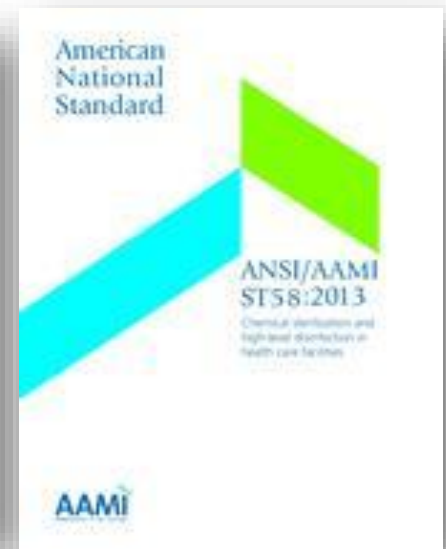
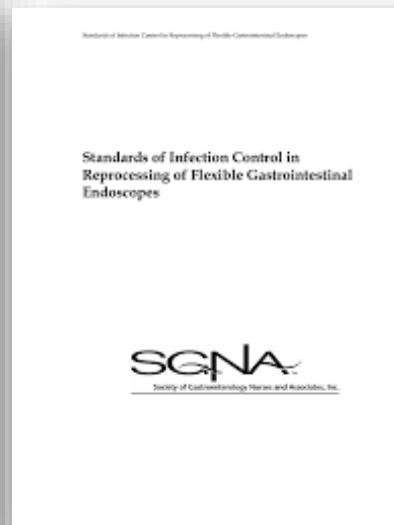
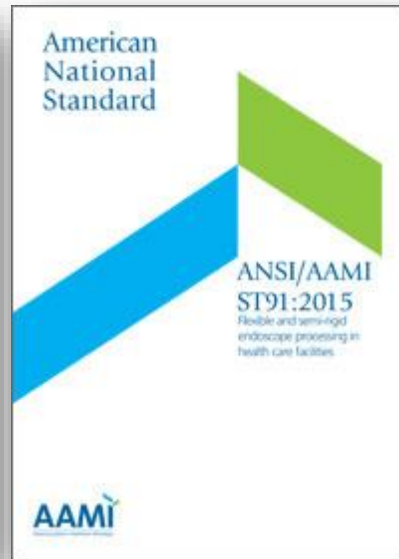




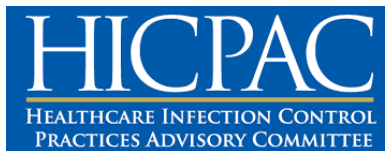
FOCUS 04

ENDOSCOPE AND HIGH LEVEL DISINFECTION

Identify basic steps for high-level disinfection of flexible gastrointestinal endoscopes.



FLEXIBLE SCOPES STANDARDS



<https://www.cdc.gov/hicpac/recommendations/flexible-endoscope-reprocessing.html>

FLEXIBLE SCOPES PROCESSING STEPS

- Follow the OEM IFU.
 - Pre-Clean scope
 - Leak Test scope
 - Manual clean
 - Follow directions exactly, may include
 - Brushing
 - Flushing
 - Suctioning
 - Rinse after cleaning
 - Visual inspection
 - High level disinfection
 - Rinse after HLD
 - Dry (alcohol if required by OEM)
 - Storage





- Three Bay Sink
 - Sink 1 Leak Test
 - Sink 2 Soak/Brush/Flush
 - Sink 3 Rinse
- Dirty to clean flow
- 36" or physical barrier between dirty and clean
- Same PPE and chemical requirements as SPD

**FLEXIBLE SCOPE
DECONTAMINATION**

MANUAL HIGH LEVEL DISINFECTION

- Ensure chemical is validated by Scope OEM
- Manual solutions require specific time, temperature, and length of use following manufacturer IFU.





- Chemical may require activation.
- Date chemical opened and date expired after opening.
- Chemical strip opening and testing.
- After expiration, chemical may need to be neutralized prior to disposal.
- PPE should always be worn when handling chemicals.
- Never top off.
- Have a spill kit and eye wash.

**MANUAL HIGH LEVEL
DISINFECTION**

MANUAL HIGH LEVEL DISINFECTION

- Scope must stay fully submerged for OEM required time
- Temperature must meet OEM requirement
- Rinse must be completed with sterile or filtered water according to OEM



AUTOMATED ENDOSCOPE REPROCESSOR HLD

- Ensure your scope is validated for your machine.
- Ensure you have all required attachments
- Scope washers do not replace manual cleaning





- Machine should be self disinfecting
- No residual water should remain in hoses and reservoirs
- Cycles for alcohol flushing and forced air drying are desirable
- Self contained or external water filtration system
- Follow scope OEM and AER OEM instructions exactly

**AUTOMATED ENDOSCOPE
REPROCESSOR HLD**



- GI Scope Processing must be traceable between patients
- Time between steps documentation is monitored by some OEMs
 - If too much time elapses, extended processing is required.
- Leak Testing pass or fail must be documented
 - If failed, scope must be sent out for repair
- Chemical strip test should be completed and documented daily and on each cycle.
- Temperature of chemical solution
- Exposure time of chemical solution

**HIGH LEVEL DISINFECTION
DOCUMENTATION**

FLEXIBLE SCOPES STORAGE

- Storage cabinets should be made of a material that can be disinfected.
- In conventional storage (no drying options) scopes are hung vertically to facilitate drying.
- When using drying cabinets, follow OEM IFU for how to position scopes.



FLEXIBLE SCOPES STORAGE

- Removable buttons and valves should be reprocessed and stored with the scope as a unique set for tracking patient to patient.
- Hung scopes should not come in contact with each other, and gloves should always be worn to prevent cross contamination.
- Do a Risk Assessment for Hang Time



QUESTIONS?

