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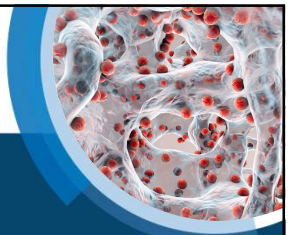

Keeping Biofilms At Bay In Your Reprocessing Loop

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Disclosures

1. **Successful completion:** Participants must complete the entire program and submit required documentation. No partial credit will be given.
2. **Conflict of interest:** Employee of STERIS.
3. **Commercial company support:** Fees are underwritten by education funding provided by STERIS.
4. **Non-commercial company support:** None.
5. **Alternative/Complementary therapy:** None.

Continuing Education

- STERIS Corporation is an approved provider of continuing nursing education by CBRN – provider # CEP 11681 and an approved Administrator Education Unit (AEU) and Infection Prevention Control (IPCH) provider by BASC – provider # 1417.
- This program is approved for:
  - 0 hour(s) of GI Specific content credit by ABCGN (American Board of Certification for Gastroenterology Nurses),
  - 1.5 AEU(s) & 1.5 IPCH(s) by BASC (Board of Ambulatory Surgery Certification), and
  - 1.5 contact hour(s) of continuing education credit
    - CBRN (California Board of Registered Nursing);
    - CBSPD (Certified Board for Sterile Processing and Distribution); and
    - HSPA (Healthcare Sterile Processing Association).

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    - **HSPA** (Healthcare Sterile Processing Association).

Continuing Education

CCI® The Leader in Perioperative Certification

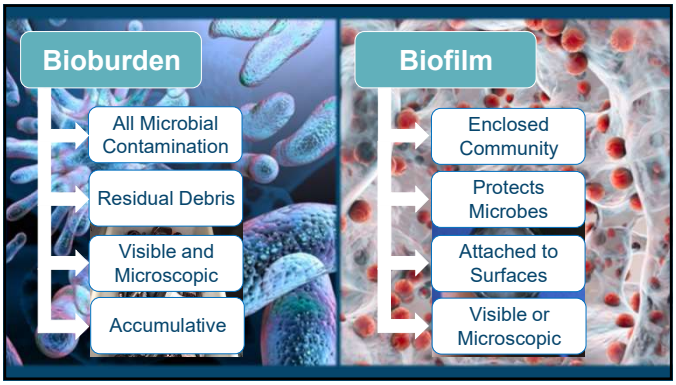
Through a partnership with CCI®, it also meets CNOR® and CSSM® recertification requirements for perioperative nurses.

Learning Objectives

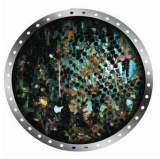
- List three requirements for biofilm formation
- Describe the hazards of medical biofilm formation
- Identify areas where biofilms hide and ways to mitigate their formation

Biofilm Is Not New

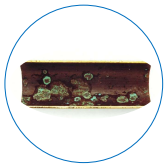
- **1683-1723** Anthony van Leeuwenhoek
- **1822-1895** Louis Pasteur
- **1933-1935** Biofilms linked to Biofouling[1]
- **1970s** Biofilm linked to chronic infections in cystic fibrosis patients[1]



Why Are Biofilms A Problem?



Biofouling



Biocorrosion

Infections

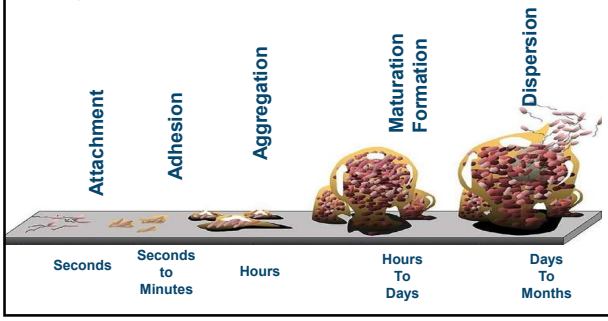
Three Needs Of Biofilms

MOISTURE

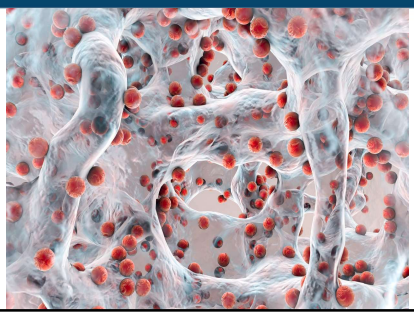
FOOD

BIOFILM FORMING BACTERIA

Stages And Timeline Of Biofilm Development

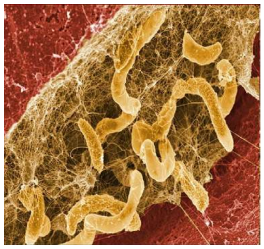


Biofilm Development



Mature Biofilms Are Tough

- Thick protective matrix
- Increased Resistance to:
  - Cleaning Chemistries
  - Disinfectants
  - Sterilants
  - Antibiotics



Danger Of Dispersion

Where Do We Begin?

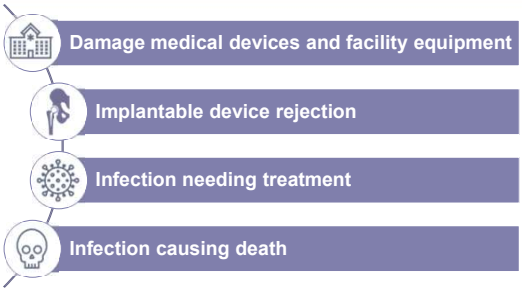
Risk Management

- Part of Quality Management System (QMS)
- Risk Management Plan
  - Identify
  - Mitigate
  - Monitor

American National Standard
ANSI/AAMI ST90:2017
AAMI

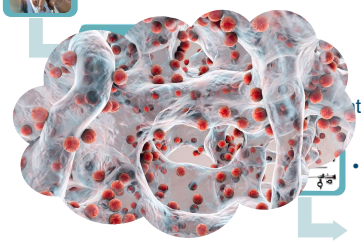
Risk Management Process

Identify - Harm



Identify – Events

- Infection



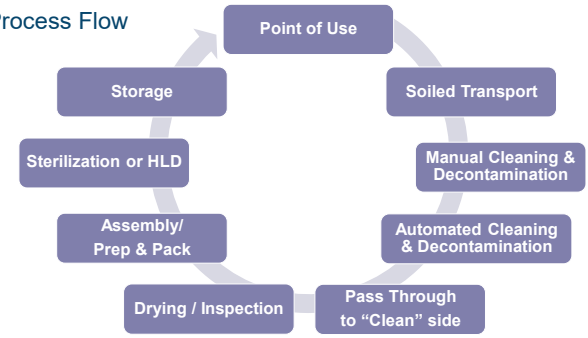
- Biofilm location
- Event that leads to harm

t Biofilm

- Residual Bioburden

- Ineffective cleaning

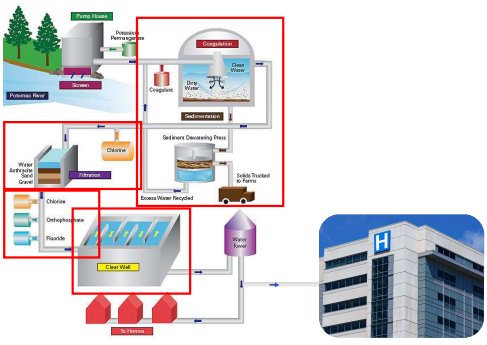
Process Flow

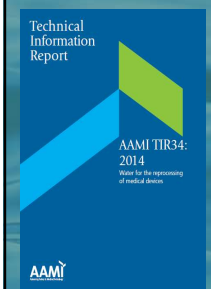


Where Can Biofilm Be Found?

Water

Biofilm in Water





AAMI TIR34: Water For Reprocessing Of Medical Devices

- Monitoring water quality
- Strategies for bacterial control

But I Have Treated Water

Mitigation - Water

- Silver and Copper Treatment
- Remove pipe dead legs
- Regular decontamination of holding tanks
- Disinfect supply lines
- Water Treatment Filter Preventative Ma

CMS
"water management policies and procedures to reduce the risk of growth and spread of *Legionella* and other opportunistic pathogens in building water systems."

Water Treatment Systems Maintenance

- Vendor Responsibility
- Facility Responsibility
- Staff Responsibility

What Else Uses Water?

Water Supply Biofilms - Monitoring

Follow manufacturer's written IFUs

Components | Tanks

↓

Monitoring

Test Frequency | All dispense ports

↓

Document & Review

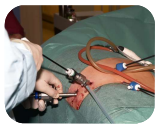
Bacteria/ Endotoxin Levels | Water Alerts/Alarms | Municipality reports

↓

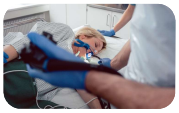
Train Staff

Actions for Alarms | Actions for Out-of-Range Results

Identify Point-Of-Use Areas

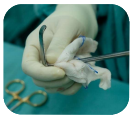


OR
Endo
ASC
RTD
Anes
Cardio
L&D
Clinics



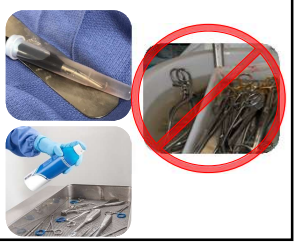
Point Of Use Treatment

Free of Gross Debris



Flush Lumens

Prepare for Transport



Soiled Transport

Transport

- Contained
- Labeled
- Timely

RISK

- Delays in Cleaning
- Dried Bioburden
- Transport Device Not Clean/Dried

Mitigation – Point-Of-Use And Transport

- Increase transport and cleaning capacity
- Identify and correct pretreatment misses
  - Staff Education & competency
  - Product availability
- Transport device cleaning procedures

How Does Cleaning Control Biofilm?

MOISTURE

FOOD

BIOFILM FORMING BACTERIA

Time: The Enemy Of Biofilm Control

Immature Biofilm

- Simple structure
- Weak surface bond
- Easy to physically remove
- Chemical penetration is possible

Add Time

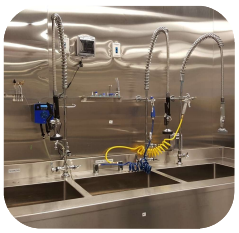
Mature Biofilm

- Complex structure
- Strong surface bond
- Virtually unbreakable
- Chemically impenetrable

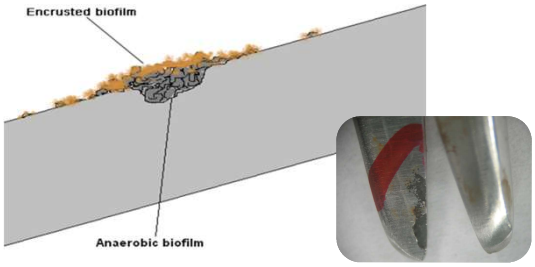
Manual Cleaning And Decontamination

Biofilm Hotspots

What Do Your Work Surfaces Look Like?



Understanding Surface Degradation



Mitigation – Manual Cleaning

- Monitor soiled device wait times
- Follow device manufacturer's written IFU
- Delayed cleaning protocol
- Cleaning verification tests
- Lighted magnification
- Borescope

Mitigation – Manual Cleaning Cont'd

- Clean and dry as you go
- Replace damp towels
- Clean up spills
- Inspect
- Clean and disinfect all surfaces

Work with Environmental Services Department (EVS)

Cleaning In The Decontamination Area

Daily	Routinely	Verification
• Horizontal surfaces • Floors and floor mats • Sinks, drains, faucets	• Walls • Ceilings • Vents	• Adenosine Triphosphate (ATP) • Ultraviolet light (Black light)

Automated Cleaning

Does your equipment look like this?



Automated Cleaning

Or like this?



Automated Cleaning

Don't forget about the supporting Cast

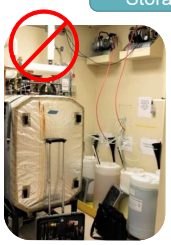


Mitigation – Automated Cleaning

- Clean, decontaminate and disinfect equipment
- Inspect, decontaminate and disinfect drains
- Repair Leaks

Cleaning Chemistries

Appropriate Storage?




No Topping Off

Are You Cleaning Your Accessories?

Mitigation – Cleaning Chemistries And Accessories

- Temperature and humidity control
- No Topping Off
- Clean & decontaminate accessories
- Consider single use items
- Clean, dry, and HLD or sterilize water bottles

Storage In Decontamination

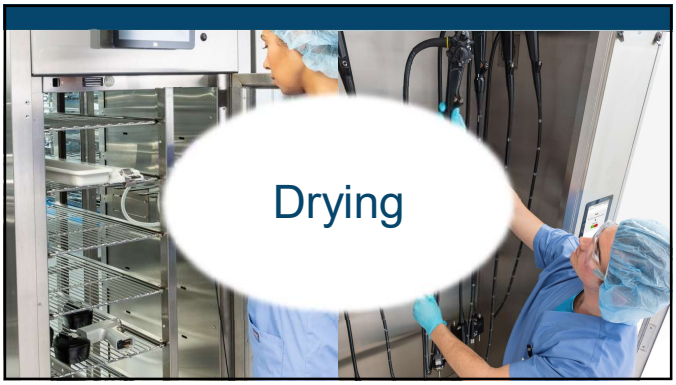
Exposure to Moisture

RISK

Poor Storage Conditions

Moisture Pooling

Drying



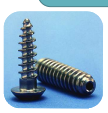
Device Drying Challenges

Lumens Channels

RISK

Complex Devices

Challenging Configurations



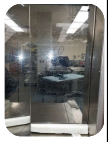
Pass Through To Clean

Microbes & Moisture

RISK

Condition

Absorbent Material



Methods Of Manual Drying

- Instrument air purging
- Alcohol flush
- Non-linting towels

Drying Cabinets

Mitigation - Drying

- Manufacturer's written IFU
- Pass through
- Drying cabinets / compressed air
- Inspection: Lighted Magnifiers / Borescopes / Moisture Check

Assembly/Prep And Pack Area

Moisture & Porous Materials

RISK

Linen & Towels

Liquids, fluids and gels

Assembly / Prep And Pack - Mitigation

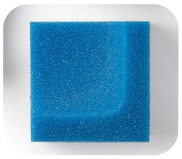
- Clean & decontaminate
- Control humidity levels
- Replace damp towels & pads
- No lotions, food and drinks
- Inspect

Assembly/Prep And Pack For Steam Sterilization

Tray / Pack Accessories

RISK

Tray Overweight



Tray Configuration

Steam Sterilization Process

Load Configuration

RISK

Cooling

Dry Time Instructions

- Use a
- Effectiv… …eam sterilizer. …e following cycles

Cycle Type	Minimum Temperature	Minimum Exposure Time - Dry Time
Prevacuum	132 - 134° C	4 minutes / 30 minute dry time for metal or metal/poly trays and 45 minutes for all poly trays.
	134 - 137° C	3 minutes/ 30 minute dry time for metal or metal/poly trays and 45 minutes for all poly trays.

Sterilization – Steam Supply System

Boiler

Pipes

Steam Filter

Steam Trap

Poor Steam Quality

Steam Filters

Sterilization – Steam Sterilizer Drainage

RISK

Mitigation – Steam Sterilization

- Follow device manufacturer's written IFU
- Cool loads completely
- Steam quality testing
- Preventative maintenance
- Inspect
- Clean & decontaminate floor drains

Liquid Chemical Sterilization Process

Filters

RISK

Drips and leaks

Drains

Improper or No Routine Maintenance

Mitigation - Liquid Chemical Sterilization

- Clean & decontamination
- Clean up drips
- Perform regular maintenance per the manufacturer's written IFU
- Inspect

High-Level Disinfection

Basins

RISK

Automated Endoscope Reprocessor

Accessories

High-Level Disinfection - Process

Incorrect Usage

RISK

Expiration / Use Dates

Dilution

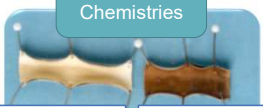
Accessories

High-Level Disinfectants

Incorrect Usage

RISK

Fixative Chemistries



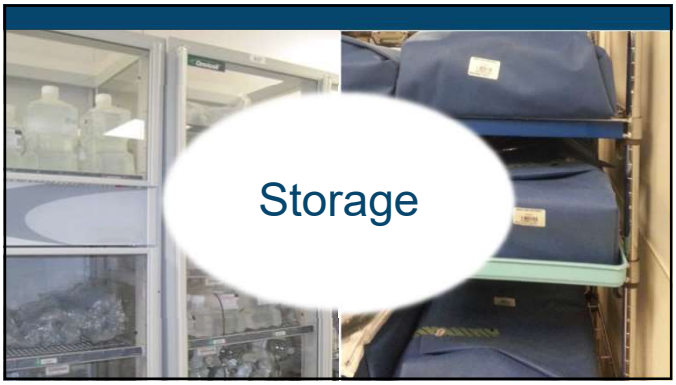
Normal Interior

Fixed Materials

Resistant Microbes

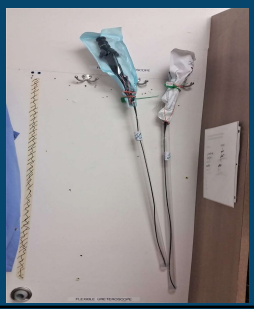
High-Level Disinfection - Mitigation

- Follow manufacturer's written IFU
- Clean & disinfect AER and accessories
- Preventative maintenance
- Expiration
- Inspect
- Concentration testing



Sterile Storage

Endoscope Storage



Mitigation - Storage

- Ensure dry devices
- No storage beneath water lines
- Control humidity
- Clean & disinfect endoscope cabinets
- Change pads
- Inspect for moisture

EVS and SPD

What?

- Checklist
- Schedule
- Trash & Linen Disposal

EVS and SPD

What?

Why?

- Protects staff
- Protects patients

EVS and SPD

What?

Why?

How?

- From clean to dirty
- Cleaning and disinfectant agents
- Department chemical hazards

EVS and SPD

What?

Why?

How?

Safety

- Personal Protective Equipment
- Dress Code
- Safety Showers / eye washes
- Blood borne pathogen

EVS Competency

Loaned Instrument Trays

Mitigation – Loaned Instrument Trays

- Timely receipt
- Follow Manufacturer's Written IFUs
- Inspect
- Follow Manufacturer's Written Dry times
- Cool trays

Summary

- Three requirements for biofilm formation
- Describe the hazards of medical biofilm formation
- Identify areas where biofilms hide and ways to mitigate their formation

Action Plan

- Become familiar with your SPD biofilm risks
- Update risk management plan
- Develop audit checklists
- Establish audit schedule

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