Standard and Transmission based Precautions

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Definitions

CDC
Universal Precautions 1985

- Universal precautions refers to certain infection-control steps that medical professionals take to reduce the risk of transmitting HIV and other infectious diseases. The scientific basis of universal precautions is that individuals should treat any blood or bodily fluid as though it contains HIV, hepatitis, or another infectious agent. In other words, universal precautions assume that all bodily fluids are dangerous and tell medical professionals to treat them accordingly.

CDC
Standard Precautions 1996

- Combined /expanded the elements of Universal Precautions and BSI - designed to protect the HCP and patients from pathogens that can be spread by blood or any other bodily fluid, excretion or secretion. This applies to all contact with blood; and all bodily fluids, secretions and excretions (except sweat), regardless of whether they contain blood; non intact skin; and mucous membranes

Standard Precautions

- Foundation of all Infection Control programs
- Include practices that apply to all patients
- Apply to all situations
- Regardless of infection status: Suspected/Confirmed or Unknown
- Treat everyone as if they are infected

Elements of Standard and transmission based precautions

- Hand Hygiene
- Using PPE
- Handling Contaminated Materials or Equipment to Prevent Cross Contamination
- Using Engineering and Work Practice Controls
- Respiratory Hygiene and Cough Etiquette
- Safe Injection Practices

Dentistry

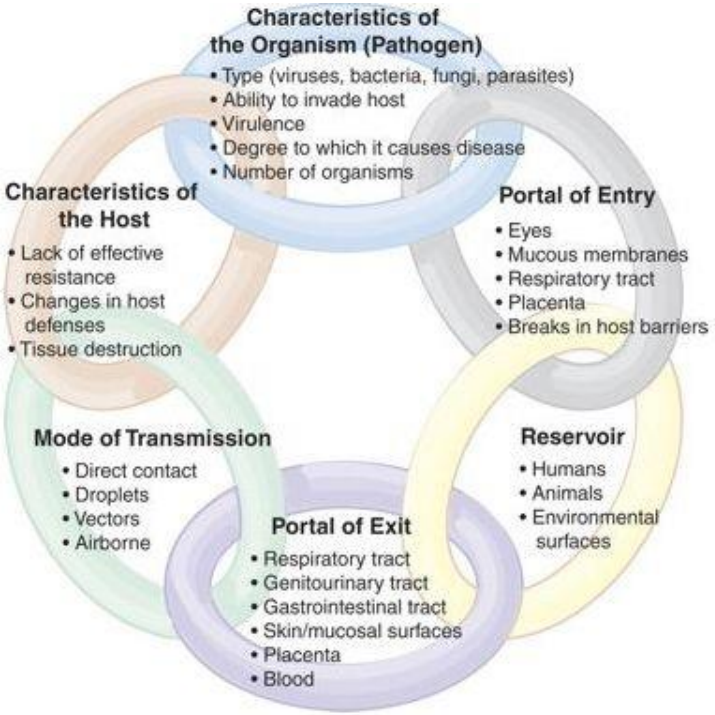
- No operational difference between Standard and Universal Precautions
- Whether blood is visible or not, saliva is considered a potentially infectious material in dentistry

Transmission based precautions

- Included in CDC guidelines in 2007
- Changing patterns of health care delivery
- New, emerging and evolving pathogens
  - SARS
  - MRSA
  - H1N1
  - Hepatitis C
- More ambulatory care crossover
- Usually those who are infected/acutely ill are not seeking routine dental care

Chain Of Infection

Chain Of Infection



Modes of Transmission

- Airborne
- Droplet
- Contact
- Some disease have multiple routes of transmission
  - SARS
  - Varicella Zoster
  - 2009 H1N1 influenza

Contact Precautions

- Most common mode
- Directly from infected person via contact with blood of bodily fluids
- Indirectly via contaminate object or person
- Contaminated hands: significant source of indirect contact transmission
- Contaminated needle
- Other sharps
- Instruments, surfaces, equipment

Droplet Precautions

- Infected person
  - Coughs
  - Sneezes
  - Talks
- Generation of droplets > 5 micrometers
- Splatter from blood and saliva
- Some droplets have traveled up to 6 feet
  - Influenza
  - Pertussis
  - Mumps
  - Rubella

Airborne Precautions

- Particles smaller (< 5 micrometers)
- Droplet Nuclei or Aerosols
- Can stay suspended for longer periods of time
- Inhalation
- Created in dentistry by use of: Handpieces and ultrasonic scalers
  - Measles
  - TB * Usually not treated in dental clinic
  - Surgical mask may not be adequate protection
  - May require use of N95 respirators

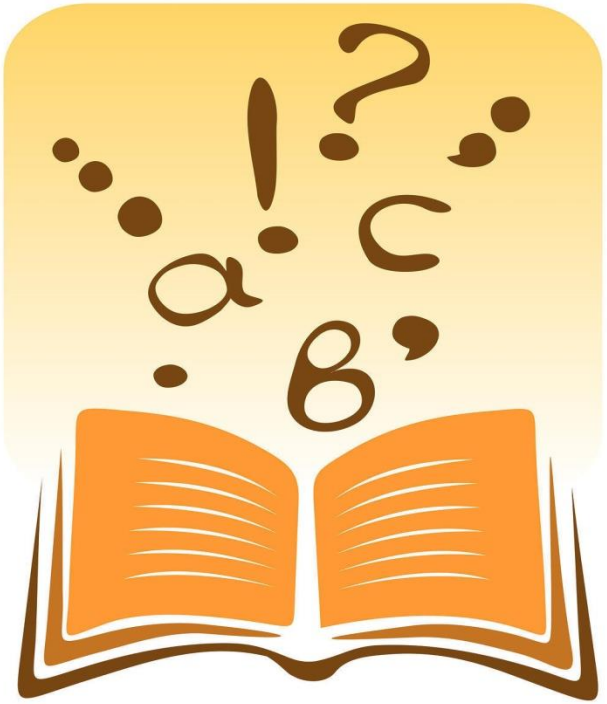
HAND HYGIENE

Respiratory Hygiene and cough Etiquette

- Cover your mouth and nose when coughing and sneezing
- Use tissues and promptly/properly dispose
- Offer a mask to those who are coughing
- Perform hand hygiene after contact with respiratory secretions
- Turn head away from others and maintain spatial separation, ideally more than 3 feet

TERMS YOU SHOULD KNOW

- ALCOHOL BASED HAND RUB
- ANTIMICROBIAL AGENT
- ANTISEPTIC
- CONTAMINATED
- HAND HYGIENE
- SUBSTANTIVITY



HAND HYGIENE

- THE SINGLE MOST IMPORTANT WAY TO REDUCE YOUR RISK OF DISEASE TRANSMISSI

So Why All the Fuss About Hand Hygiene?

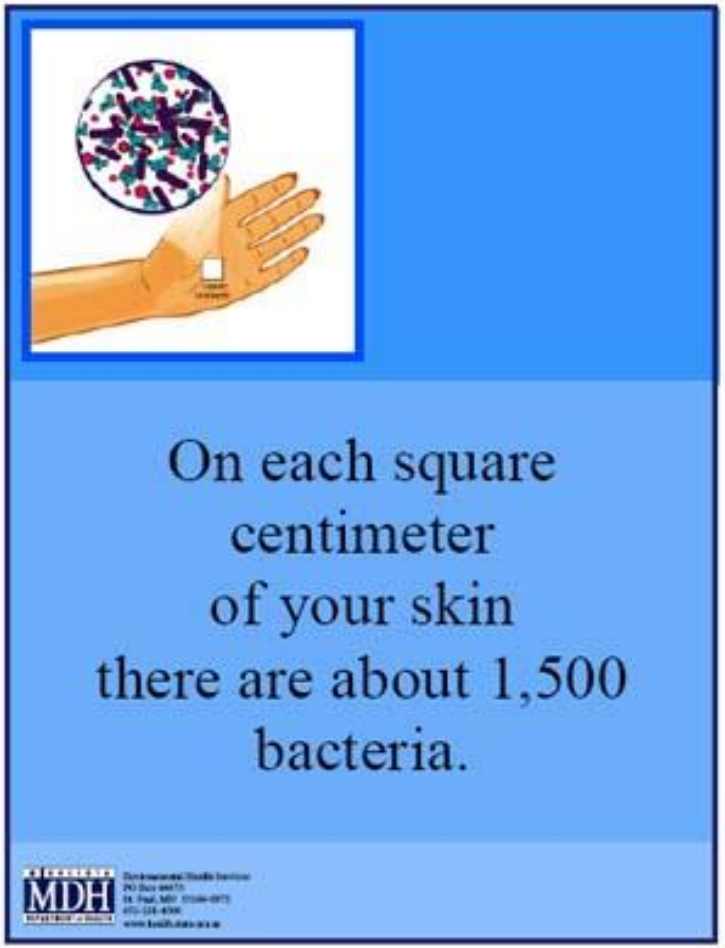
Most common mode of transmission of pathogens is via hands!

- Infections acquired in healthcare
- Spread of antimicrobial resistance

HAND HYGIENE

- SKIN IS HOME TO TWO GROUPS OF MICROORGANISMS
- RESIDENT
- TRANSIENT

- STUDIES HAVE SHOWN :
- LAPSES IN HAND HYGIENE = DISEASE OUTBREAKS/HEALTHCARE ASSOCIATED INFECTIONS/SPREAD OF ANTIBIOTIC RESISTANT INFECTIONS



- IMPROVED HAND HYGIENE = DECREASE IN HEALTH CARE RELATED INFECTIONS AND DISEASE TRANSMISSION

CHOOSING PRODUCTS FOR HAND HYGIENE

- BROAD-SPECTRUM,PERSISTENT ACTIVITY
- LOW IRRITANCY
- STAFF ACCEPTANCE
- POTENTIAL ALLERGIES
- SKIN INTEGRITY AFTER REPEATED USE
- SCENT
- DELIVERY SYSTEM
- COST

ALWAYS PERFORM HAND HYGIENE

- …AT THE BEGINNING OF THE DAY
- ….BEFORE LEAVING THE OPERATORY
- ….WHEN HANDS ARE VISIBLY SOILED
- …..AFTER CONTACT WITH INANIMATE OBJECTS THAT MAY BE CONTAMINATED
- ….BEFORE AND AFTER TREATING EACH PATIENT
- ….BEFORE DONNING GLOVES
- ….AFTER REMOVING GLOVES
- ….AT END OF THE DAY

GLOVING IS NOT A SUBSTITUTE FOR HANDWASHING

"Dirty Hand in Latex Glove Phenomenon"

- Large study in the UK
  - 7000 patient contacts in 56 institutions
    - Hand Hygiene compliance was 47%
    - When gloves were worn, hand hygiene compliance was about 41%

HAND HYGIENE IN PRACTICE

- IF HANDS ARE VISIBLY DIRTY OR CONTAMINATED…..

  WASH WITH ANTIMICROBIAL SOAP AND WATER

- IF HANDS ARE NOT VISIBLY SOILED……..

  WASH HANDS WITH ANTIMICROBIAL SOAP OR USE AN ALCOHOL –BASED HAND RUB

HAND HYGIENE IN PRACTICE

- BEFORE EATING AND AFTER USING RESTROOM…….

  WASH HANDS WITH ANTIMICROBIAL SOAP

- BEFORE SURGERY……

  PERFORM SURGICAL HAND SCRUB

TO WASH OR TO RUB?

DID YOU KNOW?

- ACT OF HANDWASHING ITSELF IS MORE IMPORTANT THAN WHAT TYPE OF SOAP IS USED
- LATHERING
- RINSING

Efficacy of Hand Hygiene Preparations in Killing Bacteria

INGREDIENTS AND ACTIVITY

- ALCOHOLS
- CHLORHEXIDENE
- IODOPHORS
- PHENOL DERIVATIVES
- TRICLOSAN
- QUATERNARY AMMONIUM COMPOUNDS

COMMON QUESTIONS

- CAN I WEAR ACRYLIC FINGERNAILS TO WORK?
- WHAT ABOUT JEWELERY?
- CAN ALCOHOL RUBS TAKE THE PLACE OF HANDWASHING?
- CAN I USE HAND LOTION?
- WHAT ABOUT PETROLEUM BASED PRODUCTS?

Recommended Hand Hygiene Technique

- Handrubs
  - Apply to palm of one hand, rub hands together covering all surfaces until dry
  - Volume: based on manufacturer
  - If hands are dry after 10-15 seconds , you have likely used too little product
- Handwashing
  - Wet hands with water, apply soap, rub hands together for at least 15 seconds
  - Rinse and dry with disposable towel
  - Use towel to turn off faucet

Guideline for Hand Hygiene in Health-care Settings. *MMWR 2002*; vol. 51, no. RR-16.

Surgical Hand Hygiene/Antisepsis

- Use either an antimicrobial soap or alcohol-based handrub
- Antimicrobial soap: scrub hands and forearms for length of time recommended by manufacturer
- Alcohol-based handrub: follow manufacturer's recommendations. Before applying, pre-wash hands and forearms with non-antimicrobial soap

Guideline for Hand Hygiene in Health-care Settings. *MMWR 2002*; vol. 51, no. RR-16.

Fingernails and Artificial Nails

- Natural nail tips should be kept to ¼ inch in length
- Artificial nails should not be worn when having direct contact with high-risk patients (e.g., ICU, OR)

Guideline for Hand Hygiene in Health-care Settings. *MMWR 2002*; vol. 51, no. RR-16.

Gloving

- Wear gloves when contact with blood or other potentially infectious materials is possible
- Remove gloves after caring for a patient
- Do not wear the same pair of gloves for the care of more than one patient
- Do not wash gloves

Guideline for Hand Hygiene in Health-care Settings. *MMWR 2002*; vol. 51, no. RR-16.

TIPS AND ADVICE

- READ AND HEED MANUFACTURER'S INSTRUCTIONS
- AVOID HANGING OR PULL TYPE TOWELS
- DO NOT "TOP OFF" SOAP DISPENSERS
- KEEP SOAP AND RUBS SEPARATED

PPE – Personal Protective Equipment

- What is it? Includes apparel, mask, glasses and gloves
- Why is it recommended? PPE is designed to protect the skin and the mucous membranes of the eyes, nose, and mouth of dental health-care personnel from exposure to blood or other potentially infectious material.
- Procedure driven

PPE – Protective Apparel

- Should cover all personal clothing and skin
- High collar
- Long sleeved
- Disposable or Reusable
- Changed when visibly soiled or at end of day
- Should not be worn outside dental clinic

PPE - Mask

- Protect clinician from transfer of respiratory secretions, fluids or debris
- Should have a filtration capacity of at least 95%
- Compromised with moisture, humidity; respiration, talking and nasal secretions of operator
- Practical experience suggests 20-30 minutes
- Only effective if worn correctly

PPE – Glasses/Face Shields

Should be impact resistant with solid side shields

Safety glasses should also be provided for the patient

Protects the clinician from exposure to microorganisms caused by droplet spatter as well as injury from particulate debris

PPE - Gloves

- Exam gloves –Patient care, examinations other non surgical procedures
- Surgical gloves – Oral surgery procedures
- Utility gloves – Housekeeping, handling sharps or chemicals

PPE – STEP BY STEP

- *Donning*
  - Protective Apparel
  - Surgical Mask
  - Protective eyewear
  - Wash hands or use alcohol based rub
  - Gloves

- *Removal*
  - Gloves
  - Mask
  - Eyewear
  - Apparel

  - Take care to prevent contamination of hands, clothing, skin and mucous membranes

Task Specific PPE

Patient Care	Gloves	Face Protection	Eye Protection	Garment	Utility Gloves	Other*	Comment*	None
Greeting the patient in the reception area								X
Taking a medical history				1*				X
Performing an oral exam	X	X	X	1*				
Polishing teeth	X	X	X	X				
Scaling (manual)	X	X	X	X				
Scaling (ultrasonic)	X	X	X	X				
Suctioning during a cavity preparation	X	X	X	X				
In-operatory charting				1*		2*		X
Taking an impression	X	X	X	X				
Answering the telephone during treatment							2*	X

***Other/Comments:**

(1) Although it may not be required, it is acceptable to leave on protective clothing that has been worn throughout patient treatment as long as it is not visibly soiled. Never wear protective equipment in break rooms, offices, or reception areas.

(2) Alternative to removing gloves, vinyl overgloves (foodhandlers' gloves) can be donned to limit the spread of contamination to clinical contact surfaces during treatment interruptions.

Task Specific PPE

	Gloves	Face Protection	Eye Protection	Garment	Utility Gloves	Other*	Comment*	None
Instrument Processing								
Placing instruments in a holding solution		X	X	X	X			
Loading the ultrasonic cleaner/instrument washer		X	X	X	X			
Handscrubbing instruments		X	X	X	X			
Wrapping instruments for sterilization				1*	X			
Loading the sterilizer				1*	X			
Removing instrument packs from sterilizer							4*	
Distributing/storing wrapped, sterile instrument packets								X

***Other/Comments:**

(1) Although it may not be required, it is acceptable to leave on protective clothing that has been worn throughout patient treatment as long as it is not visibly soiled. Never wear protective equipment in break rooms, offices, or reception areas.

(4) Heat-resistant gloves protect against burns from hot instrument packs.

Task Specific PPE

	Gloves	Face Protection	Eye Protection	Garment	Utility Gloves	Other*	Comment*	None
Operatory Clean-up								
Transporting instruments from operatiory to reprocessing area	X			1*				
Environmental surface disinfection (using spray-wipe-spray technique)		X	X	X	X			
Placing a clean surface barrier on an uncontaminated surface				1*				X
Maintenance/Quality Control								
Cleaning the ultrasonic chamber, discarding and replacing solution		X	X	X	X			
Recording the results of sterilizer monitoring								X

***Other/Comments:**

(1) Although it may not be required, it is acceptable to leave on protective clothing that has been worn throughout patient treatment as long as it is not visibly soiled. Never wear protective equipment in break rooms, offices, or reception areas.

Sterilization and disinfection of patient care items

- Several studies have demonstrated variability among dental practices while trying to meet these recommendations.
- For example, 68% of **respondents believed they were sterilizing their instruments but did not use appropriate chemical sterilants or exposure times.**
- **And 49% of respondents did not challenge autoclaves with biological indicators.**
- **Other investigators using biologic indicators have found a high proportion (15%–65%) of positive spore tests after assessing the efficacy of sterilizers used in dental offices.**
- **In one study of Minnesota dental offices, operator error, rather than mechanical malfunction, caused 87% of sterilization failures.**
- **Common factors in the improper use of sterilizers include chamber overload, low temperature setting, inadequate exposure time, failure to preheat the sterilizer, and interruption of the cycle.**
- **Source - CDC Sterilization**

Sterilization and disinfection of patient care items

- Patient care items are categorized based on risk of transmitting disease
- 1939 Dr Earl Spaulding drafted “Disinfection Of Surgical Instruments”
- Spaulding’ Classification
  - Device Usage
  - Degree of Risk
  - Body Contact
- Critical: Enters tissue, vascular system or body cavity
- Semi-Critical: Contact with mucous membranes
- Non-Critical: Contact with intact skin but not mucous membranes

Sterilization and disinfection of patient care items

Critical Items	Penetrates soft tissue or bone	Greatest risk of disease transmission	Heat sterilized
Semi critical Items	Contact mucous membranes	Lower risk of disease transmission	Heat sterilized or high level disinfectant
Non critical Items	Contact intact skin	Lowest risk of disease transmission	Low level disinfectants

STERILIZATION

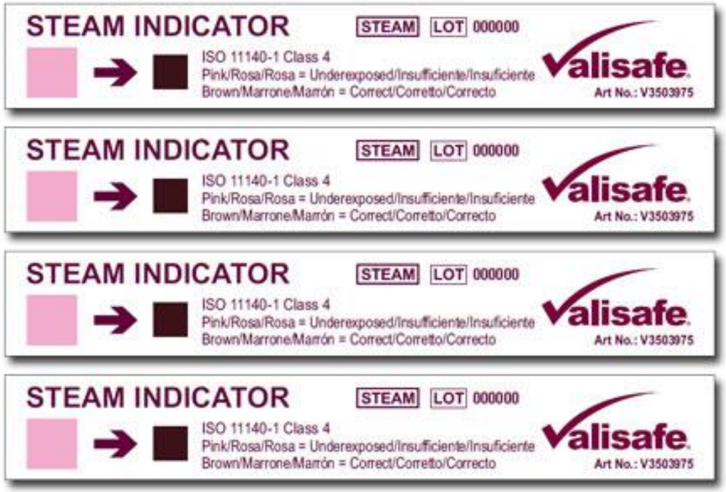
Types	Sterilizing Agent	Time	Temperature
Steam Autoclave	Pressurized Steam		
Gravity Displacement		30 min	121 C/250 F
Pre- Vacuum		4 min	132 C/270 F
Dry Heat	High Temperatures		
Static Air		60 minutes 120 minutes 150 minutes	170 C/340 F 160 C/320 F 150 C/300 F
Forced Air		12 minutes	190 C/375 F
Unsaturated Chemical Vapor	Vapors of alcohol/formaldehyde	20 minutes	132 C/270 F

Routine sterilization Monitoring

- *Mechanical Monitoring*
  - Every load
  - Detects gross malfunctions
  - Monitor time/temperature via observation of dials and gauges

ROUTINE STERILIZATION MONITORING

- *Chemical Monitoring*
  - With every instrument pack
  - Identify sterilized from unsterilized instrument packs
  - Monitor time, temperature and pressure
  - Detects gross malfunctions
  - Chemical indicators placed inside each packet



Routine sterilization monitoring

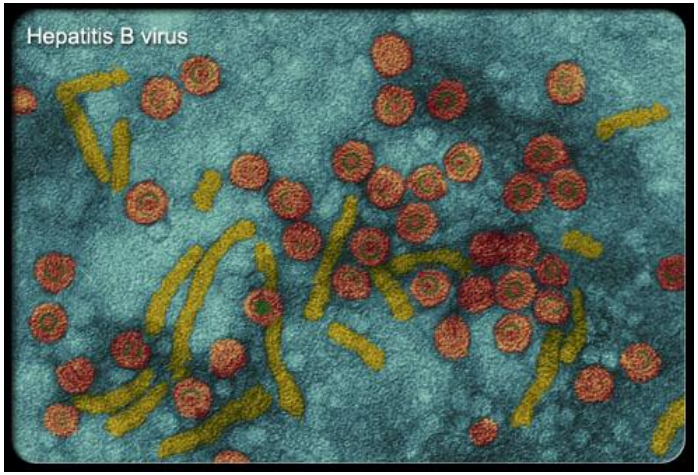
- *Biological Monitoring*
- At least weekly/every load that has an implantable device
- Directly measures the process
- Type of spore dependant on type of sterilizer **Geobacillus stearothermophilus used for autoclave*
- In office or mail in incubation

Sterilization log

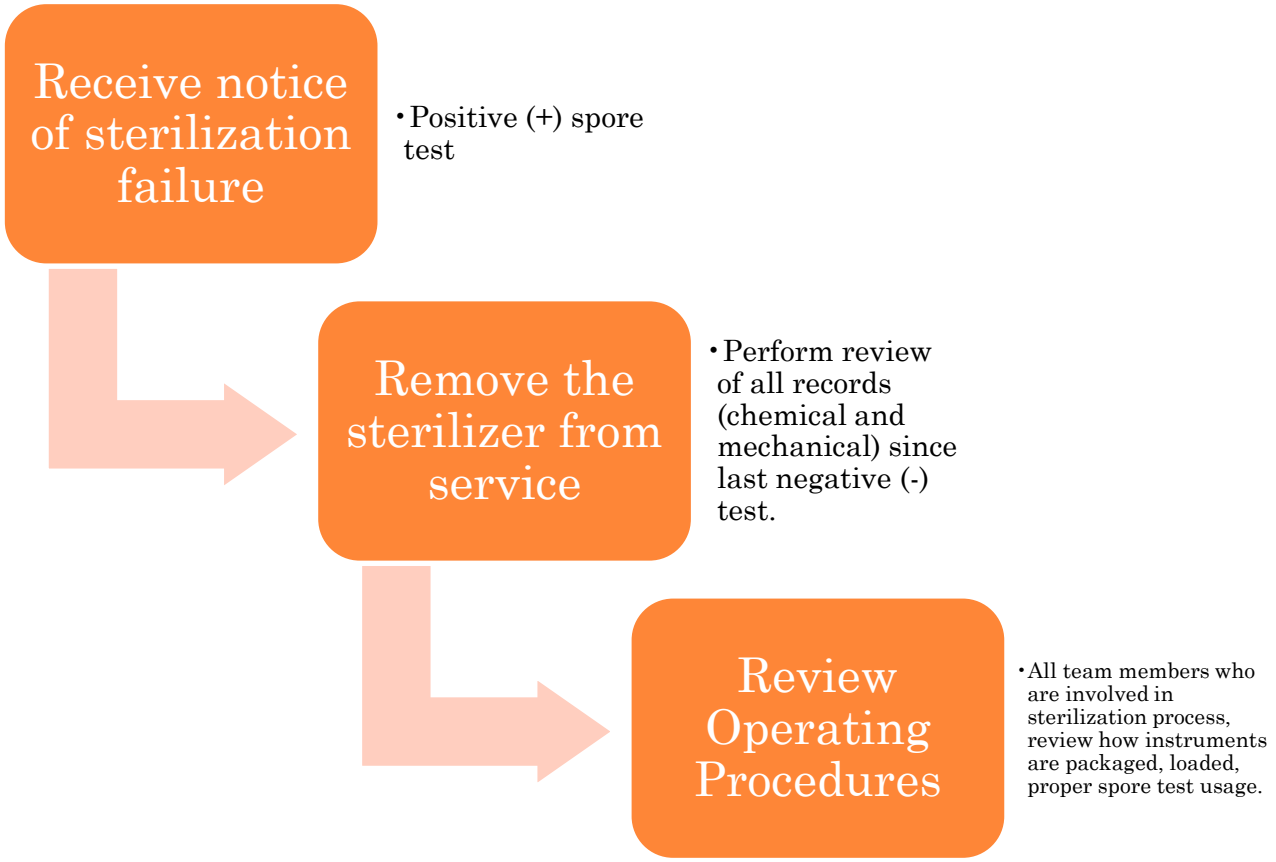
- Sterilizer identification number
- Sterilization date/cycle load
- Duration and temperature of cycle
- Description of contents
- Operator's name
- Biological monitoring results for both test and control
- Repair and preventative maintenance (date and type of service)
- Blank area for notes

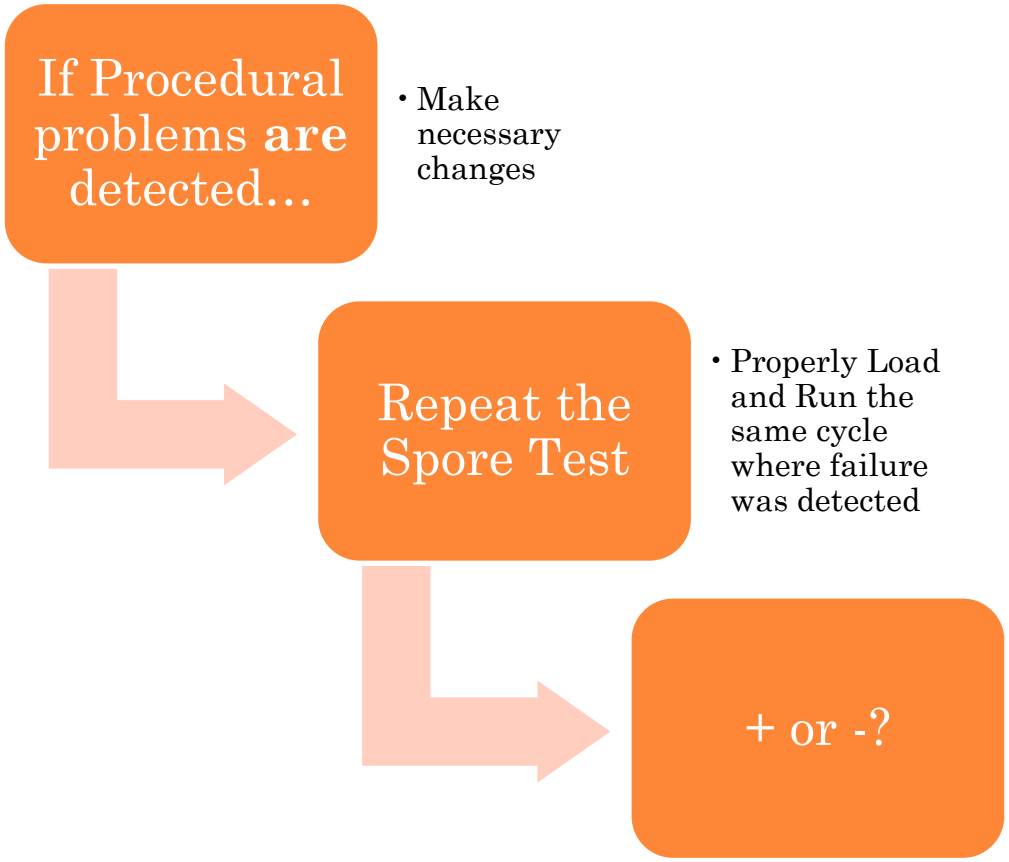
Common Causes of Heat-Sterilization Failure

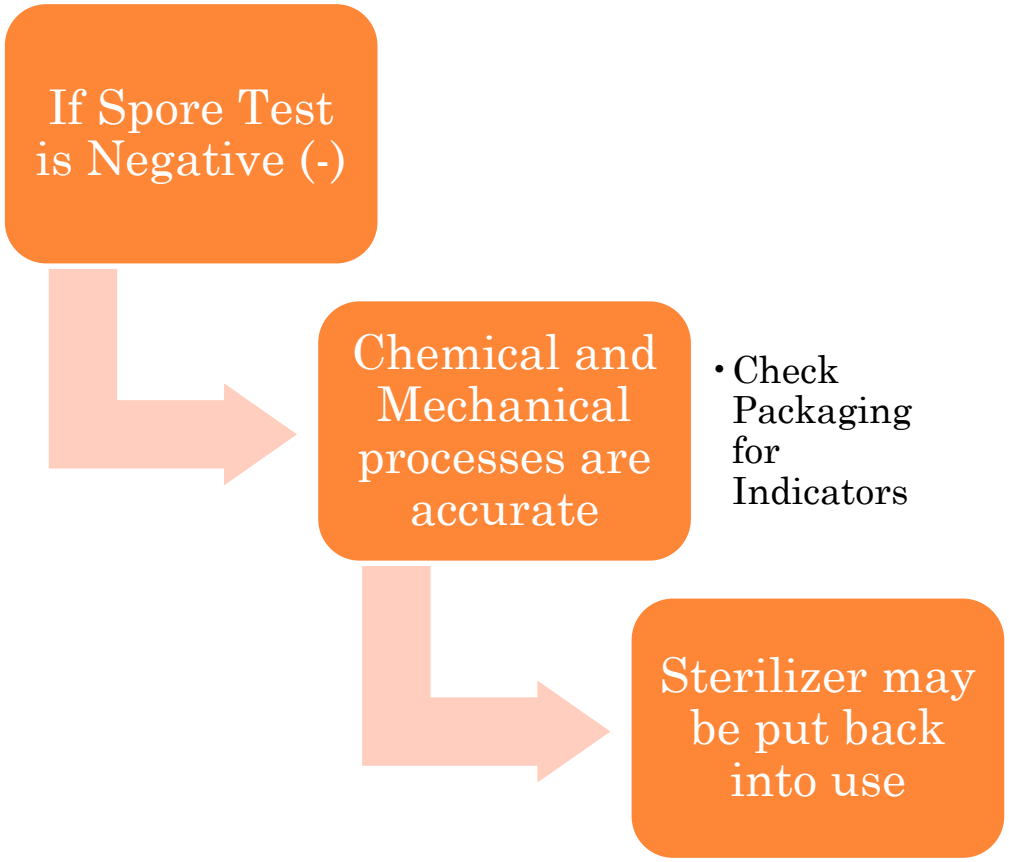
- Improper packaging
- Improper loading
- Improper timing
- Improper temperature

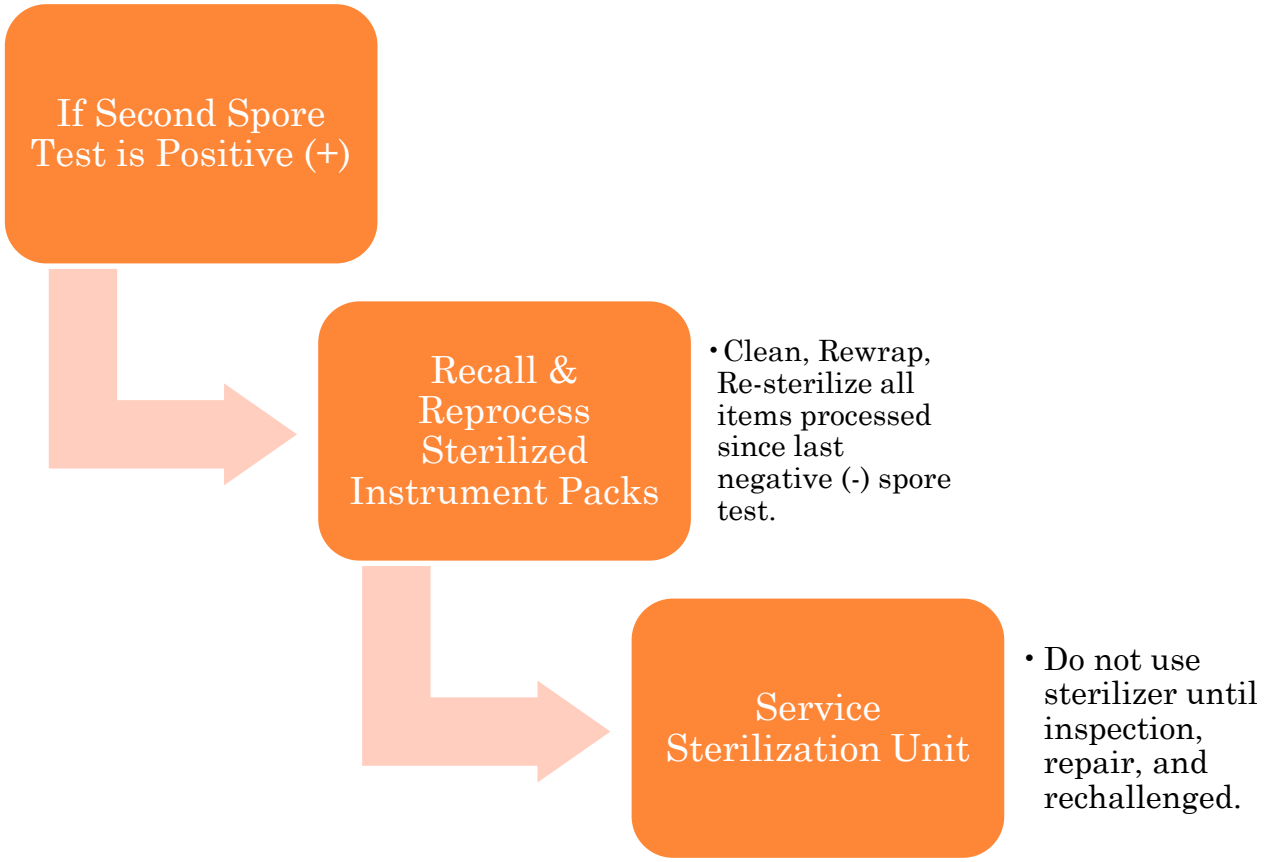


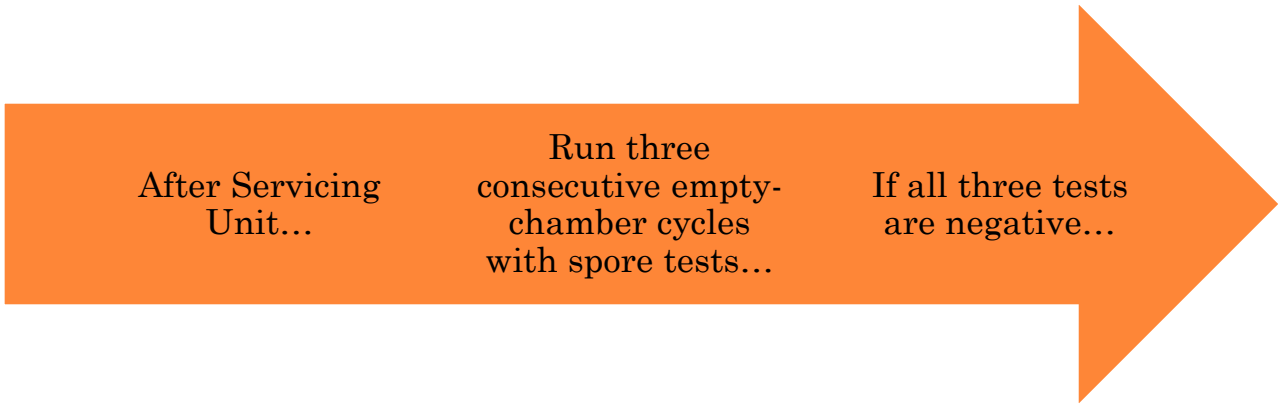
What do you do when…


Receive notice of sterilization failure
• Positive (+) spore test
Remove the sterilizer from service
• Perform review of all records (chemical and mechanical) since last negative (-) test.
Review Operating Procedures
• All team members who are involved in sterilization process, review how instruments are packaged, loaded, proper spore test usage.


If Procedural problems **are** detected…
• Make necessary changes
Repeat the Spore Test
• Properly Load and Run the same cycle where failure was detected
+ or -?


If Spore Test is Negative (-)
Chemical and Mechanical processes are accurate
• Check Packaging for Indicators
Sterilizer may be put back into use


If Second Spore Test is Positive (+)
Recall & Reprocess Sterilized Instrument Packs
• Clean, Rewrap, Re-sterilize all items processed since last negative (-) spore test.
Service Sterilization Unit
• Do not use sterilizer until inspection, repair, and rechallenged.


After Servicing Unit…
Run three consecutive empty-chamber cycles with spore tests…
If all three tests are negative…

Sterilizer is safe to use.

Respiratory hygiene and cough etiquette

- Grew from observations in 2003 SARS outbreak
- Failure to implement simple source control measures
- Possibly increased transmission
- Designed to minimize transmission of respiratory pathogens via:
- Droplet
- Airborne

Respiratory hygiene and cough etiquette

For Individuals

- Cover your mouth and nose when sneezing or coughing
- Turn head away and maintain spatial separation (more than 3 feet) if possible, when coughing
- Use tissues and promptly dispose of them
- Perform proper hand hygiene after contact

For Health Care Facilities

- Provide tissues and no touch receptacles for disposal
- Provide hand washing facilities or alcohol rubs
- Provide masks to those with symptoms
- Operators should wear mask when treating those with symptoms

Respiratory hygiene and cough etiquette

Environmental Infection control

Clinical Contact Surfaces

- Directly touched by contaminated instruments, gloves or devices
- Delivery tray, light handles, counters,

Housekeeping Surfaces

- Not directly touched during the delivery of care
- Floors, walls, windows
- Regular routine cleaning
- CDC recommends avoiding carpet or fabric upholstered furnishings

Clinical contact surfaces

- Goal-Reduce potential for disease transmission
- Health care associated pathogens can remain viable for days, weeks or months
- 100% sterilization is impossible
- High level of disinfection can be achieved
  - Proper technique
  - Use of barriers
  - Surface disinfectants

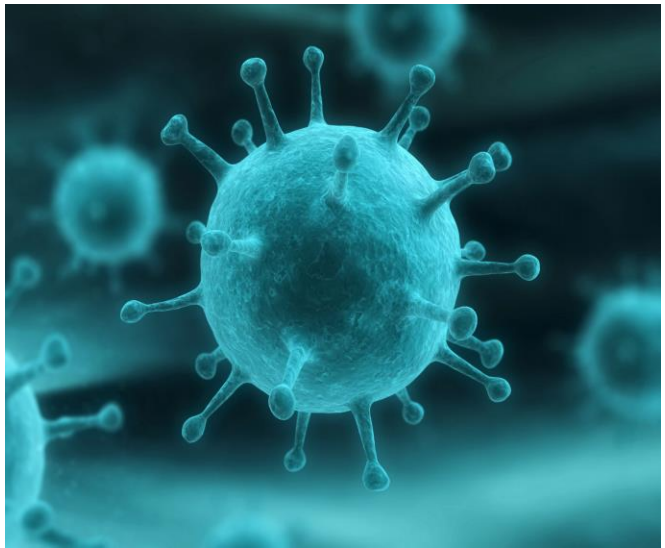
Clinical contact surfaces

Sterilization

- Uses heat or chemicals to kill all microorganisms including spores

Disinfection

- Chemically destroys most microorganisms on items or objects but does not eliminate all bacterial spores



Preparing the operatory

- All clinical contact surfaces should be:
  - Covered with barriers (difficult to clean or will be damaged by disinfectants)
  - Cleaned and disinfected
- Schedule:
  - Beginning of day
  - End of day
  - In between patients
- Most offices use a combination of methods

Choosing a disinfectant product

- High Level Disinfectants
  - Typically not used in the dental office
- Intermediate Level Disinfectants
  - "Hospital disinfectant"
  - Effective against *Salmonella choleraesuis, Staphylococcus aureus and Pseudomonas aeruginosa*, HIV, HBV and others
  - Tuberculocidal claim
- Low Level Disinfectants
  - Useful for cleaning housekeeping surfaces

Choosing a surface disinfectant

- EPA Registration Number
- Should be a “hospital disinfectant”
- Compatible with surfaces, conditions of use and staff
- Cleaning as well as disinfecting properties
- Low allergenicity
- Ease of use
- Clear and easy to follow instructions
- Reasonable contact time (less than 10 min)
- Acceptable storage and disposal requirements
- Reasonable shelf life

Choosing a surface disinfectant

- Label identifies:
- Hazards (Corrosive or toxic)
- Antimicrobial activity (virucidal, bactericidal, fungicidal, tuberculocidal)
- Active ingredients
- Needed contact time for inactivation
- Directions for use
- Precautionary statements:
  - Storage/Disposal/Shelf life/Use life/Expiration date

Types of surface disinfectants

- Agents affect microorganisms via different mechanisms:
- Disruption of the bacterial cell wall and outer membrane
- Chelators which prevent organism from replicating

Ideal surface disinfectant

- Broad Spectrum
- Fast Acting
- Non –Toxic
- Non- Allergenic
- Non-Damaging to surfaces
- No residual effect on surfaces
- Easy to use
- Economical

Process	Result	Method	Examples	Health-care application: Type of patient-care item	Health-care application: Environmental surfaces
Sterilization	Destroys all microorganisms, including bacterial spores.	Heat-automated			Not applicable
		High temperature	Steam, dry heat, unsaturated chemical vapor	Heat-tolerant critical and semicritical	
		Low temperature	Ethylene oxide gas, plasma sterilization	Heat-sensitive critical and semicritical	
		Liquid immersion†	**Chemical sterilants.** Glutaraldehyde, glutaraldehydes with phenol, hydrogen peroxide, hydrogen peroxide with peracetic acid, peracetic acid	Heat-sensitive critical and semicritical	
High-level disinfection	Destroys all microorganisms, but not necessarily high numbers of bacterial spores.	Heat-automated	Washer-disinfector	Heat-sensitive semicritical	Not applicable
		Liquid immersion†	**Chemical sterilants/high-level disinfectants.** Glutaraldehyde, glutaraldehyde with phenol, hydrogen peroxide, hydrogen peroxide with peracetic acid, ortho-phthalaldehyde		
Intermediate-level disinfection	Destroys vegetative bacteria and the majority of fungi and viruses. Inactivates *Mycobacterium bovis*.§ Not necessarily capable of killing bacterial spores.	Liquid contact	U.S. Environmental Protection Agency (EPA)-registered hospital disinfectant with label claim of tuberculocidal activity (e.g., chlorine-containing products, quaternary ammonium compounds with alcohol, phenolics, iodophors, EPA-registered chlorine-based product¶)	Noncritical with visible blood	Clinical contact surfaces; blood spills on housekeeping surfaces
Low-level disinfection	Destroys the majority of vegetative bacteria, certain fungi, and viruses. Does not inactivate *Mycobacterium bovis* .§	Liquid contact	EPA-registered hospital disinfectant with no label claim regarding tuberculocidal activity.** The Occupational Safety and Health Administration also requires label claims of human immunodeficiency virus (HIV) and hepatitis B virus (HBV) potency for clinical contact surfaces (e.g., quaternary ammonium compounds, some phenolics, some iodophors)	Noncritical without visible blood	Clinical contact surfaces; housekeeping surfaces

* EPA and the Food and Drug Administration (FDA) regulate chemical germicides used in health-care settings. FDA regulates chemical sterilants used on critical and semicritical medical devices, and the EPA regulates gaseous sterilants and liquid chemical disinfectants used on noncritical surfaces. FDA also regulates medical devices, including sterilizers. More information is available at 1) http://www.epa.gov/oppad001/chemregindex.htm, 2) http://www.fda.gov/cdrh/index.html, and 3) http://www.fda.gov/cdrh/ode/germlab.html.

† Contact time is the single critical variable distinguishing the sterilization process from high-level disinfection with FDA-cleared liquid chemical sterilants. FDA defines a high-level disinfectant as a sterilant used under the same contact conditions as sterilization except for a shorter immersion time (*C-1*).

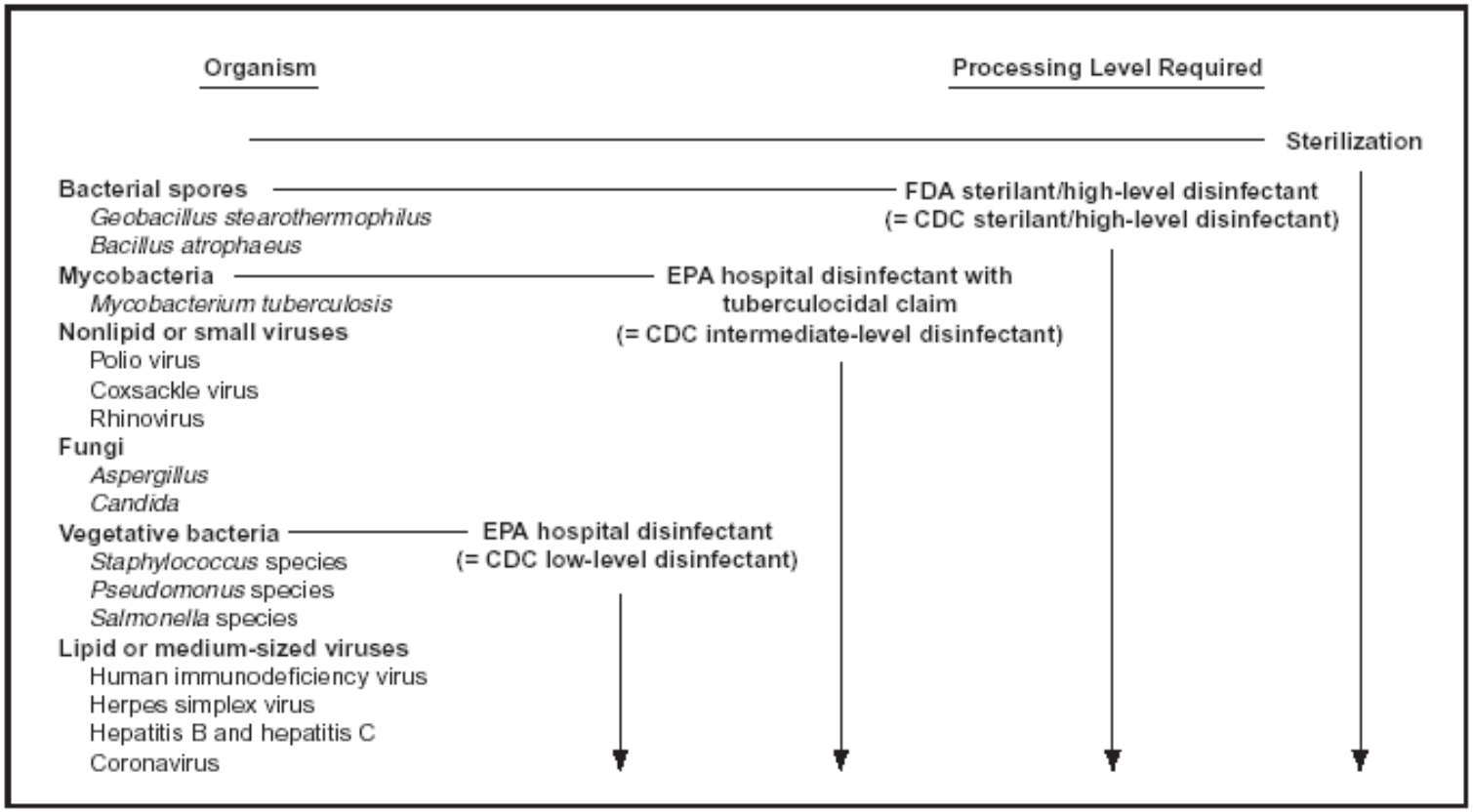
§ The tuberculocidal claim is used as a benchmark to measure germicidal potency. Tuberculosis (TB) is transmitted via the airborne route rather than by environmental surfaces and, accordingly, use of such products on environmental surfaces plays no role in preventing the spread of TB. Because mycobacteria have among the highest intrinsic levels of resistance among vegetative bacteria, viruses, and fungi, any germicide with a tuberculocidal claim on the label (i.e., an intermediate-level disinfectant) is considered capable of inactivating a broad spectrum of pathogens, including much less resistant organisms, including bloodborne pathogens (e.g., HBV, hepatitis C virus [HCV], and HIV). It is this broad-spectrum capability, rather than the product's specific potency against mycobacteria, that is the basis for protocols and regulations dictating use of tuberculocidal chemicals for surface disinfection.

¶ Chlorine-based products that are EPA-registered as intermediate-level disinfectants are available commercially. In the absence of an EPA-registered chlorine-based product, a fresh solution of sodium hypochlorite (e.g., household bleach) is an inexpensive and effective intermediate-level germicide. Concentrations ranging from 500 ppm to 800 ppm of chlorine (1:100 dilution of 5.25% bleach and tap water, or approximately ¼ cup of 5.25% bleach to 1 gallon of water) are effective on environmental surfaces that have been cleaned of visible contamination. Appropriate personal protective equipment (e.g., gloves and goggles) should be worn when preparing hypochlorite solutions (*C-2,C-3*). Caution should be exercised, because chlorine solutions are corrosive to metals, especially aluminum.

** Germicides labeled as "hospital disinfectant" without a tuberculocidal claim pass potency tests for activity against three representative microorganisms: *Pseudomonas aeruginosa, Staphylococcus aureus,* and *Salmonella choleraesuis*.

Surface disinfectants

FIGURE. Decreasing order of resistance of microorganisms to germicidal chemicals



Source: Adapted from Bond WW, Ott BJ, Franke K, McCracken JE. Effective use of liquid chemical germicides on medical devices; instrument design problems. In: Block SS, ed. Disinfection, sterilization and preservation. 4th ed. Philadelphia, PA: Lea & Gebiger, 1991:1100.

Intermediate Level disinfectant

- Label claims
  - Bactericidal
  - Fungicidal
  - Virucidal
  - Tuberculocidal
- Usually agent of choice for clinical contact surfaces
- Err on side of caution

Key Active Ingredients in Disinfectants

Chemical Category	Example	Activity
Phenols	Phenol *Birex, ProSpray*	Antifungal and antiviral properties 10 min TB kill
Surface Active Agents (Surfactants)	Quaternary Ammonium Compounds *Sani-Cloth HB*	Inactivate energy producing enzymes, denature cell proteins, disrupt cell membranes Low level disinfectants
Alcohols	Ethyl alcohol, isopropyl alcohol, n-propanol *Rubbing Alcohol*	Broad spectrum activity against vegetative bacteria but are not sporicidal. TB kill 1- 10 min. Pure alcohol not approved for surface disinfection. Added to other compounds

Key active ingredients in disinfectants

Chemical Category	Example	Activity
Surface-Active Agents (surfactants) and Alcohols	Quaternary Ammonium- alcohol compounds *Cavicide, CaviWipes, SaniCloth Plus*	Broad spectrum. Denature cell proteins and disrupt membranes. Great cleaning agent. % of alcohol impacts TB kill time.
Halogen-Releasing Agents	Bleach, sodium hypochlorite, chlorine dioxide *Bleach*	Antiseptic and disinfectant properties. Bactericidal and virucidal.
Oxidizers	Hydrogen Peroxide	Attacks vital microorganism cell components

Clinical contact surfaces

Clean

- 1st step
- Remove debris and visible contamination
- Debris left behind blocks action of disinfectant

Disinfect

- Follows cleaning step
- Eliminates, inactivates, or destroys most pathogens
- OSAP states “areas should be cleaned and then saturated with enough disinfectant to remain moist for the required contact time without evaporation”

Clinical contact surfaces

Spray-Wipe-Spray

- Clean
- Wipe
- Disinfect
- Spray creates aerosols
- Increase in occupational asthma

Wipe-Discard-Wipe

- Premoistened wipes
- Clean wipe for each surface
- Use a sufficient number of wipes to ensure adequate contact time

ALWAYS USE APPROPRIATE PPE

Reducing Exposure Risk

Engineering Controls (Devices)

- Sharps Containers
- Needle Holders/Recappers
- Instrument Washers
- Utility Gloves
- Instrument Cassettes

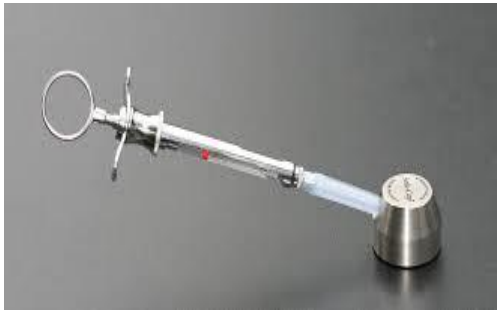
Work Practice Controls

- One-handed scoop technique
- Using a needle holder
- Neat and orderly instrument delivery tray area
- Handpiece/Ultrasonic Scaler Placement
- Not bending needles

Managing Exposures

- Have a protocol in place
- Wash area with soap and water, do not squeeze
- Flush eyes with cool water for 15 minutes
- Report incident **immediately** with as much detail as possible about health status of patient, how and when exposure occurred
- Report to designated healthcare professional for evaluation, testing, and follow-up care as indicated.

Holders and Re-cappers



Sharps Containers

- Placed as close as possible to the point of use
- Avoid overfilling
- Do not recap cartridge end of needle prior to placement in sharps container

Sharps containers

- National Institute of Occupational Safety and Health (NIOSH):
  - Closeable, puncture proof and leak proof
  - Easily accessible and as close to area of use as feasible
  - Labeled with biohazard symbol and/or colored red
- Designed so users can see how full it is and when it needs to be replaced
- Upright and positioned for clear and unobstructed view of opening
- Located within arm's reach and at a height just below eye level
- Removed by staff and replaced when ¾ full as indicated by "fill to" line

Managing medical waste

- Examples of regulated waste in the dental office:
  - Solid waste saturated with blood or bodily fluids
  - Extracted teeth, surgically removed hard and soft tissues
  - Sharps items including: needles, burs, wires, scalpel blades
- Use biohazard bags
- Use sharps containers; keep at point of use
- Teeth containing amalgam cannot be incinerated.
- Office plan and protocol must comply with federal, state and local regulations

Managing regulated medical waste in the dental setting – step by step

- Safe handling
  - Correct PPE
- Segregate
  - Regulations are waste specific
- Store
  - Rigid leak proof containers
- Label
  - Biohazard symbol indicates infectious waste
- Dispose
  - In accordance with federal, state and local agencies and requirements

Resources for the dental team

- CDC – Centers for Disease Control
  - Guidelines
  - Trends
  - Recommendations
- OSHA – Occupational Safety and Health Administration
  - Regulatory agency
  - Policies
  - Standards
- OSAP –Organization for Safety, Asepsis and Prevention
  - A growing community of clinicians, educators, researchers, and industry representatives who advocate for safe and infection-free delivery of oral healthcare. OSAP focuses on strategies to improve compliance with safe practices and on building a strong network of recognized infection control experts.

Ethics

One of the biggest problems is inconsistent implementation of proven infection prevention and control measures."
"Everyone is doing his or her own thing."

Resources

- Centers for Disease Control and Prevention (2003)CDC Guidelines and Recommendations – Infection Control in Dental Health Care Settings
- Fluent, Marie T. (2011) CDC Infection Control Guidelines and the Practice of Dental Hygiene, Western Schools
- Harte, J.A. (2010) Standard and transmission-based precautions: An update for dentistry. Journal of the American Dental Association, 141(5), 572-581
- Organization for Safety and Asepsis Procedures (2004)Infection Control Manual From Policy to Practice: OSAP's Guide to the Guidelines

RESOURCES

- All images accessed via Google Images