

**Dental Board of California**

**INFECTION CONTROL REQUIREMENTS**

112<sup>th</sup> Annual Alumni Meeting  
March 5, 2011

University of the Pacific  
Arthur A. Dugoni  
School of Dentistry

Presented by  
Eve Cuny, MS

## California Dental Board Infection Control Requirements

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UNIVERSITY OF THE PACIFIC  
ARTHUR A. DUGONI SCHOOL OF  
DENTISTRY

## Infection Control Regulations

- California Dental Board
  - Minimum standards for infection control
- Cal/OSHA
  - Bloodborne pathogens rule
- Department of Health Services
  - Medical waste management act

## California Dental Board Regulations

- Standard Precautions
- Written protocol
  - Instrument processing
  - Operatory cleanliness
  - Management of injuries
- Copy of the regulation conspicuously posted in each office

## Standard Precautions

- The same infection control procedure for all patients regardless of health history
- All body fluids with the exception of sweat considered as potentially infectious



## Bloodborne Diseases

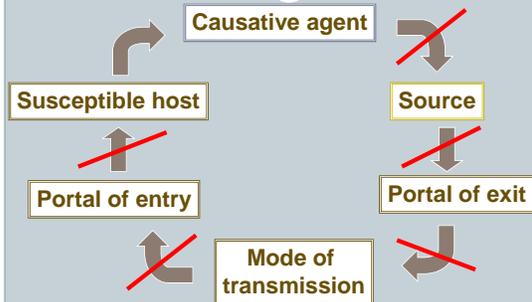
## Bloodborne Diseases

- Human Immunodeficiency Virus (HIV)
- Hepatitis B Virus (HBV)
- Hepatitis C Virus (HCV)

## Modes of Transmission

- Direct contact with blood and body fluids
- Indirect contact with contaminated instruments or surfaces
- Contact of mucosa of the eyes, nose or mouth with droplets or spatter

## Chain of Infection



## Portal of Entry

**Broken skin**



**Mucous membranes**



**Percutaneous injury**



## HIV/AIDS in the United States

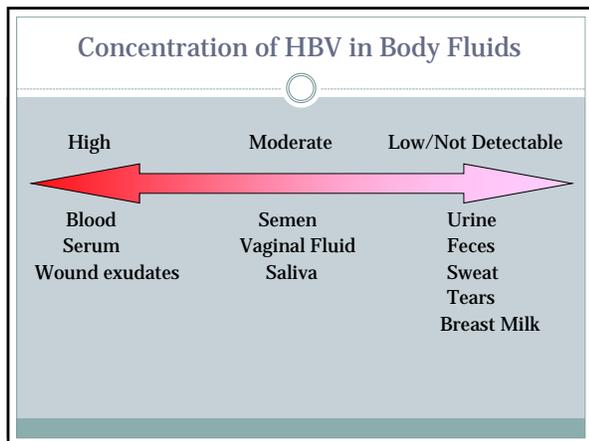
- 982,493 estimated total AIDS diagnoses
- 56,300 new infections each year
- Estimated 1.04-1.18 million people living with HIV
  - 24-27% undiagnosed or unaware of their infection

## Hepatitis B Virus (HBV)

- 46,000 new infections/yr. (down from 260,000 in 1980's)
- About 30% of people will have no symptoms
  - symptoms include jaundice, fatigue, abdominal pain, loss of appetite, nausea and vomiting
- 800,000-1.4 million chronically infected individuals
- 30% of cases are of unknown origin

## Chronic HBV

- **Chronic infection occurs in:**
  - 90% of infants infected at birth
  - 30% of children infected at age 1 - 5 years
  - 6% of persons infected after age 5 years
- Death from chronic liver disease occurs in 15-25% of chronically infected persons



- ### Healthcare Worker to Patient HBV Transmission
- Multiple clusters in various healthcare settings
    - Including dentistry
  - Most HCW were HbeAg positive
  - HCW that were not HbeAg positive had high viral HBV DNA levels
  - Transmissions may occur in spite of standard precautions

- ### Hepatitis B Vaccine
- Vaccination available since 1982
    - Now a routine childhood vaccination
  - 3 injections over a 6-month period
  - Given in the deltoid muscle
  - Must be offered to all at-risk employees

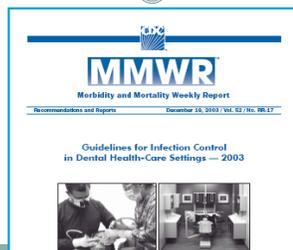
- ### Post-immunization Testing
- Anti-Hbs test
  - >10 mili – International Units
  - Consider repeating the series or checking for core antibodies (Anti-Hbc) if no antibodies are detected

- ### Booster Injections
- CDC does not recommend boosters
    - Immune memory remains intact

### Hepatitis C Virus Infection, United States

|                                   |              |
|-----------------------------------|--------------|
| New infections per year 1985-89   | 242,000      |
| 2006                              | 19,000       |
| Deaths from acute liver failure   | Rare         |
| Persons ever infected (1.6%)      | 4.1 million  |
| Persons with chronic infection    | 3.2 million  |
| HCV-related chronic liver disease | 60-70%       |
| Deaths from chronic disease/year  | 8,000-10,000 |

## Infection Control Precautions



## Infection Control Strategies

- Vaccinations
- Engineering controls
- Standard precautions
- Safer work practices
- Administrative controls

## Immunizations

- Hepatitis B
- Measles/Mumps/Rubella
- Varicella
- Diphtheria/Tetanus
- Polio
- Influenza



## Personal Protective Attire

- An important element of Standard Precautions
- To protect skin, clothing, mucous membranes from contact with blood and saliva
- Removed prior to leaving the work area
- Provided by the employer in appropriate sizes
- Maintained and laundered by the employer

## Masks and Protective Eyewear

- Mask and eye protection or face shield and mask
- Change masks between patients
- Clean reusable face protection when soiled, disinfect between patients



## Protective Clothing

- Adequate to protect street clothes or work clothes from contact with oral fluids
- Change if visibly soiled, or as soon as possible
- Remove before leaving patient care or laboratory areas



## Hand Hygiene

- Before treating each patient
- After removing and discarding gloves
- Antimicrobial soap for surgical procedures



## Alcohol-based Handrubs

- Rapid and effective antimicrobial action
- More accessible than sinks
- Are not effective at removing debris



## Patient Care Restrictions

- Refrain from direct patient care and handling patient care equipment if:
  - Weeping dermatitis
  - Exudative lesions



## Requirements for Gloving

Remove gloves that are torn, cut or punctured



Do not wash, disinfect or sterilize gloves for reuse

## Instrument Processing

## Categories of Patient Care Items

| Category     | Definition                                  | Reprocessing                             | Examples  |
|--------------|---|--|---|
| Critical     | Penetrate soft tissue or bone               | Sterilization                            | Surgical instruments, periodontal scalers, surgical dental burs |
| Semicritical | Contact mucous membranes or non-intact skin | Sterilization or high-level disinfection | dental mouth mirrors, amalgam condenser, dental handpieces      |
| Noncritical  | Contact intact (unbroken) skin              | low- to intermediate-level disinfection  | X-ray head/cone, Blood pressure cuff, facebow,                  |

## Sterilization of Instruments

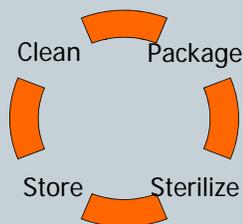
- **Critical and semicritical instruments**
  - Heat sterilize
  - High level disinfect or sterilize using chemical germicides only if item cannot be heat sterilized
- **Heat sterilize all high-speed handpieces, low-speed components used intraorally, and all other attachments (e.g.: air/water syringe tips, ultrasonic scaler tips, etc.)**

## Single-use Items

- **Used for one patient and discarded appropriately**
  - Prophy angles, prophy cups and brushes, high speed evacuator tips, saliva ejectors, a/w syringe tips



## Instrument Reprocessing



## Instrument Processing Flow

- **Receiving, cleaning, and decontamination**
- **Preparation and packaging**
- **Sterilization**
- **Storage**



## Cleaning Before Sterilization



## Washer/Disinfectors

- **Suitable for cassettes or baskets**



- **Dishwashers are not instrument washers**



- **Instrument washers are not dishwasher**

## Hand Scrubbing



## Drying Instruments

- Dry instruments carefully
- Remove debris that was not cleaned mechanically
- Wear heavy-duty gloves to process instruments



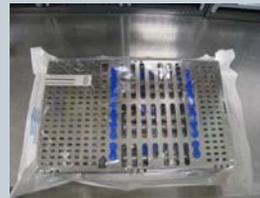
## Packaging Instruments

- Carefully place instruments in pouch or wrap
- Use materials compatible with type of sterilizer



## Packaging Cassettes

### Pouches



### Sterilization Wrap



## Storage

- Critical and semicritical instruments or containers must be wrapped unless they be used immediately.
- Remain sealed unless they are placed onto a tray and covered and used the same day.



## Loading Sterilizer



## Heat-Based Sterilization

- **Moist heat (steam) under pressure**
  - Autoclaving
- **Dry heat**
  - Static air (convection, oven-type)
  - Forced air (rapid heat transfer)
- **Unsaturated chemical vapor**
  - Proprietary formula of alcohol/formaldehyde

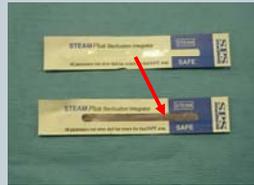
## Liquid Chemical Sterilant/Disinfectants

- **Only for heat sensitive critical and semicritical items**
- **Difficulty maintaining sterility**
  - Must be rinsed in sterile water
  - Must be sterilized and rinsed just prior to use
- **Heat tolerant or disposable alternative available for most items**



## Chemical Indicators

- Measure key parameters of the sterilization process (e.g. time, temperature)
- Visual change when the desired parameter has been achieved
- Single parameter indicators, multi-parameter indicators



## Biologic Monitoring

- Contain bacterial spores resistant to heat sterilization
- Highest level of confirmation for sterilization
- Liquid vials with incubator for office use
- Paper strips for mail-back service



## Sterilizer Monitoring Service

- Offered by Dugoni School since 1994
- All proceeds go to student scholarship
- Provided 5 scholarships in 2009
- Competitively priced
- Contact 415-929-6667

## Disinfection

**CLINICAL CONTACT SURFACES  
AND  
HOUSEKEEPING SURFACES**

### Survivability of Organisms on Surfaces

- HIV Hours
- HSV Hours
- Rhinovirus 14 Hours
- Staph 5 Days
- HBV 7 Days
- TB 6 to 8 months

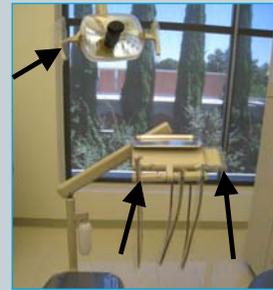
### Descending Order of Resistance to Chemical Germicides

- Bacterial spores
- Mycobacterium
- Nonlipid or small virus
- Fungi
- Vegetative bacteria
- Lipid or medium size viruses

### Disinfection

- By definition, disinfection differs from sterilization by its lack of sporicidal power
- Levels of disinfection:
  - High
  - Intermediate
  - Low
- Use intermediate-level disinfectants for clinical contact surfaces that may be contaminated

### Clinical Contact Surfaces



### Housekeeping Surfaces

- May serve as source of microorganisms
- Not directly involved in infectious disease transmission
- Do not require stringent decontamination procedures

### Housekeeping Surfaces



### Equipment Barriers

- For items or surfaces difficult or impossible to disinfect.
- Remove, discard and replace between patients



### Disinfecting Clinical Contact Surfaces

- Spray



### Disinfecting Clinical Contact Surfaces

- Wipe (clean)



### Disinfecting Clinical Contact Surfaces

- Spray
- Wait (disinfect)



### Clean Thoroughly Before Disinfecting



### Premoistened Disinfectant Wipes

- Wipe (clean)
- Wipe (disinfect)
- Wait



## Exposure Incident Management

### Exposure Incident

- Percutaneous injury
- Splash to mucous membrane or nonintact skin
  - involving a patient's blood or saliva



### Post-exposure Management

- Prompt reporting of injuries
- Interview of patient
- Testing of patient and exposed worker
- Referral for medical counseling
- Written report documenting details of incident, including whether or not a safety device was involved

### Transmission after Needlestick

| Source                                    | Risk   | CDC |
|---|--|-----|
| HBV                                       |  |     |
| HBsAg <sup>+</sup> and HBeAg <sup>+</sup> | 22.0%-31.0% clinical hepatitis;<br>37%-62% serological evidence of HBV infection |     |
| HBsAg <sup>+</sup> and HBeAg <sup>-</sup> | 1.0%-6.0% clinical hepatitis;<br>23%-37% serological evidence of HBV infection   |     |
| HCV                                       | 1.8% (0%-7% range)   |     |
| HIV                                       | 0.3% (0.2%-0.5% range)   |     |

### Postexposure Management for HIV

- Collect source patient information
  - Types of medications of patient is HIV-positive
- Testing of exposed worker
  - Baseline, 4-6 weeks, 12 weeks, 6 months
- Risk assessment by qualified healthcare professional
- Post-exposure prophylaxis, if indicated by assessment

### HBV Occupational Risk

- Transmission via accidental exposure to blood or saliva
  - Percutaneous injury
  - Non-intact skin
  - Mucous membrane
- Dentists 10x more like than general population to show evidence of past infection (pre-vaccine era)
- Decrease in cases among dentist steadily declined since the mid 1980's

## Postexposure Management for HBV

- **Vaccinated responders**
  - No PEP
- **Unvaccinated worker**
  - HBIG
  - Begin vaccine series
- **Vaccinated nonresponder**
  - HBIG x2 (or more, if recommended by healthcare provider)

## Occupational Transmission of HCV

- **Inefficient by occupational exposures**
- **Average incidence 1.8% following needle stick from HCV-positive source**
  - Associated with hollow-bore needles
- **Case reports of transmission from blood splash to eye; one from exposure to non-intact skin**
- **Prevalence 1-2% among health care workers**
  - Lower than adults in the general population

## Postexposure Management for HCV

- **IG, antivirals not recommended for prophylaxis**
- **Follow-up after needlesticks, sharps, or mucosal exposures to HCV-positive blood**
  - Test source for anti-HCV
  - Test worker if source anti-HCV positive
    - × Anti-HCV and ALT at baseline and 4-6 months later
    - × For earlier diagnosis, HCV RNA at 4-6 weeks
  - Confirm all anti-HCV results with RIBA
- **Refer infected worker to specialist for medical evaluation and management**

## Injury Prevention

## Use Scoop Technique or...



## Mechanical Device



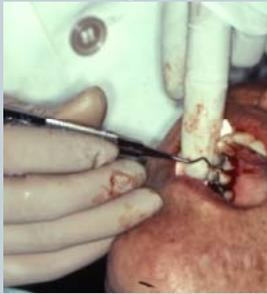
### Mechanical Devices



### Evaluate Work Practices



### Retracting Tissue Using Fingers



### Handling Sharps



### Instrument Transfers



### Dental Waterlines

## Dental Unit Waterline Biofilm



## Dental Unit Water Lines

- Flush lines for two minutes at the beginning of the day **before** attaching devices

## Flushing Waterlines

- After each patient, discharge water and air for a minimum of 20-30 seconds from any dental device connected to the dental water system that enters the patient's mouth
- e.g., handpieces, ultrasonic scalers, air/water syringe



## Epidemiological Studies

- Abnormal Gram (-) nasal flora in 14 of 30 dentists
- Two studies found high Legionella antibody titers in DHCP compared to controls
  - No clinical legionellosis cases reported

## Case Report

- *Pseudomonas* wound infections
  - Gingival infections in 2 immunocompromised patients after restorative treatment
  - *P. aeruginosa* in DUWL matched to bacteria cultured from wound
  - No infections among 78 healthy patients or among healthy patients in retrospective chart review

## Dental Unit Water Quality

- Bacteria in water from untreated systems can exceed  $10^6$  CFU/mL
- Untreated dental units cannot reliably produce safe drinking water

*American Dental Association*

## Routine Dental Procedures

- Biofilm control not regulated for routine procedures
- In-line filter, bottled systems, and unit filter all provide superior water quality
  - If used properly



## Dental Unit Filter

- Dentapure and Sterisil
- 90 or 365 day filters
- Attaches at control box to filter all lines
- Filter resin bed with iodine as disinfectant
- May need to change or decontaminate lines before installation



## Surgical Procedures involving soft tissue or bone

### Use Sterile Irrigants



### Use Sterile Delivery Devices



<http://airforcemedicine.afms.mil/decs>



The screenshot shows the website for the Dental Evaluation & Consultation Service (DECS) under the Air Force Medical Service. The page features a navigation menu on the left with items like 'Home', 'About DECS', 'Product Evaluations', 'Continuing Education', 'Dental Digital Radiology Solutions', 'Infection Control', 'New Products on the Market', 'Frequently Asked Questions', 'Literature Review', and 'Dental Readiness'. The main content area includes a header with the Air Force logo and 'Serving the federal dental community for 32 years'. Below this, there are sections for 'What's New to the Site', 'About DECS', 'Contact Us', and 'Customer Satisfaction Survey'.

## Dental Lab

## Disinfection of Devices

- Intraoral items such as impressions, bite registrations, prosthetic and orthodontic appliances shall be cleaned and disinfected before manipulation in the laboratory and before insertion in the patient's mouth.



### Lab Equipment

- Splash shields shall be used in dental laboratories



### Dental Laboratory

- Clean and heat sterilize heat-tolerant items used in the mouth
- Heat sterilize, high-level disinfect or discard laboratory equipment that touches contaminated appliances



### Contaminated Wastes

- Disposed of according to local state and federal standards



### Other Regulated Medical Waste

- Pharmaceutical waste
- Collect separately from biohazard waste
- Medical waste treatment facility for destruction



### Dental Radiology

- Wear gloves and other appropriate personal protective equipment as necessary
- Heat sterilize heat-tolerant radiographic accessories



### Dental Radiography Sensors

- Use fluid-proof barriers
- Or use intermediate EPA-registered disinfectant between patients





SUBSIDIZE WHILE YOU STERILIZE!  
**SUPPORT**  
DENTAL EDUCATION

YOUR SUBSCRIPTION DOLLARS HELP SUPPORT A STUDENT SCHOLARSHIP FUND.

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Date of order \_\_\_\_\_ Contact person \_\_\_\_\_

Dr.'s name \_\_\_\_\_

Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Telephone \_\_\_\_\_ Fax \_\_\_\_\_ E-mail \_\_\_\_\_

Sterilizer manufacturer \_\_\_\_\_ Model # or type \_\_\_\_\_

CC Type: Visa  MasterCard  AmEx  # \_\_\_\_\_ Exp. date \_\_\_\_\_

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UNIVERSITY OF THE

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Arthur A. Dugoni  
School of Dentistry

ORDERING INFORMATION

ONLINE [www.dental.pacific.edu](http://www.dental.pacific.edu) > Dental Professionals > Sterilizer Monitoring Service

EMAIL [jgutierrez@pacific.edu](mailto:jgutierrez@pacific.edu)