Bloodborne Pathogens/Infection Control
Tuberculosis Awareness

CDM 3rd years and Post-docs
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Biological Safety Officers
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Why Is Infection Control Important in Dentistry?

- Contact with blood, oral and respiratory secretions, and contaminated equipment can occur
- Both patients and dental health care personnel (DHCP) can be exposed to pathogens
- Proper procedures can prevent transmission of infections among patients and DHCP
Chain of Infection

Pathogen
Susceptible Host
Entry
Mode
Source
Disinfection
Safe sharps handling
PPE
Vaccination
Infection control
• First documented report of patient-to-patient transmission of hepatitis C virus associated with a dental setting in the United States.
• Improper sterilization techniques.
• Using single vials of medications on multiple patients.
• No written infection control protocol.
Standard Precautions

• Apply to all patients regardless of actual or perceived risk factors; treat all blood or OPIM as if infectious.

• Otherwise potentially Infectious Material (OPIM)

• Body fluids, secretions incl. saliva, and excretions (except sweat), whether or not they contain blood

• Non-intact (broken) skin

• Mucous membranes
Elements of Standard Precautions

- Hand washing
- Use of gloves, masks, eye protection, and gowns
- Disinfection of patient care equipment
- Disinfection of environmental surfaces. Alternatively, cover what you can
- Injury prevention
Bloodborne pathogens
HBV Vaccine

- Vaccine Efficacy >90%
- Now part of childhood schedule
- OSHA requirement to offer to employees with potential occupational exposure
Occupational Bloodborne Pathogen Exposure Evaluations at Columbia Student Health Services

<table>
<thead>
<tr>
<th>Year</th>
<th>Dental School (% of total evaluations)</th>
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<tbody>
<tr>
<td>2004-2005</td>
<td>66%</td>
</tr>
<tr>
<td>2007-2008</td>
<td>44%</td>
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<tr>
<td>2008-2009</td>
<td>62%</td>
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<tr>
<td>2009-2010</td>
<td>53%</td>
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- Historically, about two thirds of all occupational exposures reported to Student Health Services consisted of Dental Students.
- Lowest exposure year was 2007-2008.
- Dental students continue to be at the highest risk, particularly for HIV exposure. Of those students that sustain an occupational exposure from a known HIV-positive patient, in excess of 75% of those exposure occur in dental students.

Source: Thomas Mele, MD
Instructor in Clinical Medicine
Dental Students and Bloodborne Pathogens: Occupational Exposures, Knowledge, and Attitudes

Julie E. Myers, M.D., M.P.H.; Ronnie Myers, D.D.S.; Mary E. Wheat, M.D.; Michael T. Yin, M.D., M.S.

Abstract: Dental professionals may be exposed to bloodborne pathogens in their work, and dental students may be a particularly vulnerable group. Fear of exposure has also been linked to discriminatory practices. A cross-sectional survey of dental students was conducted at one U.S. dental school to assess their knowledge about the transmission of bloodborne pathogens and management of exposures; the frequency of their bloodborne pathogen exposures (BBPes); and associations among their prior exposure, knowledge, perception of knowledge, and attitudes toward practice. Overall, 230 students (72.1 percent) responded to the survey, and 215 (70.5 percent) answered questions about exposures. The prevalence of BBPE was 19.1 percent and was greater among clinical than preclinical students (p<0.01). Percutaneous injuries occurred in 87.5 percent of those exposed. All students (preclinical and clinical combined) answered more survey questions correctly about transmission of bloodborne pathogens (66.7 percent) than about post-exposure management (25.0 percent). Fewer than half reported adequate knowledge of transmission and management (47.5 percent and 37.3 percent, respectively). In this context, 8.2 percent of the respondents acknowledged an unwillingness to perform procedures on patients with HIV. Since knowledge gaps may lead to failure to report incidents and delays in appropriate exposure management and some negative attitudes toward treating individuals with HIV persist, these findings justify improving BBPE education at U.S. dental schools.

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Despite the use of standard precautions, dental professionals may be exposed to bloodborne pathogens in the course of their work. While there is evidence to suggest that the risk of acquiring an infection is quite small, dental students may be a particularly vulnerable group for many reasons, including their lack of experience and skill. Additionally, dental students may underreport occupational exposures, so appropriate post-exposure management may not be properly administered. Improving students' knowledge of bloodborne pathogen transmission and post-exposure management through educational initiatives is one way that dental teaching institutions can face the joint challenge of protecting both the student and the patient populations, particularly in light of reports of ongoing discrimination against patients with HIV that may limit access as well as the type and level of dental care provided.

Previous published studies of dental students' knowledge of bloodborne pathogens have focused on their perception of risk or knowledge of specific infection control practices rather than on knowledge of the actual risk of transmission. Other studies have asked dental students whether they know of the existence of a post-exposure management protocol but did not assess their knowledge of specific aspects of post-exposure management. Some have focused narrowly on whether students are willing to treat patients with HIV or on students' fear of exposure, rather than on broader questions of whether exposure concerns affect technique in performing procedures or future career choice. Additionally, most studies on this topic were performed in non-U.S. dental school settings. Therefore, this study had three aims: 1) to assess a group of U.S. dental students' knowledge about the transmission of bloodborne pathogens and...
Occupational Exposure

- Refers to: ‘stick’ from any contaminated item; mucous membrane, non-intact skin exposure
- Clean with Betadine and antimicrobial soap
- Rinse eyes/mucous membranes 10 minutes
- Inform supervisory person. All patients, students or faculty/staff injured in the clinical facility should file an "Accident Report - General Liability". Forms available in the Clinic Administration Office
- HIV, HBV, HCV response scenarios
HIV-Post Exposure Evaluation

- First Response
- Drugs (if indicated) ASAP “within a few hours”
- Previously-79% reduction with AZT alone.
- Protease Inhibitors.
  - reduce viral load.
  - inhibit replication at different step vs. AZT.
- Regimen based on hazard of source material vs. drug toxicity.
- Follow-up testing
When do needle stick injuries occur?

- **2%** • Before use
- **38%** • During use
  - passing equipment, collision w/ worker
- **42%** • After use/before disposal
  - activating safety feature, recapping
- **18%** • During and after disposal
  - improper disposal
Substitution – ENGINEERED SHARPS

‘Safe Needles’ mandatory OSHA requirement to use safest ‘sharp’ possible, engineered-in safety features

AVOID breaking, bending, or recapping needles.
Regulated Medical Waste Management

- Properly labeled containment to prevent injuries and leakage
  - Red bag waste
  - Sharps waste
- Medical wastes are “treated” in accordance with state and local EPA regulations
- Processes for regulated waste include autoclaving and incineration
What goes in here?

Needles  
Syringes  
Etchants  
Sealants  
Composite  
Glass  
Scalpel blades  
Orthodontic wires  
Endodontic files  
Burs  
Irrigation syringes

Anything that would rip a red bag

Unused sterile sharps  
Empty carpules
Red bag bins are not a place to store:
• Coats
• Bags
• Dental trays
• Anything
What goes in here?

No food or drink permitted in the clinic.
Extracted Teeth
Extracted Teeth

- Considered regulated medical waste
  - If it is determined that histologic evaluation is not required, the extracted teeth must be placed in the designated, pre-labeled “Extracted Teeth Containing Amalgam” appropriately labeled (extracted teeth) container, regardless of whether the teeth contain amalgam or not.

  - Disinfect before disposal; containers have a solution of sodium hypochlorite (1 part bleach and, 9 parts water).

- Can be given back to patient
Categories of Environmental Surfaces

- Clinical contact surfaces
  - High potential for direct contamination from spray or spatter or by contact with DHCP’s gloved hand
- Environmental surfaces
  - Do not come into contact with patients or devices
  - Limited risk of disease transmission
Clinical Contact Surfaces
Environmental Surfaces
Spills

- Small blood spills on clinical contact surfaces can be cleaned up by CODM staff / students
  - Cleaning materials and PPE are available in the clinics
    - Gloves, paper towels, bleach
- When to ask for help?
  - Spills on environmental surfaces, large spills, aspiration system failure
**TITLE:** Biological Spills

**POLICY:** This policy identifies responsibility and procedures for cleaning biological spills such as blood and saliva.

**PURPOSE:** To ensure that biological spills are cleaned and disinfected promptly as an infection control measure. This policy is in agreement with the Columbia University Policy – Biological Spills, Response and Clean-up (see REFERENCES).

**RESPONSIBILITIES:**

1. Clinicians are generally responsible for cleaning up biological spills that contact their equipment (e.g., dental chairs) and work surfaces. Facilities are generally responsible for cleaning up biological spills that are on the floor. Clinicians should call Facilities for service (212-305-4357). Facilities will then reach out to EH&S if a consultation on clean-up procedures is warranted. Departments are encouraged to contact Facilities to establish specific agreements regarding the scope of spill clean-up services.

2. Facilities are generally responsible for cleaning up biological spills that are in common areas, for example, on the hallway floor or in a bathroom. EH&S is available to consult on clean-up procedures and will assume responsibility for the spill if it is large.

**PROCEDURE:**

1. Materials for clean-up should be assembled in one place, and personnel should...
Personal Protective Equipment
Personal Protective Equipment

- A major component of Standard Precautions
- Protects the skin and mucous membranes from exposure to infectious materials in spray or spatter
- Should be removed when leaving treatment areas
Disposable gowns should also be changed daily or when they become visibly soiled. They can be disposed of in normal (non-red bag) waste.

Gowns are either front or rear-opening; NOT reversible.

Surgical masks and protective eyewear must be worn at all times when splatter, splash or aerosol producing procedures are being performed, or observations of procedures are being made.
Gloves

- Minimize the **two-way transmission** of microorganisms between patients and providers
- Reduce contamination of the hands of health care personnel by microbial flora that can be transmitted from one patient to another
- Are not a substitute for hand washing or sanitizing!
Special Hand Hygiene Considerations

- Use hand lotions to prevent skin dryness
- Consider compatibility of hand care products with gloves (e.g., mineral oils and petroleum bases may cause early glove failure)
- Keep fingernails short
- Avoid artificial nails
- Avoid hand jewelry that may tear gloves
Hand hygiene

- When removing gloves, no glove is 100% effective
- Change ASAP after visible contamination
- ‘Purell’ or soap and water?
- Technique is important
Risk of TB Transmission in Dentistry
Transmission of *Mycobacterium tuberculosis*

- Spread by droplet nuclei
- Immune system usually prevents spread
- Latent infection: Bacteria can remain alive in the lungs for many years (not transmissible)
Risk of TB Transmission in Dentistry

- Risk in dental settings is low
- Only one documented case of transmission
- Tuberculin skin test conversions among DHCP are rare
Preventing Transmission of TB in Dental Settings

- Baseline medical surveillance of DHCP (PPD/quantiferon)
- Assess patients for history of TB
- Defer elective dental treatment
- If patient must be treated:
  - DHCP should wear a respirator
  - Isolation; separate patient from others/mask
  - Refer to facility with proper TB infection control precautions
Questions?