Bloodborne Pathogens/Infection Control
Tuberculosis Awareness

CDM 4th years
May 26th 2015

Senior Biological Safety Officers
Christopher Aston Ph.D. ca2511@columbia.edu
Aderemi Dosunmu Ph.D.– ad3241@columbia.edu

Please
TURN OFF CELL PHONES
MUTE ALL ELECTRONICS
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

Mode

Entry

Source

Vaccination

PPE

Safe sharps handling

Disinfection
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.

At least 60 people have tested positive for hepatitis or HIV after visiting an Oklahoma dentist slammed by the state dental board for poor sterilization practices, the Tulsa Health Department said today.

Dr. W. Scott Harrington allegedly re-used needles, a practice that can contaminate ostensibly sterile drugs with dangerous diseases. He is also accused of using rusty equipment that was not properly cleaned.

More than 7,000 patients from Harrington’s Tulsa and Owasso clinics were sent letters in late March outlining the risk of infection and steps to take.
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
Average Risk of Bloodborne Virus Transmission after Needlestick:
Match the virus with the risk

<table>
<thead>
<tr>
<th>Source</th>
<th>A</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV</td>
<td></td>
<td>Up to 30 %</td>
</tr>
<tr>
<td>HCV</td>
<td></td>
<td>1.8% (0%-7% range)</td>
</tr>
<tr>
<td>HBV</td>
<td></td>
<td>0.3% (0.2%-0.5% range)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Source</th>
<th>B</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV</td>
<td></td>
<td>Up to 30 %</td>
</tr>
<tr>
<td>HCV</td>
<td></td>
<td>1.8% (0%-7% range)</td>
</tr>
<tr>
<td>HBV</td>
<td></td>
<td>0.3% (0.2%-0.5% range)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Source</th>
<th>C</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV</td>
<td></td>
<td>Up to 30 %</td>
</tr>
<tr>
<td>HCV</td>
<td></td>
<td>1.8% (0%-7% range)</td>
</tr>
<tr>
<td>HBV</td>
<td></td>
<td>0.3% (0.2%-0.5% range)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Source</th>
<th>D</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV</td>
<td></td>
<td>Up to 30 %</td>
</tr>
<tr>
<td>HCV</td>
<td></td>
<td>1.8% (0%-7% range)</td>
</tr>
<tr>
<td>HBV</td>
<td></td>
<td>0.3% (0.2%-0.5% range)</td>
</tr>
</tbody>
</table>
Average Risk of Bloodborne Virus Transmission after Needlestick:
Match the virus with the risk

1. A
2. B
3. C
4. D
Average Risk of Bloodborne Virus Transmission after Needlestick:

Match the virus with the risk

<table>
<thead>
<tr>
<th>Source</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV</td>
<td>Up to 30%</td>
</tr>
<tr>
<td>HCV</td>
<td>1.8% (0%-7% range)</td>
</tr>
<tr>
<td>HBV</td>
<td>0.3% (0.2%-0.5% range)</td>
</tr>
<tr>
<td></td>
<td>~0% when vaccinated</td>
</tr>
</tbody>
</table>

Which one of these probabilities can be reduced to zero?

~0% when vaccinated
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

• Historically, what percentage of occupational exposures reported to Student Health Services consisted of Dental Students?

A. 0 - 5%
B. 5 - 44%
C. 45 - 66%
D. 67-100%
Occupational Bloodborne Pathogen Exposure Evaluations at Columbia Student Health Services

• Historically, what percentage of occupational exposures reported to Student Health Services consisted of Dental Students?

A. 0 - 5%
B. 5 - 44%
C. 45 - 66%
D. 67-100%
### Occupational Bloodborne Pathogen Exposure Evaluations at Columbia Student Health Services

<table>
<thead>
<tr>
<th>Year</th>
<th>Dental School (% of total evaluations)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004-2005</td>
<td>66%</td>
</tr>
<tr>
<td>2007-2008</td>
<td>44%</td>
</tr>
<tr>
<td>2008-2009</td>
<td>62%</td>
</tr>
<tr>
<td>2009-2010</td>
<td>53%</td>
</tr>
</tbody>
</table>

- 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 Y. 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 (BBPs); and associations among their prior exposure, knowledge, perception of knowledge, and attitudes toward practice. Overall, 220 students (72.1 percent) responded to the survey, and 215 (70.5 percent) answered questions about exposures. The prevalence of HBVPE was 19.1 percent and was greater among clinical than preclinical students (p<0.01). Preventative 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 patients with HIV persist, these findings justify improving BBP education at U.S. dental schools.

Dr. Julie Myers is Clinical Postdoctoral Fellow, Division of Infectious Diseases, Columbia University Medical Center and Fellow, Department of Epidemiology, Mailman School of Public Health, Columbia University; Dr. Ronnie Myers is Associate Professor of Clinical Dentistry and Associate Dean for Clinical Affairs, College of Dental Medicine, Columbia University; Dr. Wheat is Assistant Professor of Clinical Medicine, Division of General Internal Medicine and Director, Student Health Services, Columbia University Medical Center; and Dr. Yin is Assistant Professor of Clinical Medicine, Division of Infectious Diseases, Columbia University Medical Center. Direct correspondence and requests for reprints to Dr. Julie E. Myers, Columbia University Medical Center, 630 West 168th Street, PH8-876, New York, NY 10032; 212-305-7183 phone; 212-305-7290 fax; jems2206@cumc.columbia.edu.

Keywords: health knowledge, health attitudes, hepatitis C, HIV/AIDS, infectious disease transmission, needlestick injuries, dental education, dental students

Submitted for publication 10/1/07; accepted 8/9/08

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.
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
Sharps Safety
Sharps Safety
Sharps Safety
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.
Sharps Safety – Scoop Method
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
Glass
Scalpel blades
Orthodontic wires
Irrigation syringes

Anything that would rip a red bag

Unused sterile sharps
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

The Root of His Evil

James M. Cain

Ace Books

A Surging Novel of Passion and Infidelity
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).
  - Do not incinerate extracted teeth

- 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
- Housekeeping surfaces
  - Do not come into contact with patients or devices
  - Limited risk of disease transmission
Clinical Contact Surfaces
Housekeeping 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 housekeeping surfaces, large spills, aspiration system failure
Spills

- **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

---

Columbia University Health Care

Approval: Clinical Care Committee

Section on Environmental Health and Safety

Columbia University College of Dental Medicine

Date: [blank]

Reviewed: March 2013

Reviewed: March 2014

Page: 34
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
Personal Protective Equipment

- 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?
Coming up…. Nitrous oxide
Next up…. X-Ray Safety