OSHA Training

Chicago Dental Society
Wednesday, October 28th, 2015

Presented by:
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Things We're Going Over:

- The History of Infection Control
- What's Changing and Happening in the Field!
- Bloodborne Pathogens
- Standard Precautions
Chain of Infection

Hand Hygiene

Personal Protective Equipment

Disinfection

Safety Syringes
Last - but not least!

- Dental Unit Waterlines
- Post Exposure Control and Follow-up
- The Fun Things that Offices Do!
- If Saliva Were Red!
Time Periods of Infection Control

1. Medieval Era
2. Early Modern Era
   1. Progressive
   2. Post WWII
Medieval Era

5th - 15th Centuries

Infectious Diseases

Infection Control Measures

Hospitals
Early Modern Era

- 1500 - 1800
- 1793 – Philadelphia
- Smallpox & Measles
- Hospitals
- I.C.
Progressive Era

- Mortality
- Children
- The “Biggys” in Infection Control
Progressive Era

1. Oliver Wendell Holmes
2. Ignaz Semmelweis
3. Joseph Lister
4. Louis Pasteur
5. Florence Nightingale
Post World War II

- Public Health
- Antibiotics
- Vaccinations?
- 1946 – The Office of Malaria Control
Promote prevention of disease transmission:

1. Providing evidenced based information – dental infection control

2. High levels of adoption of CDC infection control guidelines
Recommendations & Regulations

- 1986 - CDC Recommendations
- 1991 - BPS OSHA - Regulations
- 1993 - CDC Recommendations
- 2003 - CDC Recommendations
- 2015? - CDC Recommendations
How long........has this been goin’ on?

1. Clusters of Transmissions
2. Markers for HBV
3. Nurses Union
4. Transmission of HIV: Dentist > Patient
University of Kentucky Study - 1989

1. Pain
2. The needle
3. The drill
4. Cost
Kentucky Study - 1992

1. Pain

2. The Needle

3. FEAR OF AIDS

4. The Drill

5. Cost
United States

- 1.2 million Americans – chronically infected
- 50% of the cases are asymptomatic
- 2012: Chronic infections = 24,950
- 4,000 deaths/year
United States: History of HBV Incidence

1980 - 208,000
1985 - 287,000
1990 - 232,000
1995 - 113,000
2000 - 81,000
2005 - 53,000
2012 - 24,950
What’s Changing and Happening

- Dr. Harrington
- GHS – Pictographs
- The Infection Control Coordinator
4200 Patients tested:

90 – HCV

6 – HBV

4 – HIV
Rusty Equipment

Re-used Needles

Autoclave: no test – 6 years

12 allegations, 17 counts
Drug vial: 1993 expiration date – still being used

Morphine used in 2013......but no shipment since 2009
Count XVII – O.S. unlawful practices; it shall be unlawful for any person to aid and abet another person in violation of the State Dental Practice Act, specifically by allowing or authorizing dental assistants Terri (Waugh) Valega and Lisa Young to practice dentistry without a license in violation of 59 O.S. 328.49(B)(a).
The investigation revealed:

- Need for heightened awareness and training regarding infection control

- The OSDH would be supportive of requiring a record of infection control training and

- The OSDH advocates for mandatory CE in infection control for license renewal
Hazard Communication Std.

- 25 years
- Must provide information
- Has decreased injuries at work
Earth Summit

Global Harmonization Summit

Global Harmonization Project

Global Harmonization System

1992

2000

2015
The New Safety Data Sheets

1. Identification of the substance and supplier
2. Hazards Identification
3. Composition
4. First Aid Measures
5. Firefighting measures
6. Accidental Release Measures
7. Handling and Storage
8. Exposure Controls
9. Physical and Chemical Properties
10. Stability and Reactivity
11. Toxicological information
12. Ecological Information
13. Disposal Considerations
14. Transport information
15. Regulatory Information
16. Other Information
Safety Coordinator

- Plays well with others
- Potential hazards
- Corrective Action
- Safety manual
Infection Control Coordinator

- Greatly assists office safety program
- Open lines of communication about safety
- Voice opinions and ask question
- Facilitates change
Specifically....what do they do?

- Written Exposure Control Plan
- Provide safety training for new employees
- Temporary staff – primary employer
- Arrange annual update of OSHA’s BPS
ICC Duties: continued

- The cleaning crew
- Inform employees
- Post signs
- More huddles!
What else?

- Maintain products
- Ensure waste management, logs and signs up to date
- Staff taking x-rays?
Hepatitis: Inflammation of the liver
Causes of Inflammation:

- Parasites or Bacteria
- Alcohol
- Drugs
- Chemical Exposure
- Blood Transfusions
- Viruses
Non A, B, C, D, E, G, TT Hepatitis!
Hepatitis B

1. Immunity

2. Significant role – infection control

3. Versatile
Woodchucks
Humans
Ground squirrels
Other birds
Ducks
Hepatitis B

1. Acute hepatitis
2. Chronic non-progressive hepatitis
3. Chronic progressive ending in cirrhosis
4. Fulminant hepatitis with liver necrosis
5. Asymptomatic carrier
6. Has a role in carcinoma
HBV INFECTION OUTCOMES

- Asymptomatic or mild Symptoms (66%)
- Fulminant hepatitis (< 1%)
- Symptomatic (34%)

Asymptomatic or mild Symptoms:
- Total recovery with Immunity (90%)
- Carrier state (HBsAg-positive)
  - Chronic carrier (10%)
Chronic carrier (10%)

- Recovery
  - HBsAg-negative
- Asymptomatic
  - HBsAg-positive
- Chronic active hepatitis
  - HBsAg-positive
  - Cirrhosis
    - Liver Cancer
- Chronic hepatitis (HBsAg+)

Worldwide

- 2 Billion people infected
- 350 million carriers
- 600,000 people die each year
United States

- 1.2 million Americans – chronically infected
- 50% of the cases are asymptomatic
- 2008 – New infections = 38,000
- 4,000 deaths/year
TRANSMISSION

- Blood
- OBF
- Infected needles
- STD
- Mother > Infant
- Body Piercings
Signs & Symptoms

- Fatigue
- Abdominal pain
- Jaundice
- Loss of appetite
- Nausea & vomiting
- Joint pain
High Risk Groups

- Persons with multiple sex partners
- Homosexuals
- Infants < Mothers
- Immigrants
- IV Drug users
- Household contacts
- Health Care Workers
HEPATITIS C

“THE SILENT EPIDEMIC”
HEPATITIS C - HISTORY

- WWII
- 1960’s - liver problems
- 1970’s - a third kind of hepatitis
- 1989 - replicated part of virus
- 1992 - improved blood test
Your symptoms?

- Fever
- Abdominal Pain
- Malaise
- Jaundice
- Signs
Who’s at risk for HCV?

- Drug users
- Blood transfusion recipients
- Hemophylliacs
- Hemodialysis patients
At Risk........

- Persons with known exposures to HCV
- HIV-infected persons
- Infants
- Sexual Transmission
Tattoos & Body Piercings
HCW – HCV Occupational Risk

1. Splash in the Eye

2. Non-intact skin

3. Needle Stick = 1.8%
CLINICAL PROGRESSION – HCV

INITIAL INFECTION

- 85% of patients become chronic carriers
- 15% of patients mount a successful immune response

INFLAM.

- 20% develop cirrhosis
- 80% suffer chronic liver inflammation
LIVER FAILURE

25% develop end stage liver disease

75% of those that develop cirrhosis have no serious effects

cancer
transplant
death
Hepatitis C: Worldwide

- 150 million - chronically infected
- 350,000 deaths
- Curable?
- 3-4 million new infections each year
HCV in the United States

- 3.9 infected people
- 2.7 chronically infected carriers
- New cases decreasing
- 10,000 deaths/year - to triple
HIV

Aids at 30+ years
WORLDWIDE

- 34 million people infected
- 30 million have died
- 7,000 infections/day
- Women of reproductive age
In the U.S.

- 500,000 have died
- 1.1 million people live with the disease
HIV Disease

- CD4+ T cells
- 800 – 1200 CD4+ T cells
Symptoms

- Fever
- Rash
- Swollen glands
Achievements

- Medically supervised circumcision
- Needle and syringe program
- Daily dose – antiviral drug (MSM)
STANDARD PRECAUTIONS vs. UNIVERSAL PRECAUTIONS
## A Brief History

<table>
<thead>
<tr>
<th>Year</th>
<th>Infected Patients</th>
<th>Blood Precautions</th>
<th>Isolation Precautions</th>
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<tbody>
<tr>
<td>1970</td>
<td>Infected patients</td>
<td>Blood &amp; Body Subs. Isolation</td>
<td></td>
</tr>
<tr>
<td>1983</td>
<td>Infected patients</td>
<td></td>
<td>Universal Precautions</td>
</tr>
<tr>
<td>1985</td>
<td>all patients</td>
<td></td>
<td>Body Substance Isolation</td>
</tr>
<tr>
<td>1988</td>
<td>all patients</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1996</td>
<td>all patients</td>
<td></td>
<td>Standard Precaution</td>
</tr>
</tbody>
</table>
BSI = Hospitals

UP = Autopsies, dialysis, dentistry
OPIM

O = other
P = potentially
I = infectious
M = material
1. Amnionic fluid
2. Cerebrospinal fluid
3. Pericardial fluid
4. Peritoneal fluid
5. Pleural fluid
6. Semen
7. Synovial fluid
8. Vaginal fluid
1. All secretions
2. Mucous membranes
3. Non-intact skin
4. Any moist body substance
STANDARD PRECAUTIONS

1. Blood
2. All body fluids
3. Secretions
4. Excretions
5. Non-intact skin
6. Mucous membranes
Chain of Infection

- Pathogen
- Reservoir
- Mode of Transmission
- Entry
- Susceptible Host
Control Strategies & the Chain of Infection

Pathogen

1. Hand Antisepsis
2. Pre-procedural mouthrinse
3. Dental Unit Waterline Maintenance
Control Strategies & the Chain of Infection (cont’d)

Reservoir

1. Hand Antisepsis
2. Pre-procedural mouthrinse
3. Dental Unit Waterline Maintenance
Control Strategies & the Chain of Infection (cont’d)

Mode of Transmission

1. Hand Antisepsis
2. Surface Disinfection
3. Barriers
4. Safety Devices
Control Strategies & the Chain of Infection (cont’d)

Mode of Transmission

5. High Speed Evacuation
6. Use of Dental Dams
7. Instrument decontamination and sterilization
Control Strategies & the Chain of infection (cont’d)

Entry

1. Eye Protection
2. Protective Clothing
3. Mask
4. Heavy Duty Gloves
5. Engineering Controls
6. Sharps Containers
Control Strategies & the Chain of Infection (con’t)

Susceptible Host

1. Immunization

2. Pre- and post-exposure prophylaxis
Breaking the Chain:

1. Work Practice Controls
2. Engineering Controls
3. Immunization
4. Hand Hygiene
HANDS: Their use and abuse
Non-Compliance

- Health Care associated infections
- Multi-resistant organisms
- Outbreaks
ORGANISMS:

1. Resident
   - not highly virulent
   - can cause disease

2. Transient
   - recent contaminations
   - spread disease
Choices for hand asepsis

- Plain soap and water
- Antimicrobial soap and water
- Alcohol-based hand rub
Soap and water

- Suspends micro-organisms
- 10 – 15 seconds
- Rinse well
Antimicrobial Soap

- 10 – 15 seconds
- Low to medium antimicrobial
Surgical Scrubs

- 2 – 6 minutes
- Medium to high antimicrobial
Antimicrobial Products

- Chlorhexidine digluconate (CHG)
- Povidone iodine
- Para-chlorometaxylenol
- Triclosan
Chlorhexidine digluconate

- Broad spectrum
- Binds to the skin
- Concentrations
Povidone iodine

- Highly effective against gram+, TB, fungi, & viruses

- .75 – 1.0%
Para-chlorometaxylenol

- Broad spectrum

- Concentrations: 3-4%, also .5%
Triclosan

- Effective against gram+ and most gram-
- Less effective against pseudomonas aeruginosa
- Viruses = ?
The Ideal Surgical AND Non-surgical Hand Scrub:

- Substantially reduce microorganisms on intact skin
- Contain non-irritating antimicrobial preparation
- Have a broad spectrum of activity
- Be fast acting
- Have a persistent effect
WATERLESS
ANTIMICROBIAL
HAND GEL
ALCOHOL

- Concentrations
- Gram+ and Gram-
- TB
- Low Toxicity
- Fungi
- HBV & HIV
Personal Protective Equipment

PROTECTION FROM THE HAZARDS OF BEING A DENTAL HEALTH CARE WORKER
The Spray:

- Aerosols
- Spatter
- Droplets and Debri
Protective Clothing

- Changed daily
- Hospitals
Surface Disinfection
Considerations in choosing a disinfectant

1. EPA Registration Number

2. Ability to inactivate: HIV, HBV, & TB

3. Compatibility

4. Mixing, Storage, and Shelf Life
Considerations in choosing a disinfectant (cont’d)

5. Temperature

6. Cleans & Disinfects

7. Contact Time

8. Health hazards & Precautions
Efficacy of a Disinfectant

Spaulding Classification

VS.

EPA Registration
EPA: which organisms do they inactivate?

- *Mycobacterium tuberculosis*
- HIV-1
- HIV-1 & HBV
- TB, HIV-1, & HBV
- HCV
...an intermediate level disinfectant is one that has a tuberculocidal claim on its label
Phenols: in high concentration

- Penetrate the cell wall.

- Phenolics: also inactivate enzymes

- Most Common: Phenylphenol
  Benzochlorophenol
  Tertiary amylphenol
Quaternary Ammonium Compounds

- Clean or disinfect
- Gram- bacteria
- Killing cells
Alcohols

- Underrated
- Mode of action
- Drying
- Cavicide Spray
- Caviwipes
- Cetylcide II
- Clorox Disinfecting Spray
- GC Spray-Cide
- Lysol IC Disinfectant Spray
- Maxispray Plus
- Maxiwipe Germicidal Wipes
- Opti-cide-3 Spray
- PD Care Wipes
- Sanitex Plus Spray & wipes
Chlorines

- Mode of Action
- TB Kill Time
- Chlorox Germicidal Spray & Wipes
Sodium Bromide & Chlorine

- Sodium Dichloroisocyanurate
- TB Kill Time
- Microstat 2 (Septodont)
Citric Acid

- Lysol IC Ready to Use Disinfectant Cleaner
Iodophors

- Long time use
- Problems
- Mode of Action
- Biocide and Iodofive
Disinfectants in Dentistry - 2015

1. Dual Phenolics – water based
2. Dual Phenolics – alcohol based
3. Quaternary Ammonium Compounds
4. Chlorines
5. Sodium Bromide & chlorine
6. Accelerated Hydrogen Peroxide
2006 until now....... 

Accelerated Hydrogen Peroxide is in!

Who knows what’s out?

NEXT!
OPTIM 33TB

- 1 minute - bactericidal & virocidal
- 30 second sanitizer
- 5 minute TB claim
Toxicity Levels

- Phenols: “danger...hazard to humans...corrosive”

- Quats/Alcohols: “irritation, probable mucosal damage....”
OPTIM 33TB

No warnings required, except for the standard statement “keep out of the reach of children.”
SAFETY
SYRINGES
OSHA Update - 1999

- An annual review of Exposure Control Plan
- FDA device approval evidence
- Multiemployer worksites
- CDC guidelines on vaccinations and Post Exposure follow-up
- Effective training and education
- Engineering and Work Practice Controls
2000 - Needlestick Safety Act

1. Evaluate safer sharp devices
2. Employees involved in process
3. Sharps entry log
4. Update exposure Control Plan

5. Document:
   - consideration
   - non managerial staff
Percutaneous Injuries

- Risk of Transmission
- Incidence
1. Communicate the importance of prevention of PI’s to all DHCW’s
2. Office training in safe handling devices
3. Consider devices to reduce the risk of PI’s
4. Non-managerial DHCW should have input about the devices
Post Exposure Evaluation History

- OSHA - 1991
- PHS - 1991-2001
- CDC - 2003
OSHA – “must include these elements”

1. Documentation of route & circumstances

2. The source individual – Identification

3. Source blood tested ASAP

4. Employee & blood testing

5. PEP – done according to PHS guidelines
DENTAL UNIT WATER LINES
A Confusing Issue: 2000 - ??

- Absence of well-documented links to health problems in DHCW
- Lack of consensus of experts – solve the problem
- Absence of well-documented links to health problems in patients
No Confusion Today!

- DHCW?

- Let’s solve the problem!

- Patients and Legionnaires’ Disease
Italy: February 2011

- 82 year old female – intensive care
- Positive for Legionella pneumophila
- Microbiological testing of H2O
Dr. G. C. Blake

Dentist in Great Britain

1963

50 years – dozens of articles about DUWL
Clean Water

- Municipal water supplies - 200cfu/ml

- Military and CDC - 500cfu/ml
Pipes - 85% TFC bacteria

DUWL - 72% contaminated

JEFFREY WILLIAMS - 1993
Air/water 49,000 cfu/ml
High speeds 72,000 cfu/ml
Ultrasonics 19,000 cfu/ml

Jeffrey Williams
Causes of DUWL Contamination

1. Biology

2. Physics

3. Geometry
BIOLOGY

Surface Colonization
Start of DUWL Contamination

- Calcium Carbonate
- Large Organic molecules
- Bacteria
PHYSICS

Laminar Flow
Geometry

Surface to Volume Ratio
SURFACE COLONIZATION

LAMINAR FLOW

SURFACE TO VOLUME RATIO
Macro-molecules

Bacteria

Polysaccharide slime layer
Types of Bacteria

- Psuedomonas
- Mycobacteria
- Legionella
Pseudomonas

DENTAL
P. aeruginosa: and tofflemeir bands

Mycobacterium

MEDICAL
Six speices isolated from hospital water lines - URT infections
LEGIONELLA

-agents for Legionnaire’s & Pontiac Fever

-48 species: 18 assoc. with fatal pneumonia

-risk factors!
Risk Factors

- Advanced age
- Recent Travel - outside the home
- Exposure to whirlpool spas
- Smoking
- Malignancies
- Immune system disorders
LEGIONELLA

DENTAL

- DHCW’s have a high seroprevalence
  34% vs. 5%

- One fatal case of Legionella dumoffi pneumonia has been reported

- 2011: death of a patient in Italy
RECOMMENDATIONS FOR DENTAL UNIT WATER LINES
Recommendations & Regulations

- 1993 - CDC
- 1996 - ADA
- 1999 - Group of DUWL Experts
- 2003 - CDC
Recommendations & Regulations

- 1993 - CDC
- 1996 - ADA
- 1999 - Group of DUWL Experts
- 2003 - CDC
dental offices must disinfect DUWL’s on a regular basis.

monitor that disinfection process or at least the quality of water in your DUWL’s
What do other industries do?

1. Pigging
2. Steam Sterilization
3. Ethylene Oxide
4. Corrosive flushes
5. Ultraviolet radiation
The Ideal System

- Remove the biofilm
- Must not cause resistant bacteria
- Be non-toxic
- Non-corrosive to dental equipment
- Conform to water regulations
THINGS THAT WE CAN DO!

- Flushing
- Anti-retraction valves
- Filters
- Clean water systems
- Biocides and chemical disinfectants
Things that we can do - cont'd

- Peroxide, Ultraviolet Light, and Ozone
- AutoClavable systems
- Chlorination
- Hypochlorous Acid
What's available today?

- Filters
- Chemicals
- Water purifiers
- Monitoring
Filters

- Pall-Aquasafe
- Dentapure
Chemicals

- Dentacide
- ICX
- Lines
- Mint-A-Kleen
A-dec’s ICX

- Effervescing tablet
- Two sizes!
- Safe
- Three primary ingredients
Chemicals: cont’d

- Pure Tube
- Citrisil
- Sterilex Ultra
- Vista Clean
Water Purifiers

- Waterclave
- DentaPure
- VistaClear
- PureLine Systems
DentaPure

- 2013 Clinically recommended - Clinician’s Report
- 2014: Dr. John Flucke’s - Favorite New Products
- 2015: Top Waterline Product - Dental Advisor
- 2015: Best in Class Technology Award - The Pride Institute
Monitoring your DUWL

1. Dental Unit Water Quality Testing Services:
   - Loma Linda University (Dentistry) 909-558-0656
   - Microtest Laboratories 916-567-9808
   - Baylor College of Dentistry 214-828-8446
Monitoring your DUWL: cont’d

2. Dental Unit Quality Testing Products - office
   - Aquasafe Water Test Kit (Pall Medical Corp) 800-645-6578
   - HPC Total Count Sampler (Millipore) 800-645-5476
   - Disinfection Paddle Tester (Hach) 800-227-4224
   - Waterclave Dental Waterline Test Kit 913-312-5860
Post Exposure Evaluation and Follow-up
OCCUPATIONAL EXPOSURE

VS.

AN EXPOSURE INCIDENT
Post Exposure Evaluation History

- OSHA - 1991
- PHS - 1991-2001
- CDC - 2003
OSHA – “must include these elements”

1. Documentation of route & circumstances

2. The source individual – Identification

3. Source blood tested ASAP

4. Employee & blood testing

5. PEP – done according to PHS guidelines
Exposure incident

1. Wash or flush immediately
   - use soap and water
   - antiseptics?
   - squeeze it?
   - caustic agents
   - injection of antiseptics
2. DHCP – report exposure to ICC

3. ICC – initiates referral to HCP

4. ICC – completes (with DHCP) necessary reports.
Reports should include:

- Date and time of exposure
- Details of the procedure being performed
- Details of the exposure
Details of the Procedure

- Where exposure occurred
- How the exposure occurred
- Did it involve a sharp device
- Type of the device
- Brand of the device
- How and when during the handling
Details of the exposure

- Its severity
- Type of fluid or material
- Amount of fluid or material
- Depth of the wound, gauge of the needle
Do you need Post-exposure prophylaxis? (PEP)
REGIMENS

Basic:

4 weeks of zidovudine, 600mg/day in 2 or 3 doses AND lamivudine, 150mg twice a day

Expanded:

The basic regimen AND either indinavir 800mg every 8 hours or nelfinavir 750mg 3 times a day
Post Exposure Prophylaxis Recommendation

Exposure Code + HIV Status Code = PEP Recommendation
Post Exposure Follow-up

- Do DHCP know to report exposures
- Do you record date & time of exposure
- Do you record procedure performed
- Details of the exposure
- Details about the exposed source
- Is person immediately sent for medical evaluation
Important things to remember:

1. Employer = cost
2. Option for chemoprophylaxis
3. Pay attention to your injury
4. Go over EC, HIV SC, and PEP