

## **Getting a "Handle" on Infections**

OR

(Handwashing -- What else do we need?)

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## **Learning Outcomes**

- Define the acronym OSHA.
- Outline history of bloodborne pathogens and needlestick safety regulations.
- Identify workplace and engineering controls.
- Discuss ways to reduce the spread of "superbugs."
- Discuss and describe handwashing and its benefits.
- Discuss cleaning and disinfection and apply these principles to phlebotomy.

## **Part I**

### **"Sharp" Guidance for Needles and PPE**

## Who Says We MUST to Be Safe in the Workplace?

- OSHA --Occupational Safety and Health Administration
  - Created in 1970
  - By Occupational Safety and Health Act of 1970
  - Goal: Reduce injuries and illness on the job in America
  - Design: Assist employers and employees with safety in the work environment

## OSHA's Strategies

- Strong, fair and effective enforcement
- Outreach, education, and compliance assistance
- Partnerships, alliances and other cooperative and voluntary programs

## Safety Aspects Discussed in This Webinar

- 1. Bloodborne Pathogen Protection
- 2. Preventing the Spread of "Superbugs."

## History of Bloodborne Pathogen Regulations

- **Bloodborne Pathogens Standard (BPS)** -- First published in 1991 (*Title 29 of the Code of Federal Regulations (CFR) 1910.1030.*)
  1. Mandates to protect workers from needlestick and other sharps-related injuries.
  2. Extensive coverage to reduce exposure to blood and other potentially infectious materials in the workplace.
  3. The original intent was to reduce exposure to the human immunodeficiency virus (HIV), the hepatitis B virus (HBV) and the hepatitis C virus (HCV).

## History (cont'd)

- **Needlestick Safety Act in 2001** -- (Section (d)(2)(vii) of the BPS)
- Developed as a result of OSHA's determination that safety devices would reduce the number of needlesticks
- Prohibition of removal of contaminated needles from reusable blood tube holders

## Bloodborne Pathogen Standard

- Exposure Control Plan
- Use of Engineering Controls
- Provide PPE
- Make Hepatitis B Vaccination Available
- Provide Post Exposure Follow up
- Use Labels and Signs to Communicate Hazards
- Provide Information and Training To Employees
- Maintain Employee Medical and Training Records

## Work Practice Controls

### Definition

“Specific practices that should either be utilized or avoided in the workplace”

## Examples

- Avoid unnecessary use of needles and other sharps
- Do not leave exposed, contaminated sharps in the work area
- Place sharps disposal containers near the work area
- Do not recap needles
- Activate safety mechanisms immediately after use.
- Do not move from one work area to another with an exposed, contaminated sharp
- Dispose of all sharps in appropriate containers immediately after use

## Engineering Controls

### Definition

Equipment, devices, or instruments designed to reduce or remove the likelihood of exposure. The equipment, devices, and instruments do so by substitution of ENGINEERED items.  
(e.g. Safety Needles)

## Engineering Control Specifics

- OSHA Mandated
- Evaluate Each Task in the Workplace
- Review Available Devices
- Re-assess Devices including any New Ones Annually
- Involve Employees in Device Evaluation
- Document
- Refer to: [www.osha.gov](http://www.osha.gov)

## Engineered Sharps Protection

- Formally: Sharp with Engineered Sharps Injury Protection (SESIP)
- OSHA mandates: Attached to a blood tube holder and whole device discarded
- Features
  - Single-handed activation
  - Push-button activation
  - Complete locking mechanism

## Venipuncture Needle



(Courtesy and © Becton, Dickinson and Company)

## Winged Collection Devices



(Courtesy and © Becton, Dickinson and Company)

## Microcollection Devices



(Courtesy and © Becton, Dickinson and Company)

## Sharps Containers

- Puncture Resistant
- Closable
- Leak-Proof
- Appropriately labeled and color-coded
- Sufficient opening for SESIP in use
- Conveniently placed at each location
- Capable of containing entire blood tube holder and needle assembly



Covidien SharpStar™ Container

## Personal Protective Equipment

- Purpose: Protection of Exposure to Pathogens
  - Type of Exposure: Splash/Spray; Touch; Puncture possibility
- Provision: Without Cost by Employer
- Availability: All PPE Available at All Locations
- Selection: Varies with assignment and risk of occupational exposure

## Type of PPE

- Gloves -- OSHA requires for phlebotomy
- Lab Coats
- Face and Eye Protection -- Masks, Goggles, Face Shields
- Masks and Respirators
  - Protect nose and mouth from splashes or sprays
  - N95 filters small spray aerosols that may contain viruses

## Gloves

- A “handy” form of protection
- Barrier protection
- Wear when possible exposure to blood and body fluids is expected
- Remove by proper technique
- Wash hands after removal

## Light bulbs on Old Issues



## Guidelines for Glove Use

### (Summary of Common Sense)

- Work practices proceed from "clean to dirty"
- Do not touch exposed skin or adjust PPE with contaminated gloves
- Do not touch environmental surfaces during patient care
- Change gloves between patients
- Change gloves if torn or otherwise compromised
- Change gloves if heavily soiled
- Discard used gloves in appropriate receptacle

## Lab Coats

- Water repellency of the fabric
- Resistance of the fabric to the penetration of water under pressure (Suter rating)
- Air permeability of the fabric
- Fabric strength
- Anti-static properties

## Choice of PPE

- Evaluate and assess with each patient encounter
- Type of clinical interaction with the patient determines a decision on specific PPE use
- Specific applications include:
  - **Gloves** -- touching mucus membranes, non-intact skin, contaminated items or any blood or body fluids.
  - **Gowns** -- potential for contact of clothing or skin with blood or body fluids is possible.
  - **Face Protection** -- when splashes or sprays of blood, body fluids, secretion or excretions may be generated.
- Contact precautions, droplet precautions or airborne infection isolation require more extensive use of PPE

## Compliance with PPE

- Effectiveness of PPE is reflected in compliance.
- Effectiveness of PPE is reflected with on-going use of appropriate PPE.
- Factors impacting on use of PPE
  - Staffing levels
  - Availability
  - Perceived risk
  - Knowledge
  - Loss of Dexterity

## Improving PPE Compliance

- Education
- Positive Feedback
- Availability

## Hand Hygiene

- Use in combination with gloves. Hand hygiene includes:
  - Wash hands thoroughly or use alcohol-based hand rub
  - Perform immediately after removing PPE
  - Perform between each patient contact

### Hand-washing technique with soap and water



## Part II

## “Cleaning” Up Bacterial Infections

### How Clean Should it Be?

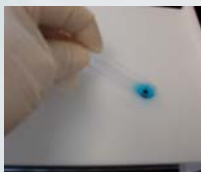
- Cleaning -- Removal of gross contamination
- Disinfection -- Process that kills germs
- Sterilization -- Destruction of all forms of life including bacterial spores

### Is Cleaning Enough?

- Cleaning -- the removal of gross contamination
- Performed prior to disinfection or sterilization

### What Should We Clean?

Surfaces  
&  
People



### Determination of Level of Disinfection Required

- Critical Materials: Materials that invade sterile tissues or enter the vascular system. Require sterilization.
- Semicritical Materials: Materials that come into contact with mucous membranes. Sterilization not required. High-level disinfection required.
- Noncritical Materials: Materials that require low to intermediate-level disinfection.

## Levels of Disinfectants

- High Level Disinfectant -- active against bacterial spores (sporicidal)
- Intermediate Level Disinfectant -- active against tuberculosis organisms (tuberculocidal)
- Low Level Disinfectant -- not as effective as either of the above
- Antiseptic -- disinfectants used on human tissues

## Skin Disinfecting

- Vital for Phlebotomy -- especially blood cultures
- Low Level Disinfectants
- Two Major Disinfectant Solutions
  - Alcohol -- 50-70%; work by denaturing proteins and making lipids soluble
  - Iodophors -- iodine; 2% in 70% alcohol; inactivates proteins

## Surface Disinfecting

- Review effectiveness of compound
- Determine need (require spore killing?)
- Follow specifics for contact time
- Specific examples
  - Phenols -- Lysol
  - Quaternary Ammonium Compounds -- benzalkonium chloride
  - Chlorine Compounds -- bleach

## Why Clean and Disinfect?



- S
- U
- P
- E
- R
- BUGs



## Superbugs

- Have developed resistance to multiple antibiotics
  - MRSA
  - VRE
  - Clostridium difficile (C. diff)

## MRSA

- Methicillin resistant *Staphylococcus aureus*
- Carriers of MRSA ↑ in number
- Identifying and isolating carriers = expensive venture for the healthcare industry
- A carrier of MRSA may harbor the organism for months or years

## Reservoir Sites

- Nares (nasal passages)
- Axillae (underarms)
- Perineum (near the rectum)
- Hands or arms

## Individuals Likely to Be Colonized

- Recipients of antimicrobial therapy who become colonized in the GI tract
- Ostomy sites
- Wounds and pressure ulcers
- Sputum
- Patients with indwelling catheters, central lines
- Ventilated patients

## Identify Carriers

- Nasal swabs
- Culture
- Polymerase Chain Reaction (PCR)
- 1.5 hours for a STAT test
- High Risk Populations
  - Admits to ICU
  - Transfers
  - Patients with skin and soft tissue infection
  - Previously infected individuals

## Where Did You Get It?

- HAMRSA -- hospital acquired MRSA
  - Treat with Vancomycin
- CAMRSA -- community acquired MRSA
  - Trimethylsulfa or erythromycin and intranasal mucoprin

## Vancomycin Resistant Enterococcus

- VRE
- Screen with rectal swabs
- Infected individuals housed with contact precautions
- Properly disinfect bathrooms and hospital rooms

## *Clostridium difficile*

- Normal flora of the bowel
- Antibiotic use may upset the bacterial balance
- Symptoms= watery diarrhea, abdominal pain and fever
- Propagates with vegetative forms/spores
- Drying & application of most disinfectants does not affect spores

## Risk Factors

- Hospitalized patients or patients in long-term care facilities
- Age greater than 65 years
- Severe underlying illness
- Nasogastric intubation
- Antiulcer medications
- Antibiotic therapy=preemptive risk factor

## Where Might We Find 'Em?

- **EVERYWHERE**
- Surfaces
- Clothing
- Hands
- Items

## Do They Get Better With Age ?

(Like a Good Wine)

- **No**
- However, they may live to be a ripe old age
- Factors that affect how long they are viable
  - Temperature
  - Humidity
  - Amount of contamination (Less is not more)
  - Type of surface material

## What Can We Do To Reduce the Spread?

Is Handwashing the **ONLY** Step Required?

Yes and No

Here Are Some  
Suggestions .....

### Be Mr. or Ms. Clean

- Surface Cleaning
  - Important in Patient Care Areas
  - Densely Contaminated Surfaces Most Problematic
- Critical Surfaces May Include
  - handles
  - patient charts
  - bed frames
  - computer keyboards
  - control panels

### Goals for Surface Cleaning

- Follow directions for the specific cleaning agent
- Allow for appropriate contact time
- Disinfect frequent-touch surfaces more frequently
- Clean up spills promptly
- Near-patient surfaces and frequent-touch environmental surfaces should be cleaned regularly and at discharge
- Practice hand hygiene at all times

## Is There a Learning Curve?

- Educate
- Educate
- Educate

## Role of Traveling Personnel

- Peripatetic healthcare workers -- Those that travel from place to place
- Increased potential for spreading superbugs and causing nosocomial infections
- Influential factors:
  - Hygiene
  - Incidence of direct contact
  - Compliance with control measures

## Where Else Should We Look?

- Tourniquets
- Blood Pressure Cuffs
- Stethoscopes
- Computer Keyboards and Mice (not like Mickey and Minnie)
- Jewelry
- Miscellaneous Objects

## How Do We Prevent Spread from These Fomites?

- Hand Hygiene
  - Prevents contamination of items previously listed
- Surface Cleaning
  - Clean surfaces with appropriate wipes OR
  - Alcohol gel



## Let's Sum it Up

- Two Types of Infection Concerns
  - Bloodborne Pathogens (BBP)
  - Hand to Hand Spread
- BBP
  - Be aware of sharps use and disposal
- Hand to Hand Combat
  - Know your bugs
  - Surfaces
  - Objects

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## Questions?

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The End

Be Back Soon  
Couldn't resist  
taking a  
Disney Vacation