INFECTION PREVENTION FOR EMPLOYEES

Infection Prevention & Control
Boot Camp For Long-Term Care Facility
Infection Preventionists

OBJECTIVES

At the conclusion of this presentation, participants will be able to:

- Review essential activities of employee health programs relating to infection prevention and control
- Identify three common infectious diseases important to an effective Employee Health program
- Understand laboratory testing for tuberculosis (TB) screening
- Discuss the components of a Bloodborne Pathogen (BBP) exposure control plan
- Describe precautions for prevention of contracting bloodborne diseases and tuberculosis
- Discuss the importance of immunizations for employees
- Describe steps taken in an employee infectious disease exposure follow-up
- Understand when employee work restrictions should be implemented

TERMINOLOGY AND DEFINITIONS

- PEP
- EIA
- PCR
- TST
- PPD
- ATD
- BCG

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Infection Prevention For Employees

Employee Health & Wellness

- Need to recognize the role of the healthcare worker (HCW)
  - HCW may be both carrier of infection and/or recipient of infection from the resident
- Our goal is to keep both residents and HCWs safe and free of infection[1]

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1. State Operations Manual Appendix PP-Guidance to Surveyors for Long Term Care Facilities. https://www.cms.gov/Regulations-and-Guidance/Guidance/Transmittals/Downloads/R117SOMA.PDF.

Employee Health

- Physical
- Tuberculosis (TB) screening-2 step PPD on hire[2]
- Immunization evaluation[2]
  - Hepatitis B vaccinations
  - Influenza
  - Measles, Mumps, Rubella (MMR)
  - Varicella
  - Tetanus, Diphtheria, Pertussis (Tdap)
- Respirator fit-testing[3]
- Drug screening (optional)

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2. Guidelines for Prevention and control of tuberculosis in California Long Term Health Care Facilities. 2013. https://www.cdph.ca.gov/programs/tb/pr/documents/guidelinesprevent-control-TB-California-LT-HCF-2013.pdf

3. California Code of Regulations, Title 8, section 5199, Aerosol Transmissible Diseases. http://www.dir.ca.gov/Title8/5199.html

Employee Health (continued)

- Annually:
  - TB screening[2]
  - Respirator fit-testing[3]
  - Hepatitis B Vaccine education and offering vaccine
  - Vaccines to offer and/or assess immunity[3]:
    - Annual influenza

EMPLOYEE HEALTH (continued)

- Counseling
  - Education to prevent exposure to infectious disease
  - Work restrictions
  - Exposure risk
- Wellness promotion
  - BBP injury prevention
  - Ergonomic worksite evaluation
- Infectious disease exposure investigation
  - Post-exposure management (e.g., TB or scabies)

BLOODBORNE PATHOGENS (BBP)[4]

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

These infections have the potential for resulting in acute or chronic infections

4. United States Department of Labor, Occupational Exposure to Bloodborne Pathogens. https://www.osha.gov/pls/oshaweb/owasrch.search_document?p_table=PREAMBLES&p_id=806

HOW ARE THE BBP TRANSMITTED?

- Exposure to blood or other potentially infectious materials (OPIM) of an infected person (by percutaneous or mucosal exposure)[4]
- Sharp injury
- Sexual contact
- Pregnant mother to unborn baby
- Intravenous drug users who share needles
  - Example of High-Risk fluids[5]: blood, semen, vaginal secretions
  - Example of Low-Risk body fluids[5]: sweat, tears, saliva

5. Guidelines for the Management of Occupational Exposure to HBV, HCV, and HIV and Recommendations for Post exposure Prophylaxis. http://www.who.int/occupational_health/activities/Prevexpo1.pdf

WHAT IS THE RISK OF DISEASE?

- HIV
  - Needlestick: 0.3%[5]
  - Splash: less than 0.09%[6]
  - Non-intact skin: <0.1%
- Hepatitis B
  - Needlestick: up to 30%[5]
- Hepatitis C
  - Needlestick: up to 10%[6]

6. Beltrami EM, Williams IT, et al. Risk and management of blood-borne infections in healthcare workers. Clinical Microbiology Review 2000 July;13 (3):385-407

BBP POST-EXPOSURE MANAGEMENT: ASSESS RISK[4]

- Type of exposure
  - Percutaneous
  - Mucus membrane
  - Non-intact skin
  - Depth, quantity, and duration of exposure
- Body Fluid
  - Blood
  - OPIM
- Assess viral load of source
  - Lab testing for Hepatitis panel (HCV, antibody, Hepatitis B surface antigen HBsAG) and HIV screen (HIV antibody test)
- If source unknown, assess epidemiological & clinical evidence to determine post exposure treatment

WHAT TO DO IF YOU ARE EXPOSED[5]

- Flush eyes or mucus membranes with large amount of water for 15-20 minutes[4]
- Wash exposed skin with soap & water[4]
- Report exposure to supervisor immediately
  - Fill out incident report
  - If significant exposure, get emergency treatment immediately
  - Get medical evaluation[4]
    - Baseline testing of exposed person
    - Offer employee treatment as needed
    - Test source resident immediately
    - Offer Counseling

BBP POST-EXPOSURE MANAGEMENT: TESTING[5]

Immediate Testing:

SOURCE (IF AVAILABLE)	EMPLOYEE
Rapid HIV	Rapid HIV
HBsAg	HBsAg
HBcAB (hepatitis B core antibodies)	HBcAB
HBsAB (hepatitis B surface antibodies)	HBsAB
Hepatitis C Antibody	Hepatitis C Antibody
	Hepatic Function Panel

RECOMMENDED POST-EXPOSURE MANAGEMENT FOR HBV EXPOSURE[5]

VACCINATION & ANTIBODY (AB) STATUS OF EXPOSED PERSON	TREATMENT FOR EMPLOYEE WHEN SOURCE IS HBSAG POSITIVE
Unvaccinated	Hepatitis B immunoglobulin (HBIG) given once & then initiate HBV vaccine series
Previously vaccinated 1. Known responder 2. Known Non-responder 3. Antibody response unknown	1. No Treatment 2. HBIG given once & initiate re-vaccination or give HBIG x2 3. Test exposed person for Hepatitis B surface antibodies (anti-HBs) • If adequate, no treatment • If inadequate HBIG given once & give vaccine booster

POST-EXPOSURE *PROPHYLAXIS* FOR HEPATITIS B: SOURCE HBSAG NEGATIVE OR UNKNOWN[5]

VACCINATION & ANTIBODY STATUS OF EXPOSED EMPLOYEE[6]	TREATMENT FOR EMPLOYEE WHEN SOURCE HBSAG NEGATIVE OR STATUS UNKNOWN[6]
Unvaccinated	Initiate Hepatitis B vaccine series
Previously vaccinated 1. Known responder 2. Known non-responder 3. Antibody response unknown	1. No treatment 2. If known high risk source, treat as if source were HBsAg positive 3. Test exposed person for anti-HBs • If adequate, no treatment • If inadequate, vaccine booster and re-check titer in 1-2 months

POST-EXPOSURE PROPHYLAXIS FOR HEPATITIS C[5]

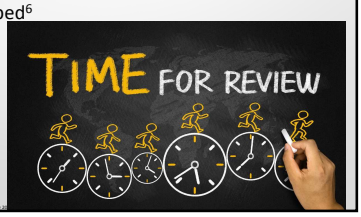
- Prompt wound care or flushing of mucous membranes
- Prophylaxis not recommended
  - Immunoglobulin not effective
  - No data to support use of antivirals (e.g. interferon) for ***preventing infection***; may be effective only with established infection.
- Consider expert consultation

POST-EXPOSURE PROPHYLAXIS (PEP) FOR HIV[5]

- If indicated, start PEP as soon as possible after exposure
  - Regard as an urgent medical concern; hours rather than days
  - PEP consists of 2-3 antiretroviral medications (to be effective must be taken within 72 hours of exposure)
  - Ensure complete blood count (CBC), liver panel & pregnancy test done prior to initiation of meds
  - Provide counseling about potential side effects of medications
- Interval after which PEP is no longer effective is unknown
  - Initiating days or weeks after exposure might be considered for higher risk exposures

RE-EVALUATION OF HIV-EXPOSED PERSON

- Consider re-evaluating the person exposed within 72 hours[5]
  - Additional information about source case may become available
  - If source case has a negative HIV antibody test, PEP may be stopped[6]



WHEN PEP MAY NOT BE WARRANTED

- When intact skin has come in contact with blood or OPIM[5]
- After exposure to unknown source in populations where HIV prevalence is low[5]
- Low risk exposure to unknown source[5]

FOLLOW-UP HIV TESTING OF EXPOSED PERSON

- If source case is HIV positive, test again in 6 weeks, then again in 3 months and 6 months
  - Enzyme Immuno-assay test (EIA)[5]

BLOODBORNE DISEASE PREVENTION[4,6]

- Standard Precautions- mandatory[4,6]
- HBV vaccination series offered to all staff with potential for blood exposure
  - 1-2 months after completion of 3 vaccine series, antibody titer test to be performed[4]
- Hierarchy of prevention methods used[4]:
  - Engineering controls—needleless devices
  - Work practice controls—no recapping
  - Appropriate cleaning, linen handling & sharps disposal

BLOODBORNE DISEASE PREVENTION (continued)

- Post-exposure prophylaxis (PEP) immediately available[4,6]
- BBP training required annually and as needed[4]
- All facilities must have a BBP Exposure Control Plan[4,6]

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TUBERCULOSIS[2]

- Pulmonary TB is a serious chronic illness, caused by *Mycobacterium tuberculosis* which can be fatal if untreated
- Highly communicable and transmitted by airborne route
  - Droplets can stay afloat for hours & travel on air currents[8]
  - Patient contact not required for exposure
- One third of the world population is infected with TB[9]
- In 2014, there were 2147 cases of TB identified in California[8]
- In 2014, there were 62 cases of TB diagnosed in Long-term Care Facilities in CA with more than 31% of all cases reported in persons 65 years of age and older[8]

8. Tuberculosis Disease Data. https://www.cdph.ca.gov/data/statistics/Pages/TuberculosisDiseaseData.aspx ;
9. Data and Statistics. CDC. http://www.cdc.gov/tb/statistics

MILIARY TUBERCULOSIS (MT)

- This is a widespread dissemination of *Mycobacterium tuberculosis*[10]
- Can occur in other organs (rare, 5%) throughout the body (lungs, liver, spleen, brain)[10]
- Up to 25% of patients with MT may have meningeal involvement[10]
- Fatal if left undetected or untreated[10]

10.LessnauKD. Miliary tuberculosis. http://emedicine.medscape.com/article/221377-overview.

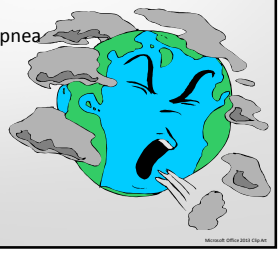
TB DEFINITIONS[11]

- **Latent TB Infection(LTBI)**
  - One who has been exposed to TB bacteria
  - No symptoms
  - TB skin test positive- (purified protein derivative) (PPD) or TB blood test positive
  - Chest x-ray negative
  - Not communicable
- **Active TB**
  - One who has been exposed to active TB case
  - Manifests respiratory signs/symptoms of TB infection
  - PPD test positive
  - Acid- fast smears positive
  - Abnormal chest x-ray
  - Is communicable!

11. *Tuberculosis*: Fact Sheet. http://www.cdc.gov/tb/publications/factsheets/general/ltbiandactivetb.htm.

CLINICAL SYMPTOMS OF ACTIVE PULMONARY TUBERCULOSIS[11]

- Persistent cough that lingers on even after antibiotic treatment
- Hemoptysis
- Shortness of breath or dyspnea
- Fever
- Night sweats
- Fatigue
- Unexplained weight loss



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TB SCREENING & ANNUAL TESTING[11]

- Chest x-ray is not a mechanism for screening for latent TB
- A tuberculin skin test (TST), called PPD, identifies those who are infected (aka LTBI)
- CDC and California Department of Health (CDPH) also include the Interferon-Gamma Release Assays (IGRA) such as Quantiferon-Gold TB blood test as an acceptable method to screen for LTBI
- When you screen for TB, you are looking for those who are infected with the TB bacillus not those with active disease

TB SCREENING[11]

- On Hire
  - 2-step PPD skin test
  - TB symptom review questionnaire
  - If **documented** positive on prior PPD, chest x-ray may be done if one or more positive answers on questionnaire
  - Those who have had BCG (Bacillus Calmette-Guerin) vaccine are not exempt from PPD unless documented proof of prior positive PPD test[2]
- Annual
  - One step PPD on anniversary of hire date
  - If positive on prior PPD, TB symptom review questionnaire becomes the screening method
  - Chest X-ray is not required unless sign or symptom present or positive answers to TB questionnaire

ADDITIONAL SCREENING INFORMATION

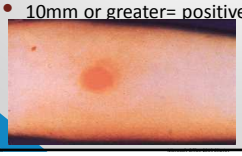
- If documentation of a previous PPD which was performed within past 12 months prior to employment is available, (with results recorded in millimeters) only a single PPD will be needed[2]
- According to CDPH, employees who previously received BCG vaccine are NOT exempt from the PPD screening test[2]
- Healthcare workers (HCW) who convert to positive on their PPD should be reported to local public health department and recorded on the OSHA 300 log[2]

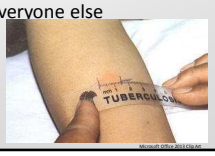
IGRA SCREENING FOR TB[2]

- Pro
  - More sensitive than PPD skin test
  - Does not react with other strains of mycobacterium
  - Can be used to confirm a positive PPD skin test
  - Only requires one test vs. a 2-step with the PPD
- Con
  - Cost
  - This is a blood test requiring phlebotomist
  - Requires special kit to do the test

INTERPRETATION OF PPD[2]

- Test to be read 48-72 hours after given
- Measure and document results by number of millimeters (not positive or negative) of induration
- Measure induration, not swelling or redness
- 5mm or greater= positive for those recently exposed to active TB care or those who are immunocompromised (e.g. HIV)
- 10mm or greater= positive for everyone else





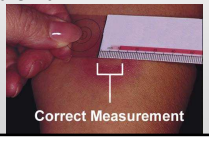
TB RISK ASSESSMENT

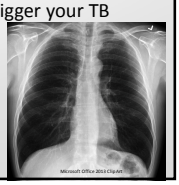
2-step PPD performed on hire[2]

- Must have a negative reading on the first PPD before HCW can begin work
- Second step to be performed 1-3 weeks after first test
- Have a small group of people responsible for reading results (consistency)
- Read results 48-72 hours after administration of test
- Measure only induration (a hard knot under the skin, not swelling or redness)

WHAT TO DO IF PPD IS POSITIVE?

- If HCW has a positive PPD reading, remove from work[2]
- Refer to physician[2]
  - Chest X-ray
  - Acid-fast sputum stains
- Report to local public health (PH) department[2]
  - PH will advise you if you need to trigger your TB Exposure Plan





RESIDENT TB MANAGEMENT

- Most LTC are not set up to care for TB residents.
  - Requires Airborne Infection Isolation (AII) [2,12]
  - Requires room with negative pressure air flow[12]
  - Requires room air exchange of 6-12 per hour[2,12]
- If TB suspected, you have 1 working day to discharge resident to ACH[2]
- Place resident in single room with door closed[2,12]

12. Core Curriculum on Tuberculosis: What the Clinician Should Know. https://www.cdc.gov/tb/education/corecurr/pdf/chapter7.pdf

RESIDENT TB MANAGEMENT (continued)

- Droplet Isolation (if no airborne isolation room available) [12]
- Use N95 respirator when entering room[12]
  - Keep door to resident's room closed until resident can be transferred to an appropriate facility with AII[12]
  - Provide resident with receptacle to dispose of tissues[12]
  - Instruct resident on cough etiquette[12]
  - As resident is leaving facility place mask on resident[12]

TB PREVENTION FOR HCW[12]

- Risk reduction strategies include:
  - Standard Precautions
    - Routinely wear mask if resident is coughing or has uncontained respiratory secretions
  - Cough etiquette for residents, visitors, and HCW
  - TB screening upon hire and annually
  - Comply with Aerosol Transmissible Disease Standard (ATD)

AEROSOL TRANSMISSIBLE DISEASE (ATD) PROGRAM[15]

- Respiratory Hygiene /Cough Etiquette
- Tuberculosis screening for HCW and residents
- Respiratory Protection Plan
  - Fit Testing for N95 respirators
- ATD Exposure Control Program Plan
- Vaccination Program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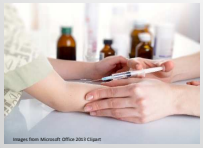
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15.California Code of Regulations, Title 8,Section 5199. Aerosol Transmissible Diseases. www.dir.ca.gov/title8/5199.html

AEROSOL TRANSMISSIBLE DISEASE (ATD)[3]

- Title 8, California Code of Regulations, Section 5199
- ATD program requires facilities to have written procedures for complying with the regulation
- Scope: Preventing and protecting employees from occupational exposures to known and novel pathogens that may cause illnesses through aerosol generation (e.g., TB)

ATD PROGRAM[3]

- Designate an administrator of program
- Policy for ATD program with designated employees (from various departments) who will need to be fit-tested for N95 respirators
- Medical clearance required before fit-testing can be performed


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ATD PROGRAM (continued)

- Have several different models of respirators available for testing[3]
- Fit-testing will need to be repeated annually or when physical facial changes occur on employee (e.g. weight loss or extensive dental work)[3]
- For employees with facial hair, a powered air-purifying respirator (PAPR) will be needed[3]

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ATD PROGRAM (continued)

- Have several different kinds of respirators available for testing[3]
- Fit-testing will need to be repeated annually or when physical facial changes occur on employee (weight loss)[3]

Images from Microsoft Office 2013 Clip Art

ATD PROGRAM (continued)

- Facilities must have a Respiratory Protection Program[3] (RPP)
  - Respiratory/Cough Etiquette
  - Providing masks and tissues for those people with a cough
  - If suspected cases are identified in your facility who might require airborne isolation, refer to appropriate facility

VACCINATIONS FOR EMPLOYEES

- According to Section 5199 of Title 8[3]:
  - All employees with potential occupational exposure to ATDs will be offered appropriate vaccinations at no cost to the employee upon hire or 10 working days prior to performing tasks determined to be at risk
    - Vaccinations are to be given to employee at a time and place convenient to the employee
    - Facilities to cover the cost of employee vaccinations

VACCINATIONS (continued)

VACCINE[3]	SCHEDULE[3]
Influenza	One dose annually
Measles	Two doses
Mumps	Two doses
Rubella	One dose
Tdap (tetanus, diphtheria, pertussis	One dose, booster as recommended
Varicella zoster (VZV)	Two doses

EMPLOYEE EXPOSURE CONTACT LIST

- Employee exposure contact list example
- Employee exposure follow-up

Infection Prevention For Employees