Preventing Employee Infections

Basics of Infection Prevention
2-Day Mini-Course
2014

Objectives

- Review essential activities of Employee Health (EH) programs.
- Describe communicable disease screening and immunization guidance.
- Describe prevention of bloodborne & airborne diseases.
- Review priorities in post exposure management

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Employee Health and Wellness

- Education of infection prevention would not be complete without recognizing the role of health care workers
- Health care workers may be both
  - Carriers of infections to patients
  - Recipients of infections from patients

The most crucial aspect is to keep both patients and health care workers safe and infection free

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Employee Health Activities

- Pre-employment
  - Communicable disease screening – immunity by titer or vaccine history
  - Physical
  - Drug screening
  - Latex allergy screening
  - TB screening
  - Respirator fit-testing
- Annual
  - TB testing
  - Vaccines
    - Annual influenza
    - Tdap
  - Respirator Fit testing
- Infectious disease exposure investigations
- Post-exposure management
- Counseling
  - Infectious disease exposure risk
  - Work restrictions
  - Latex allergies
- Wellness Promotion
  - Ergonomic worksite evaluation
  - Smoking cessation
  - BP checks
  - Bloodborne pathogen injury prevention

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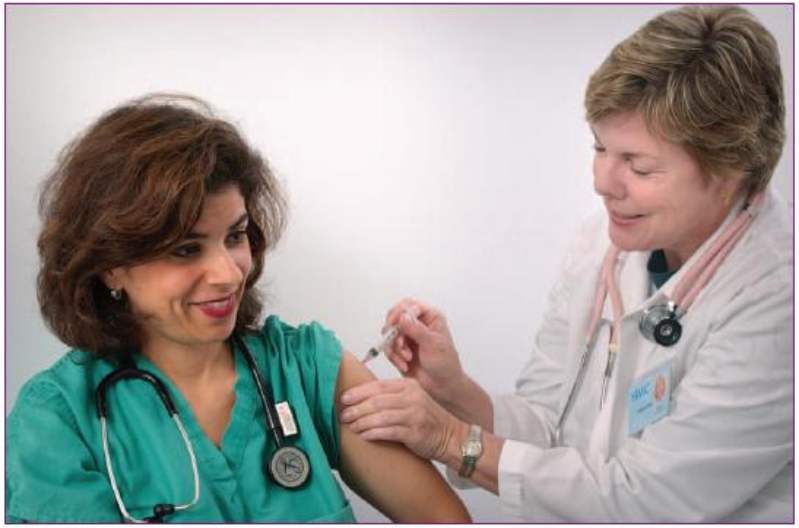
HCW Immunization

Centers for Disease Control and Prevention
MMWR
Morbidity and Mortality Weekly Report
Recommendations and Reports / Vol. 60 / No. 7
November 25, 2011

Immunization of Health-Care Personnel

Recommendations of the Advisory Committee on Immunization Practices (ACIP)



Continuing Education Examination available at http://www.cdc.gov/mmwr/cme/conted.html.

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

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Healthcare Personnel Vaccination Recommendations[1]

Vaccine	Recommendations in brief
Hepatitis B	Give 3-dose series (dose #1 now, #2 in 1 month, #3 approximately 5 months after #2). Give IM. Obtain anti-HBs serologic testing 1–2 months after dose #3.
Influenza	Give 1 dose of influenza vaccine annually. Give inactivated injectable vaccine intramuscularly or live attenuated influenza vaccine (LAIV) intranasally.
MMR	For healthcare personnel (HCP) born in 1957 or later without serologic evidence of immunity or prior vaccination, give 2 doses of MMR, 4 weeks apart. For HCP born prior to 1957, see below. Give SC.
Varicella (chickenpox)	For HCP who have no serologic proof of immunity, prior vaccination, or history of varicella disease, give 2 doses of varicella vaccine, 4 weeks apart. Give SC.
Tetanus, diphtheria, pertussis	Give a dose of Tdap as soon as feasible to all HCP who have not received Tdap previously and to pregnant HCP with each pregnancy (see below). Give Td boosters every 10 years thereafter. Give IM.
Meningococcal	Give 1 dose to microbiologists who are routinely exposed to isolates of *N. meningitidis* and boost every 5 years if risk continues. Give MCV4 IM; if necessary to use MPSV4, give SC.

Hepatitis A, typhoid, and polio vaccines are not routinely recommended for HCP who may have on-the-job exposure to fecal material.

Immunization Action Coalition
Technical content reviewed by CDC
www.immunize.org/catg.d/p2017.pdf

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Employee Exposure Investigations

- Warranted when staff are exposed to infectious diseases
  - May be patient-to-staff or visitor-to-staff
- Evaluate type of exposure and risk of transmission
- Make list who was exposed – staff, patients, visitors
- Evaluate need for post-exposure management
  - Prophylaxis
  - Vaccination
  - TB skin testing
- Determine if local public health or State should be notified

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Preventing Bloodborne Disease in HCW

- Standard Precautions mandatory
- HBV vaccination series offered to all staff with potential for blood exposure
- Hierarchy of prevention methods applied
  - Engineering controls – needleless devices
  - Work practice controls – no recapping
  - Appropriate cleaning, linen-handling, disposal of sharps
- Post-exposure prophylaxis (PEP) immediately available
- BBP training required annually and as needed
- Facilities must have BBP Exposure Control Plan
  - Employees must be given opportunity to contribute to product evaluation for sharps safety

Post Exposure Bloodborne Diseases

Risk for transmission in healthcare settings

- Hepatitis B Virus (HBV)
  - 1-6 % if e-antigen negative (HBeAg-)
  - 22-30% if e-antigen positive (HBeAg+)
- Hepatitis C Virus (HCV)
  - 1.8%, range 0-7%
- Human Immunodeficiency Virus (HIV)
  - 0.3% (1 in 300 exposures), range 0.2%-0.5%
- Less common or rare BBP
  - Syphilis
  - Malaria
  - Viral hemorrhagic diseases
  - Leptospirosis
  - Prion diseases

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Body Fluid Exposure Risk

- Higher risk body fluids
  - Blood
  - Amniotic Fluid
  - Peritoneal Fluid
  - Cerebrospinal fluid
  - Pleural Fluid
  - Pericardial Fluid
  - Vaginal Fluid/Semen
  - Any body fluid with visible blood (saliva after dental)
- Low/No risk*
  - Sweat
  - Tears
  - Feces
  - Saliva
  - Urine

*Unless visibly contaminated with blood

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Exposure Risk by Injury Type

- Infection risk dependent on type of exposure
- Ordered highest to lowest risk
  - Deep puncture from a used hollow bore needle
  - Laceration or wound with a "dirty" scalpel or instrument
  - Puncture through a bloody glove
  - Blood/body fluid on non-intact skin
  - Non-intact skin or mucous membrane contact with dried blood
  - Splash to mucous membranes

BBP Post-exposure Management: Assess Infection Risk

- Type of exposure
  - Percutaneous
  - Mucous membrane
  - Non-intact skin
  - Bites resulting in blood exposure
  - Depth, quantity, or duration of exposure
- Body fluid
  - Blood
  - Other bloody fluid
  - Tissue
- Assess viral load of source
  - HBsAg
  - HCV antibody
  - HIV antibody
- If source unknown, assess epidemiologic and clinical evidence to determine post-exposure treatment

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Bloodborne Disease Post-Exposure Management

- Clean with soap and water
- Flush mucous membranes with water
- Flush eyes with eye irrigant or clean water
- No evidence of benefit from
  - application of antiseptics or disinfectants
  - squeezing ("milking") puncture sites
- Avoid bleach and other agents caustic to skin

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BBP Post-exposure Management: Testing

- Immediate testing

Source (if available)	Employee
Rapid HIV	Rapid HIV
HBsAG	HBsAG
HBcAB	HBcAB
HBsAB	HBsAB
Hepatitis C Antibody	Hepatitis C Antibody
	Hepatic Function Panel

- Employee follow-up

  At 6 & 12 weeks and 6 months (4 months with newer PEP therapies)

  Test for HCV antibody, HIV, liver function

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Kuhar et al. Updated U.S. Public Health Service guidelines for the management of occupational exposures to HIV and recommendations for post-exposure prophylaxis. (CDC, 2013)

Post-exposure Prophylaxis for Hepatitis B: Source HBsAg **Positive**

Vaccination and antibody status of Exposed	Treatment for Employee when Source **HBsAg+**
Unvaccinated	HBIG x1 & initiate Hepatitis B vaccine series
Previously Vaccinated	
Known Responder	No treatment
Known non-responder	HBIG x1 & initiate re-vaccination –or– HBIG x 2
Antibody Response unknown	Test exposed person for anti-HBs 1. If adequate, no treatment 2. If inadequate HBIG x1 & vaccine booster

Post-exposure Prophylaxis for Hepatitis B: Source HBsAg **Negative or Unknown**

Vaccination and antibody status of Exposed Employee	Treatment for Employee when Source **HBsAg- or status unknown**
Unvaccinated	Initiate Hepatitis B vaccine series
Previously Vaccinated	
Known Responder	No treatment
Known non-responder	If known high risk source, treat as if source were HBsAg positive
Antibody Response unknown	Test exposed person for anti-HBs 1. If adequate, no treatment 2. If inadequate, vaccine booster & recheck titer in 1-2 months

Post-exposure Prophylaxis for Hepatitis C

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

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Post-exposure Prophylaxis for HIV

- If indicated, send to MD for assessment for PEP management as soon as possible after exposure
  - Regard as an urgent medical concern; hours rather than days
  - Ensure CBC, liver panel, pregnancy test done prior to initiation of meds
  - Provide counseling about potential side effects of medications
    - Monitor for potential toxicity
- Interval after which PEP is no longer effective is unknown
  - Initiating days or weeks after exposure might be considered for higher risk exposure

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National Clinicians' Post-Exposure Prophylaxis Hotline **(PEPline)**

- Free consultation for clinicians treating occupational exposures to HIV and other bloodborne pathogens
- 24 hours a day
- 7 days a week
- 1-888-HIV-4911
- nccc.ucsf.edu/clinician-consultation/post-exposure-prophylaxis-pep/

Joint program of UCSF/SFGH
Supported by HRSA and CDC

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Prevention of Airborne Transmissible Diseases in Health Care Workers

Risk reduction strategies include

- Follow Standard precautions
  - Routinely wear mask if patient coughing or has uncontained respiratory secretions
- Cough etiquette by patients, visitors, health care workers
- Apply mask on ill/coughing person for source control
- TB screening upon hire and annually
- Annual influenza vaccination
- Comply with Aerosol Transmissible Disease (ATD) Standard

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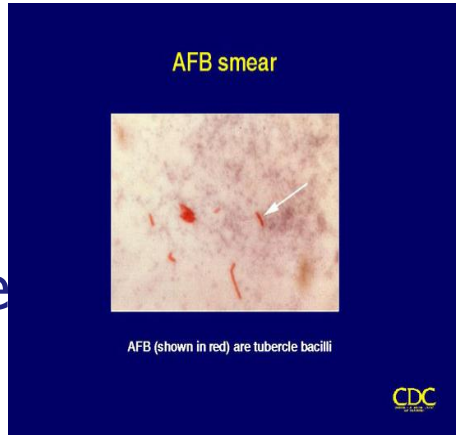
Pulmonary Tuberculosis (TB)

- Caused by bacteria *Mycobacterium tuberculosis*
- **A**cid **F**ast **B**acilli can be seen on a stained slide
- Serious chronic illness; can be fatal if untreated
- Transmitted by airborne route
  - Patient contact not required for exposure
  - Droplets can stay afloat for hours and travel on air currents
- Likelihood of transmission affected by
  - infectiousness of patient
  - environmental conditions
  - duration of exposure
  - Most persons exposed do not become infecte



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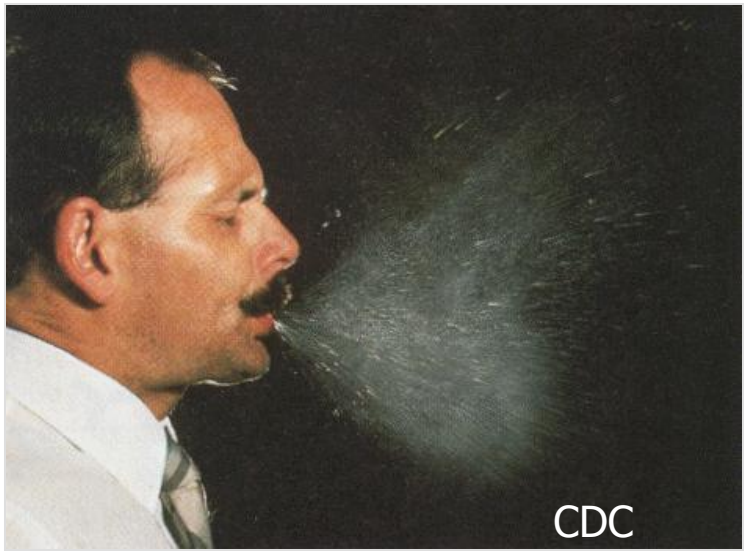
Transmission of TB



Increased risk of transmission

- From infection person with
  - Forceful cough
  - Acid-fast bacilli (AFB) in sputum
  - Laryngeal disease
  - Cavitation on chest xray
- Undergoing cough-inducing procedures
- In small closed spaces with poor ventilation
- Failing to cover nose/mouth when coughing

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Risk of TB Infection and Disease

Highest Risk for Infection

- Medically under-served, low income
- High-risk minority populations
- Persons who inject drugs
- Close contacts to suspect/ known cases
- Foreign-born from high prevalence areas
- Healthcare workers serving high risk patients

Highest Risk for Progression to Disease

- HIV infected, or otherwise immune compromised
- Recently infected with TB
- Certain chronic medical conditions
- IV drug abusers
- History of inadequately treated TB
- Stressors, such as recent immigration

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Annual TB Testing

- Identifies health care workers newly infected with TB
  - Enables prompt treatment to minimize risk of respiratory disease

- Serves as an ongoing evaluation for effectiveness of TB prevention strategies
  - May identify improvement needs in control measures

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TB Risk Assessment

- Determine HCW to be included in annual TB screening program
  - Annual skin testing
  - Review symptoms with previously positive employees
  - Annual chest xray not required
- Determine HCW to be included in Respiratory Protection Program, require fit testing
- Identify areas with increased risk for TB transmission
- Assess if adequate number of Airborne Infection Isolation Rooms
- Conduct periodic reviews of TB prevention strategies

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Airborne Transmissible Disease (ATD) Standard

- Applies to all health care settings
  - Includes
    - Hospitals
    - Skilled nursing facilities
    - Hospices
    - Private medical offices
    - Paramedic and emergency services
    - And many others

Exceptions: dental offices and outpatient settings where ATDs are not diagnosed or treated

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ATD Requirements

- Written ATD Plan
  - Policies & Procedures addressing ATD
    - Education & training for prevention
    - TB Screening
    - Post exposure management
  - Provide seasonal influenza vaccination to all employees with potential for occupational exposure
  - Engineering controls for management of patients with ATDs
  - Fit testing for respiratory protection
  - Maintenance of employee health records

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ATD Requirements- Engineering Controls

- Airborne Infection Isolation Room (AIIR)
  - 12 air exchanges per hour (ACH)

    AND
  - Daily verification of negative pressure (via smoke stick or flutter test) while room is occupied

- PAPR for high hazard procedures
  - Includes sputum induction, bronchoscopy, intubation, open system suctioning, aerosolized nebulizer treatment

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California Code of Regulations, Title 8, Section 5199 Appendix A. - Windows Internet Explorer

DIR http://www.dir.ca.gov/Title8/5199a.html

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ATD Standard Appendix A:

Specifies diseases that require airborne or droplet precautions

Subchapter 7. General Industry Safety Orders
Group 16. Control of Hazardous Substances
Article 109. Hazardous Substances and Processes

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§5199. Appendix A.

Appendix A – Aerosol Transmissible Diseases/Pathogens (Mandatory)

This appendix contains a list of diseases and pathogens which are to be considered aerosol transmissible pathogens or diseases for the purpose of Section 5199. Employers are required to provide protections required by Section 5199 according to whether the disease or pathogen requires airborne infection isolation or droplet precautions as indicated by the two lists below.

Diseases/Pathogens Requiring Airborne Infection Isolation

Aerosolizable spore-containing powder or other substance that is capable of causing serious human disease, e.g. Anthrax/*Bacillus anthracis*
Avian influenza/Avian influenza A viruses (strains capable of causing serious disease in humans)
Varicella disease (chickenpox, shingles)/Varicella zoster and Herpes zoster viruses, disseminated disease in any patient. Localized disease in immunocompromised patient until disseminated infection ruled out
Measles (rubeola)/Measles virus
Monkeypox/Monkeypox virus
Novel or unknown pathogens
Severe acute respiratory syndrome (SARS)
Smallpox (variola)/Varioloa virus
Tuberculosis (TB)/*Mycobacterium tuberculosis* -- Extrapulmonary, draining lesion; Pulmonary or laryngeal disease, confirmed; Pulmonary or laryngeal disease, suspected
Any other disease for which public health guidelines recommend airborne infection isolation

Diseases/Pathogens Requiring Droplet Precautions

Diphtheria pharyngeal
Epiglottitis, due to *Haemophilus influenzae* type b
Haemophilus influenzae Serotype b (Hib) disease/*Haemophilus influenzae* serotype b -- Infants and children
Influenza, human (typical seasonal variations)/influenza viruses
Meningitis
Haemophilus influenzae type b known or suspected

ATD Standard in Facilities Other than Hospitals

Many health care facilities are not equipped to care for persons ill with an ATD

- If a resident develops respiratory illness
  - Transfer within 5 hours
  - Do not transfer if detrimental to resident's condition
- In absence of AIIR, place ill patient in single room with door closed
  - May cohort with other ill patients
  - Employees wear an N95 respirator to enter

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ATD Standard in Outpatient Settings

- Outpatient clinics do not provide same level of care as inpatient settings
  - Shorter duration of exposure
- Apply ATD Standard to extent feasible
  - Place person in separate room or area
  - Provide separate ventilation or filtration
  - Source control is primary; mask patient
  - In absence of source control, employee must wear N95 respirator or above when entering room or area

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References and Resources

- California Code Regulations, Title 8, Section 5193 (BBP ECP)
- CAL-OSHA ATD Standard http://www.dir.ca.gov/title8/5199.html
- CDC Guidelines for Preventing the Transmission of Mycobacterium tuberculosis in Health-Care Setting http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5417a1.htm?s_cid=rr5417a1_e
- Cal/OSHA Guidance for the 2010-2011 Influenza Season regarding the Application of the Aerosol Transmissible Diseases Standard (Issue Date: 11/5/2010)
- PEPline at http://nccc.ucsf.edu/clinician-consultation/post-exposure-prophylaxis-pep; telephone 888-448-4911
- Joint Guidelines for Prevention and Control of Tuberculosis in CA Long Term Health Facilities. California Department of Public Health *www.cdph.ca.gov/*
- *http://stacks.cdc.gov/view/cdc/20711*

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References and Resources

- *Updated U.S. Public Health Service Guidelines for the Management of Occupational Exposures to HBV, HCV and HIV and Recommendations for Postexposure Prophylaxis*, CDC, MMWR, June 29, 2001 / Vol 50 / No. RR-11
- Updated U.S. Public Health Service Guidelines for the Management of Occupational Exposures to HIV and Recommendations for Postexposure Prophylaxis. (2013). http://stacks.cdc.gov/view/cdc/20711

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Questions?

For more information, please contact any HAI Liaison Team member

Thank you