Infection Prevention in Ambulatory Care: Meeting CMS Conditions for Coverage

Employee Health

Health Care Personnel

“...all paid and unpaid persons working in healthcare settings who have the potential for exposure to infectious materials, including body substances, contaminated medical supplies and equipment, contaminated environmental surfaces, or contaminated air.”

Guidelines for Infection Control In Healthcare Personnel. CDC 1998
Elements of a Personnel Health Service

- Medical evaluations – pre placement
- Employee health guidelines
- Health and safety education
- Exposure/illness analysis & trending
- Confidential employee health records

Elements of a Personnel Health Service

- Immunizations
- Policies/procedures
- Coordination with Infection Control
- Coordination with Engineering/Safety re: CMS CfC and LSC requirements
- Containing costs

Elements of a Personnel Health Service

- Job illness/injury-management
  - Treatment/evaluation
  - Source testing
  - Education
  - Counseling
  - Records
Pre-Employment/Placement

Health History:
• Immunization Status
• Communicable disease history
• Immunodeficient conditions
• Screening for vaccine preventable disease
• Presence of infection e.g. dermatitis, wounds

Pre-placement Evaluation
• Tuberculin skin test (TST)
  – Includes HCW’s with history of BCG, pregnant
• Serological screening for anti-HbsAb post Hepatitis B vaccine
• Serologic screening for measles and rubella may be done/not required (mumps, chickenpox)
• Presence of disability
• Knowledge level

Immunization Practices
• ACTIVE IMMUNIZATION- stimulates production of antibodies
  -Vaccines: Live (attenuated -MMR) or inactivated (killed) hepatitis B recombinant)
• PASSIVE IMMUNIZATION
  -Refers to temporary immunity that follows exogenous antibody administration. (IG, HBIG, or antitoxin)
Immunization Recommendations for HCW

- Hepatitis B vaccine
- Influenza vaccine
- Measles
- Mumps
- Rubella
- Varicella
- Tetanus
- Rabies (in select settings)
- Pertussis

Exposure Evaluation

- Definition of exposure
- Infectious agent
- Mode of transmission
- Degree of contact/duration
- Use of barriers
- Susceptibility of HCW
- Work restrictions

Post exposure Counseling

- Risk of infection
- Signs & symptoms of infection
- Prophylaxis
- Testing
- Side effects of medications
- Interim precautions
- Risk reduction measures
OSHA’S BBP Rule Revisions
1-18-2001

- Sharps- safety devices required
- Solicitation of employee input
- OSHA 300 log
  - Device
  - Location
  - Circumstances

HIV PEP and Counseling

- Start PEP & counseling ASAP after exposure
  - 1-2 Hours rather than days
  - Urgent medical concern
- Consider re-evaluation of the exposed person within 72 hours
  - Additional info about the source?
  - If source HIV-negative, stop PEP

Resistance to Antiretroviral Agents:
Implications for PEP

- Select drugs to which source not resistant
- Testing source person’s virus for resistance at exposure not recommended

→ EXPERT CONSULTATION IS ADVISED
HIV PEP Considerations for a Pregnant Employee

- General principles
  - PEP not contraindicated in pregnancy
  - Consult OB Physician, ID
- Choosing regimen is more complex
  - Effects on fetus/newborn unknown
  - Most data are on zidovudine (AZT)
  - Some drugs contraindicated

Post Exposure Management:

- If source HIV +, test at 6 weeks, 3 & 6 months
- Extend to 12 months if HCP infected w/ HCV
- Baseline and 2 weeks after starting PEP
  - CBC
  - renal and hepatic profiles
- If on protease inhibitor
  - monitor for hypoglycemia
  - monitor for crystalluria, hematuria, hemolytic anemia, and hepatitis if on indinavir

Case Study

- A 30 year old female registered nurse is assisting the physician who is inserting a PICC line. Her only PPE is a pair of medical exam gloves. During the procedure, she is splashed in the eyes with a significant amount of blood. She is wearing contact lenses in both eyes. The patient is a 24 year old IV drug abuser who has a diagnosis of leukopenia and lymphadenopathy.
- Discuss the most appropriate post exposure follow-up.
Hepatitis B

- Vaccine
- Post vaccine screening
- Revaccination
- Staff in chronic dialysis centers
- Post exposure- susceptible personnel

Hepatitis C

- 1.8% risk of transmission per needlestick
- 15% of those infected will resolve the illness
- 10-15% who develop chronic hepatitis will progress to cirrhosis and/or death
- No work restrictions
- No prophylaxis after exposure

HCV Exposure Testing

- Test for anti-HCV and ALT 4-6 months after exposure
- Test for HCV-RNA at 4-6 weeks for earlier diagnosis of HCV infection.
- Confirm anti-HCV EIA-positive results with supplemental test (e.g., RIBA)
- No guidelines for therapy during acute infection- specialist referral
Meningococcal Disease

- Only for unprotected intubation or CPR
- PEP: Rifampin 600 mg (po) q12 x 2 days; or Ciprofloxacin 500 (po) x1 dose; or Ceftriaxone 250 mg IM x 1 dose
- Work Restrictions: None unless infected then off work until completed 24 hrs of Rx
- Vaccine: Outbreaks of serogroup C; vaccine recommended for microbiology

Conjunctivitis

- Emphasis on infectivity – adenovirus primary cause
- Outbreaks by other organisms rare
- Standard precautions, handwashing, disinfection of environment
- Restrict infected HCW from patient care for duration of symptoms

Varicella (Chickenpox)

- Incubation: 10 - 21 days, often 14
- Communicable: 1 - 2 days before symptoms & until lesions crusted.
- Vaccine: Recommended (2 doses 0.5 ml, SC, 4-8 wk. apart)
- Screening: May be cost effective; no post vaccine screening
- Shingles: reactivation of VZV, localized needs no isolation.
Varicella Vaccine

- Live virus vaccine, kept frozen
- No recommendation for post exposure vaccine administration
- Develop guidelines for managing vaccine recipients
- Develop written guidelines for post exposure management to wild-type varicella

Varicella Exposure

- Exclude from duty until all lesions dried and crusted
- Exclude susceptible exposed personnel day 10 from 1st day of exposure to 21st day from last date of exposure
- Perform serologic screening on exposed personnel with unknown status

Measles, Mumps, Rubella

- Screening can be done if cost effective
- Vaccinate non-immune or unvaccinated personnel (2 doses)
- MMR vaccine is a live virus vaccine
- Do not administer the vaccine to pregnant personnel or those who might become pregnant in the next 30 days
Measles (Rubeola)

- Transmission: Airborne
- Communicable: 3-5 days before rash; 4-7 days after rash
- Vaccine: (one dose SC; 2nd dose 1 mo. later)
  Born > 1957: No documentation of 2 doses vaccine, MD diagnosed measles or + serology
  Born < 1957: Consider vaccine if no evidence of immunity

Measles (Rubeola) (continued)

- PEP: Give vaccine to exposed susceptible if < 72° elapsed since exposure
- Work Restrictions
  Susceptible: 5th – 21st day (from first and last dates of exposure)
  Infected: until 7 days after rash onset

Mumps

- Transmission: Droplets
- Communicable: 6-7 days before parotitis to 9 days after onset of disease
- Vaccine (one dose SC – no booster)
Scabies

- Transmission: Skin to skin contact, contact with infested linens, clothing
- Communicable: Until adequately treated
- Work Restrictions: None unless infested, then off work until treated and no s/s
- Do not treat exposed employees unless symptoms develop or outbreak situation

Lice (Pediculosis)

- Standard Precautions
- Head lice- don’t jump or fly. Don’t share brushes, combs. OTC or Rx treatment
  – MUST comb out ALL the nits, or don’t bother
- Pubic lice (crabs) not an occupational risk
- Body lice- extremely rare, hide in seams of clothing

Bordetella Pertussis

- Transmission: Droplet, contact with aerosols or respiratory secretions
- Communicable: Onset of catarrhal stage and up to 3 weeks after symptoms
- PEP: Erythromycin, Sulfis, or Azithromycin
- Tetanus Toxoid, Reduced Diphtheria Toxoid and Acellular Pertussis (Tdap) recommended for adults
MRSA
Infection and Colonization

- Epidemiology of MRSA no different from MSSA
- Culture only personnel implicated in transmission
- Remove from direct pt care MRSA carrier or infected personnel linked to transmission

Herpes Simplex

- Standard Precautions
- Infection of fingers most common transmission to HCW (herpetic whitlow)
- PEP not recommended

Work Restrictions:
- Hands – exclude from patient contact
- Orofacial - case by case basis, use good hand hygiene

Cytomegalovirus (CMV)

- Looks like mono in adults
- In ~5% of children’s urine up to age 6
- HCW not at increase risk, including pregnant HCW
- Standard Precautions
- No work restrictions for infected or exposed
The Pregnant HCW

- Women of child bearing age should be vaccinated before pregnancy
- Standard Precautions
- Do not exclude from care of patients with infections that may harm fetus
- Counsel on risks and prevention
- Some drugs contraindicated-refer to OB

Tuberculosis

Guidelines for Preventing the Transmission of *Mycobacterium tuberculosis* in Health-Care Settings

Morbidity and Mortality Weekly Report (MMWR)
Recommendations and Reports
December 30, 2005
Tuberculosis

- Caused by *Mycobacterium tuberculosis* (*M.tb*)
- There are other Mycobacteria species but they are not transmissible from person-to-person, e.g., *Mycobacterium Avium Complex* (MAC); *Mycobacterium Other Than Tuberculosis* (MOTT); Non-tuberculous Mycobacteria (NTM); *M. intracellulare, chelonae, kansasii*, etc.
- No exposure issues with the MOTTs

Ambulatory Facilities & TB

Care of TB patients requires specific policies, engineering controls, work practices, personal protective equipment, education, by law
- Negative pressure room(s) with ≥ 6 (old) or 12 (new) air exchanges per hour
- Exhausted directly from facility, no communication with other rooms, or must be HEPA filtered
- Respiratory Protection Program
- Is it worth it? Can elect not to provide care

Facility TB Risk Assessment

- Number of cases of active TB seen in facility previous year
- Level of risk in the community (health dept)
  - Number of cases
  - Demographics of cases
  - Risk factors
- Number of PPD/BAMT conversions in employees previous year
Transmission of TB

Tiny TB particles are released by:

- Coughing
- Sneezing
- Speaking
- Singing

Affected by:
- Infectiousness of patient (e.g. cough, cavity)
- Environmental conditions (e.g. room air changes, size of room)
- Duration of exposure (e.g. minutes, hours, days)

Factors That May Increase Communicability Of Tuberculosis

- Presence of cavitation on chest radiograph
- Inappropriate or short duration of TB therapy
- Administration of cough-inducing or aerosol-generating procedures

Infection After Exposure

- 20-30% of family members /close contacts become infected (+PPD/QFT)
- Of those, only 5-10% develop TB
- This most often occurs in the first two years after infection (conversion) or in the elder years, or if immunosuppressed
TB: Infection vs. Disease

- A person may be exposed to and infected with TB (+ PPD/BAMT) without having active TB, and is not infectious.
- A person is infectious when active lung or throat TB is present, with release of infected secretions.

Tuberculosis Diagnosis

- History (risk factors) and physical exam
- Tuberculin skin test (TST)
- Chest X-ray / CT Scan
- Sputum smear and culture
- Bronchoscopy or biopsy may be indicated
- Blood Assay for *M. tuberculosis* (BAMT); a TST alternative

High Risk Patients

- Immigrants from Asia, Russia; Native Americans, Eskimos
- Homeless/shelter dwellers
- Drug users, alcoholics
- Prisoners (current or past)
- Contacts of those with TB
- Check local risk factors
Strong Indicators of Active TB

- Acid fast bacilli (AFB) in sputum smear
- X-ray or chest CT suggestive of TB
- Symptoms

Signs and Symptoms of TB

<table>
<thead>
<tr>
<th>Initial</th>
<th>Advanced</th>
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</thead>
<tbody>
<tr>
<td>Fever</td>
<td>Cough</td>
</tr>
<tr>
<td>Fatigue</td>
<td>Chest pain</td>
</tr>
<tr>
<td>Weight loss</td>
<td>Coughing blood</td>
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<tr>
<td>Night sweats</td>
<td>Hoarseness</td>
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Drug Treatment

- Isoniazid (INH)
- Rifampin (RIF)
- Ethambutol (EMB)
- Streptomycin (SM)
- Pyrazinamide (PZA)
- Directly Observed Therapy (DOT)
Multi-Drug Resistant TB (MDRTB)

TB resistant to 2 or more drugs
- Some strains resistant to 7 drugs
- Treatment time increases to 18-36 months or more (instead of 12)
- Cure rate 60% or less

HIV and TB
- Greater risk of infection with TB
- May not react to PPD/BAMT
- May have normal chest xray
- May already have + AFB with MAC
- Diagnosis to death: 1 month
- If HIV+ DO NOT care for TB patients!

Occupational Transmission
Repeated, prolonged contact with high risk patients or high hazard (cough inducing) procedures:
- Aerosolized medications
- Bronchoscopy
- Sputum induction
- Suction procedures
- Intubation
Isolation Engineering Controls

• Single-patient Airborne Infection Isolation (AII) room
• Keep door, windows closed
• Negative pressure (monitored daily)
  • ≥ 6 air changes per hour for existing rooms
  • ≥12 air changes per hour whenever feasible and for new construction

Tuberculosis Isolation

Personal Respiratory Protection

• N95 particulate respirator
  – Medical questionnaire & evaluation
  – Fit test, initial and annual
  – Seal check at time of use
  – Training
PAPR- Powered Air Pressured Respirator
  - Fit testing not required
  - Pressure check before each use
  

Screening HCWs for Latent TB Infection

• Everyone on hire
• Low Risk
  – Additional TB screening not necessary unless exposure occurs
• Medium Risk
  – Annual TB screening
Tuberculosis Skin Testing (TST)

Screening Baseline TST or BAMT
• On newly employed personnel who have exposure potential
• Include Bacillus Calmette Guerin (BCG) vaccine recipients
• Include pregnant healthcare workers
• Interpret according to the CDC guidelines

Booster Phenomenon
Ability to react to TST may wane over time
• Test “boosts” ability to react to subsequent tests
• Positive reaction to a second test (boosted reaction) may be misinterpreted as a new infection (conversion) if only one test is done
• More common in older persons
Two-Step Testing

- Perform on newly employed HCWs
  - Initial negative TST result, and
  - Do not have a documented negative TST result during the proceeding 12 months
- Second TST should be administered at least one week after the first negative TST

Blood Assay M. Tb (BAMT)

- Checks for TB infection using ONE blood draw
- No cross reaction with BCG immunization
- Very sensitive, easy access, no repeated visits to EH, retrievable lab test result
- If positive, x-ray, screen for signs, symptoms
- 5-10% lifetime risk of disease
- Drugs can reduce risk to almost zero

Screening HCWs for Active TB Disease

- Evaluate HCWs with TB symptoms promptly
- Restrict symptomatic HCWs from the workplace until infectiousness is ruled out
- Investigate new 'converters'!
Tuberculosis
Post-Exposure Management

• TST ASAP at time of exposure
• Repeat 8 -10 weeks later
• If positive, obtain chest X-ray, check for signs and symptoms, refer to MD
• Obtain chest X-ray only on those with prior positive TST/BAMT who are symptomatic

Prevention and Control

• Annual Facility TB Risk Assessment
• Employee screening program
• Annual TB education for HCW
• Early identification and effective treatment- THINK TB!
• Isolation for suspected or diagnosed cases
• Precautions for cough-producing procedures
• Respiratory Protection Program-TB Plan in place
• Place a surgical mask on the patient for transport
Case Study:
Tuberculosis Exposure

- 62 y/o staff nurse complains of
  - Fatigue
  - Chest pain
  - Cough
  - Low grade fever
  - Unintended weight loss in past 3 months
- You note that she has been PPD positive for many years
- What do you do?

Summary

Chances of increased potential of communicability with TB include:
- Cavitation on chest radiograph
- Inappropriate or short duration of TB therapy
- Cough-inducing or aerosol generating procedures
- Your Prevention and Control Program is key to management
- Screening, Education, …’Think TB’!

Any Questions?
Hepatitis

- Hepatitis is defined as “inflammation of the liver”
- Can be caused by chemical exposure
  - Acetaminophen, other drugs
- Can be caused by a group of viruses, called the Hepatitis Viruses
- There are a lot of Hepatitis Viruses! We can only test for a few of these

Viral Hepatitis A-E

- Hepatitis A and E
  - Fecal-oral route
  - Occasional healthcare infection control issue (e.g. infected dietary HCW)
- Hepatitis B, C and D
  - Bloodborne pathogens
  - Healthcare transmission
  - Healthcare occupational exposure → needlestick

Viral Hepatitis

Clinical features
- Malaise
- Fatigue
- Anorexia
- Nausea/vomiting
- Abdominal discomfort
- Arthralgia/myalgia
- Fever
- Jaundice (varies with age)
Hepatitis A

- Worldwide distribution
- Incubation: 30-45 days
- Acute infection: IgM anti-HAV positive
- Fecal-oral transmission (rarely blood or blood products)
- Past infection: IgG anti-HAV positive (lifelong immunity)

Prevention
- Standard Precautions
- Personal hygiene measures
- Hepatitis A Vaccine (HAV)

Post exposure
- IG within 2 weeks post exposure

Hepatitis B

- Worldwide distribution
- Causes 80% of liver cancer worldwide
- Transmission
  - Blood or blood products
  - Sharing needles
  - Sexual contact
  - Perinatal/vertical
- Incubation 1-6 months
Hepatitis B Diagnosis

- HBsAg, HBeAg and HBV DNA detectable in serum 2-7 wks before onset of symptoms
- IgM anti-HBc, ALT, AST, increase bilirubin when symptoms occur
- IgG anti-HBc, anti-HBe and anti-HBs detected as acute hepatitis B resolves
- “Little e” antigen is associated with increased infectivity

Reference

Hepatitis B
Prevention and Control
• Standard Precautions
• Hepatitis B vaccine (HBV)
• Counseling
• Safer medical devices

Hepatitis B Post-exposure
• Test for anti-HBs if person has been vaccinated, but vaccine response is unknown
• Baseline testing not necessary if exposed person has not been vaccinated or vaccine response is known
• Hepatitis B immune globulin (HBIG) for persons not immune to HBV exposed to HBsAg positive source

Hepatitis C
• Most common cause of post-transfusion non-A, non-B viral hepatitis until 1990s
• Worldwide distribution
• Transmission
  – Parentally (needles)
  – Organ transplantation
  – Transfusions
• Incubation: 2-26 weeks
Hepatitis C
- Usually asymptomatic
- Only 25% develop jaundice
- Chronic infection in 85%
- Severity assessed by liver biopsy
- First symptoms may be liver failure
- Leading reason for liver transplants in U.S.

Hepatitis C
- Anti-HCV detected as early as 6-8 weeks after exposure
- Recombinant immunoblot assay (RIBA-2) to confirm
- Interferon and ribavirin, mixed success

Hepatitis C
- Prevention
  - Screening blood donors, ?IDUs, tattoos?
  - Behavior modification
  - Standard Precautions
- Post Exposure
  - No prophylaxis available
  - Anti-HCV and ALT at 4-6 months; ALT is a liver damage marker
  - HCV RNA at 4-6 weeks (earlier detection)
Human Immunodeficiency Virus (HIV)

- Viral infection of CD4 cells compromising the natural immune system
- Primarily sexually transmitted disease (75%)

**HIV**

- Acute retroviral syndrome
  - 1-4 weeks after exposure
  - 40%-90% mildly symptomatic or asymptomatic
  - Fever, malaise, lethargy, anorexia, nausea, myalgias, headaches, sore throat, diarrhea, lymphadenopathy
- Variable latent period
  - Asymptomatic, virus continues to replicate
  - 6-10 years for most
- Progression to AIDS

**HIV Testing**

Enzyme-Linked Immunosorbent Assay (ELISA)
- Initial screening test
Western Blot
- Confirmatory test
HIV

• Prevention and Control
  – Education
  – Standard Precautions
    • Appropriate use of personal protective equipment
    • Cleaning and reprocessing
  – Safe medical devices
  – Safe work practices

HIV

• Post Exposure Management
  – First aid
  – Counseling
  – Medical evaluation
    • Baseline testing
    • Follow-up testing (6 wks, 3 & 6 months)
  – Post exposure prophylaxis (PEP)
    • Handouts

BBP Exposures & Wound Care

• Clean wounds with soap and water
• Flush mucous membranes with water
• With needle stick injuries – No squeezing (“milking”)
• Avoid use of bleach
• Only minor burns should be treated in EH – relieve from work if infection risk