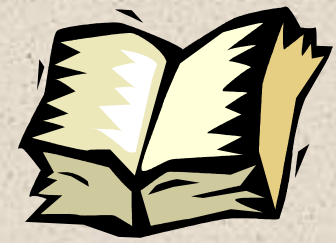


# Bloodborne Pathogens

Garrett County Health Department

Cynthia L. Mankamyer, RN

# Exposure Control Plan



- Exposure determination
- Protocol for evaluation surrounding an exposure incident
- Schedule a method for implementation
- Plan must be reviewed annually
- Title 29 Code of Federal Regulations Section 1910.20(e) should be accessible to employees

# Exposure Control Plan

---

- Contents:  
A written plan to protect employees
  - Location: Know where yours is!
-

# Exposure Control Plan

---

- Employers must:
  - Have a written plan to protect you (Exposure Control Plan)
  - Keep a safe workplace
  - Provide you with protective gear (such as: gloves, gowns, masks, or eye protection)

# Exposure Control Plan

---

- Employers must:
  - Teach you how to protect yourself at work
  - Provide you with free hepatitis B vaccine, if you want it
  - See that you get proper care if you are exposed to blood or other potentially infectious material
  - Keep accurate records

# Exposure Control Plan

---

- Employees must:
  - Learn about the risks that occur on the job
  - Learn how to avoid the risks
  - Work safely and use protective gear
  - Decide whether you want to take Hepatitis B vaccine
  - Know what to do if you are exposed

# Overview of Blood Borne Pathogens Review

---

- Epidemiology & symptoms of bloodborne diseases
- Transmission routes
- Universal Precautions
- Standard Precautions
- Hepatitis B vaccine
- Exposure control plan
- Work practice & engineering controls
- Information on PPE
- Warning labels & signs
- TB Control Plan
- Post-exposure incident

# Bloodborne Pathogens

---

- **Pathogen**
  - **infectious agent**
    - **virus**
    - **bacterium**
    - **parasite**
- **Bloodborne**
  - **present in human blood and certain body fluids.**
  - **Spread through contact with these fluids**

# Blood & other potentially infectious materials

---

- Blood, serum
- Semen
- Vaginal secretions
- Saliva (dental procedures)
- Fluids
  - **lungs, heart, intestines, brain and spinal fluid, joints, & fetus**
- Any body fluid where there is blood
- Any body fluid when you can't tell what the material is

# Bloodborne Pathogens

---

- **HIV- Human Immunodeficiency Virus**
  - **causes AIDS**
  - **spread by blood, sex, IDU, mother to baby, breastfeeding**
  - **virus attacks the immune system**
  - **will not survive outside body very long**
- **Hepatitis B virus**
  - **inflammation of the liver**
  - **takes 2- 6 months between exposure & getting sick**
  - **spread by blood,sex, IDU, mother to baby, household contact, & other potentially infectious materials**

# Bloodborne Pathogens

---

- Hepatitis C
- Hepatitis D
- Hepatitis E
- Syphilis
- Malaria
- Brucellosis
- SARS
- Arboviral infections
  - **West Nile, etc.**



# HIV (Human Immunodeficiency Virus)

- **Question:**
- **Can you get HIV from sweat, saliva, tears or urine of an infected person?**



● **NO!**

Unless these fluids contain.....

- Blood or other fluids that carry the virus!

# **HIV**

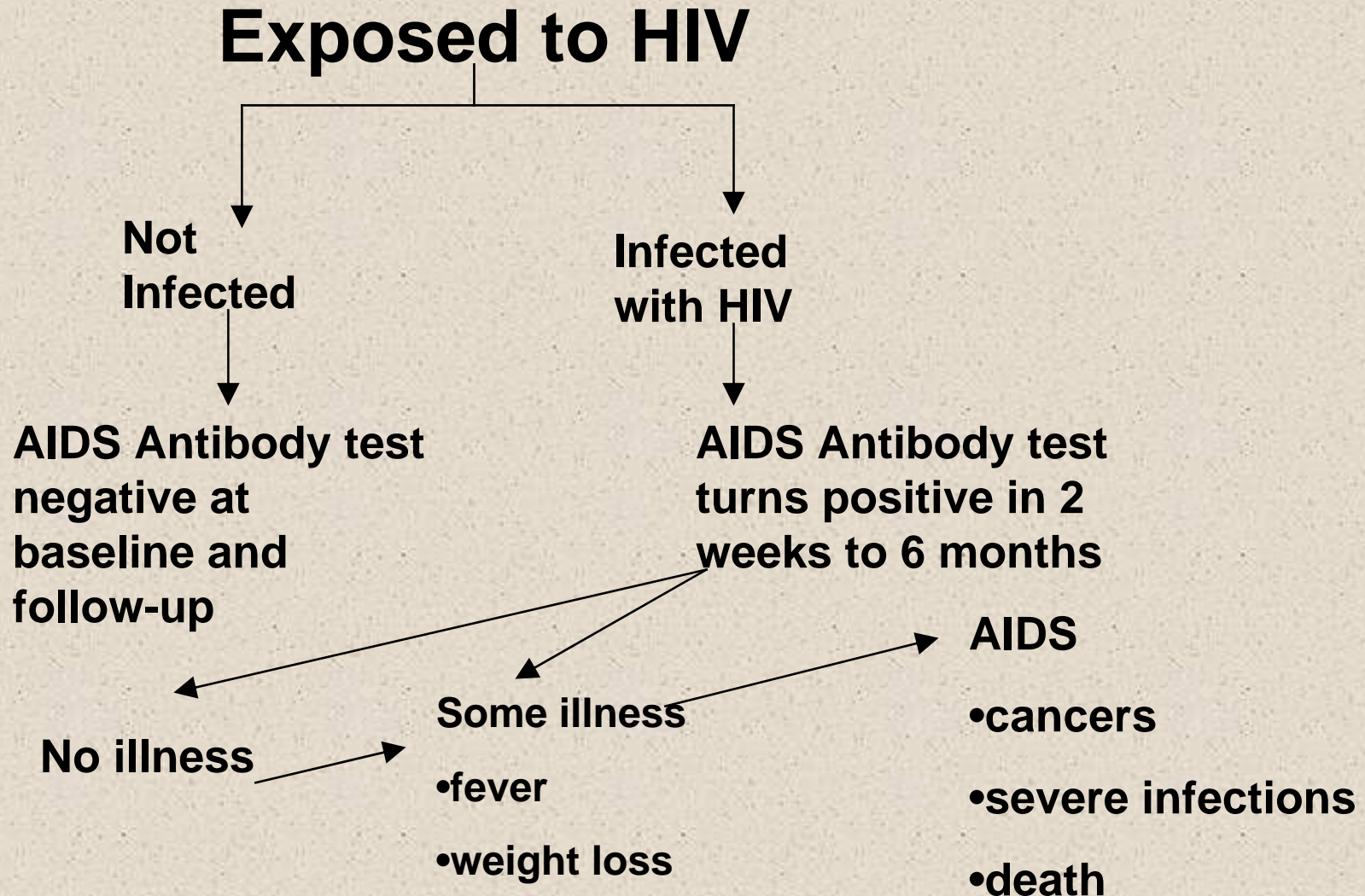
## **(Human Immunodeficiency Virus)**

---

- **Symptoms**
  - **fever**
  - **night sweats**
  - **weight loss**
  - **swollen lymph nodes**
  - **fatigue**
  - **frequent infections**
  - **sore throat**
  - **thrush**
  - **nausea**
  - **headaches**
  - **weakness**

# HIV

## (Human Immunodeficiency Virus)



# HBV & HIV Transmission Routes

---

- Sexual contact
- IDU (sharing needles)
- From mother to baby at/before birth
- Accidental puncture from contaminated needles, glass or others sharps
- Contact between broken or damaged skin and infected body fluids
- Contact between mucous membranes and infected body fluids

# Viral Hepatitis - Overview

## Type of Hepatitis

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>
<b>Source of virus</b>	feces	blood/ blood-derived body fluids	blood/ blood-derived body fluids	blood/ blood-derived body fluids	feces
<b>Route of transmission</b>	fecal-oral	percutaneous permucosal	percutaneous permucosal	percutaneous permucosal	fecal-oral
<b>Chronic infection</b>	no	yes	yes	yes	no
<b>Prevention</b>	pre/post- exposure immunization	pre/post- exposure immunization	blood donor screening; risk behavior modification	pre/post- exposure immunization; risk modification	ensure safe drinking water

# Estimates of Acute and Chronic Disease Burden for Viral Hepatitis, United States

	HAV	HBV	HCV	HDV
Acute infections (x 1000)/year*	125-200	140-320	35-180	6-13
Fulminant deaths/year	100	150	?	35
Chronic infections	0	1-1.25 million	3.5 million	70,000
Chronic liver disease deaths/year	0	5,000	8-10,000	1,000

\* Range based on estimated annual incidence, 1984-1994.

# Hepatitis B Virus

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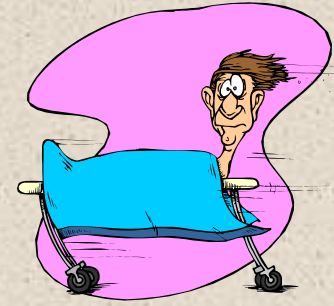
- Risk of contracting HIV from a contaminated needle is 1 in 300 (0.3%)
- 5-10% of adults who contract HBV will become carriers

# Hepatitis B Virus

---

- Risk of contracting Hepatitis B from a contaminated needle is 6 - 30%.
- May survive for days, weeks outside body

# Hepatitis B Virus



- Symptoms of acute infection:
  - abdominal pain
  - fever
  - vomiting
  - jaundice (skin & eyes)
  - loss of appetite
  - dark urine

# Concentration of Hepatitis B Virus in Various Body Fluids

---

<b>High</b>	<b>Moderate</b>	<b>Low/Not Detectable</b>
blood	semen	urine
serum	vaginal fluid	feces
wound drainage	saliva	sweat
		tears
		breast milk

# Hepatitis B Vaccine

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- Protection from acute Hepatitis B
- Protection from HBV carrier state
- Protection from chronic liver disease caused by HBV
- Protection from Hepatitis D

# Hepatitis B Vaccine

---

- Offered to employees unless previously vaccinated and immune or medically contraindicated
- Given in three doses
  - Day 0
  - 1 month after 1st dose
  - 6 months after 1st dose
- Given in the muscle of the upper arm
- Efficacy > 85%

# Hepatitis B Vaccine



- **If a person had vaccine and no initial titer done, it is not possible to determine if a negative titer years later represents...**
  - **A: True vaccine failure           OR:**
  - **B: Protective antibodies present, but below detectable level**
- \*60% of vaccinated persons lose detectable antibodies (but not protection) 9 - 15 years after vaccination**

# Options if Hepatitis B Immunity



## Status Unknown:

- 1. Assume initial vaccine failure and repeat
  - series, then check titer.
- 2. Give 1 dose of vaccine, check titer.
  - **If positive , stop**
  - **If negative, finish last 2 doses**

# Hepatitis B Vaccine

---

- Possible Side effects
  - Injection site soreness, swelling, and redness
  - Mild fever
  - Headache

**You should not receive the vaccine if:**

- you have an allergy to yeast
- you have an allergy to thimerosal (a preservative)

# Hepatitis B Vaccine

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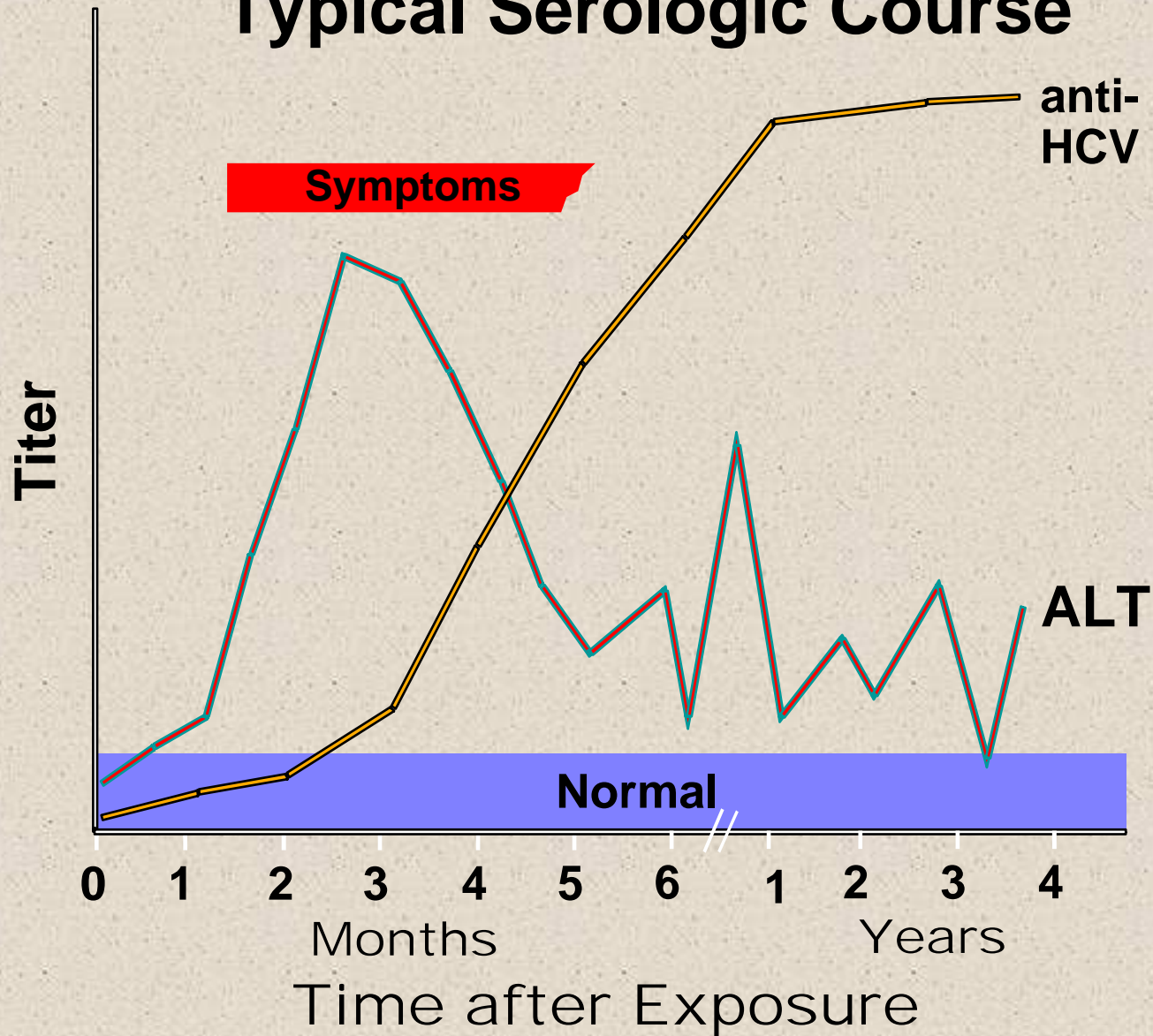
- You will need to sign either:
  - a consent to receive the vaccine
  - a “declination form” if you don’t want vaccine
  - if a persons declines the vaccine initially they may receive it later if they change their mind

# Hepatitis C - Clinical Features

---

Incubation period:	Average 6-7 wks Range 2-26 wks
Clinical illness (jaundice):	30-40% (20-30%)
Chronic hepatitis:	70%
Persistent infection:	85-100%
Immunity:	No protective antibody response identified

# Hepatitis C Virus Infection Typical Serologic Course



# Prevention of Hepatitis C

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- Screening of blood, organ, tissue donors
- High-risk behavior modification
- Blood and body fluid precautions

# **Risk Factors For Transmission of Hepatitis C**

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- **Transfusion or transplant from infected donor**
- **Injecting drug use**
- **Hemodialysis (yrs on treatment)**
- **Accidental injuries with needles/sharps**
- **Sexual/household exposure to anti-HCV-positive contact**
- **Multiple sex partners**
- **Birth to infected mother**

Post exposure Prophylaxis for Hepatitis C  
Advisory Committee on Immunization  
Practices (ACIP)  
Revised Recommendation, February 1994

“Recent studies indicate that IG does not protect against infection with HCV. Thus, available data does not support the use of IG for post exposure prophylaxis of hepatitis C. There is no data on the efficacy of IG for post exposure prophylaxis of other (non-HCV) parenterally-transmitted non-A, non-B hepatitis.”

# Public Health Service Guidelines for Counseling Hepatitis C + Persons

- Hepatitis C + Persons should:
  - Be considered infectious
  - Keep cuts and skin lesions covered
  - Practice safe sex
  - Be informed of the potential for perinatal transmission; no evidence to advise against pregnancy or breastfeeding
- Should not:
  - Donate blood, organs, tissue, or semen
  - Share household articles (e.g., toothbrushes, razors,)

# Universal & Standard Precautions

Reduce risk of transmission of **MORE** pathogens, including bloodborne

## Standard Precautions

blood; ALL body fluids, secretions, & excretions except sweat; nonintact skin; mucous membranes

## Universal Precautions

blood, serum, semen, bloody saliva or stool, etc.

Reduce risk of transmission of HIV, HBV, & other bloodborne pathogens

# Standard Precautions

---

- Includes
  - blood
  - all body fluids, secretions & excretions except sweat
    - **urine, feces, saliva, tears, nasal secretions  
sputum, vomitus, breast milk**
  - non intact skin
  - mucous membranes

# Standard Precautions

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- Will also protect you against bloodborne organisms & those that are not bloodborne
  - Salmonella
  - CMV
  - EB virus in saliva

# Standard Precautions

---

- Routine hand washing
- New guidelines from CDC: alcohol based hand rubs
- Consistent & correct glove use and glove changing
- Masks, eye protection, face shields, and gowns when appropriate
- Routine cleaning or disposal of patient care equipment

# Standard Precautions (cont.)

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- Routine cleaning of environmental surfaces and patient care equipment
- Appropriate handling of linens
- Managing patients with poor hygiene
- Adherence to occupational safety requirements

# Universal Precautions

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- Treat blood & certain body fluids from every person as if they carry bloodborne pathogens

# Universal Precautions

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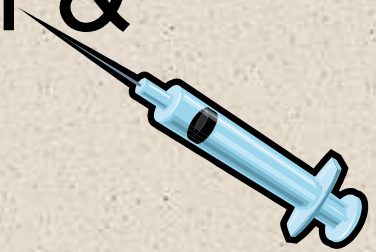
- Wear appropriate protective gear to keep blood & other body fluids away from your body
- Wash your hands
- Prevent injuries from needles & sharps
- Use mouthpieces (CPR)
- Caution with dermatitis (weeping lesions & rashes)

# Universal Precautions

- **Clean up spills immediately**
- **Clean equipment after use**
- **Clean environment**
- **Wash Hands**
- **Wash Hands**
- **Wash Hands**



# Post Exposure Evaluation & Follow Up



- If you have an exposure:
  - **needle stick**
  - **bloodborne; cuts on hand/skin**
  - **blood splash in eyes**
  - **getting a bite that breaks the skin...**

# Post Exposure Evaluation & Follow Up

---

- Wash wound with soap and water
- Control bleeding if necessary
- If eyes, mouth, or nose exposed, lean over a sink and flush with lots of clean water (Eyewash Stations)

# Post Exposure Evaluation & Follow Up

---

- Report incident to your supervisor!
  - Document the incident
  - Provide a description of the circumstances under which the exposure occurred
  - Complete post-exposure forms
  - Go to emergency room as soon as possible!

# Post Exposure Evaluation & Follow Up

---

- If you have an exposure incident
  - The source will be asked to be tested for HIV and HBV with their consent
  - You will be offered proper follow-up for Hepatitis B (ER protocols)
  - You will be offered HIV, HBV, HCV testing (and possibly other lab tests if medications are recommended)

# Post Exposure Evaluation & Follow Up

---

- Treatments depend on:
- Type of Exposure (and method):
  - Percutaneous?                      Large bore needle?
  - Mucous Membranes? Few drops?
  - Intact skin?                              Superficial scratch?
  - Major blood splash?

# Post-Exposure Evaluation and Follow up

- **Algorithm used in Emergency Room to determine type of treatment and/or chemoprophylaxis needed**

# Post Exposure Evaluation & Follow Up

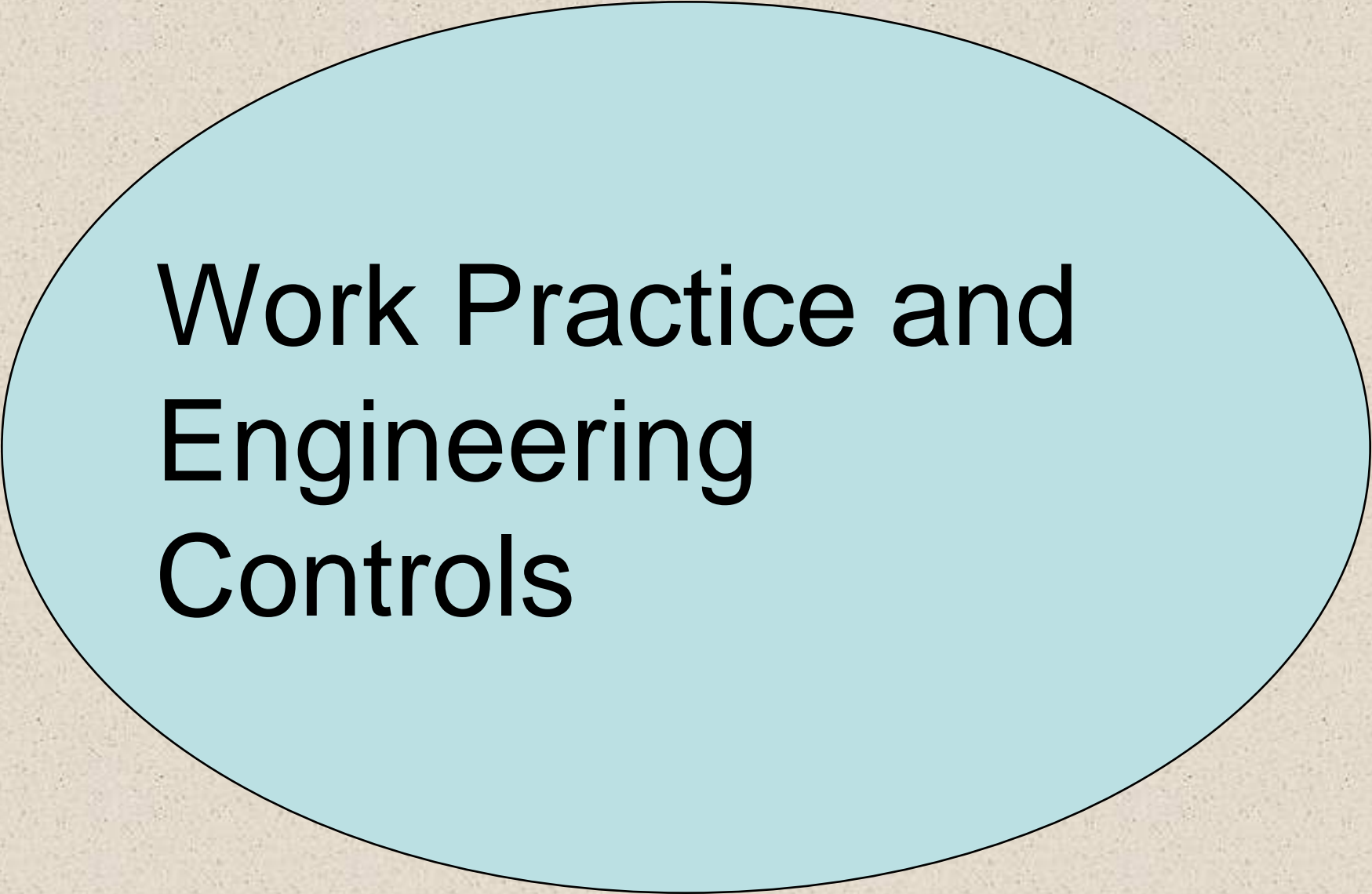


- Chemoprophylaxis after Exposure to HIV
  - Treatment should begin within 2 hours after exposure!
  - Regimens include 2 to 3 anti-viral drugs
  - (May be for 4 weeks)
  - ER Doctor will determine if treatment is warranted based on HIV Post-exposure Prophylaxis protocol

# Post Exposure Evaluation & Follow Up

---

- If the source is HIV positive, the Health Care Professional will:
  - recommend HIV testing of exposed employee at baseline, 6 weeks, 3 months, & 12 months
  - counsel about precautions
  - discuss post exposure medications after exposure



# Work Practice and Engineering Controls

# Decontamination and Sterilization

---

- All surface, tools, equipment and other objects that come in contact with blood or potentially infectious materials must be decontaminated and sterilized as soon as possible.
- Equipment and tools **must** be cleaned and decontaminated before servicing or being put back into use.

# Decontamination and Sterilization

---

- **Decontamination should be accomplished by:**
  - Household bleach/Clorox diluted between 1: 10 to 1:100 with water.
  - 1/4 cup of bleach per gallon of water is standard recommendation.
  - Lysol or some other EPA-registered tuberculocidal disinfectant.

# Decontamination and Sterilization

---

- If cleaning up a spill, cover spill with paper towels or rags and pour the 10% solution of bleach over the spill and leave it for 10 minutes.
- If decontamination of equipment is needed, place the equipment in the solution for 10 minutes prior to cleaning
- Know the “kill times” of disinfectants

# Personal Protective Equipment

---

- Gloves
- Goggles/Face Shields
- Gowns/Aprons
- Safer Sharps

# Personal Protective Equipment

- **Gloves**
  - **Latex**
  - **Nitrile**
  - **Vinyl**
  - **Synthetic**
- If a glove is damaged, don't use it!



# Personal Protective Equipment

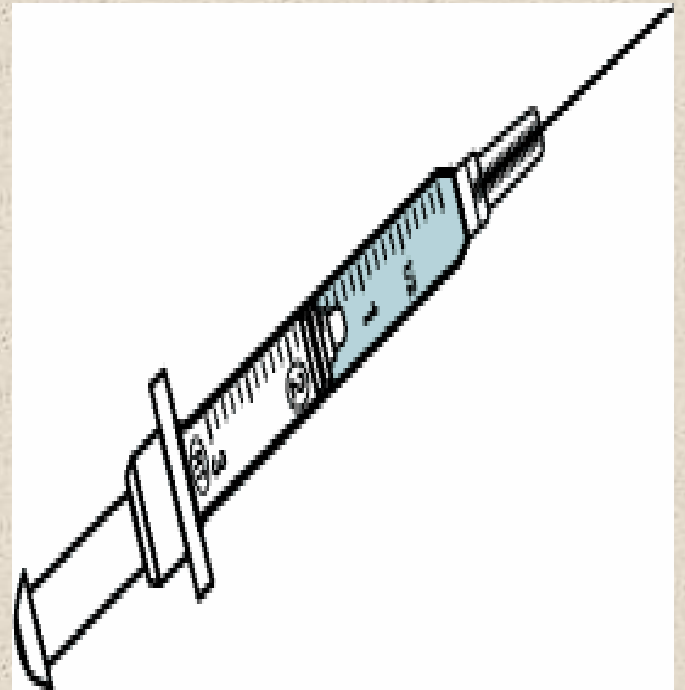
- Goggles
  - Protects eyes
- Face Shields
  - Protects nose and mouth





# Personal Protective Equipment

- Safer Sharps
  - Needle less IV
  - Needle less vaccutainers
  - Safety syringes



# Personal Protective Equipment

---

- **Needles**

- Never recap
  - Should not be removed by mechanical device or tool such as forceps and pliers
  - Never break or shear needles
- Needles should be disposed of in labeled sharps containers only

# Personal Protective Equipment

---

- **Sharps containers**

- Shall be closable, puncture-resistant, leak-proof on sides and bottom
- Must be labeled or color coded
- Prior to being moved from an area, the containers should be closed to prevent spillage or protrusion of contents during handling or transport
- Tape and initial

# Personal Protective Equipment

---

- To protect yourself, it is essential to have a barrier between you and the potentially infectious material
- Always wear PPE in exposure situations
- Remove and replace any PPE that is torn or punctured; unable to function as a barrier
- Remove PPE before leaving the work area

# Personal Protective Equipment

---

- **Handwashing**

- Prevents transmission of bloodborne pathogens
- Easy to do!
- Wash hands immediately after task with soap & water or:
  - **Water-less alcohol gels**
  - **Antiseptic hand wash**
  - **Antiseptic towelettes**

# Personal Protective Equipment

---

- Remember to use Universal Precautions
- And treat ALL blood or potentially infectious body fluids as if they are contaminated
- Wear PPE

# Warning Labels

- Biohazard Labels
  - Red, orange-red with biohazard label
- Red biohazard bags
  - Look for biohazard label



# Ergonomics

---

- **Purpose**
  - **Decrease injuries**
    - **Long Term**
      - **back injuries**
      - **CT Syndrome**
      - **neck, back ,  
shoulder**
- **Examples**
  - **keyboard height**
  - **posture**
  - **chair height**
  - **position of monitor**
  - **repetitive motion**
  - **awkward positions**

# Ergonomics



- **Prevention:**
  - **Workspace**
    - counter height
    - seat height
    - right tools for the job
  - **Good body mechanics**
  - **Exercise**

# Ergonomics

- **Back**
  - **mechanics**
    - **Lift with legs not back**
    - **Hold weight close to body**
  - **Carpal Tunnel**
    - **wrists raised**
    - **use wrist rest**
    - **take breaks**
    - **drink water**
- **Neck, back, shoulder**
  - **telephone between shoulder and ear**
    - **use shoulder rest or head set**

# General Safety

---

- **Electrical**
- **Fire**
  - **Evacuation Plan**
  - **Training**
  - **Extinguishers**
- **Indoor Air Quality**
- **Emergency**
  - **Hold regular drills**
  - **Know your role**
  - **Know meeting areas**

# Hazard Communications

- **Chemical**
  - **Physical**
    - fire, explosion
  - **Health**
    - Acute - H/A, irritation, nausea, etc.
    - Chronic
- Know chemicals
  - Labeling
- **MSDS**
  - **Location**
  - **How to understand**
  - **How to obtain**
- **Spill Kits**
  - **Where are they?**
  - **Directions/Equipment**

# Workplace Violence

- Risks
  - lighting
  - isolation from hrs. of operation
  - security
- Triggers
  - personal conflict
- Controls
  - Plan
    - buddy system



**Maryland Department of  
Health & Mental Hygiene  
Epidemiology & Disease Control Program**

**A Slide Presentation for  
Employees on Reducing Risk  
of Occupational Exposure to  
Tuberculosis**

# **TB Training Objectives**

- **How is TB spread?**
- **What is TB infection?**
- **What is active TB disease?**
- **How is TB prevented and treated?**
- **How can you protect yourself from TB?**
- **What should your employer do for you?**

# **Global Tuberculosis**

- **One of three people in the world is infected with TB**
- **Half of the 23 million refugees in the world are infected**
- **Three million people die each year of TB**
- **13 million people coinfectd with HIV and TB**

# **Why did TB Increase in the U.S.?**

- **Homelessness**
- **Intravenous drug use**
- **Overcrowding in institutional settings**
- **HIV infection**
- **Reduced resources for TB control and treatment**
- **Immigration from high TB prevalence areas**

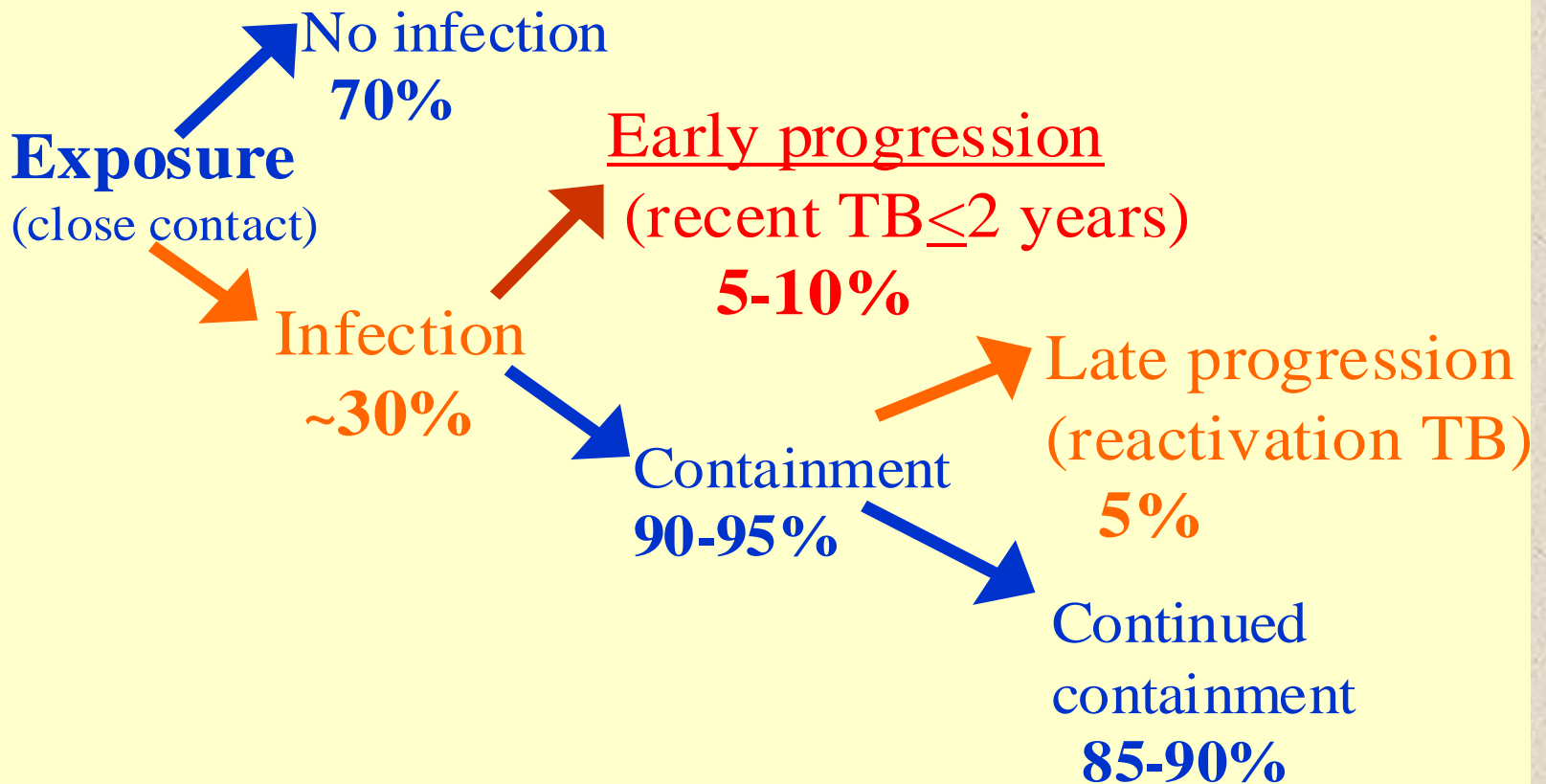
# **How can TB decrease in the U.S.?**

- **Increased funding**
- **Improved TB infrastructure**

# TB Transmission

- **Infectious disease caused by *Mycobacterium tuberculosis***
- **Spread by airborne droplets, “droplet nuclei”, to 5 microns in size**
- **Droplet nuclei generated when a person with TB disease coughs, sneezes, speaks or sings**
- **TB infection occurs when a person inhales the bacteria and it becomes established in the body**

# Risk of TB infection and disease among exposed individuals



# Symptoms of Active TB Disease

- **Persistent cough**
- **Productive cough**
- **Fever**
- **Weight loss**
- **Night sweats**
- **Coughing up blood**
- **Loss of appetite**
- **Fatigue**

# **Tuberculosis Infection - No Active Disease**

- **Cannot spread to others**
- **Positive skin test reaction**
- **X-ray negative**
- **No symptoms**
- **Potential for active TB disease**
- **Not reportable to health department**
- **May be offered prophylactic medication**

# Sites of Active TB Disease

- Lungs \* (most common site)
- Other sites:

Larynx \*

Lymph nodes

Brain

Kidney

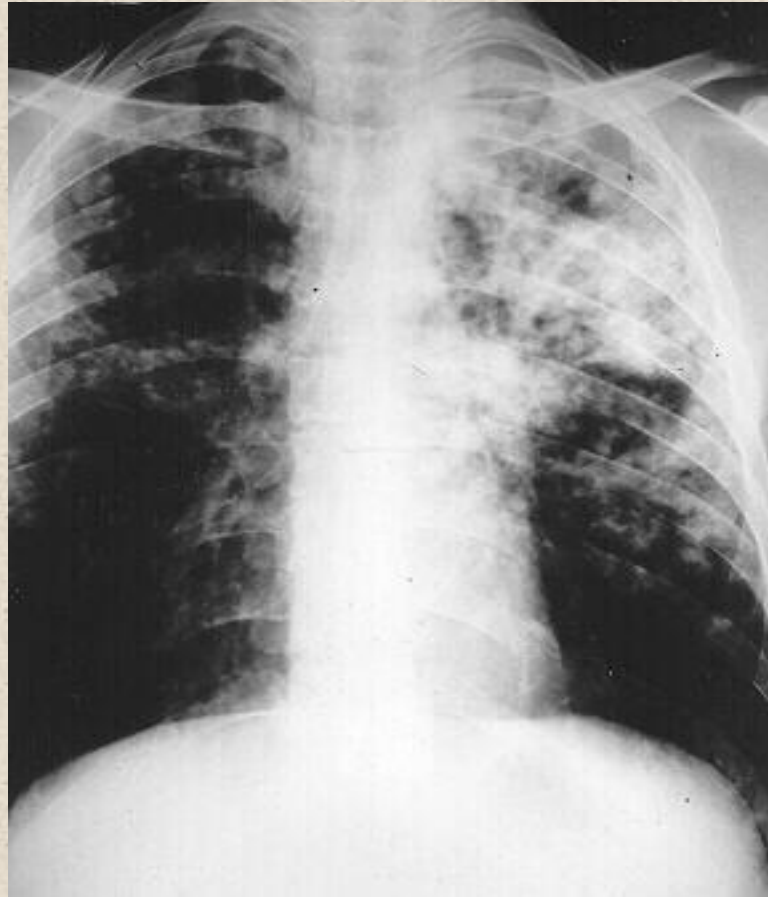
Bones

Other locations

\* Only pulmonary and laryngeal TB are infectious

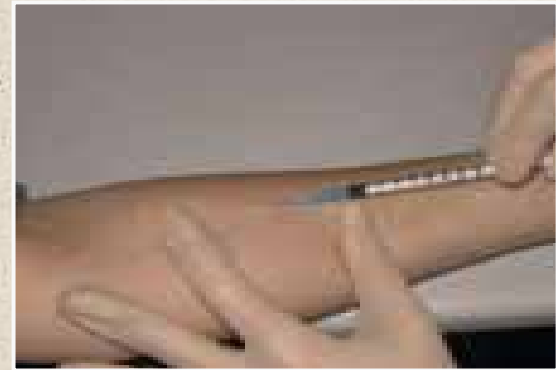


# Pulmonary Tuberculosis



# Mantoux Tuberculin Skin Test

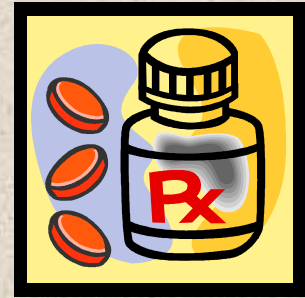
- Inject PPD intradermally
- “Read” in 48-72 hrs
- Measure swelling
- (not redness)
- A positive result means person may have had exposure to TB bacteria (TB infection, NOT active TB disease)
- \*Size of induration read as “positive” depends on risk factors



# Treatment of Latent TB Infection (TB Preventive Therapy)

- For certain *infected persons* without active TB disease:
  - A single drug, INH (isoniazid), usually recommended (other regimens now available)
  - Reduces risk of developing active TB
  - People are monitored for side effects on a regular basis

# Treatment for Active TB Disease



- **Essential to cure TB and prevent drug resistance**
- **A combination of 4 drugs used initially**
- **Directly observed therapy (DOT) is the standard of care in Maryland**

# **TB Disease Often More Serious In:**

- **HIV-infected persons**
- **Persons with other immunocompromising conditions**
- **The very young**

# **Multi-Drug Resistant (MDR) TB**

- **Resistance to at least isoniazid (INH) and rifampin**
- **Difficult to treat because other drugs are not as powerful and are more toxic**
- **Long duration of treatment (at least 2 years)**

# **OSHA/MOSH Enforcement Guidelines for Occupational Exposure to TB**

- **Based on CDC 1994 *“Guidelines for Preventing the Transmission of Mycobacterium Tuberculosis in Health Care Facilities”***
- **Covers work places identified by CDC with a high incidence of TB**

# **Work Places Identified by CDC with High Incidence of TB**

- **Health care settings**
- **Correctional institutions**
- **Homeless shelters**
- **Long-term care facilities for the elderly**
- **Drug treatment centers**

# **OSHA General Duty Clause Used to Cite Employers Whose Employees:**

- Have potential exposure to exhaled air or perform hazardous procedures on confirmed or suspected TB cases**
- Work in CDC-designated high TB incidence facilities**

# High Hazard Procedures

- **Characterized by potential to generate airborne secretions:**
  - **Aerosolized medication treatment**
  - **Bronchoscopy**
  - **Sputum induction**
  - **Endotracheal intubation and suctioning**
  - **Autopsies**

# Employer Responsibilities

- **Keep a safe work place**
- **Have a written plan to identify and manage people with active TB disease**
- **Place patients with suspected or confirmed infectious TB in an AFB (acid fast bacilli) isolation room**
- **Teach you about TB and how to protect yourself at work**
- **If needed, provide you with respirator and teach you how to use it**

# **Employer Responsibilities** (cont'd)

- **Regular skin testing to employees who have negative skin tests**
- **Proper care if you develop TB infection or active TB disease**
- **Written policy on when employees who have active TB can work**
- **Policy on voluntary work reassignment options for immunocompromised employees**
- **Medical records kept confidential**

# If You Develop Symptoms of TB

- **Seek medical attention**
- **Get proper therapy**
- **Prevent spread to others**
- **Notify your employer if you are diagnosed with active TB disease**

# **Fundamentals of TB Infection Control**

- **Find cases of active TB promptly**
- **Isolate TB cases promptly**
- **Initiate effective anti-TB drugs promptly**
- **Use precautions for cough-inducing or high risk procedures (e.g., sputum collection, bronchoscopy)**

# **Fundamentals of TB Infection Control**

**(cont'd)**

- **Screen persons at high risk for TB and provide treatment for latent TB infection**
- **Identify and evaluate people exposed to infectious TB**
- **Screen with skin tests periodically**
- **Look for TB cases among patients and workers**

# **TB Infection Control Measures**

## **Work practice controls:**

- **Early identification and isolation of suspected or confirmed TB cases**
- **Have suspected or confirmed TB cases wear masks during transport**
- **Caregivers wear protective masks**

# **TB Respiratory Protection**

- **Protective masks are required when:**
  - **Entering rooms housing persons with suspected or confirmed TB disease**
  - **Performing high hazard procedures on persons with suspected or confirmed TB disease**
  - **Transporting a person with suspected or confirmed TB disease**

## **TB Respiratory Protection (Cont'd)**

**Where respirators are required employers must:**

- **Make sure employees use NIOSH-approved high-efficiency particulate respirators**
- **Have a respiratory protection program in accordance with OSHA**
- **Conduct annual "fit-testing"**
- **Assure respirators are "fit-checked" by employees prior to each use**

# Questions?

- **Please direct questions to the  
Communicable Diseases  
Nurses in PERSONAL HEALTH  
DEPARTMENT**
- **301 334-7770**