

Bloodborne Pathogens

Garrett County Health Department

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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

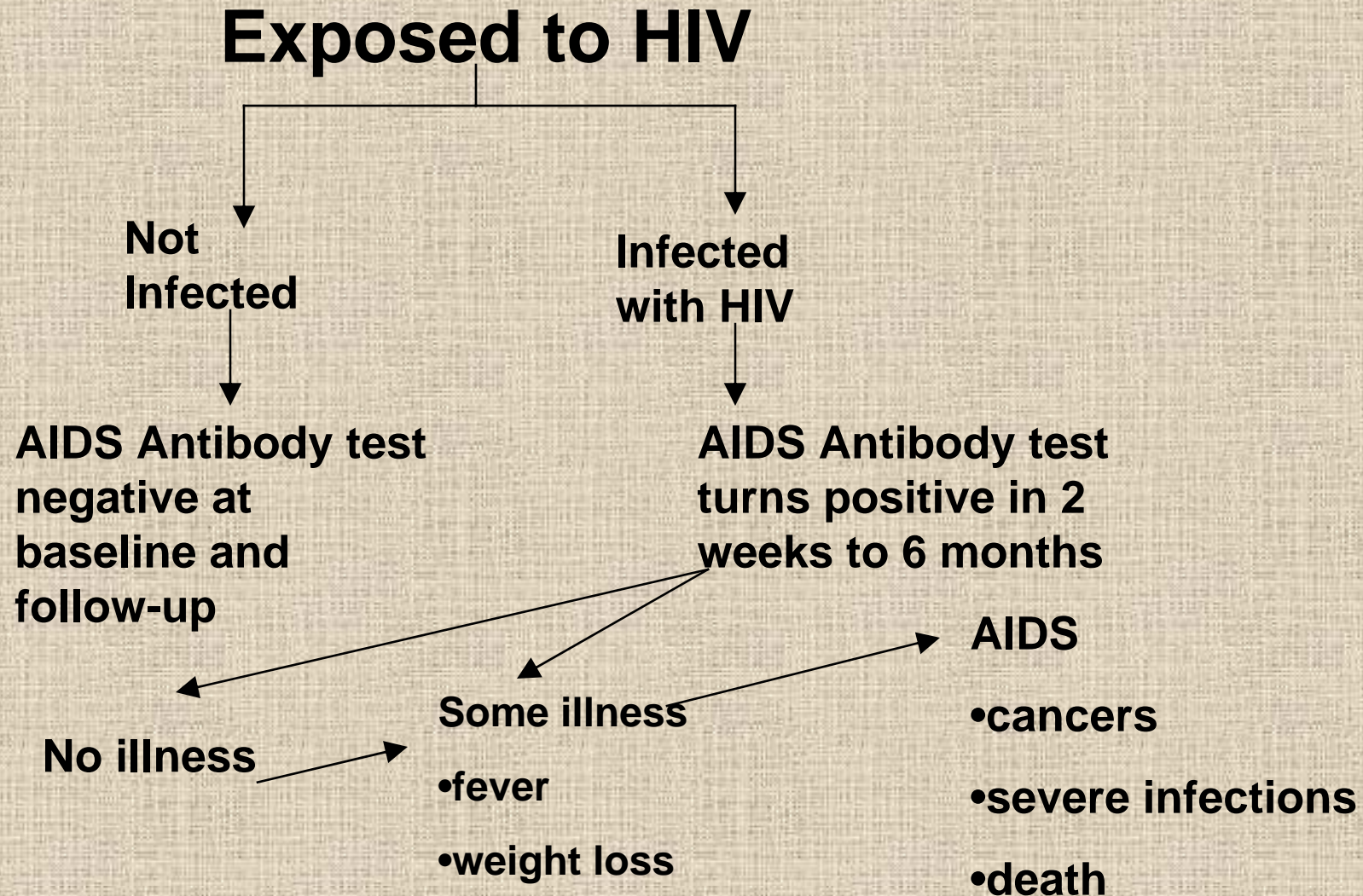
(Human Immunodeficiency Virus)

■ **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

	A	B	C	D	E
Source of virus	feces	blood/ blood-derived body fluids	blood/ blood-derived body fluids	blood/ blood-derived body fluids	feces
Route of transmission	fecal-oral	percutaneous permucosal	percutaneous permucosal	percutaneous permucosal	fecal-oral
Chronic infection	no	yes	yes	yes	no
Prevention	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.

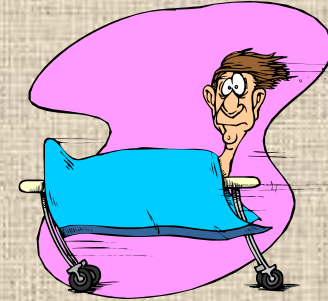
Hepatitis B Virus

- 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

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

Hepatitis B Vaccine

- 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**

If Hepatitis B Immunity Status Post Vaccination Is Unknown



- ❑ **Do nothing until exposure occurs**
- ❑ **When an exposure occurs**
 - Check HBsAB
 - If adequate; > 10 mIU/ML, no treatment
 - OR
 - If inadequate, initiate revaccination

**Source: Recommendations for Immunization of HCW's
from ACIP; MMWR 12/16/97-Vol. 46, No. RR-18**

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)

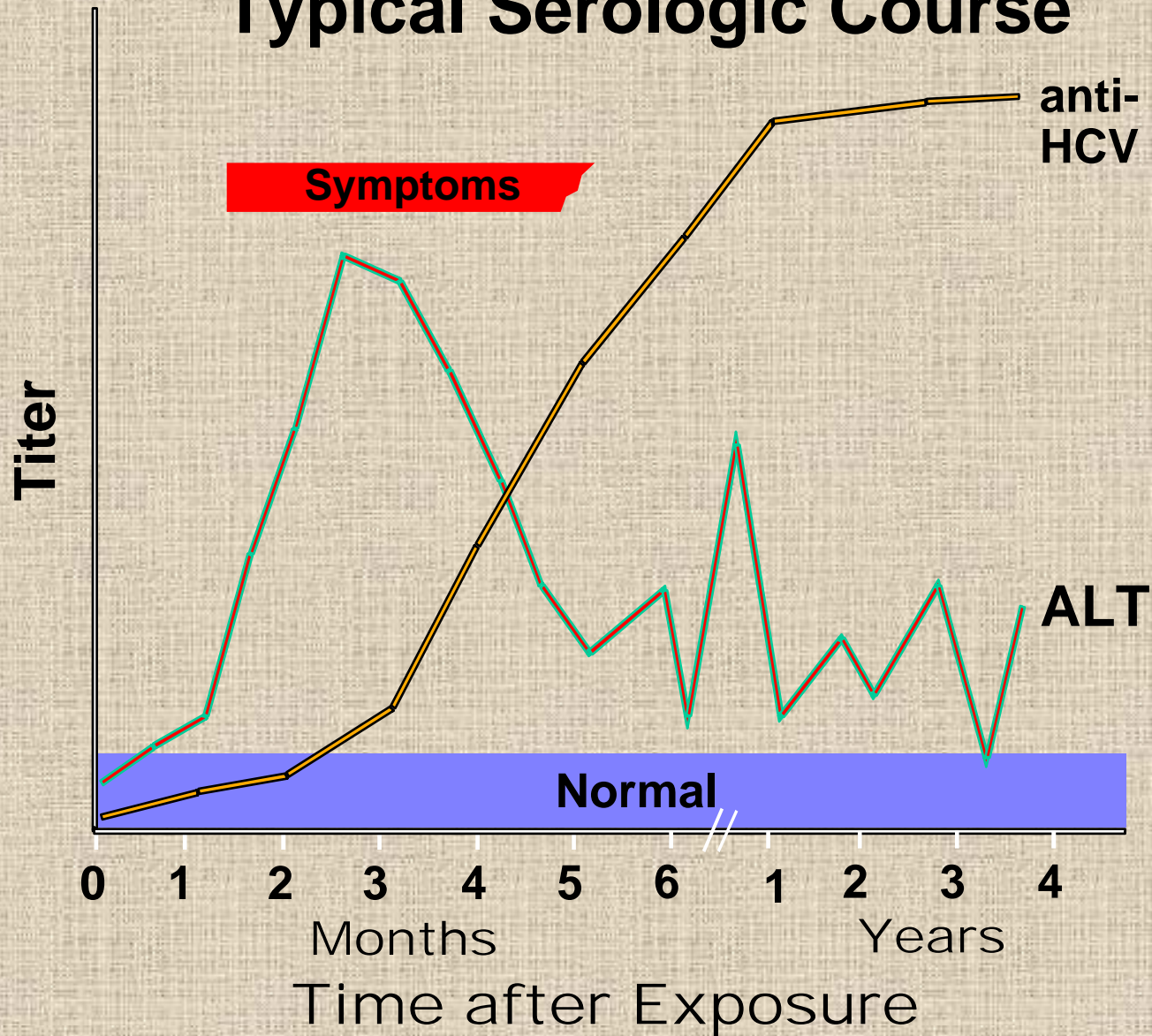
Hepatitis B Vaccine

- 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

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

Risk Factors For Transmission of Hepatitis C

- **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**

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

- 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.)

- 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

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

Universal Precautions

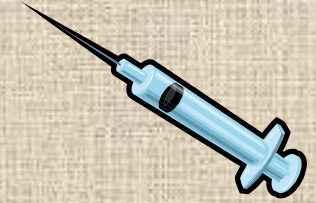
- Wear appropriate protective gear to keep blood & other body fluids away from your body
- Wash your hands
- Prevent injuries from needles & sharps
- Use mouthpieces (CPR)
- Caution with dermatitis (weeping lesions & rashes)

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; flush 15 minutes**
 - **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 for approximately 15 minutes (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

■ Gowns

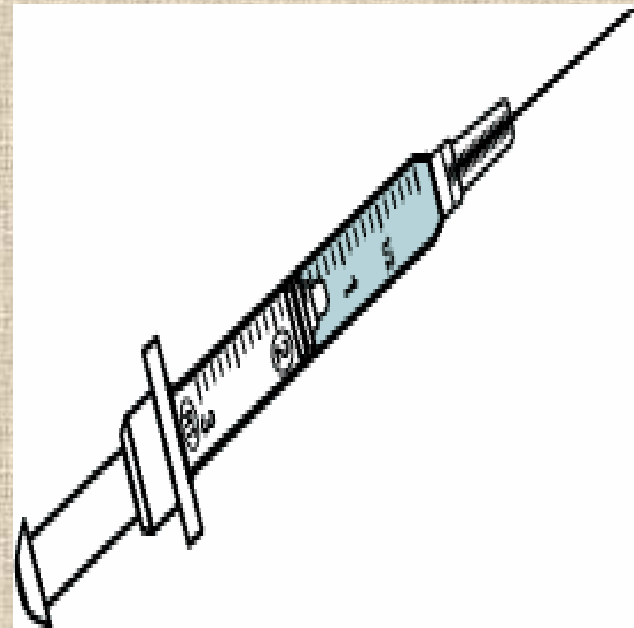
- Protects clothing and keeps blood & other fluids from soaking through to skin

■ Aprons



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**

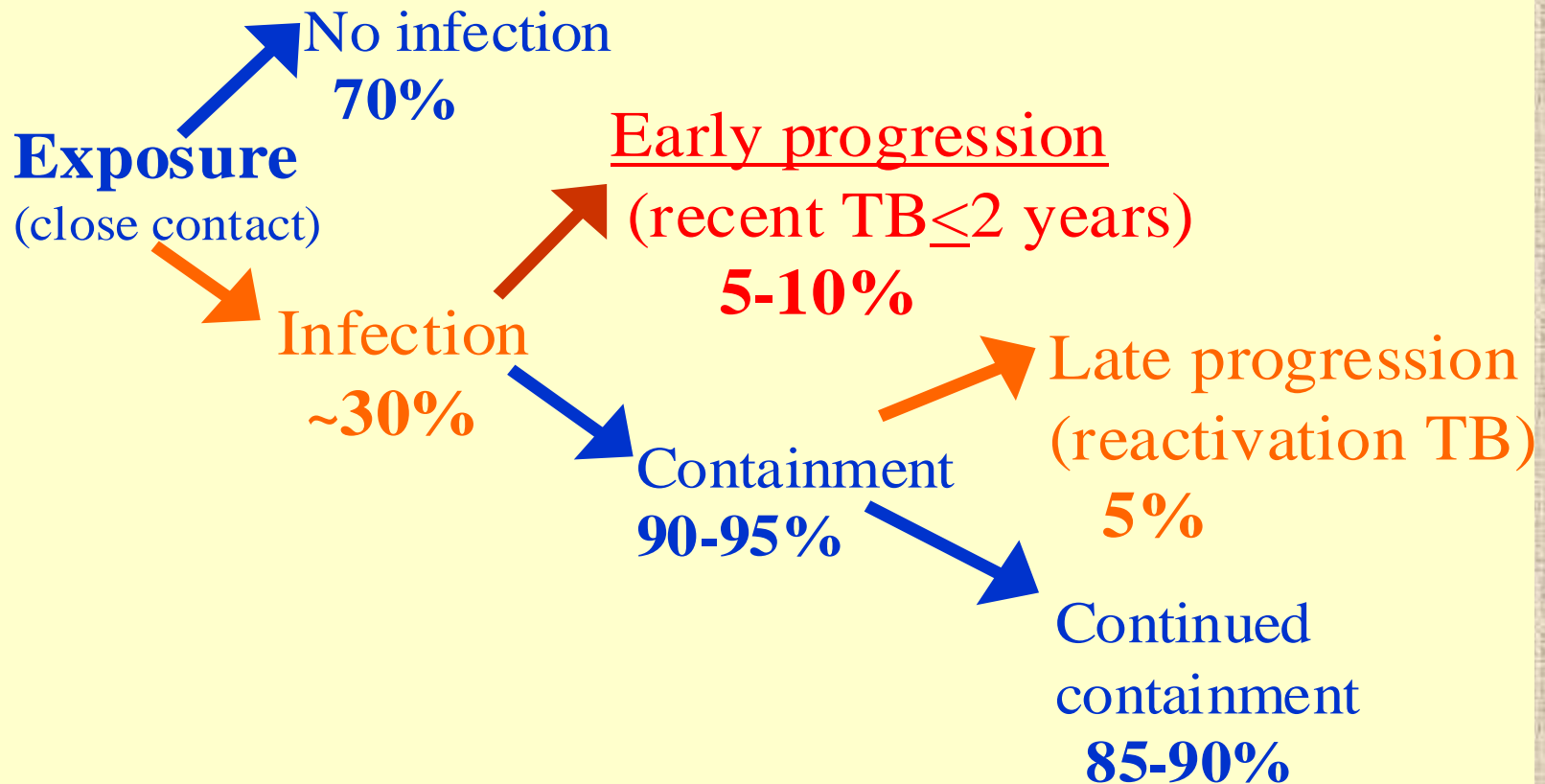
How can TB decrease in the U.S.?

- **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

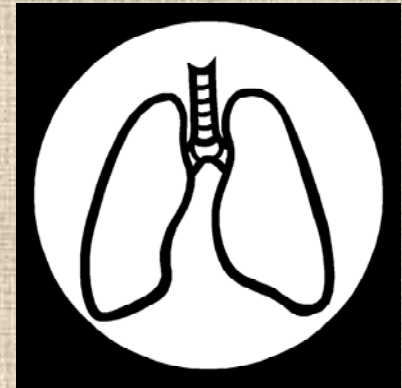
Brain

Kidney

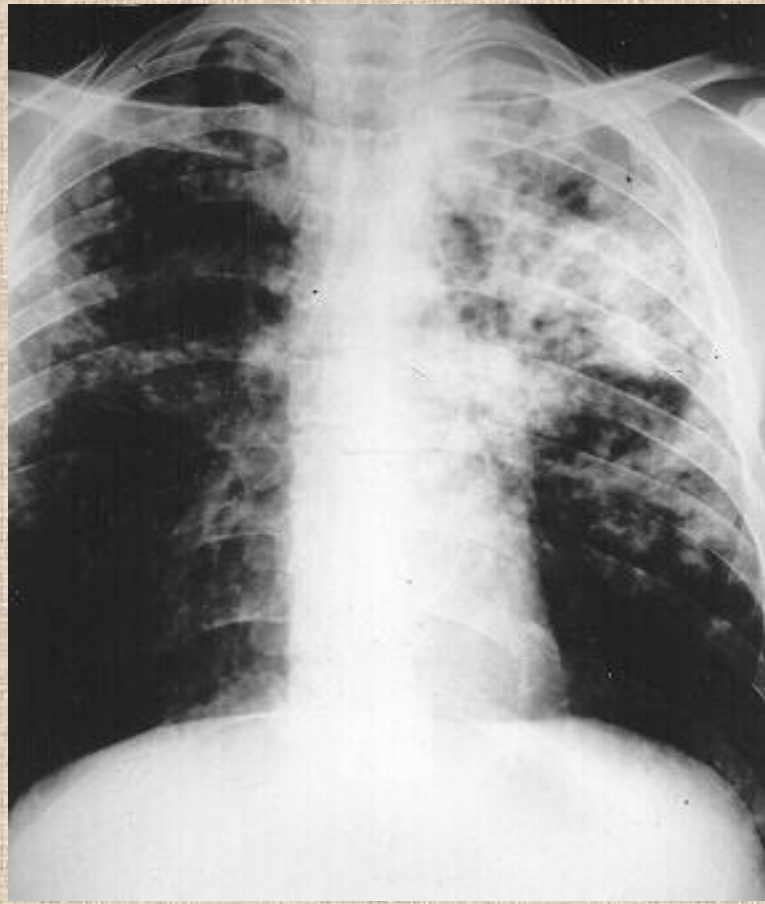
Bones

Other locations

* Only pulmonary and laryngeal TB
are infectious



Pulmonary Tuberculosis



Mantoux Tuberculin Skin Test

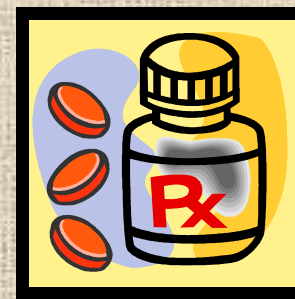
- Inject PPD intradermally
- “Read” in 48-72 hrs
- Measure swelling
- (not redness)
- A positive result means person may have had exposure to TB bacteria (TB infection, NOT active TB disease)
- *Size of induration read as “positive” depends on risk factors



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**