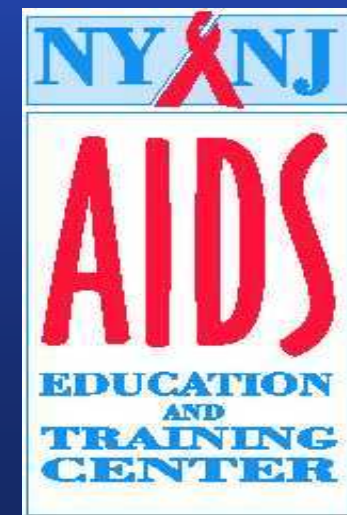


Blood Borne/Airborne Pathogens



Ronald G. Nahass, MD, FACP, FIDSA
Clinical Professor of Medicine
UMDNJ-RWJ Medical School
ID Care
Medical Director of AETC



By the very nature of what you do....



There is risk for exposure to blood and airborne diseases.

Goal of this Presentation

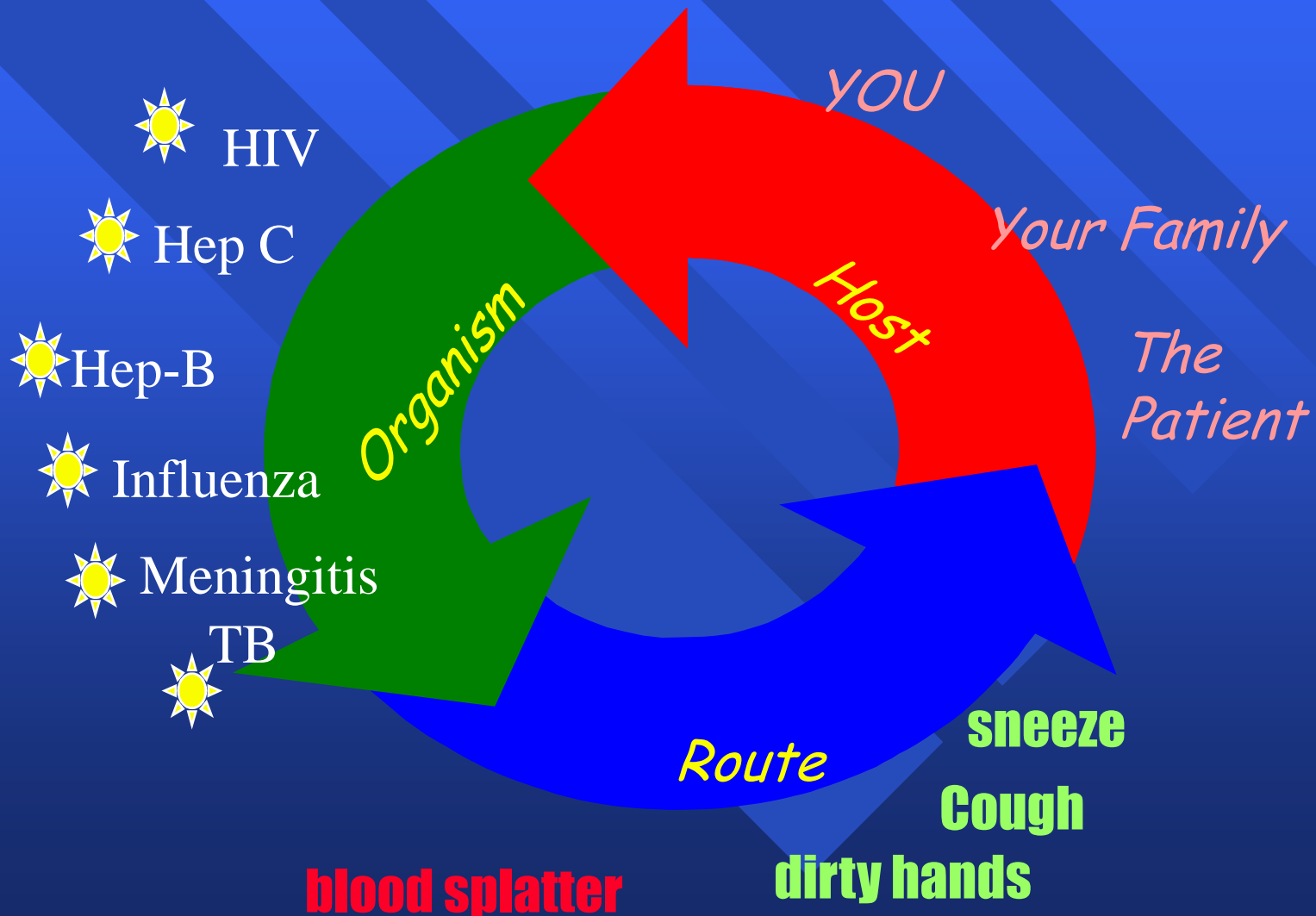
To Help Keep You Safe By

- Reviewing common **blood** and **airborne** pathogens
- Discussing risk reduction
- Describing what to do if you are exposed to **bloodborne** or **airborne** pathogens

The Chain of Infection contains 3 elements

- Organism = GERMS (bacteria, virus, mold)
 - Pathogen = BAD Germs that can cause illness
- Route—Transit System, how the organism gets from one place to another
- Host—GERM Condominium, where the germ lives and grows. This could be a patient, bystander, or this could be you!!

Chain of Infection



Organism

- Virus, Bacteria, Molds, Fungus
- There are thousands, but most are not problematic
- The common trouble makers...
 - Bacteria
 - Viruses
- Any germ can be problematic in a person with compromised immune system!

Routes of Disease Transmission

- There are several ways organisms are spread.
 - *Direct Contact*
 - *Indirect contact*
 - *Airborne/Droplet*

Direct Contact

- touching *blood* or *blood tinged* body fluids
- person touching another person with germs on their hand.



Direct Contact Pathogen

- Hepatitis B and C
- HIV
- Methicillin resistant Staphylococcus aureus (MRSA)
- Clostridium difficile (Cdiff)

Indirect Contact

- person handles an object that is **contaminated** or with contaminated hands and then gives the object to another person. This is a fomite

Bathroom Glass



Airborne/Droplet

- Person inhales organisms in the air or droplets **contaminated** with sputum or other secretions from a patient with the disease.



Airborne or Inhalation Pathogen

- Meningitis
- Tuberculosis
- Influenza
- SARS
- Colds
- Measles
- Chickenpox

Breaking the Chain of Transmission by...

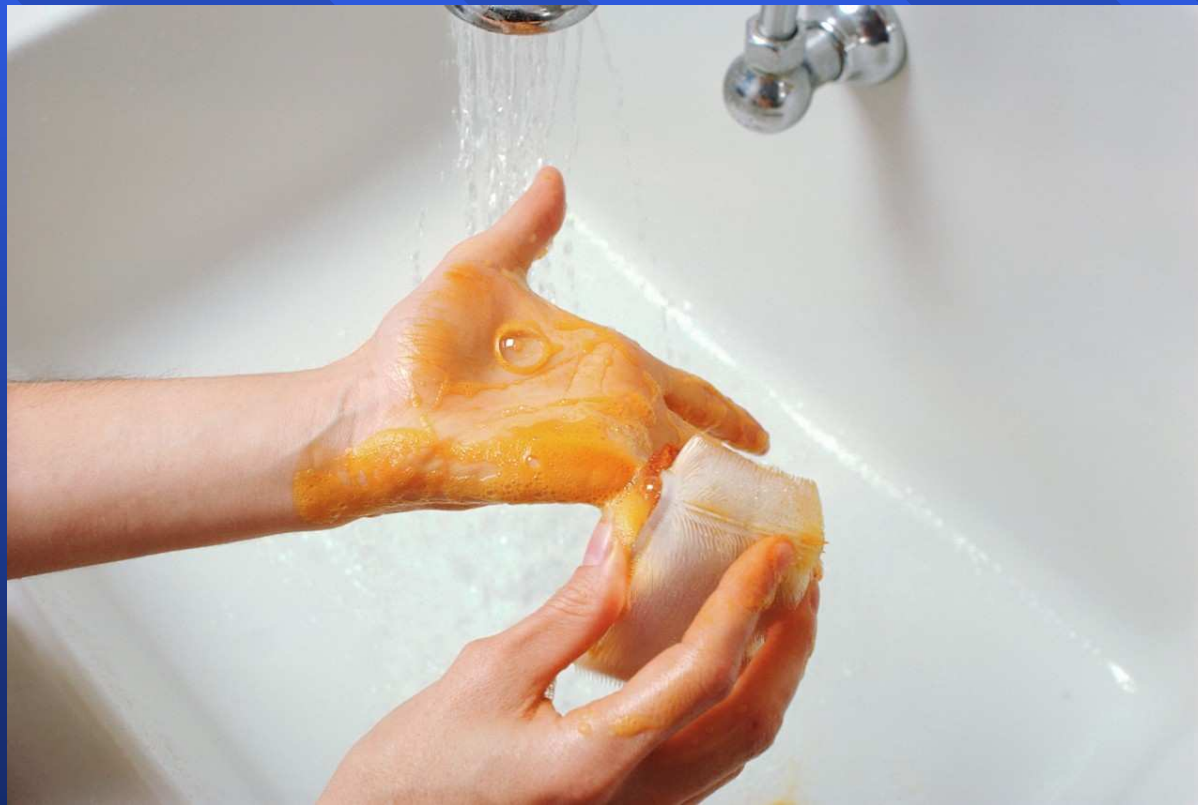
Destroying the Organism

- By cleaning and disinfecting.

Dirty equipment and surfaces need to be thoroughly cleaned with appropriate germicidal agents and allowed to air dry between patients.



Hand Hygiene is the single most important means for preventing the spread of infection!



What is hand hygiene?

- It's a handwash with soap and water
- It's hand cleaning with an antimicrobial soap and water or alcohol-based waterless solution



Why is hand hygiene important in the healthcare setting?

- It reduces spread of infection from you to patients
- It reduces risk of you becoming infected with organisms from patients
- It can reduce illness, death and expense of infections

When is hand hygiene indicated?

- Before and after patient contact
 - After removing gloves

How to use alcohol hand rubs:

- Spread over both hands up to $\frac{1}{2}$ inch above your wrist
- Rub vigorously until dry
 - ALCOHOL PRODUCTS SHOULD ONLY BE USED IF HANDS ARE NOT VISIBLY SOILED
 - Or if nothing else is immediately available

Breaking the Chain of Transmission by...

Barricading the Route



- Wearing personal protective equipment



- Using engineering controls like Sharps containers...



Stopping Transmission by using Personal Protective Equipment (PPE)

Prevent contact with body fluids and other contaminants by using the following PPE:

- Hands: *Gloves*
- Face: *N-95 mask / eye protection*
- Clothing: *Cover gown / turn out gear*



PPE needs to be appropriate for the method of contact and should be donned as soon as the possibility of contact arises! Better yet..... **ANTICIPATE!**

Gloves

- Wear gloves whenever providing care
- Check that gloves are intact
- Don't use petroleum-based hand lotions
- Remove contaminated gloves without touching contaminated outside surface
- Dispose of gloves properly
- Change gloves and wash hands between patients
- Wear heavy utility gloves to clean spill or disinfect equipment

Skill:

Glove
Removal

Hold hands away from body
and point fingers downward



Remove the glove
inside out



Do not touch the contaminated
outer surface of the glove



First glove is balled
up inside the second





Personal Protective Equipment

Masks



- Use resuscitation mask or other barrier for rescue breathing/CPR
- Use surgical (cloth) masks if blood may splash
- Surgical mask may be put on cooperative coughing patient
- Use high-efficiency particulate air (HEPA) respirator for patient with an airborne infection
- Follow local protocols for using masks

Eye Protection

- Bloodborne pathogens can enter body through mucous membranes
- Use eye protection for risk of splashing blood
- Equipment includes eye shields, safety glasses and goggles, and splash shields on prescription glasses



Protective Clothing

- Use gown or jumpsuit for risk of large blood splashes
- Follow local protocols
- Change clothing soiled by blood or other body fluids a.s.a.p.
- Handle soiled clothing appropriately

Significant Exposure: What Happens Now?

Exposure to Blood

Exposure to Bloodborne Pathogens

When contact with **blood** or other body fluids occurs through

1. Percutaneous inoculation (needle stick)
2. An open wound
3. Non intact skin
4. Mucous membrane

During the performance of normal job duties.

Levels of Risk

- Intact skin to intact skin
 - Slight possibility
- Blood on intact skin
 - Minimal
- Blood or body tinged body fluids on mucous membranes
 - Moderate
- Needle stick, laceration, chapped skin, abrasion or dermatitis
 - Significant



When Significant Exposure Happens

- *Turn over patient care, as soon as possible*
- *Provide yourself with immediate care*
- *Seek Emergency Care*
- *Report Exposure*

Immediate Care

Goal: remove **Blood** ASAP!

- Splash to the Eye
 - **BLINK!** Several times
 - **RINSE** with saline or water
- Contact with other Mucous Membranes
 - Mouth
 - **SPIT!**
 - **RINSE** with water
 - Nose
 - **BLOW!**
 - **RINSE** with water
- Needle stick or break in the skin
 - **WASH** with soap and water
 - Should you squeeze it to make it bleed

Report the Exposure ASAP

- Report the exposure as soon as possible to the appropriate leader
- Seek evaluation at the Emergency Department right away

FOOD for Thought!

If you have been exposed to a patient with HIV, you may need to be started on a drug regimen ASAP!

If you don't report a potential significant exposure right away, you have lost precious time!

Exposure to AIRBORNE Diseases

Tuberculosis

Common Cold

Influenza

Meningitis

Whooping Cough

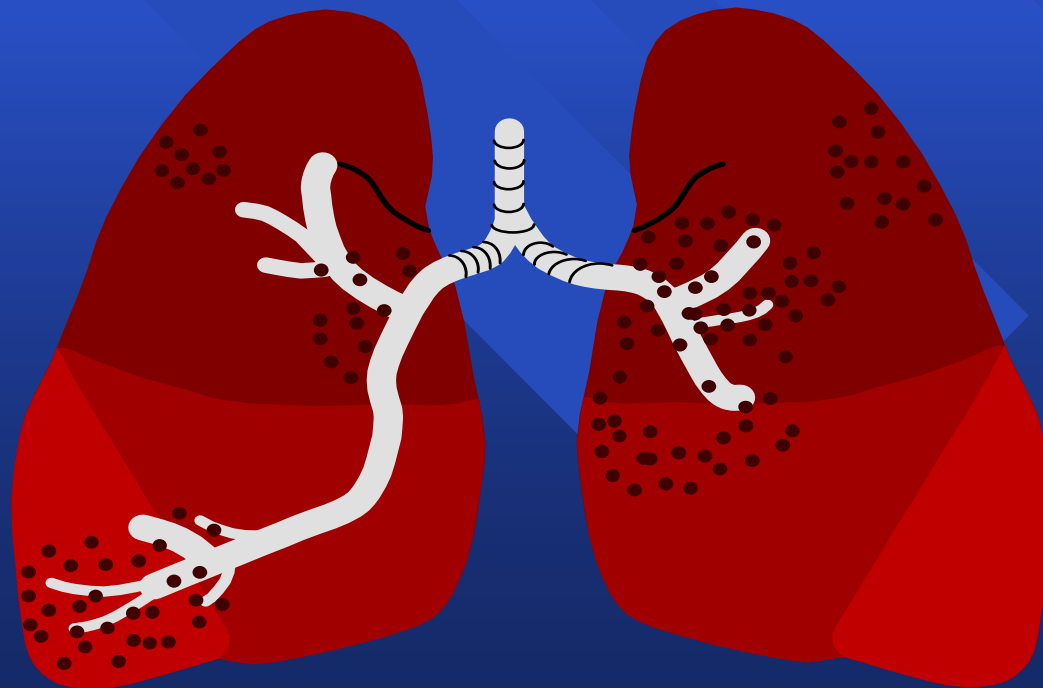
Measles

Airborne Transmission

One Sneeze = 4500 droplets
flying 2-12 feet at
100 miles/hour

What is TB?

Tuberculosis is a bacterial infection predominately of the lung which destroys tissue.



How TB is spread?

TB is spread by Airborne Transmission
by breathing in droplets coughed into
the air by a person with untreated TB

How can you protect yourself?

- First Responders caring for suspect/known TB patients must wear NIOSH approved respirators (N95)
- You must be fit tested prior to using the N95 respirators
- When you have a patient with respiratory symptoms, protect yourself. Wear appropriate PPE (N95)!

Medical Screening

- Medical Screening:
 - Personnel must have a TST skin test annually
 - TST skin tests must be read @ 48-72 hours
 - Staff with known positive TST skin test should receive treatment to protect themselves from getting TB disease

Exposure to AIRBORNE Diseases

Harder to identify because you can't see them!

- Maintain an Index of Suspicion
 - Watch for signs and symptoms
- Wear PPE when appropriate
- If you have an exposure, report it to supervisor



Index of Suspicion


■ Productive cough

■ Fever

■ Rash



■ Weight loss

■ Runny nose

■ Night sweats

■ Just a feeling 

Preventing Disease Transmission

A photograph of a person's arm and hand using a white paper towel to turn off a chrome faucet in a stainless steel sink. The person's hand is positioned under the faucet handle, and the paper towel is being used to grip it. The sink is set into a light-colored countertop. The background is a plain wall.

- Risk of disease from infected victim
- Taking steps to prevent infection reduces the risk

Serious Infectious Diseases

- Bloodborne pathogens transmitted through contact with infected person's blood
- Pathogens also in body fluids, such as semen, vaginal secretions, bloody saliva, vomit
- Nasal secretions, sweat, tears, and urine do not normally transmit pathogens

The background of the image is a dark blue gradient that transitions from a lighter blue at the top to a darker blue at the bottom. Overlaid on this gradient are several diagonal stripes of varying shades of blue, running from the top-left towards the bottom-right. The stripes are spaced evenly and create a sense of depth and movement.

HIV

HIV

- Causes AIDS
- AIDS disease is eventually fatal
- Almost 1 million HIV-positive people in the U.S.
 - one fourth are unaware of their infection
- Only blood test will determine HIV

Transmission of HIV

- Transmitted through body fluids:
 - Blood
 - Semen
 - Vaginal secretions
 - Breast milk
 - Other body fluids if blood is present
- Exposure to saliva, tears, urine, and other body fluids does not result in transmission.
- Casual contact does not result in transmission.

Importance of Prevention

- No vaccine available for HIV
- No cure for AIDS
- Preventive measures are critical

Hepatitis B

Hepatitis B (HBV)

- Viral infectious disease
- Transmitted through body fluids
- May cause liver damage or cancer
- Vaccine available

HBV Transmission

- Direct contact with infectious blood
- Exposure to HBV on contaminated environmental surfaces
- Sharing personal items or drug paraphernalia
- Not transmitted in food, water, fecal matter, or by casual contact

HBV Vaccine

- Vaccine is available
- First Responders should receive this vaccine and other recommended immunizations
- If not vaccinated, prevent infection by preventive actions

Hepatitis C

Hepatitis C (HCV)

- Viral infectious disease
- Transmitted through body fluids
- Can cause liver disease or cancer
- No vaccine

Importance of Prevention

- No HCV vaccine
- No cure
- Preventive measures are important
- Early treatment may is very important



Universal
Precautions

Tuberculosis

Tuberculosis

- About 16,000 cases reported annually
- First Responders rarely need special precautions
- Using face masks with one-way valves protects rescuers

The background is a solid blue color with several diagonal stripes of a slightly darker shade of blue running from the top-left to the bottom-right. The stripes are evenly spaced and create a sense of movement and depth.

Reducing Your Risk from Transmissible Diseases

Take Immediate Action if an Exposure Occurs

- Flush eyes or mucous membranes with running water for 20 minutes
- Immediately wash exposed area with antibacterial or antimicrobial soap
- Treat scabs and sores gently
- Report exposure to supervisor a.s.a.p.
- Save potentially contaminated object for testing
- Seek medical care a.s.a.p.
- Follow employer's required plan to receive needed tests and medical treatment

Recommended Immunizations, Tests and Medications

- Hepatitis B immunization
- Tdap within last 10 years - Tetanus, diphtheria, whooping cough
- Annual TB skin tests
- Post exposure HIV medications
- Post exposure vaccination for Hepatitis B
- Early intervention for Hepatitis C