



# Post-Exposure Prophylaxis

Health Worker Safety Training Module 2

# Topics

- What is PEP?
- Infectious body fluids
- Types of exposures requiring PEP
- PEP procedure
- HIV Exposure
- HBV Exposure
- HCV Exposure
- Toxicity and drug interactions

# Introduction

- Workers in hospitals are at risk of exposure to bloodborne pathogens, including Hepatitis B (HBV), Hepatitis C (HCV) and HIV/AIDS
- All occupational exposure to blood and other potentially infectious materials (OPIM) places workers at risk for infection



Photo by David Snyder

# What is Post-Exposure Prophylaxis?

- **Post-exposure prophylaxis (PEP)** is short-term antiretroviral (ARV) or immune globulin treatment to reduce the likelihood of viral infection after exposure to the blood or body fluids of an infected person.
- PEP can prevent infection from
  - Hepatitis B Virus (HBV)
  - Human Immunodeficiency Virus (HIV)
- No PEP exists for Hepatitis C Virus (HCV)



# Infectious Body Fluids and Materials

# Infectious Body Fluids

## Known Infectious:

- Blood
- Semen
- Vaginal Fluids

## Potentially Infectious:

- Cerebrospinal fluid
- Synovial fluid
- Peritoneal fluid
- Pericardial fluid
- Amniotic fluid

## Non-Infectious:

- Feces
- Nasal Secretions
- Sweat
- Tears
- Urine
- Saliva
- Sputum
- Vomit

# Other Potentially Infections Materials (OPIM) Includes:

- Any unfixed tissue and organ other than intact skin from a living or dead human
- HIV-containing cell or tissue cultures, organ cultures, and HIV or HBV-containing culture medium or other solutions
- Blood, organs, and other tissues from experimental animals infected with HIV or HBV



**Health workers should follow standard precautions when contact with any type of body fluid is anticipated**

# Human Immunodeficiency Virus (HIV)

- Exposure to blood or bloody fluids, as well as potentially infectious fluids carry risk of HIV infection.
- HIV does not survive well outside the body, but can be transmitted through needle sticks and injuries with instruments visibly contaminated with blood.
- Exposed persons can take PEP.
- If the source patient is HIV negative, the health worker should be aware that the patient's test may have been administered during the 3-month window period and PEP may still be recommended.

# Hepatitis B (HBV)

- Blood is the most important vehicle of transmission. Most other body fluids are not infectious, unless they contain blood.
- HBV can survive on dried blood or surfaces for one week.
- Pre-exposure vaccination is the best preventive measure and should be standard workplace policy.
- PEP with hepatitis B immune globulin (HBIG) should be implemented for unvaccinated persons.

# Hepatitis C (HCV)

- HCV is transmitted through blood.
- The Hepatitis C virus can survive for up to four days in dried blood and on surfaces outside the body.
- No post-exposure vaccine or prophylactic drug exists for HCV. Immune globulin is ineffective.
- Prevention of exposure is the only effective strategy for HCV prevention.



## Types of Exposure Requiring PEP

# Types of Exposure Requiring PEP

- Percutaneous injury
  - Needle stick
  - Injuries from scalpels, wires, surgical pins, saws, etc.
- Mucous membrane exposure—splashes and other contact with mucous membranes (includes eyes, nose, mouth)
- Non-intact skin exposure
- Direct contact (without barrier protection) to a concentrated virus in a research laboratory or production facility
- Human bites resulting in blood exposure to either person involved

## Risk of disease transmission after occupational exposure to blood-borne pathogens

Virus	Mode of Exposure	Risk of Infection
HIV	Percutaneous	0.3%
HIV	Mucous Membrane	0.03—0.09%
HBV	Percutaneous	10—30%
HCV	Percutaneous	0—10%



# PEP Procedure

# PEP Management

1. Treatment of injury site
2. Exposure report
3. Begin PEP starter pack
4. Evaluation of the source
5. Evaluation of the exposed person



## What to do if exposed:

- If you are stuck with a needle or sharp, or get blood or OPIM in your eyes, nose, mouth or on broken skin...
  1. Immediately flood the area with water
  2. Clean the wound with soap and water
  3. Report the incident to a supervisor
  4. Seek immediate medical attention and PEP within 2 hours of exposure

# Treatment of the Exposure Site

## DO

- Immediately flush the affected area with water.
- Wash the wound with soap and water.
- Start PEP within 2 hours.



## DO NOT

- Put the wound in your mouth.
- Squeeze the wound.
- Use caustic agents, such as bleach.



# Exposure Report

- If a needle stick, injury or splash occurs, immediately report the exposure to a supervisor and seek medical attention.
- The Exposure Report should include:
  1. Date and time of exposure
  2. Details of the procedure being performed and PPE being used
  3. Type, severity and amount of fluid to which worker was exposed
  4. Details about the exposure source person (patient)
  5. Medical documentation that provides details about post-exposure management

*Note to the trainer: Distribute the PEP form to participants and demonstrate how to properly complete each section.*

## Evaluation of the source person

- Evaluation of the source person is performed when the exposed health worker agrees to take PEP
- The following factors should be considered:
  - If the source is known:
    - If HIV, HBV, and HCV status of source person is unknown, these tests should be performed after obtaining consent
    - The exposed health worker should not be involved in obtaining consent for testing from the source
  - If the source is unknown, the exposure should be treated as high risk for infection
  - Needles and syringes do not need to be tested for viral contamination

## When to Start PEP

- The source person is known to be HIV or HBV positive.
- The source person is known, but their HIV or HBV status is unknown.
- The source is unknown.



# Post-Exposure Counseling

- Addresses the emotional effect of the exposure.
- Discusses behavior modification, including medicines and precautions to prevent secondary transmission.
- If the exposed worker tests negative for infection, the worker should be counseled on how to prevent future infection



# Post-Exposure Education

- Exposed health workers who initiate PEP should be advised about the importance of completing the prescribed regimen.
- Information about potential drug reactions and side effects, and how to manage and report these, should be explained.
- Behavioral changes (e.g. abstinence or condom use) should be discussed.



# HIV Exposure

# Clinical assessment to determine necessity of PEP when the source person is HIV positive

## High-risk criteria

- Source presenting with symptoms of HIV infection
- Acute sero-conversion
- High viral load (if known)
- AIDS
- Patient under Highly Active Antiretroviral Therapy (HAART) with indications of treatment failure

## Low-risk criteria

- Source person with asymptomatic HIV infection
- Low viral load
- Patient under HAART without treatment failure

## Clinical assessment to determine necessity of PEP when infection status or source person is unknown

- If the source person is not known, consider the infection risk high.
- If the source person refuses a test, it should be assumed that the source is positive.

### High-risk criteria

- Source person with symptoms suggestive of HIV infection
- Source person belongs to high risk group for HIV infection: including IV drug users and sex workers

### Low-risk criteria

- Clinical examination does not establish HIV/AIDS-related symptoms
- Source person's history does not include risk factors for HIV or primary HIV infection

# Risk Factors for HIV Infection

Increased risk for HIV infection is associated with exposure to a larger quantity of the source person's blood by:

- A device (e.g. needle) visibly contaminated with the patient's blood
- A procedure involving a needle being placed directly in a vein or artery
- A deep injury



## PEP regimens according to level of risk

Risk Category	ARV Regimen	Drug Regimen
Low Risk	Dual therapy (2 drugs)	Zidovudine (ZDV) + Lamivudine (3TC)
High Risk	Triple therapy (3 drugs)	ZDV + 3TC + Efavirenz (EFV) (or replace Efavirenz with Rotanovir/Lopinavir (LPV))

# Timing and Duration of PEP for HIV

- PEP should be initiated as soon as possible, preferably within 2 hours of exposure, and not after 72 hours.
- PEP should be implemented for 4 weeks without interruption.
- An HIV test and evaluation should be done at the time of exposure, and again at 6 weeks, 12 weeks and 6 months.
- PEP should be discontinued if the source is determined to be HIV negative, or if the person exposed is HIV positive.

# Assessment and management of HIV-exposed health workers

Source Person	Health Worker	Health Worker Management
HIV positive	HIV negative	PEP for 28 days, then monitoring for 6 months
HIV positive	HIV positive	Stop PEP and refer to CTC
Refuses testing/assumed positive	HIV negative	PEP for 28 days, then monitoring for 6 months
HIV negative	HIV negative	No PEP



# HBV Exposure

# Preventing HBV infection

- The risk of acquiring HBV is far greater than that of HIV and HCV
- Immunization against HBV must be routinely provided to health workers who perform tasks involving contact with blood or OPIM
- Recommended standard course for HBV immunization
  - First dose: stat
  - Second dose: one month later
  - Third dose: 6 months after first dose

# Immunization against HBV

- There is no danger in vaccinating a person already infected with HBV
- Pre-vaccination serologic screening for previous infection with HBV is not necessary or cost-effective
- Antibodies to HBV must be measured 2-6 months after the last dose



Photo by BMC Staff

# Management of occupational exposure to HBV

In case of exposure to HBV, prophylaxis is indicated for susceptible health workers—those who have a negative HBV surface antigens and no history of receiving immune serum globulin

Source person	Health Worker	Health Worker Management
HBV positive	Previously vaccinated	Give booster dose of HBV vaccine
HBV positive	Not vaccinated	Start 3 dose vaccination course

# Steps for managing exposure to HBV

1. Assess risk of HBV exposure
  - Determine status of the source and exposed worker
  - Obtain consent and collect a specimen from the source person to determine if there is an active HBV virus
  - If testing is not possible, base determination on source history: jaundice, any strain of hepatitis, previous immunization status
2. Administer 5ml hyper immune serum globulin (HBIg) by intramuscular injection as soon as possible, but within 7 days of exposure
3. Administer first dose of HBV vaccine, and continue with standard immunization course
  - If first dose of HBV vaccine is not available, repeat HBIg one month from the first dose
  - In occupational settings, efficacy is increased by combining HBIg with the vaccine.



# HCV Exposure

# Managing health worker exposure to HCV

- There is no vaccine or PEP for hepatitis C—prevention of exposure is the only effective strategy against HCV infection
- Following exposure to blood or other body fluids, the source person should be tested for HCV (with consent)
- Counseling:
  - Exposed person should refrain from donating blood, plasma, organs, tissues, or semen
  - Although sexual transmission risk for HCV is low, a barrier method of contraception (e.g. condom) is recommended until 6 months after exposure (when infection status is determined)
  - There are currently no recommendations to make changes in breast feeding, pregnancy or professional activities

# PEP Challenges

- Delayed reporting of exposure
- Unknown exposure source
- Toxicity of the initial PEP regimen
- Resistance of the source virus to antiretroviral agents



# Toxicity and Drug Interactions of Antiretroviral agents

# PEP toxicity and drug interactions

- Side-effects are associated with all anti-retroviral agents
- The most common PEP side effects are:
  - Nausea
  - Malaise and fatigue
- As a result of toxicity and side-effects, a substantial proportion of health workers do not complete the full four-week course
- The toxicity profile of these agents, including the frequency, severity, duration, and reversibility of side effects, is an important consideration in selecting an HIV PEP regimen



**Thank You**

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